# VFC Index - Watershed (Plan)

**Program:** Watershed

**IDEM Document Type:** Plan

**Document Date:** 9/11/2003

**Security Group:** Public

**Project Name:** Highland-Pigeon WMP

**Plan Type:** Watershed Management Plan

**HUC Code:** 05140202 Highland-Pigeon

**Sponsor:** Four Rivers RC&D

**Contract #:** 00-86

**County:** Vanderburgh

**Cross Reference ID:** 22628305; 22628303

**Comments:** Gibson, Pike, Warrick, Posey

## Additional WMP Information

**Checklist:** 2003 Checklist

**Grant type:** 319

**Fiscal Year:** 2000

**IDEM Approval Date:** 9/11/2003

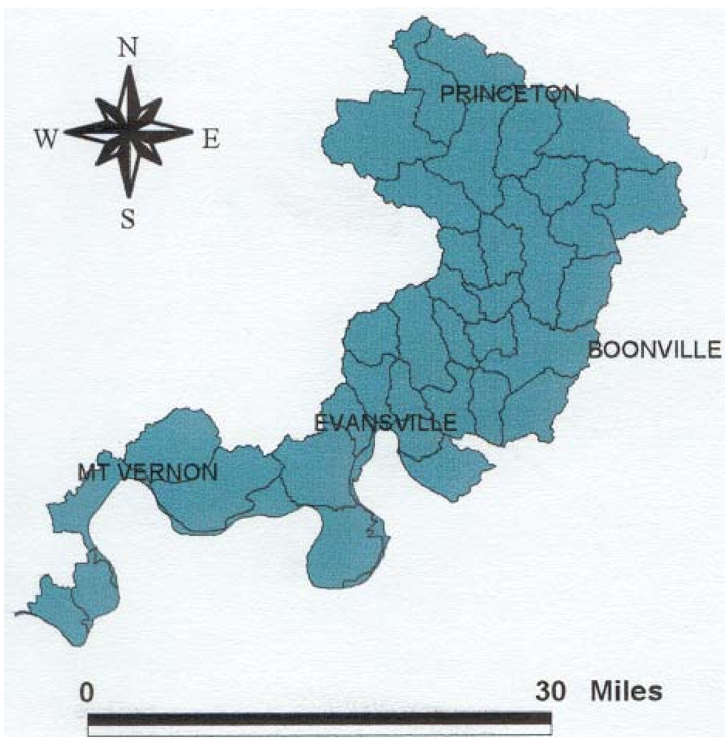
**EPA Approval Date:**

**Project Manager:** Amy Henninger

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**Prepared for Indiana Dept. of Environmental Management by**
**Pigeon-Highland Watershed Steering Committee and**
**Four Rivers Resource Conservation & Development Area, Inc.**
**June 2003**

## Executive Summary

Highland-Pigeon Watershed drains nearly 300,000 acres of southwestern Indiana to the Ohio River. Since settlement by Europeans, the landscape of the watershed has been altered dramatically. Over the decades, settler activities have changed the dynamic equilibrium of the streams and their upslope systems. The cumulative effect of these watershed changes on the aquatic ecosystem has been degradation of water quality, loss of floodplain storage, diminished wildlife populations, and decreased aesthetic and recreational values. This Watershed Management Plan was written to evaluate the severity of these changes and to recommend implementation of best management practices, engineering studies, and educational opportunities to improve water quality in Highland-Pigeon watershed.

Major nonpoint sources of pollutants to the watershed are row crop agriculture, mined lands, and urban runoff. Cropland area in the watershed has been reasonably constant since 1997. Watershed wide, conservation tillage systems were used on 25% of cropland in 1997, 16% of cropland in 1998, and 33% of cropland in 2000. Data on the conservation tillage in the watersheds are insufficient to statistically demonstrate trends. In the year 2000, the Warrick County portion of the plan area had the highest rate of conservation tillage adoption, with 51% of its cropland in some type of conservation tillage.

While all 37 subwatersheds are impaired for aquatic life support to some degree, among the more healthy subwatersheds, and those most warranting protection against degradation, include principally Smith Fork (subwatersheds 20 and 21), Little Pigeon Creek (subwatershed 12) and Big Creek (subwatersheds 17, 18 and 19).

There are also extensive bottomland wetlands along Pigeon Creek and the Ohio River(subwatersheds 15,19,21 and 33) that remain. We recommend these be studied for enhanced legal protection, perhaps in association with an overall corridor initiative for the watershed.

### RESTORATION OF STREAM CORRIDOR

According to IDEM's surface water assessment methodology, all streams in the watershed are impaired for support of aquatic life due to physical habitat degradation. No site met the IDEM's QHEI score to be considered fully supportive of aquatic life and therefore should be considered a candidate for 303(d) listing and TMDL development.

This is the effect of nearly two centuries of single-purpose water resource management for improved agricultural drainage and construction of the Wabash and Erie Canal.
To address historic stream degradation and soil erosion, we recommend extensive new investments in agricultural BMPs. Stream corridor restoration is required to improve connectivity and width of the riparian corridor; such an investment will benefit nutrient and water flow, sediment trapping during floods, water storage, wildlife migration, floral dispersal, biodiversity, and sustainability (NRCS 1998).

We have recommended stream corridor restoration efforts in nearly all subwatersheds in the Pigeon Creek watershed. This restoration is a complex endeavor that begins with the recognition that human-induced changes have damaged the structure and function of the ecosystem and prevent the recovery of the watershed to a sustainable condition. These human-induced changes include:

- Creation of the Wabash and Erie Canal
- Channelization of first and second order streams to facilitate agricultural drainage
- Draining of wetlands
- Dredging, clearing and snagging of Pigeon Creek to reduce flooding
- Increased watershed imperviousness

• Mineral extraction and massive landscape alteration
• Loss and/or alteration of vegetative cover across the watershed
• Addition of nutrients and other pollutants to the streams

The Pigeon-Highland Watershed Steering Committee, or similar stakeholder galvanizing group, will be required to drive the social, political and financial requirements of a whole-scale corridor restoration program. EWSU and EMC are currently forming a CSO Stakeholder Advisory Committee that may also present opportunities for public education and involvement.

Part of stream corridor restoration that should be supported immediately is conservation buffers in agricultural and urban areas. Besides reducing sediment, nutrients and pesticides in runoff water, conservation buffers can greatly increase wildlife habitat.

The USDA's Conservation Reserve Program (CRP) is an excellent opportunity for establishing conservation buffers in agricultural areas. Costs for installation of conservation buffers ranges widely, as expected given the broad variety of buffer types. The CRP shares in the cost of installation of conservation buffers and provides for long-term contracts for the setting aside of eligible lands.

## HIGHLY ERODIBLE LANDS

According to our land use map, soils map, and sediment loss models, subwatersheds 6, 18, 20, 22, 23, 24, 25 and 26 are the priority areas for investing in soil erosion controls. These subwatersheds contain Fairpoint and Alford soils that appear to be tilled. In any case, tillage of the Fairpoint or Alford soil associations will result in very high soil loss rates and special efforts to mitigate these areas will reap significant benefits.

Conservation tillage in 2000 was practiced on approximately one-third of all cropland, being highest (51% of cropland) in Warrick County. In 2000 in Gibson County, farmers practiced conservation tillage on about 25% of croplands. There are large areas of highly erodible Alford soils in Gibson County (Figure 7) that warrant conservation tillage (or CRP set aside).

## POINT SOURCE CONTROLS

We examined the available performance records of public and private wastewater treatment plants (WWTP) in the watershed. We also monitored the EWSU's combined sewer system tributary to Pigeon Creek and examined available operational records. Recommendations are presented below.

We have data that examines point sources of pollution throughout the watershed. Permitted point sources include EWSU's eight CSO discharges to lower Pigeon Creek, five industrial discharges, and six municipal wastewater treatment plants (WWTP). The CSOs are addressed below under the context of the SRCER. The five industrial discharges appear to be minor contributors of pollutants to Pigeon Creek, with generally good compliance records. In general, the municipal WWTPs in the watershed do not have acceptable performance records and require expansion, upgrading, and/or additional operator training. Three municipal WWTPs have been upgraded, but more should be studied for possible upgrade or expansion.

• The Chandler WWTP has a history of poor compliance, but has been upgraded, so pollutant discharges from this point source may be reduced in the future.
• The Haubstadt WWTP also had a history of poor compliance. We verified this with our sampling program. This WWTP has been upgraded-since the data was collected- to reduce wet weather overflows and improve effluent quality.
• The Fort Branch WWTP also has noncompliance reports to its records. We measured high coliform bacteria concentrations, high nitrates, and supersaturated dissolved oxygen conditions downstream of this facility. No plans for expansion or upgrade have been made- but it has been discussed for several years.

• The Elberfeld WWTP has numerous noncompliance reports in the EPA's Permit Compliance System database. It is currently being expanded.

## COMBINED SEWER OVERFLOWS

We monitored wet weather CSO discharges for eight months. From the water quality data, the waterway is most affected by the discharges of *E. coli* bacteria. That water quality standard is regularly exceeded during wet weather both within and upstream of the CSO discharge area. The inflow/infiltration monitoring program should be expanded in the CSS. Since more overflows appear to occur in areas with high concentrations of commercial/industrial customers it is recommended that inspection of all commercial and industrial structures be undertaken to identify any additional sources of inflow and infiltration to the sewer system. Efforts should be made to disconnect such direct sources of inflow as far as possible.
Existing flow monitoring efforts should be greatly expanded in order to confirm the capacities of major sanitary sewers and to verify the results of the capacity analyses conducted earlier.

In view of the fact that overflows continue to be significant and are perhaps causing deterioration of Pigeon Creek, Evansville should continue to investigate the feasibility of providing in-line storage in 11 sub-systems and detention/ retention basins at various sites. A gate control system, which would control the non-automated CSOs to Pigeon Creek and the Ohio River, would allow the storage of combined sewerage in the interceptors tributary to the diversions. This gate control system could provide about 154,5000 cubic feet (11.6 MG) of storage. To obtain the maximum storage, available, additional weirs, gates, etc. may be necessary. A study to investigate the feasibility of such a system and the condition of the sewers at the storage sites (to avoid damage from surcharging) is warranted and should be implemented.

Evaluation of a runoff control program to store and control runoff before it enters the combined system is also recommended. The feasibility and effectiveness of this alternative requires development of a system model, scheduled for completion as part of the long-term CSO control plan LTCP.

Elements of the LTCP are (USEPA 1995):

1. Characterization, monitoring and modeling activities for selecting and designing effective CSO controls
2. Public participation programming to involve stakeholders in decision-making for long-term controls
3. Consideration of sensitive areas as the highest priority for controlling overflows
4. Evaluation of alternatives to select controls that meet the Clean Water Act requirements
5. Cost and performance considerations
6. Operational plan revisions to include the selected long-term control measures
7. Maximization of treatment at the existing treatment plants for wet weather flows
8. An implementation schedule
9. A post-construction compliance monitoring program

The watershed management plan for Highland-Pigeon watershed has been prepared by watershed coordinator Rick Obenshain, an employee of Four Rivers Resource Conservation & Development Area, Inc., with assistance from: Amy Steeples and Gary Seibert- Resource Specialists with Indiana Dept. of Natural Resources, Div. Of Soil Conservation; Dennis Angel, Posey Co. SWCD chairman, PHWSC chairman; Ethel Osborn, Gibson Co. SWCD Coordinator; and Jane Bruce, Warrick Co. SWCD Coordinator.  Members of the ad hoc Watershed Management Plan committee include those people listed above, and: Darrell Rice, NRCS District Conservationist for Vanderburgh Co.; Norma Duckworth, SWCD Water Quality Specialist for

Vanderburgh Co.; and Jeri Ziliak, Posey Co. SWCD Coordinator. Geographic Information System (GIS) files and assistance were provided by Larry Hazelwood, SW Indiana Brine Coalition.

The members of the Pigeon-Highland Watershed Steering Committee are: Greg Obert and Travis Nolcox, Gibson Co.; Mike Watson and Gerry Howard, Warrick Co.; Dave Ellison, Tom Niksch and Joy Fitzgerald, Vanderburgh Co.; Dennis Angel and Jim Droege, Posey Co. Administrator of IDEM's Section 319 grants for the watershed was Dave Elgin, Coordinator of Four Rivers RC&D Area, Inc.

The information, data and recommendations found within this document draw heavily from "Pigeon Creek Watershed Diagnostic Study" written by Harza Engineering Company, October, 2000, commissioned by Evansville Water & Sewer Utility(EWSU) and Four Rivers RC&D Area, Inc., and paid for by EWSU and grants from In. Dept. of Environmental Management and In. Dept. of Natural Resources Lake & River Enhancement.

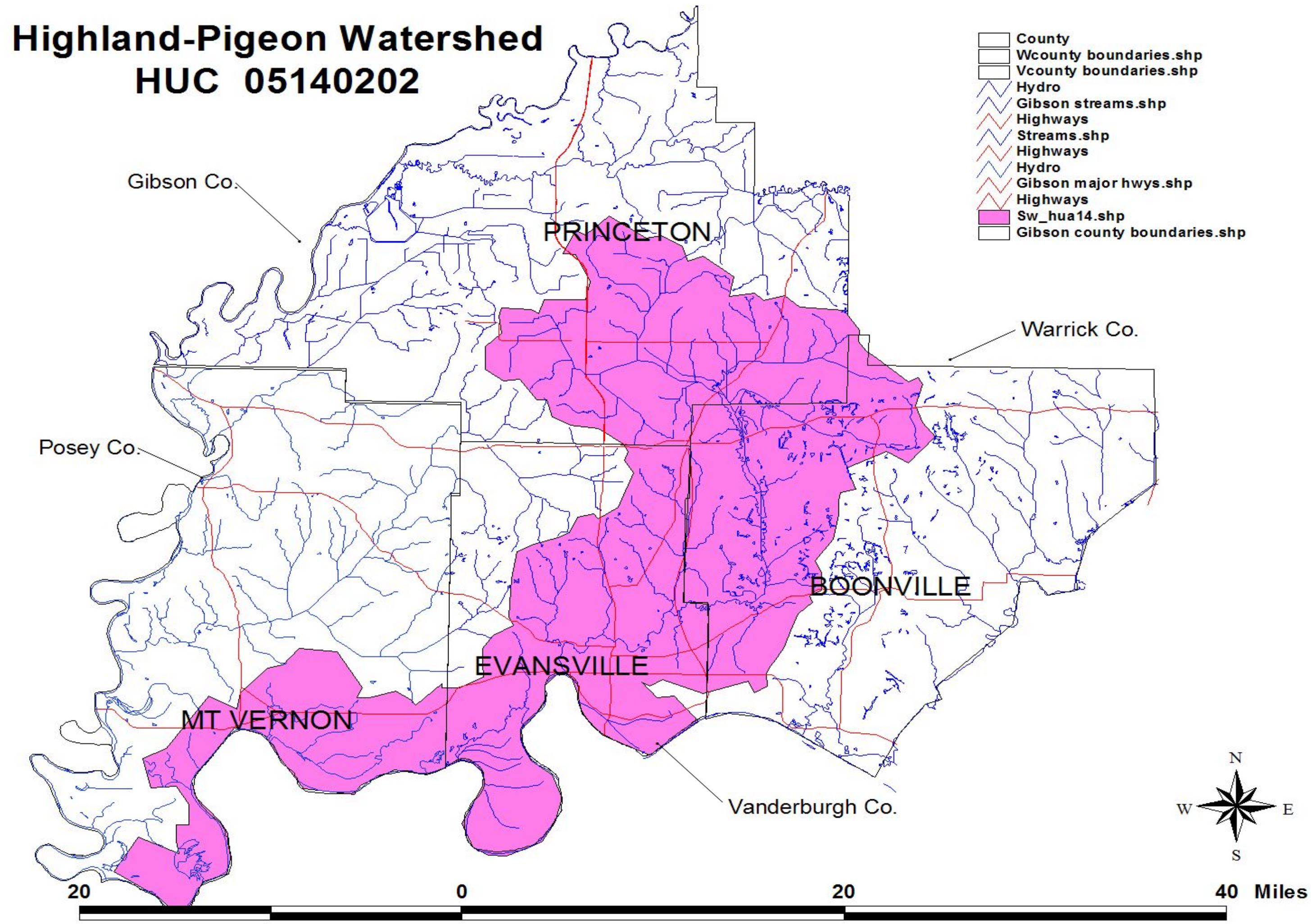



**Figure 1: Highland – Pigeon watershed**

# A Watershed Management Plan for Highland-Pigeon Watershed


1. Introducing the Project
2. Describing the Watershed
3. Establishing Benchmarks
4. Identifying Problem Causes & Stressors
5. Identifying Sources
6. Identifying Critical Areas
7. Setting Goals and Selecting Indicators
8. Choosing Measures to Apply
9. Calculating Load Reductions
10. Implementing the Measures
11. Monitoring Indicators
12. Evaluating and Adapting the Plan


**Appendices:**


A: Data from Harza Diagnostic Study of Pigeon Creek and IDEM Assessment Branch

B: Data from Pigeon-Highland Watershed Steering Committee for Pigeon Creek basin and Carpentier Creek

C: Summary of Combined Sewer Overflow Effects

D: Data from Harza Diagnostic Study and PHWSC for McFadden Creek

E: Data from SOLE and IDEM Assessment Branch for Bayou Creek

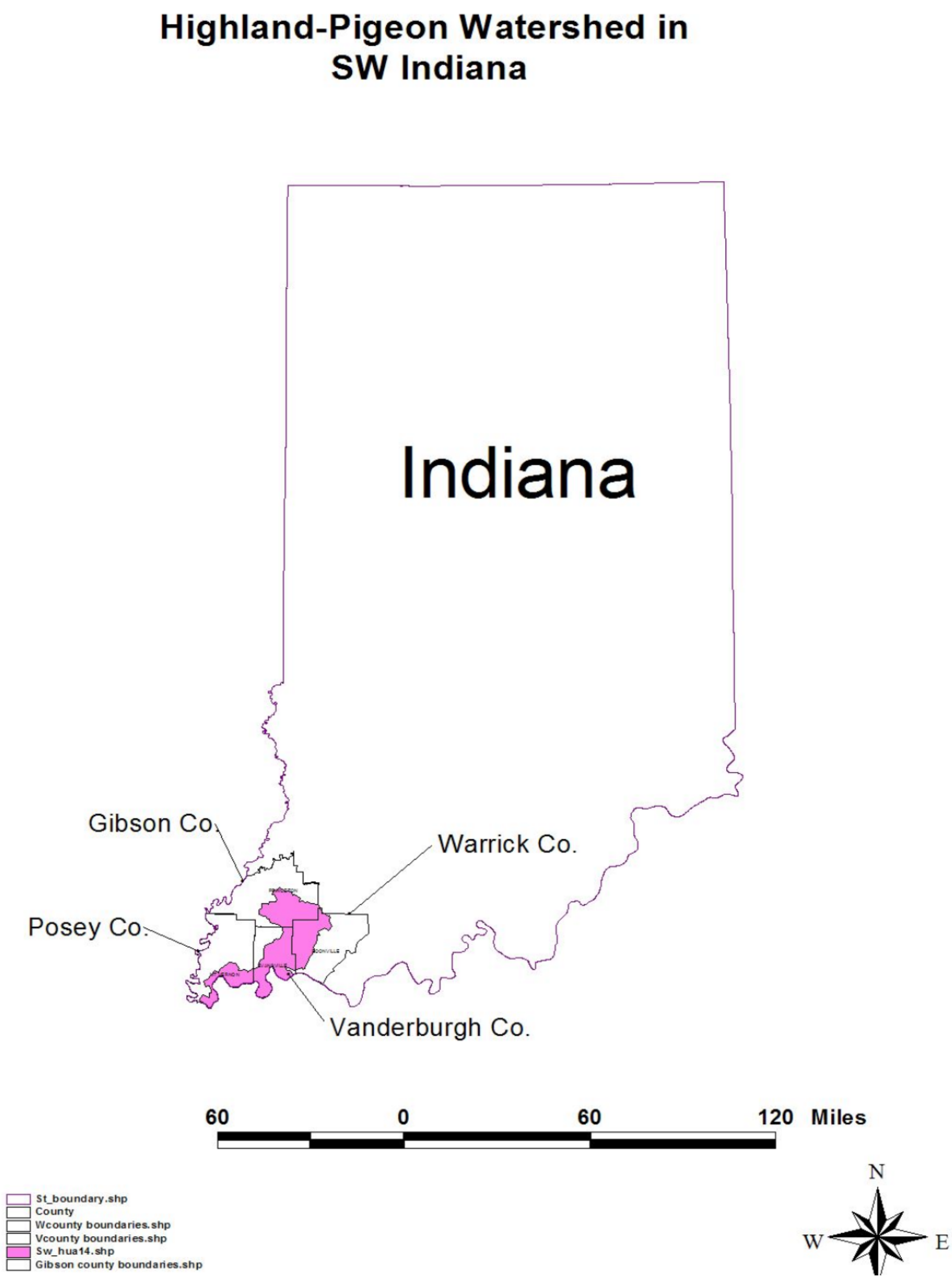
F: Goals and Timeline

G: Past Conservation Efforts in the Watershed

## 1. Introducing the Project: Describe the process the community went through when developing the plan, list the parties involved, and summarize any important issues that influenced how the plan emerged.

- Highland-Pigeon watershed, HUC 05140202, is located in SW Indiana and NW Kentucky, and contributes flow to the Ohio River (see map, Figure 1). For the purposes of planning at a state level, the watershed management plan only considers the portion of the watershed in Indiana. This area of the watershed encompasses approximately 400 square miles in four counties of SW Indiana: Gibson, Warrick, Vanderburgh and Posey (see map, Figure 2). The major land use is agriculture, but there are significant areas of urban, mining and wetlands.
- This watershed management plan was developed in response to a request from the Indiana Conservation Partnership members in SW Indiana: USDA-NRCS, IDNR-Div. Of Soil Conservation, county Soil & Water Conservation Districts and citizen stakeholders. The overall responsibility for the plan belongs to the Pigeon-Highland Watershed Steering Committee (PHWSC). PHWSC's mission statement reads: "Our mission is to coordinate efforts to improve the natural resources of Pigeon-Highland Watershed for present and future generations." The original "Citizens for the Improvement of Pigeon Creek" committee was formed in 1994, and helped develop the "Watershed workplan designed for Pigeon Creek", published in 1997. This plan was limited in use because: it only covered the Pigeon Creek watershed; recommendations for action were too generalized; there was not enough scientific data to base more detailed planning upon; and six years after publication, it is out of date in many sections.
- Concerns about water quality in the watershed were voiced by stakeholders at public meetings, conversations at the SWCD offices and at other community meetings. Sedimentation from soil erosion- and related problems- was the most commonly-expressed concern. Other concerns included: need for education; flooding, loss of habitat-trees, malfunctioning septic systems, illegal dumping of solid waste; destruction of wetlands, failure of developers to design and follow erosion control plans; and safety of water for recreation- especially for children.
- Decisions regarding the watershed management plan were made by the PHWSC with advice from the watershed restoration coordinator, NRCS, IDNR and SWCD staff.
- Partners in developing the actual plan included: USDA-NRCS District Conservationist Darrell Rice; Gibson Co. SWCD office coordinator Ethel Osborn, and Warrick Co. SWCD office coordinator Jane Bruce, who put together the raw data Appendices; Posey Co. SWCD and PHWSC chairman Dennis Angel, who co-wrote Section 2 with IDNR Resource Specialist Gary Seibert; PHWSC watershed restoration coordinator Rick Obenshain, who was responsible for facilitation of planning meetings, record keeping, document retention, preparation of maps, wrote Sections 1,7-12and co-wrote Section 3 with IDNR Resource Specialist Amy Steeples; and Vanderburgh Co. SWCD water quality specialist Norma Duckworth, who assisted with overall planning.
- The major community groups (stakeholders) engaged in the planning process included: agricultural landowners, through the local SWCD's; and urban citizens, through the Greenway Passage Committee and the Westside Improvement Association. These groups were involved because, despite their obvious differences, i.e. urban vs. rural, they discovered that they had some common goals- taking responsibility for making the streams of Pigeon-Highland watershed healthier.

*Figure 2: location of watershed relative to state*



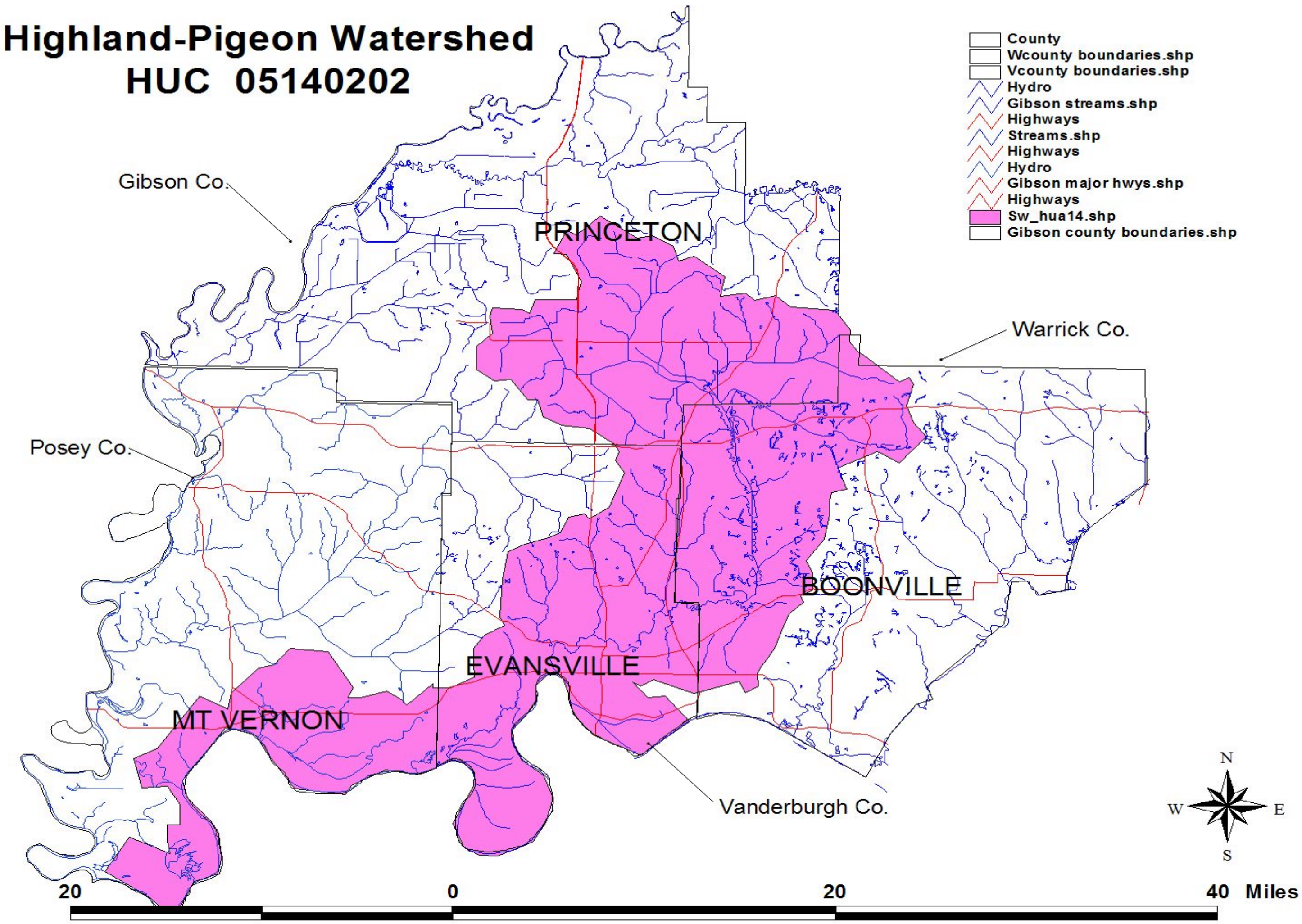



**Figure 3: Location of Highland - Pigeon watershed within SW Indiana**

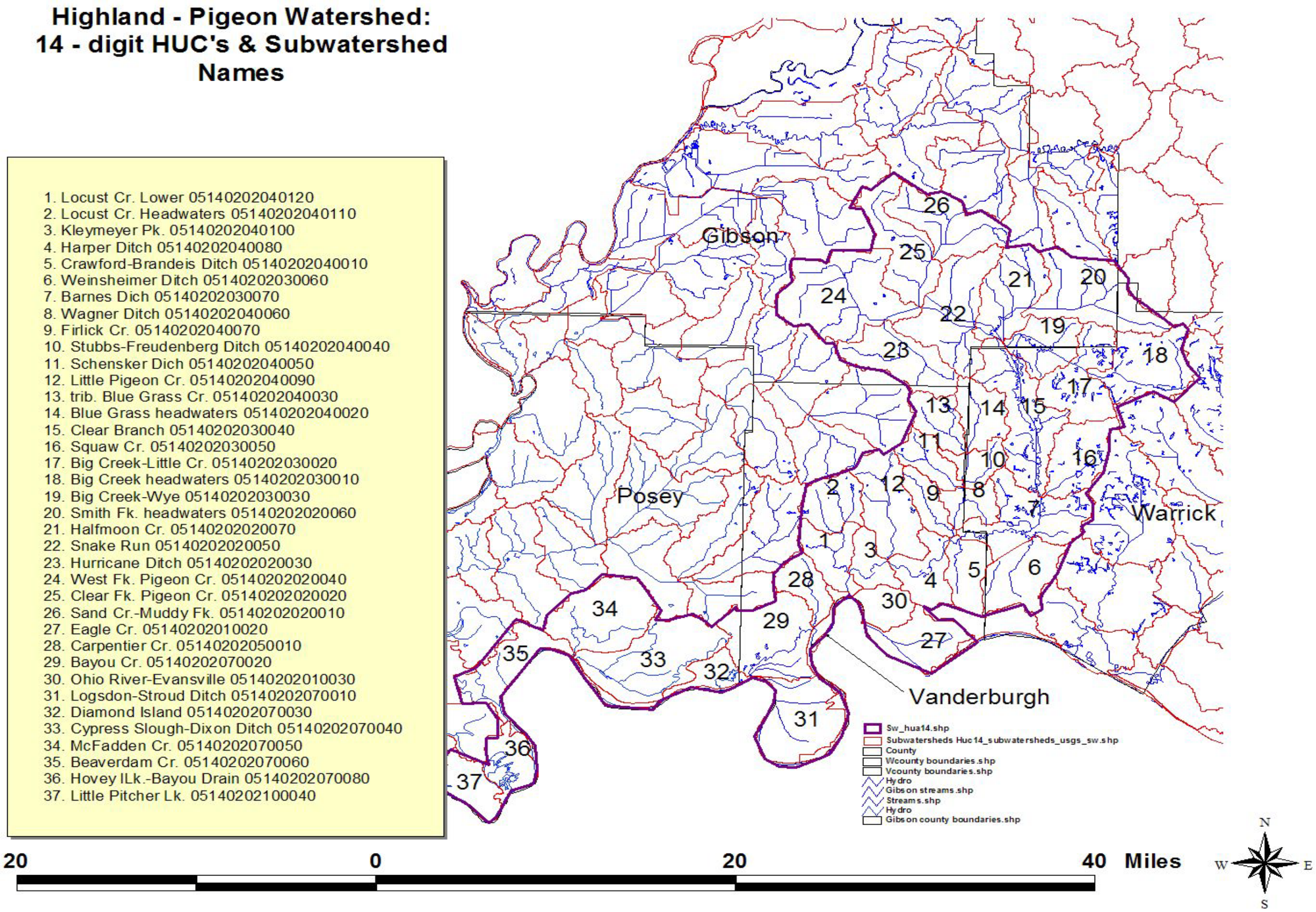



**Figure 4: 14-digit subwatersheds**

2. **Describing the Watershed:** Describe features of the watershed, including land use, soil types, topographic features, hydrology, and any other information needed to understand the plan.

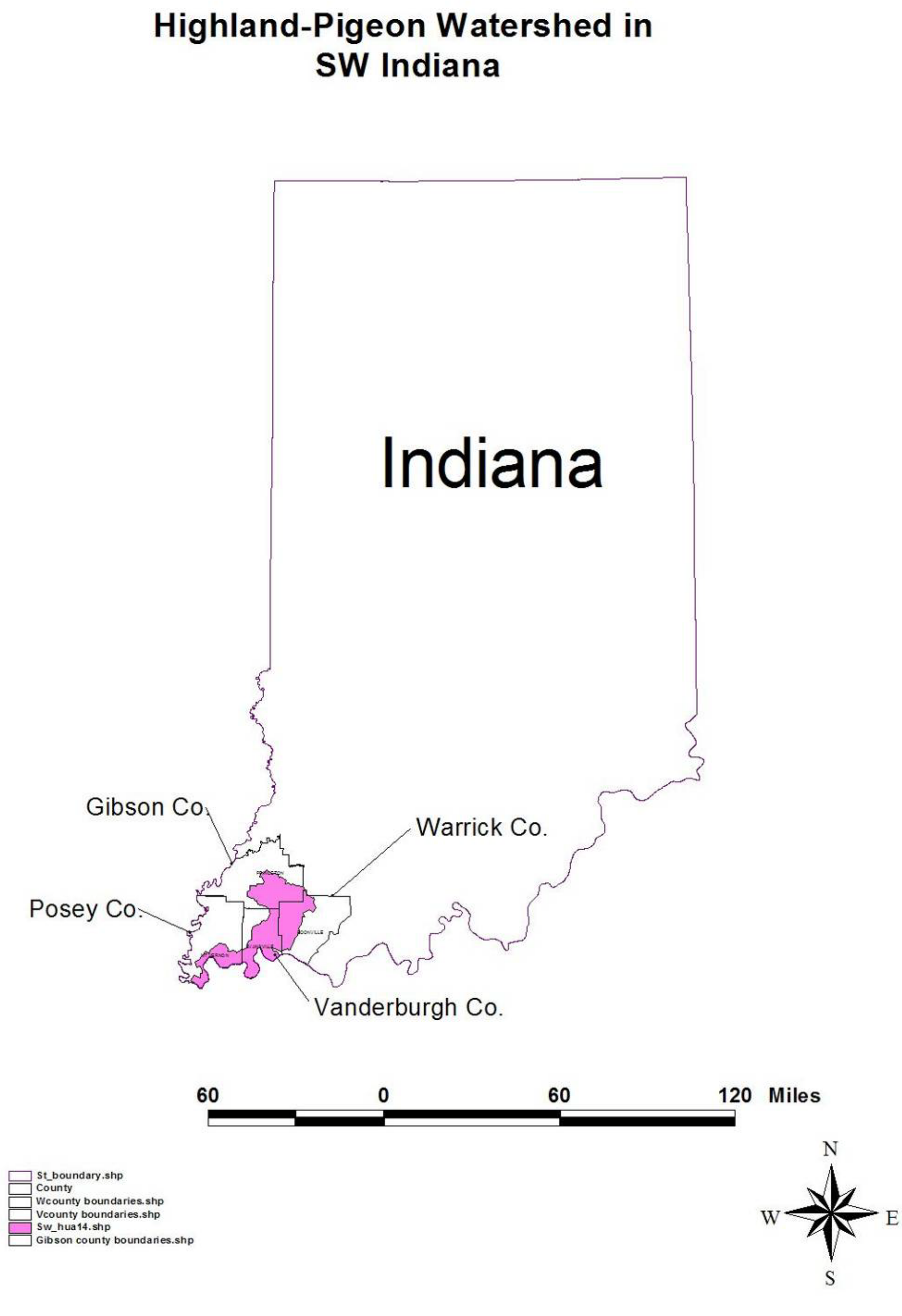



**Figure 5: Location of watershed**

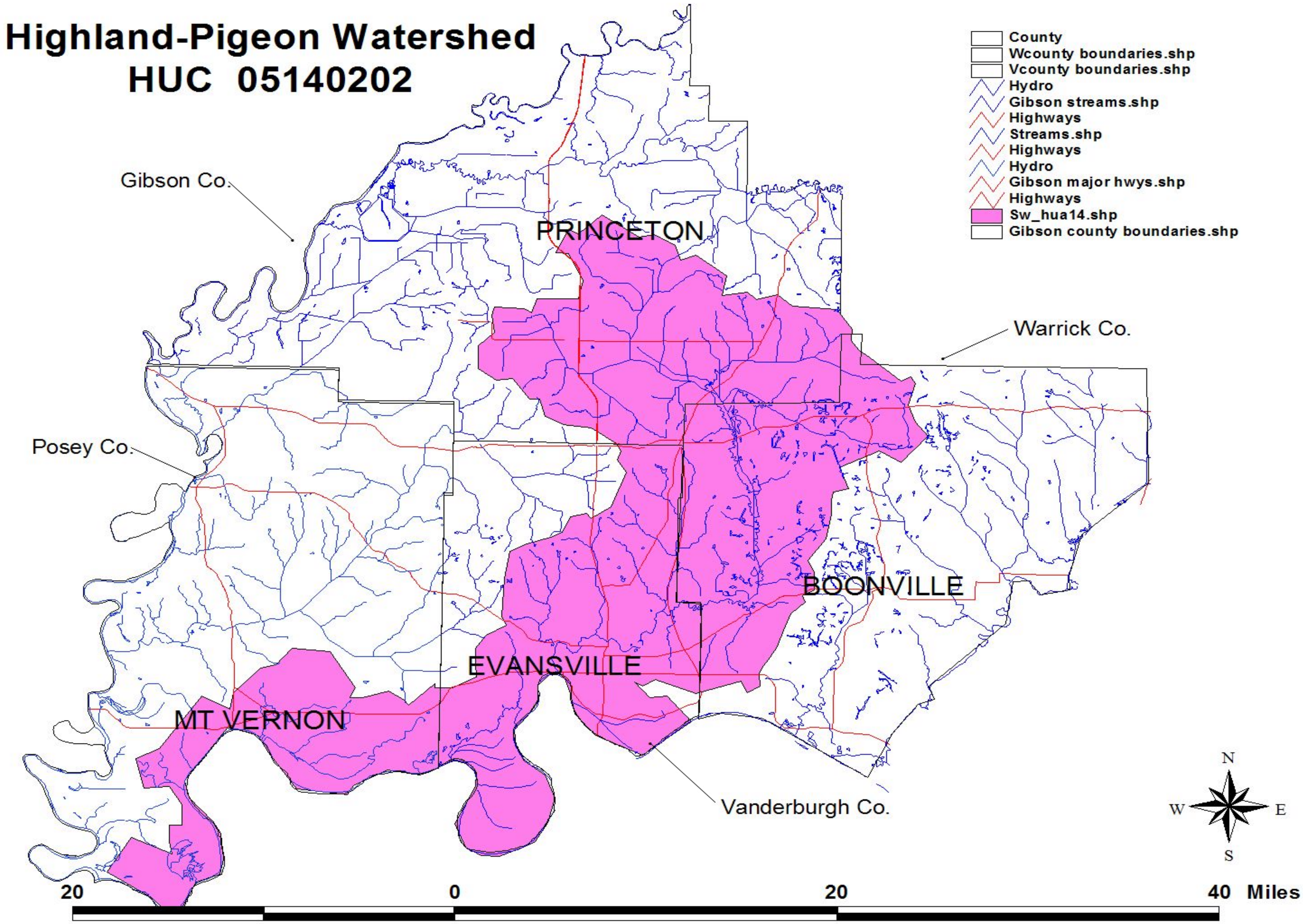



**Figure 6: Location of watershed within SW Indiana**

**Physical description:**

- **Geologic setting**

The study area is in unglaciated terrain of the Wabash Lowland Region. The watershed is nearly entirely underlain by the McLeansboro Group Patoka and Shelburn bedrock formations of Pennsylvanian age. The outcrop belt of the McLeansboro Group extends from western Warrick County northward to southwestern Vermillion County. The maximum thickness of 770 feet (235 m) is reached in the Mumford Hills in northern Posey County. Shale and sandstone make up more than 90 percent of this sequence, but minor amounts of siltstone, limestone, clay, and coal are present (Wier 1961, 1965).

- **Climate**

While Indiana has warm summers and cold winters, temperatures fluctuates both daily and seasonally as surges of polar air move southward or tropical air masses move northward. Temperature fluctuations are more common in winter than in summer. Severe storms and tornadoes are more frequent in the spring months. Temperature and precipitation data for the area are presented below. Spring is generally the wettest season in southwestern Indiana. The length of the growing season ranges from 166 to 233 days.

- **Natural History**

- Pigeon Creek enters the Ohio River at mile point 792.9 after draining 375 square miles of southwestern Indiana. The drainages of both Pigeon Creek and McFadden Creek are largely rural, and contain a variety of land uses and cover types. Land use/land cover types in the watershed include forests, water and wetlands, prairies, residential and commercial urban areas, industrial and rural areas, active and reclaimed mined lands, and agriculture. These habitats provide for an abundant and diverse fauna. Principal crops include wheat, corn and soybeans. Large tracts of coal mined lands are on the eastern sides of the watershed, in Warrick and Gibson Counties. There are also oilfields in parts of Gibson County and Posey County.

Table 1

**WATERSHED CLIMATE DATA (1961-1990) TAKEN AT EVANSVILLE AIRPORT**
**(Source: Midwestern Regional Climate Center, Champaign, IL)**

| | Temperatures | | | Precipitation | | |
|---|---|---|---|---|---|---|
| Month | Maximum | Minimum | Mean | Mean | High | Low |
| January | 38.9 | 21.2 | 30.1 | 2.66 | 14.78 | 0.51 |
| February | 43.7 | 25 | 34.4 | 3.12 | 7.26 | 0.27 |
| March | 55.9 | 35.7 | 45.8 | 4.71 | 12.84 | 0.01 |
| April | 67.4 | 45 | 56.2 | 4.02 | 11.83 | 0.4 |
| May | 76.9 | 54.2 | 65.5 | 4.75 | 13.51 | 0.59 |
| June | 86.2 | 63.3 | 74.8 | 3.49 | 11.44 | 0.38 |
| July | 89.1 | 67.5 | 78.4 | 4.04 | 10.32 | 0.18 |
| August | 87.2 | 64.9 | 76.1 | 3.11 | 8.43 | 0.13 |
| September | 80.7 | 57.6 | 69.2 | 2.97 | 9.89 | 0.25 |
| October | 69.6 | 44.7 | 57.2 | 2.87 | 11.19 | 0.01 |
| November | 55.9 | 36.5 | 46.2 | 3.73 | 9.24 | 0.2 |
| December | 43.6 | 26.7 | 35.2 | 3.67 | 8.23 | 0.56 |
| Annum | 66.3 | 45.2 | 55.8 | 43.14 | 64 | 25.55 |

- Stream habitat in the mainstem is generally poor. This poor habitat is attributable to channelization for agricultural development and navigation. In 1853 the Wabash and Erie Canal extension was completed through Evansville, forming, at that time, the longest man-made waterway in the Western Hemisphere. The Wabash and Erie Canal crosses the watershed boundary at Francisco. In 1860, after only a few years of use, the southern part of the canal was abandoned, leaving Pigeon Creek without much of its natural meanders, pools or riffles.

- Today, Pigeon Creek is deemed by the Natural Resources Commission to be a navigable waterway from its mouth at the Ohio River upstream 15.8 river miles. Locust Creek, which enters Pigeon Creek one-half mile downstream of the Illinois Central Gulf Railroad Bridge, is also a navigable waterway for its first 1.5 miles. Portions of Little Pigeon Creek, Clear Creek and Baker Creek are also considered navigable waterways.

- Prior to settlement by European immigrants, much of the study area was wetland. Today, there are very few wetlands. There are 14,216 wetland acres in the watershed or about 6%. Table 2 shows acreage of wetlands in each subwatershed of the study area. Forested wetland is the dominant wetland type remaining in the Pigeon Creek watershed.

Table 2: wetlands

**WETLANDS (acres) IN THE STUDY AREA**
**(Source: Indiana GAP Project)**

| | Subwatershed | Wetland Forest | Wetland Woodland | Wetland Shrubland | Wetland Herbaceous | Wetland Sparsely Vegetated | Water | Percent |
|---|---|---|---|---|---|---|---|---|
| 1 | Pigeon - Locust Creek Lower | 253 | 11 | 26 | 29 | 61 | 50 | 7% |
| 2 | Locust Cr Headwater | 62 | 18 | 15 | 0 | 4.2 | 86 | 2.8% |
| 3 | Pigeon - Kleymeyer Park | 162 | 9.8 | 20.9 | 3.5 | 19 | 19 | 5.6% |
| 4 | Harper Ditch | 454 | 0 | 0 | 14 | 17.6 | 73 | 8.5% |
| 5 | Pigeon - Crawford Brandeis | 117 | 0 | 2.5 | 0 | 0 | 61 | 3.1% |
| 6 | Weinsheimer Ditch | 104 | 0 | 0 | 39 | 10.3 | 24 | 2.0% |
| 7 | Pigeon - Barnes Ditch | 1,586 | 3.3 | 140 | 139 | 83 | 452 | 18.2% |
| 8 | Blue Grass Cr – D Wagner | 125 | 0 | 0 | 2.8 | 0 | 106 | 5.5% |
| 9 | Firlick Ditch | 138 | 0 | 0 | 4.5 | 0 | 15 | 3.8% |
| 10 | Stubbs Fruedenberg Ditch | 115 | 0 | 0 | 27 | 8.0 | 27 | 4.5% |
| 11 | Schlensker Ditch | 89 | 0 | 0 | 0 | 11.6 | 23 | 2.7% |
| 12 | Little Pigeon Creek | 265 | 7.5 | 26 | 15 | 0 | 108 | 3.8% |
| 13 | Unnamd Trib to Blue Grass Cr | 87 | 0 | 0 | 19 | 15.7 | 94 | 4.1% |
| 14 | Blue Grass Cr Headwaters | 166 | 0 | 8.0 | 7.3 | 7.4 | 34 | 3.6% |
| 15 | Clear Branch | 2,527 | 18 | 404 | 113 | 171 | 474 | 25% |
| 16 | Squaw Creek | 529 | 3.2 | 79 | 92 | 141 | 355 | 14% |
| 17 | Big Creek - Little Creek | 461 | 0 | 53 | 100 | 48 | 615 | 12% |
| 18 | Big Creek Headwaters | 792 | 4.7 | 84 | 121 | 101 | 439 | 13% |
| 19 | Big Creek - Wye | 1,056 | 3.7 | 191 | 50 | 52 | 31 | 19% |
| 20 | Smith Fork Headwaters | 194 | 0 | 0 | 22 | 44 | 125 | 2.6% |
| 21 | Smith Fork - Halfmoon Creek | 1,001 | 0 | 168 | 73 | 17.8 | 72 | 12.5% |
| 22 | Snake Run | 448 | 0 | 1.7 | 10 | 4.5 | 6.9 | 3.3% |
| 23 | Hurricane Ditch Creek | 102 | 3.1 | 0 | 3.0 | 0 | 20 | 1.2% |
| 24 | West Fork Creek | 67 | 5.7 | 5.5 | 3.5 | 0 | 30 | 0.6% |
| 25 | Clear Fork Ditch | 169 | 0 | 15 | 21 | 0 | 4.9 | 1.8% |
| 26 | Sand Cr - Muddy Fork Ditch | 80 | 0 | 3.7 | 10.0 | 0 | 1.4 | 0.8% |
| | TOTAL | 11,149 | 88 | 1,243 | 920 | 816 | 3,347 | 7.5% |

- **Endangered Species**

The threatened and endangered species are protected under the Endangered Species Act (16 USC 1531 et seq.) of 1973. The goal of the act is to provide a means whereby the ecosystems upon which endangered and threatened species depend may be conserved and to restore all listed species to the point where their numbers make them viable self-sustaining members of their ecological communities.

We contacted the DNR Division of Nature Preserves with a request for information on the presence of threatened of endangered species and high quality natural communities within the study area. Table 3 lists the threatened and endangered species for the Pigeon Creek watershed by county.

The Division of Nature Preserves also provided data on natural areas and communities in the watershed. These are listed below. These data do not include the recently opened 2,500-acre Blue Grass Fish and Wildlife Area near Elberfeld.

Table 3: endangered species

**THREATENED AND ENDANGERED SPECIES IN THE STUDY AREA**

| Type | Species | Common Name | Fed Status | State Status | County |
|---|---|---|---|---|---|
| Amphibian | *Cryptobranchus alleganiensis alleganiensis* | hellbender | ** | SE | V |
| Bird | *Botaurus lentiginosus* | American bittern | ** | SE | W, G |
| Bird | *Ixobrychus exilis* | least bittern | ** | SE | W, G |
| Bird | *Ardea herodias* | great blue heron | ** | ** | W |
| Bird | *Nyctanassa violacea* | yellow-crowned night-heron | ** | SE | W |
| Bird | *Circus cyaneus* | northern harrier | ** | SE | W |
| Bird | *Buteo lineatus* | red-shouldered hawk | ** | SSC | W, G |
| Bird | *Rallus elegans* | king rail | ** | SE | G |
| Bird | *Rallus limicola* | Virginia rail | ** | SE | W |
| Bird | *Bartramia longicauda* | upland sandpiper | ** | SE | V |
| Bird | *Tyto alba* | barn owl | ** | SE | W, G |
| Bird | *Asio flammeus* | short-eared owl | ** | SE | W |
| Bird | *Thryomanes bewickii* | Bewick's wren | ** | SE | G |
| Bird | *Cistothorus platensis* | sedge wren | ** | SE | G |
| Bird | *Lanius ludovicianus* | loggerhead shrike | ** | SE | V |
| Bird | *Dendroica cerulea* | cerulean warbler | ** | SSC | W |
| Bird | *Helmitheros vermivorus* | worm-eating warbler | ** | SSC | W |
| Mammal | *Taxidea taxus* | American badger | ** | SE | G |
| Reptile | *Nerodia erythrogaster neglecta* | copperbelly water snake | LTNL | SE | W, G |
| Crustacean | *Orconectes indianensis* | Indiana crayfish | ** | SSC | V |
| Insect | *Nicrophorus americanus* | American burying beetle | LE | SX | V |
| Insect | *Catocala marmorata* | marbled underwing moth | ** | ** | V |
| Plant | *Perideridia americana* | Eastern eulophus | ** | SE | W |
| Plant | *Krigia oppositifolia* | dwarf dandelion | ** | ST | V, W |
| Plant | *Catalpa speciosa* | Northern catalpa | ** | SR | W |
| Plant | *Phacelia ranunculacea* | blue scorpion-weed | ** | SE | V |
| Plant | *Juglans cinerea* | butternut | ** | WL | G |
| Plant | *Rhexia mariana var mariana* | Maryland meadow beauty | ** | SE | V |
| Plant | *Bacopa rotundifolia* | roundleaf water-hyssop | ** | SE | W |
| Plant | *Vitis palmata* | catbird grape | ** | SR | V |
| Plant | *Carex socialis* | social sedge | ** | SR | W,V |
| Plant | *Nothoscordum bivalve* | crow-poison | ** | SR | W |
| Plant | *Isoetes melanopoda* | blackfoot quillwort | ** | SE | V |

Notes: SSC=State Special Concern, ST=State Threatened, SE=State Endangered, SR= State Rare, WL= Watch Listed, LE=Federal Endangered, LTNL=Federal Threatened

Counties: V=Vanderburgh, W=Warrick, G=Gibson

| Table 4: natural areas | |
|---|---|
| **NATURAL AREAS AND COMMUNITIES IN THE STUDY AREA (Source: DNR Division of Nature Preserves)** | |
| Community | Counties |
| Wet-Mesic Floodplain Forest | V, G ,P |
| Dry-Mesic Upland Forest | W, G |
| Dry Upland Forest | G |
| Mesic Upland Forest | V |

Notes: V=Vanderburgh, W=Warrick, G=Gibson P-Posey

- **Soils**

Soil associations in the study area are mapped on Figure 7. Most soils are silt loams that range from zero to 18% slopes. Within the Pigeon Creek watershed, there are 64,300 acres of highly erodible land, much of which is eroding well above “T”, the tolerable limit.

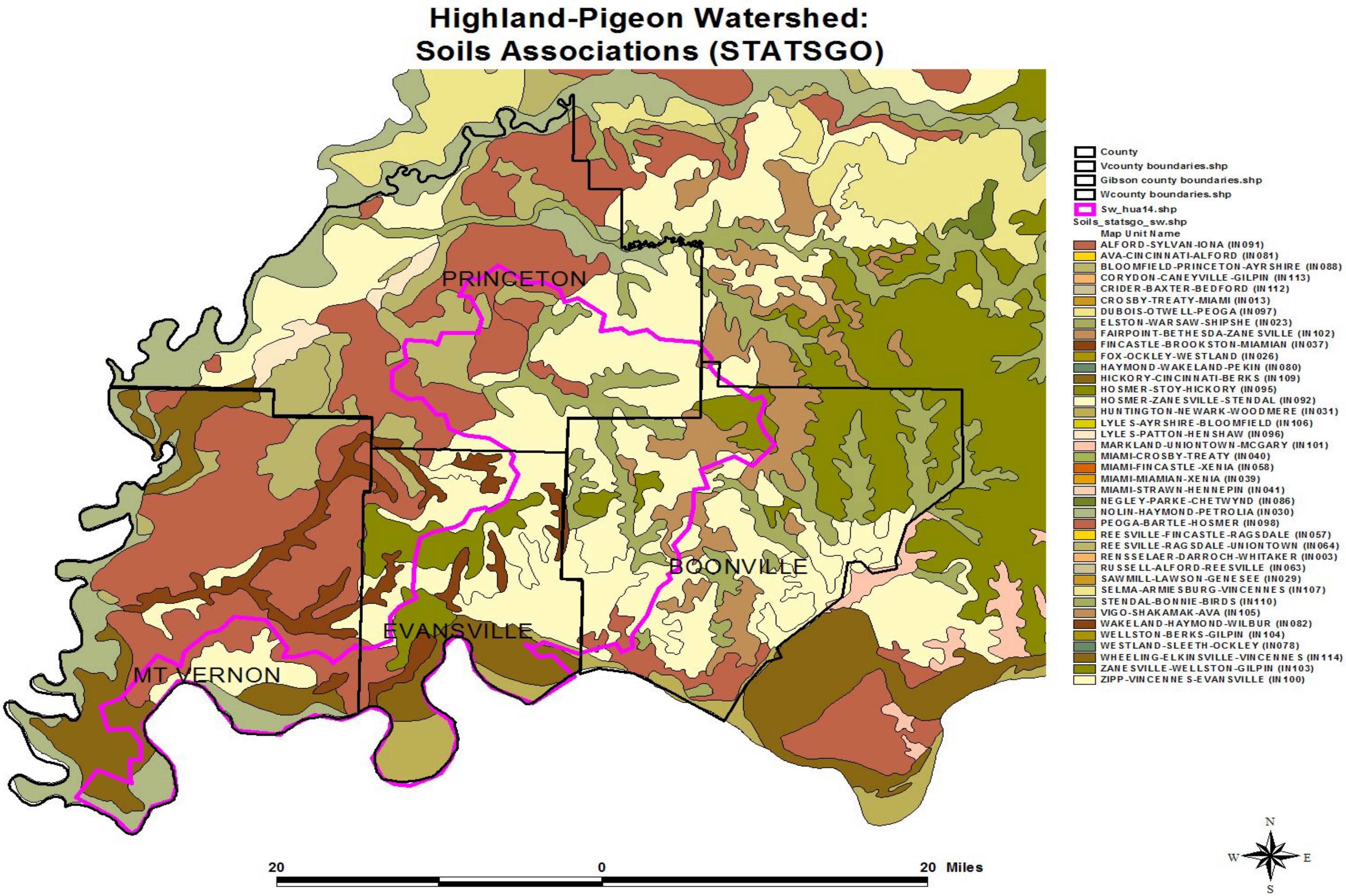



**Figure 7: soil associations**

- **Topography & Hydrology**

Land elevation in the study area ranges from about 340 feet at the Ohio River to 550 feet in some upper reaches of the watershed. Land is generally level in the Ohio River and Pigeon Creek bottomlands and terraces. While slopes are typically gentle, short lengths of slope may be up to 50% in certain upland areas.

The United States is divided and sub-divided into successively smaller hydrologic units. Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to fourteen digits based on the multiple levels of classification in the hydrologic unit system. The fourteen-digit level of classification was available for the study area and supplied to Harza by Rick Obenshain, the watershed coordinator. There are 37 subwatersheds in the Highland-Pigeon watershed, and these are the spatial units of diagnostic study in this report. These subwatersheds are delineated in the map on the following page (Figure 8).

## Highland - Pigeon Watershed: 14 - digit HUC's & Subwatershed Names

1. Locust Cr. Lower 05140202040120
2. Locust Cr. Headwaters 05140202040110
3. Kleymeyer Pk. 05140202040100
4. Harper Ditch 05140202040080
5. Crawford-Brandeis Ditch 05140202040010
6. Weinsheimer Ditch 05140202030060
7. Barnes Dich 05140202030070
8. Wagner Ditch 05140202040060
9. Firlick Cr. 05140202040070
10. Stubbs-Freudenberg Ditch 05140202040040
11. Schensker Dich 05140202040050
12. Little Pigeon Cr. 05140202040090
13. trib. Blue Grass Cr. 05140202040030
14. Blue Grass headwaters 05140202040020
15. Clear Branch 05140202030040
16. Squaw Cr. 05140202030050
17. Big Creek-Little Cr. 05140202030020
18. Big Creek headwaters 05140202030010
19. Big Creek-Wye 05140202030030
20. Smith Fk. headwaters 05140202020060
21. Halfmoon Cr. 05140202020070
22. Snake Run 05140202020050
23. Hurricane Ditch 05140202020030
24. West Fk. Pigeon Cr. 05140202020040
25. Clear Fk. Pigeon Cr. 05140202020020
26. Sand Cr.-Muddy Fk. 05140202020010
27. Eagle Cr. 05140202010020
28. Carpentier Cr. 05140202050010
29. Bayou Cr. 05140202070020
30. Ohio River-Evansville 05140202010030
31. Logsdon-Stroud Ditch 05140202070010
32. Diamond Island 05140202070030
33. Cypress Slough-Dixon Ditch 05140202070040
34. McFadden Cr. 05140202070050
35. Beaverdam Cr. 05140202070060
36. Hovey ILk.-Bayou Drain 05140202070080
37. Little Pitcher Lk. 05140202100040

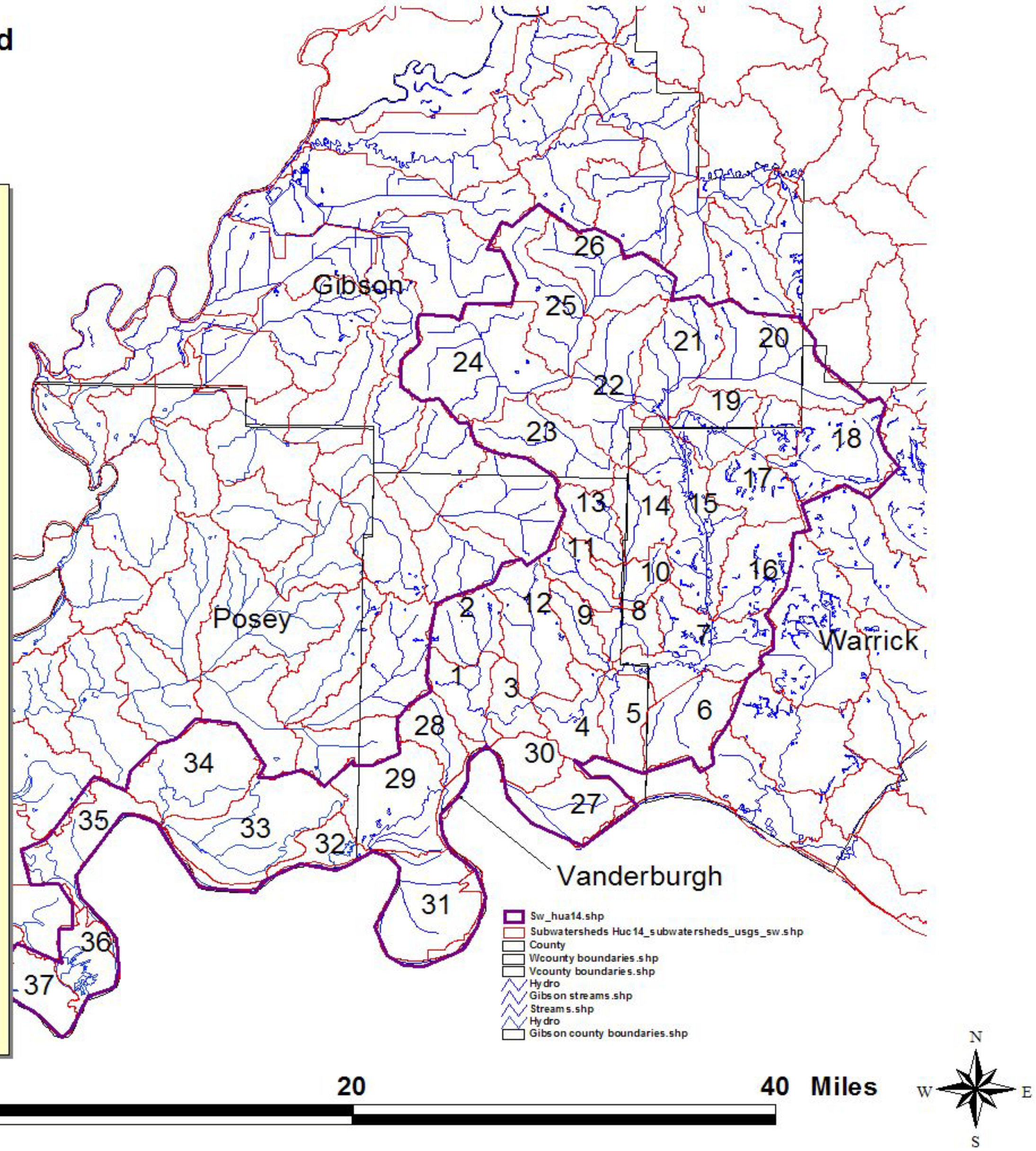



Figure 8: 14-digit subwatersheds

- Drainage

The Indiana statute at IC 36-9-27 contains the County Drainage Code. This law authorizes county drainage boards to regulate certain drains. The intent of this law is to increase the hydraulic efficiency of waterways and control upstream ponding and flooding. The county surveyor is the technical authority on the construction, reconstruction, and maintenance of all regulated drains or proposed regulated drains in the county. The County Drainage Code requires the county surveyor to classify regulated drains in the county as:
1. Drains in need of reconstruction;
2. Drains in need of periodic maintenance; or
3. Drains that should be vacated.

The county drainage boards across the state fund reconstruction and maintenance of regulated drains. Among the board’s duties, as defined in the statute, is the reconstruction of regulated drains that do not properly function and may require erosion control or grade stabilization structures. An example project undertaken under this authority is the Gibson County Drainage Board’s reshaping of nearly six miles of Pigeon Creek and West Fork in 2000. This project, while justified on the basis of flood control, exemplifies continued single objective management of water courses in the watershed and abuse of ecological consequences.

The County Drainage Code also offers opportunities for financing of watershed projects. We believe this regulatory vehicle is considerably underutilized in the state for environmental change due to the traditional use of these funds for drainage purposes only.

Since settlement by Europeans, the watershed landscape has been dramatically altered. Over the years, settler activities have changed the dynamic equilibrium of the creek and its upslope systems. The cumulative effect of these changes has been degradation of water quality, loss of floodplain storage, diminished wildlife populations, and decreased aesthetic and recreational values. We have recommended stream corridor restoration efforts in nearly all subwatersheds in the Pigeon Creek watershed. This restoration is a complex endeavor that begins with the recognition that human-induced changes that begun nearly two centuries ago have damaged the structure and function of the ecosystem and prevent the recovery of the watershed to a sustainable condition. These human-induced changes include:

- Creation of the Wabash and Erie Canal
- Channelization of first and second order streams to facilitate agricultural drainage
- Draining of wetlands
- Dredging, clearing and snagging of Pigeon Creek to reduce flooding
- Increased watershed imperviousness
- Mineral extraction and massive landscape alteration
- Loss and/or alteration of vegetative cover across the watershed
- Addition of nutrients and other pollutants to the streams

Among the net results of these alterations are:

- A watershed that is 100% impaired for aquatic life support due to poor physical habitat
- Poor water quality throughout the watershed
- High rates of soil loss
- Near extirpation of nine species of mussels

NRCS (1998) presents guidelines on restoration of stream riparian processes. The massive investment over the last 200+ years in separating the stream from its watershed will require a similar level of investment to reverse, but we believe that will prove economically attractive to do so. The economic benefits of environmental restoration can prove attractive, if the investments are well founded and prudent.

- Land Use

The City of Evansville was founded on March 27,1812 by Colonel Hugh McGary. On January 7, 1818, Vanderburgh County was created. In 1837, the first cabinet-making shop and steam-powered sawmill opened, in anticipation of the completion of the Wabash and Erie Canal. By 1900, Evansville had over 300 iron, steel and woodworking companies and had become a center for furniture manufacturing. Automobile production and refrigerator manufacturing dominated the local economy by the mid 1920's. The effects of the Great Depression were lessened with the discovery of oil in the area in the early 1930's and the gearing up for World War II. In 1942, the Evansville Shipyard was established and factories were converted to build airplanes for the war effort. After the war the demand for automobiles, household appliances and farm equipment helped to maintain employment and create a network of industrial suppliers and service shops.

During the 1950's, many auto, refrigerator and stove manufacturers closed their doors or were sold, while other industrial concerns relocated to Evansville. Currently, Evansville is home to a large number of plastics related companies. Other notable companies are involved in pharmaceutical, aluminum sheet, food products, and home appliance production.

The Evansville IN-Henderson KY Metropolitan Statistical Area (MSA) consists of Vanderburgh, Posey, Warrick counties in IN and Henderson County, KY. The Evansville MSA ranks 114th in population nationwide. As a city, Evansville ranks 130th in the nation and is the 3rd largest city in the state of Indiana. The MSA has 120,962 households, while the city has 55,144 households. Evansville is a regional economic center, as evidenced by the location of three major hospitals, two full service universities and a vibrant retail and banking community. Evansville has a 1990 population of 126,272 person residing in 53,058 households. Other communities in the watershed include Chandler, Fort Branch, Haubstadt, and portions of Owensville and Princeton.

Evansville supplies its residents with drinking water from collection and treatment of surface water and ground water. Water service is provided to Evansville by the City's Water and Sewer Utility Department. Sources include the Ohio River and an auxiliary deep well. Filtration system capacity is 60.0 million gallons per day (mgd) to meet current peak demands of 35 mgd. The Evansville Water & Sewer Utility also operates two sewage treatment facilities with a capacity 38.6 mgd. Average daily wastewater flows are 28 mgd. EWSU uses a land application system to dispose of its sludge. While EWSU discharges treated wastewater to the Ohio River, many of the smaller upstream communities, as well as some industrial facilities, are permitted to discharge treated wastewater to Pigeon Creek.

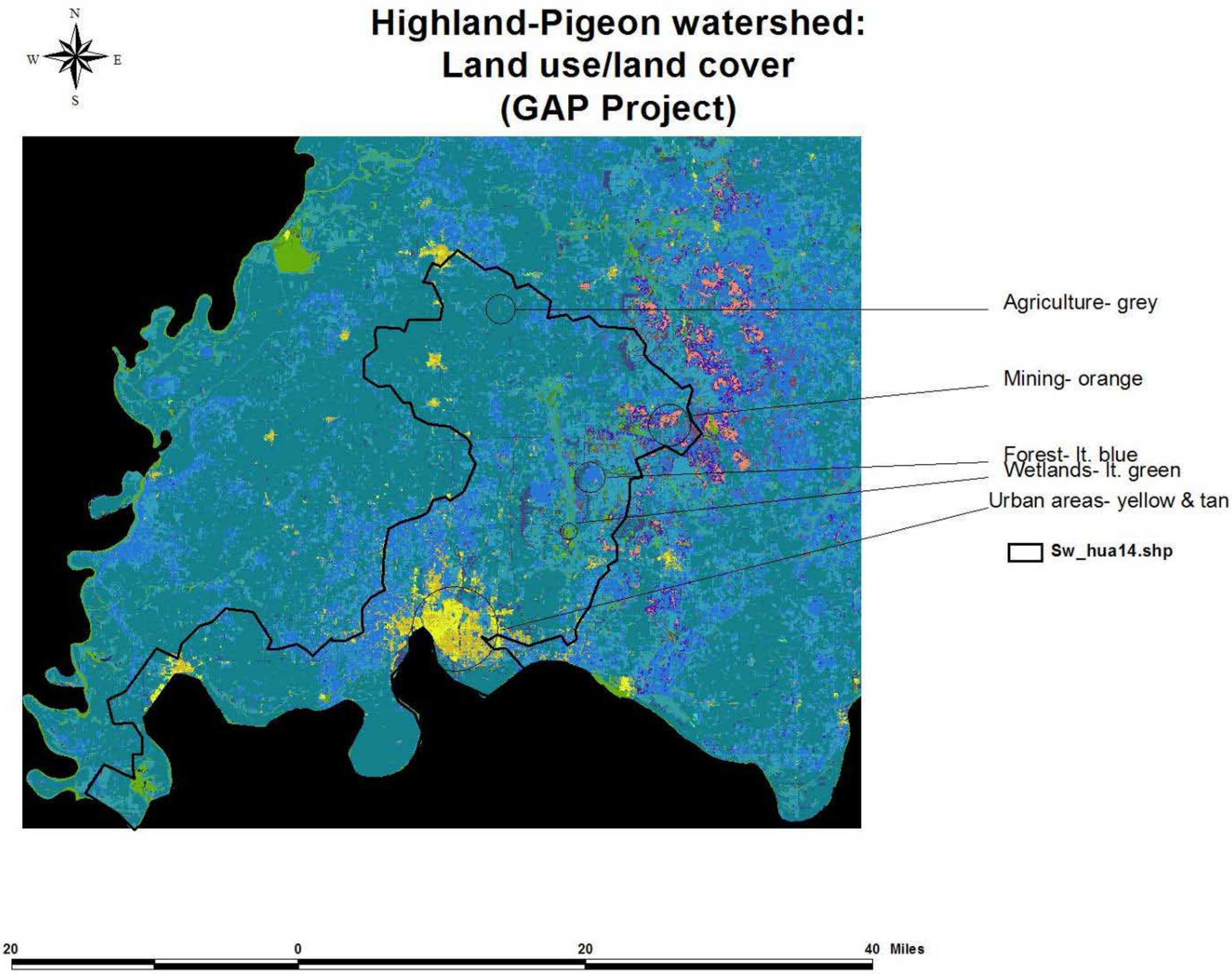
Our land use/land cover data were derived from the Indiana GAP Project (1998). The interagency project, led by the U.S. Fish and Wildlife Service, used Landsat Thematic Mapper images to develop the land cover dataset. The images reflect 1994 conditions. About two-thirds of the study area is classified as agricultural lands. Urban land is approximately 4% of the watershed. A more detailed land use analyses was made of McFadden Creek subwatershed, which is 82% agriculture use.

Table 5: land use in Pigeon Creek watershed

**LAND USE IN THE PIGEON CREEK WATERSHED**
**(Source: Indiana GAP Project, 1998)**

| **Land Use** | **Area (ac)** | **Percentage** |
|---|---|---|
| Other Non-vegetated | 8,920 | 4% |
| Urban High Density | 3,512 | 1% |
| Urban Low Density | 7,335 | 3% |
| Agriculture Row Crop | 113,055 | 48% |
| Agriculture Pasture/Grassland | 46,728 | 20% |
| Shrubland | 0 | 0% |
| Woodland | 2315 | 1% |
| Forest Deciduous | 32,106 | 14% |
| Forest Evergreen | 1,354 | 0.6% |
| Forest Mixed | 2,339 | 1% |
| Wetland Forest | 11,149 | 5% |
| Wetland Woodland | 88 | 0.04% |
| Wetland Shrubland | 1,243 | 0.5% |
| Wetland Herbaceous | 920 | 0.4% |
| Wetland Sparsely Vegetated | 816 | 0.3% |
| Water | 3,347 | 1% |
| Total | 235,226 | 100% |

Figure 9: land use/land cover



- Evansville has developed into a center for manufacturing, warehousing, wholesaling and retailing, as well as insurance, finance and health services. The Evansville area is known for the production of appliances, nutritional products, pharmaceuticals, prepared foods, aluminum sheet and ingot processing, auto glass, coal and oil production, plastics including finished product, resins and pellets. The surrounding agricultural interests focus on production of corn, soybean and wheat.

- The Evansville area has a diversified economy. Total non-agricultural wage and salaried employment in the Evansville area has risen from 125,200 in 1984 to 138,700 in 1990, an increase of 10.8 percent. Manufacturing employment over the past ten years has decreased, but employment in the service economy has increased, paralleling a national trend.

- Public Lands: Two Indiana Dept. of Natural Resources managed preserves exist in Highland – Pigeon watershed: Hovey Lake, in southwestern Posey Co.; and Bluegrass Fish & Wildlife Area in northwestern Warrick Co., and several tracts of Classified Forest (see map next page- Figure 10)

- Agriculture: The study area depends upon agriculture for much of its well-being. Recent agricultural statistics show local agricultural trends following much of the State and the nation, that is, a trend towards fewer, but larger farms with greater returns. Under this trend, farms offer diminished employment opportunities and greater efficiency.

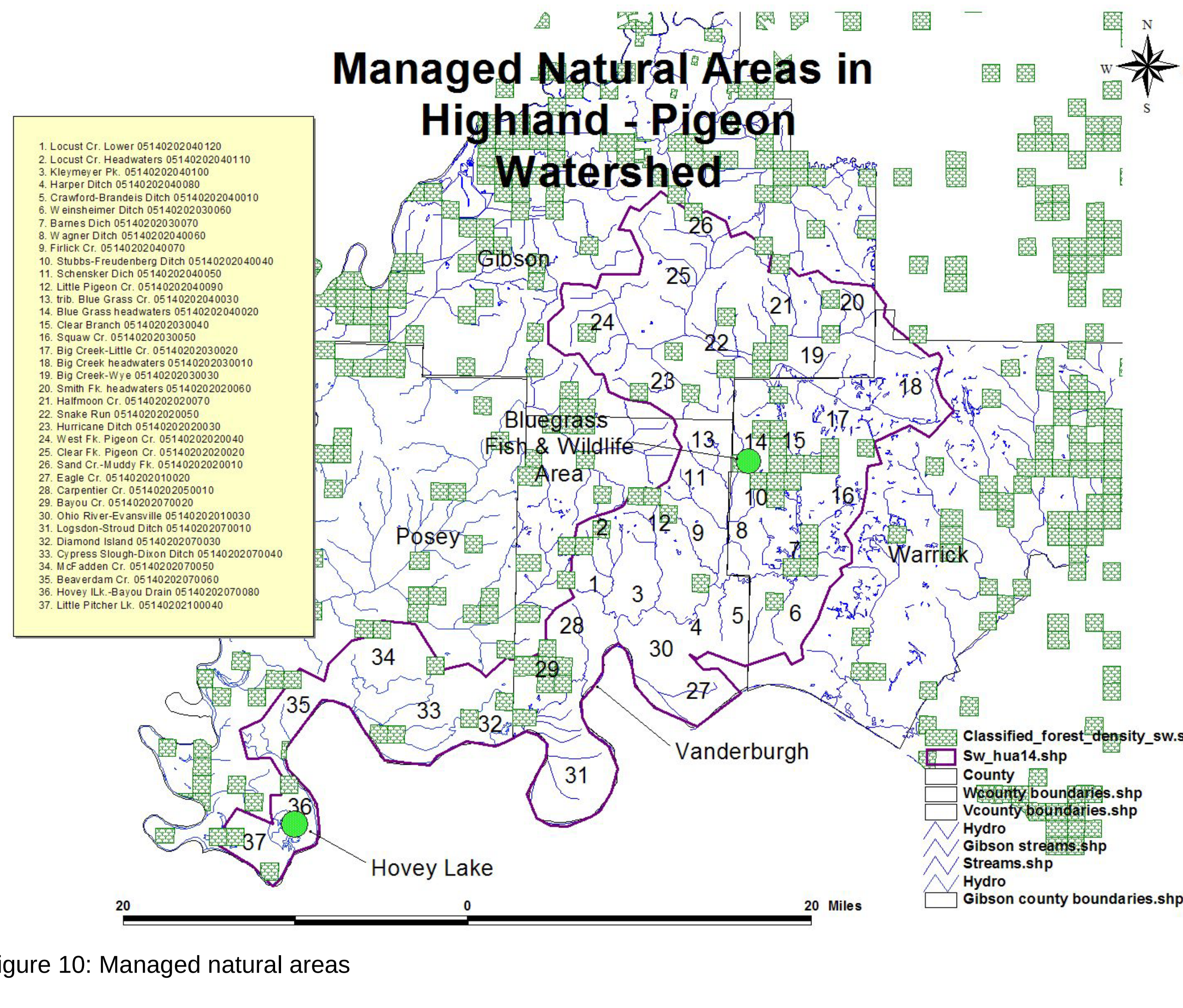


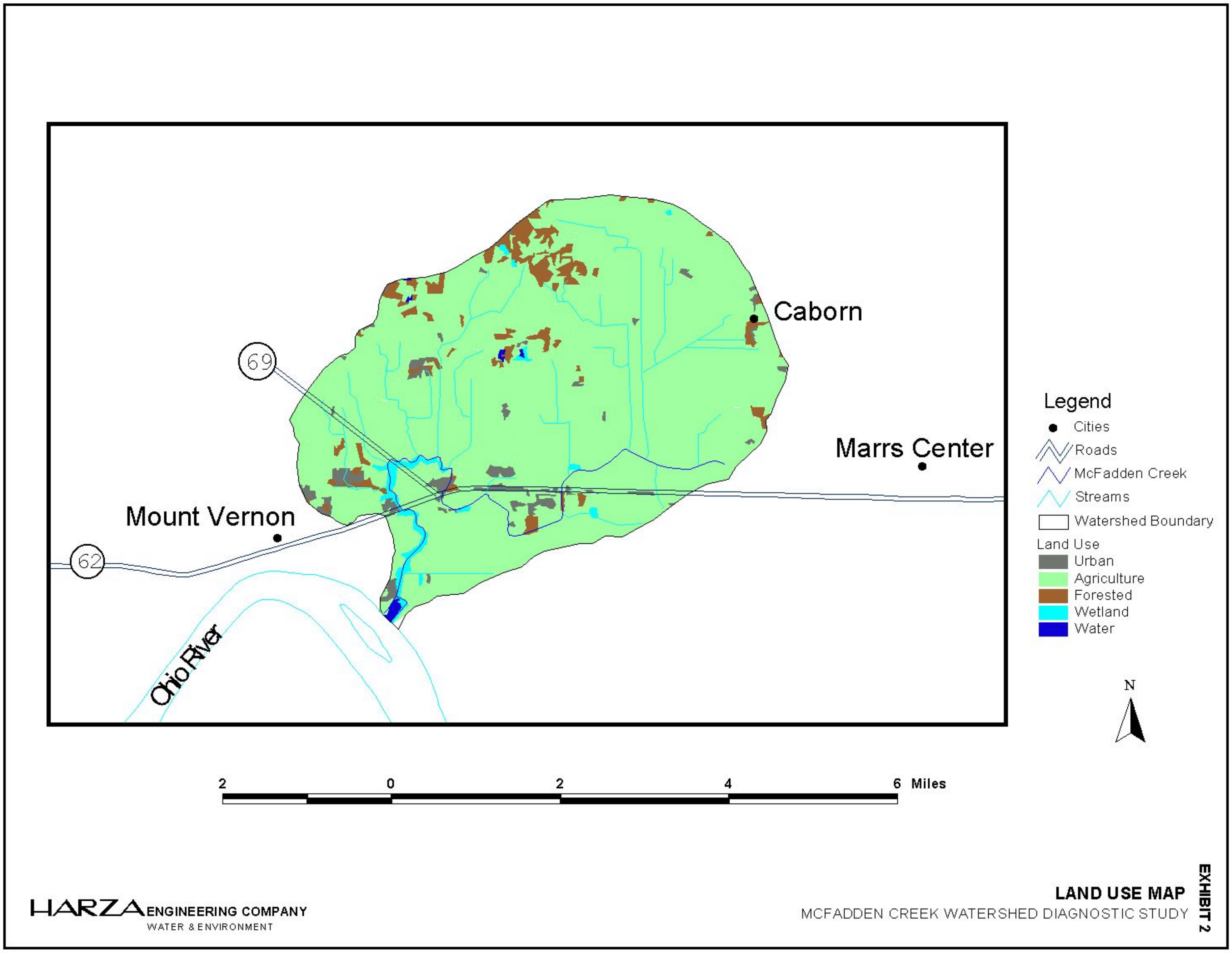

Figure 10: Managed natural areas

Table 6: **Watershed Land Use-McFadden Creek**

**McFadden Creek Watershed**

| | **Area (acres) percentage** |
|---|---|
| Urban | 191 1.6% |
| Agriculture Row Crop | 9,815 82% |
| Agriculture Pasture/Grassland | 1,070 8.9% |
| Upland Forest and Woodlands | 534 4.4% |
| Wetland Forest and Woodlands | 157 1.3% |
| Other Wetlands and Water | 70 0.6 % |
| Other Non-vegetated | 137 1.1% |
| Total | 11,974 |

Figure 11: McFadden Cr. Watershed land use



- Current and Past Conservation Efforts in watershed:

Several conservation efforts are currently in place in the watershed. The USDA programs, including the Conservation Reserve Program (CRP) and Environmental Quality Incentives Program (EQIP), have seen an increase in applicants and practices established in the Highland – Pigeon watershed over the past four years. This increase can be attributed to the efforts of Pigeon-Highland Watershed Steering Committee coordinator, Rick Obenshain. Obenshain was instrumental in contacting agricultural landowners, and encouraging them to install Best Management Practices (BMP's). Cost share was available through an IDEM Section 319 grant for BMP's, with the result being: 41 acres of filter strip, 5.8 ac. field border, 7 grassed waterways, 1.6 ac. of trees, 2275 ft. of fencing, 1 pipe structure, 2 livestock watering systems, 1 compost pad, 7 water & sediment control basins (WASCoB's) and 1.2 acres of wildlife habitat. Many more practices were installed through CRP and EQIP, using USDA cost share. With the end of IDEM Section 319 grant, ARN 00-86, funding will cease for Obenshain's position, leaving no one to "sell" conservation in the watershed. Natural Resource Conservation Service (NRCS) employees, who have the technical responsibility for CRP and EQIP, do not have time to actively solicit participation in these programs. Fortunately, landowners who have had success with BMP's have become the best sales tool, and new participants are signing up due to this peer influence. See Appendix G for "Conservation Practices Installed 1999-2002".

A Lake and River Enhancement (LARE) program is in effect in the McFadden Creek subwatershed (#34). Funded by Indiana Dept. of Natural Resources, using the money generated through boat registrations, the program has been highly successful. See Appendix G for maps.

A previous LARE grant was in effect for Smith Fork-Halfmoon Ditch subwatershed in the mid-1990's. Some work remains to be done there, however, as a large swine operation- the only livestock in the subwatershed- continues to cause water quality problems. The SW Regional Office of IDEM has been attempting to work with the owner to rectify the situation.

**<u>3. Establishing Benchmarks:</u> Identify water body impairments, water quality threats, and baseline data for water quality and biological community parameters.**

- Existing data: Sufficient baseline chemical, biological and habitat assessment data have been collected in order to make management decisions for the majority of the eight-digit watershed. One set of data was collected by Harza Engineering Co. as part of the "Diagnostic Study of Pigeon Creek", 1999-2000. This study was funded by Indiana Dept. of Env. Mgt.(IDEM), Indiana Dept. of Natural Resources(IDNR) LARE (lake and river enhancement)program and the City of Evansville Water & Sewer Authority. A Quality Assurance Project Plan (QAPP) was approved for the monitoring portion of the Diagnostic Study under IDEM ARN 99-215. In addition to monitoring nonpoint source pollution, the Harza study also sampled discharges from Evansville's NPDES-permitted combined-sewer overflows. Harza's data covers Pigeon Creek and tributaries in Gibson, Warrick & Vanderburgh counties, and McFadden Creek in Posey County. IDEM Water Quality Assessment Branch also collected chemical data in 1999 and 2000- on the main stem of Pigeon Creek in Vanderburgh County. IDEM's analyses included metals and pesticides/herbicides. *See Appendix A for the raw data, sampling dates and sample site locations.*
- A second data set was collected by Pigeon-Highland Watershed Steering Committee's watershed coordinator, Rick Obenshain. Obenshain collected and analyzed chemical, biological and habitat assessment data from November 2001 to June 2003 (this document includes data collected up to April 2003). The data were quality-assured under a QAPP developed for IDEM grant ARN 00-86. *See Appendix B for the raw data, sampling dates and sample site locations.*
- Summary of Data: The data from Harza's Diagnostic Study and Pigeon-Highland Watershed Steering Committee's monitoring reveals that human-induced changes to the watershed have resulted in degradation of water quality, loss of floodplain storage, diminished wildlife populations, and decreased aesthetic and recreational values. Specifically, the watershed upstream of Evansville is subject to nonpoint source pollution from agricultural, mining and other land use detrimental to stream health. Within the City of Evansville, Pigeon Creek is impacted by combined-sewer overflows (CSO) which contribute nutrients and bacteria to the stream. *See Appendix C for CSO data summary and recommendations.*
- Sediment from erosion is indicated as the greatest pollutant problem. The Harza study estimated that the sediment yield in the Pigeon Creek watershed was 29,712 tons per year. Well correlated to the sediment yield is the phosphorous loading of 39,218 kg per year. Other indicators of poor water quality were dry-weather *E. coli* bacteria levels well-above the state standard, high nitrate and phosphate levels, and poor diversity among the macroinvertebrates sampled.
- Pigeon-Highland Watershed Steering Committee's data reflected similar conditions. Obenshain was able to witness first-hand the destruction of habitat and sedimentation problems associated with development of land in the watershed area. In the spring of 2003, extremely high nitrate levels were detected at several monitoring points- in the absence of known human or animal waste discharges. Further testing revealed that the nitrate source was farm field drainage tile. Obenshain theorizes that the corn crop of 2002, which was well below average in yield in many areas of the watershed, failed to utilize the available nitrogen in the soil. With 12+ inches of snow and significant rain events early this year, the nitrate was subsequently leached through the soil into the groundwater, and discharged through the drainage tiles into the creeks.
- In a separate study of McFadden Creek watershed (05140202070050)in Posey County, both Harza and Pigeon-Highland Watershed Committee produced quality-assured data. Water quality analyses found: supersaturated oxygen levels, generally high nutrient and suspended solids concentrations, and high fecal coliform counts. The Harza study noted the following trends from downstream to upstream reaches: increased dissolved oxygen supersaturation, increased nitrate nitrogen concentrations and degraded physical habitat- particularly in the substrate and riparian ratings. *See Appendix D for raw data, sampling dates & sample site locations.*

Summary of Harza's data from McFadden Creek watershed:

Examined on a stream-reach scale, the data indicates that nonpoint source pollution from agriculture (82% of land-use) is resulting in degradation of water quality. In addition, the riparian zones, especially the upper reaches, have been cleared of all trees- resulting in diminished wildlife values, lack of woody debris in the channel and higher stream temperatures. Higher than normal conductivity readings at some sample sites may indicate brine contamination from oil wells in the watershed. There are three livestock operations in the watershed: one turkey farm, one swine operation and a dairy that all warrant attention. In addition, illegal disposal of solid waste is a problem in some areas of McFadden Creek.

- Pigeon-Highland Watershed Steering Committee's data on Carpentier Creek (05140202050010)revealed widely-fluctuating E. coli bacteria levels: 0 to 5400 col/100 ml, occasional alkaline spikes in pH, and normal nutrient and sediment loads. However, this urban subwatershed is under tremendous pressure from development, and in fact, the riparian habitat at the sampling location was recently completely removed by a developer. *See Appendix B for raw data.*
- IDEM's Assessment Branch also sampled in the Bayou Creek subwatershed (05140202070020). Their data, from the summer of 2000, indicate critically low dissolved oxygen levels and lower than normal pH. Volunteer data (non quality-assured), from Hoosier Riverwatch taken at two sites upstream from IDEM's site indicates phosphate enrichment, E. coli bacteria counts from 0 to 3600 col/100 ml, poor macroinvertebrate pollution tolerance scores, and poor habitat scores, indicating impaired water quality and habitat. *See Appendix E for the raw data and sample site locations.*

- A WRAS (watershed restoration action study) was completed by USDA-Natural Resources Conservation Service employee Andy Ertel in 2000. The study found similar conditions within the watershed without the detail of the Harza data.
- Impaired streams indicated in IDEM's 303(d)& 305(b) lists: Nine 14-digit subwatersheds of Pigeon-Highland watershed appear in IDEM's 2002 303(d) list: Crawford Brandeis Ditch (Vand) (PCB's); Pigeon Cr.-Lower Locust Cr.(Vand) (PCB's); Harper Ditch (Vand) (PCB's,low dissolved oxygen, high TDS, pathogens); Pigeon Creek at Kleymeyer Park (Vand)(PCB's, sulfates, TDS,pathogens and low dissolved oxygen); and the Ohio River from the confluence of the Green River to the confluence of the Wabash River (Vand, Posey)(PCB's, pathogens, dioxin); Hovey Lake(Posey) (PCB's); Squaw Creek (Warrick) (sulfates, TDS). It should be noted that PCB's are "legacy" contaminants usually found in the sediment of the affected water bodies. "Legacy" means that the original source of the contaminant may not be known, but is no longer actively contributing contaminants to the water body. The 305(b) report states that in the Ohio River Basin- of which Pigeon-Highland is a subbasin- 67% of stream miles do not provide aquatic life support. This is well documented for Pigeon-Highland watershed in the data we have.

- Point source discharges: Evansville is the largest community in the watershed, having a 1990 population of 126,272 person residing in 53,058 households. Other communities in the watershed include Chandler, Elberfeld, Fort Branch, Haubstadt, and portions of Owensville and Princeton. Many of these communities, as well as some industrial facilities, are permitted to discharge treated wastewater to directly to Pigeon Creek or its tributaries (Table 23, Exhibits 18 and 19). In this section we qualitatively evaluate the effects of these discharges on watershed health. Where possible, we relate NPDES compliance with our bioassessment data. The EWSU CSOs are addressed in detail in Appendix C.

Table 7: NPDES discharges

**NPDES DISCHARGES TO PIGEON CREEK**
(Source: USEPA Permit Compliance System)

| FACILITY | RECEIVING WATER | HUC | NPDES |
|---|---|---|---|
| Indiana Hardwoods, Kimball Intern'l | Pigeon Cr via Stollberg Ditch via Ditch. | 05140202030070 | IN0058530 |
| EWSU - Westside Plant | Ohio R (except certain CSOs) | 05140202040 | IN0032956 |
| EWSU - Eastside Plant | Ohio R (except certain CSOs) | 05140202040 | IN0033073 |
| Chandler Municipal WWTP | Pigeon Cr via Stollberg Ditch | 05140202030070 | IN0020435 |
| Haubstadt Municipal WWTP | West Fork Pigeon Cr via Haubstadt (aka Hurricane) Ditch | 05140202020030 | IN0021482 |
| Solar Sources Inc. - Pit 12 | Smith Fork Cr Honey Cr Rough Cr. | 05140202020060 | IN0047970 |
| Darmstadt Municipal WWTP | Pigeon Cr via Little Pigeon Creek | 05140202040090 | IN0052990 |
| Lynnville Municipal WWTP | Pigeon via Big Cr via Mill Cr | 05140202040010 | IN0040282 |
| Elberfeld Municipal WWTP | Pigeon Cr via Bluegrass Creek | 05140202040020 | IN0020788 |
| Warrick Cnty Coal-Lynnville | Pigeon Cr via Big Cr via Plum B | 05140202040010 | IN0047287 |
| Cargill Meat Products | West Fork Pigeon Creek via Toops Ditch | 05140202020040 | IN0001686 |
| Fort Branch Municipal WWTP | West Fork Pigeon Creek | 05140202020040 | IN0022896 |
| Mid-State Rubber Products | Clear Fork Pigeon Creek via storm sewer | 05140202020020 | IN0004880 |

**Stollberg Ditch**
Stollberg Ditch drains a portion of Hydrologic Unit Code (HUC) 05140202030070. We included this stream in our bioassessment. Stollberg Ditch was found it to contain some of the highest TSS, BOD, phosphorus, nitrate and ammonia nitrogen concentrations, and some of the lowest DO levels among sites we surveyed in the watershed. We also found low benthic diversity and an absence of sensitive macroinvertebrate taxa (mayflies, stonefiles, caddisflies). Stollberg Ditch is the receiving water for two NPDES discharges: Chandler Municipal Wastewater Treatment Plant (WWTP) and Indiana Hardwoods. Chandler WWTP was issued a new NPDES permit on June 18, 1999 to discharge 1.8 million gallons per day of treated sanitary wastewater into Stollberg Ditch. The facility is currently being upgraded to a major plant, with construction nearing completion. According to the new permit, effluent parameters to be limited and/or monitored include flow, carbonaceous BOD5, total suspended solids, ammonia nitrogen, pH, dissolved oxygen, total residual chlorine and *E. coli.* The Chandler WWTP has a history of being overloaded, bypassing of sewage, and regular noncompliance reports (USEPA Permit Compliance System).

Indiana Hardwoods, of Kimball International, Inc. is a manufacturer of hardwood veneers and plywood. Indiana Hardwoods also has a permit to discharge to Stollberg Ditch. Permit IN0058530 expires December 31, 2000 (has since been renewed). According to the Permit Compliance System, their wastewater is from the washing of logs in the yard. They are required to monitor pH, ammonia nitrogen, flow and carbonaceous BOD5. The facility has an apparently good compliance record, with two reportable noncompliance events recorded between March 1996 and July 2000.

**West Fork Pigeon Creek**
Two municipal and one industrial point source discharges are permitted in this drainage. The Haubstadt Municipal WWTP discharges to Haubstadt Ditch, a tributary of Hurricane Ditch, HUC 05140202020030, which drains to the West Fork Pigeon Creek HUC 05140202020040. The Town of Haubstadt WWTP was issued a new NPDES Permit, No. IN0021482, in November 1999 to discharge 0.81 million gallons per day of treated sanitary wastewater into Haubstadt Ditch. HC1 was one of our bioassessment sites, downstream of the Haubstadt WWTP. We found high concentrations of nitrate, phosphorus and coliform bacteria. The RBP results included very low numbers of sensitive taxa at HC1, a lack of shredders and a dominance of filterers. The permit requires that certain effluent parameters be limited and/or monitored at the WWTP: flow, carbonaceous BOD, total suspended solids, ammonia nitrogen, pH, dissolved oxygen and total residual chlorine. In July 2000, the Town approved IDEM-mandated upgrades to the WWTP to reduce wet weather overflows and to improve effluent quality. IDEM required the upgrades due to the Haubstadt WWTP's history of regular noncompliance reporting. This facility has completed upgrades to treatment processes.

The Town of Fort Branch WWTP discharges to the West Fork Pigeon Creek (Permit No. IN0022896). This WWTP was issued a new permit on July 31, 1998 to discharge 0.655 million gallons per day of treated sanitary wastewater into the West Fork of Pigeon Creek. It is a minor municipal wastewater treatment facility, and is required to monitor and or limit the following effluent parameters: flow, carbonaceous BOD, total suspended solids, ammonia nitrogen, dissolved oxygen, total residual chlorine and pH. There are sanitary sewer overflows in this system during wet weather. Since the new permit was issued, the permittee has reported four noncompliance events. We also had bioassessment sites on the West Fork Pigeon Creek. We found supersaturation DO, high concentrations of coliform bacteria, and nitrate. PHWSC monitored upstream and downstream from this plant and found similar results, although the treatment plant does not seem to be the main source of phosphorous in West Fork.

Cargill Processed Meat Products, of Fort Branch, was issued a new NPDES permit on May 14, 1999 (IN0001686). The permit allows the owner to discharge 0.272 million gallons per day of meat products processing wastewater into Toops Ditch, tributary to West Fork of Pigeon Creek. The permit requires the owner to limit or monitor the following effluent parameters: flow, BOD5, total suspended solids, oil and grease, ammonia nitrogen, fecal coliform bacteria, total residual chlorine and pH. The facility is apparently well operated, without reports of noncompliance in the EPA's Permit Compliance System. The meat processing plant has since been closed, but a hog transfer station is still active at the site. PHWSC found no evidence of improper discharge from the site.

**Clear Fork-Pigeon Creek**

Mid-State Rubber Products, Inc. is in Princeton, IN. This industrial concern was issued a NPDES storm water permit on June 7, 1999 (IN0004880). The permittee manufactures molded, extruded, and lathe-cut mechanical rubber goods. The discharge is to the Clear Fork branch of Pigeon Creek on the south side of Princeton.

**Big Creek**

On April 27, 1998, NPDES Permit No. IN0040282 was renewed for the Town of Lynnville. The permit allows the WWTP to discharge 0.1 million gallons per day of treated sanitary wastewater into an unnamed tributary to Mill Creek, which discharges to Big Creek (HUC 05140202040010) in Warrick County. The facility is considered a minor municipal wastewater treatment plant. The permit requires the following effluent parameters to be limited and/or monitored: flow, carbonaceous BOD5, total suspended solids, ammonia nitrogen, dissolved oxygen, pH and total residual chlorine. Review of the EPA's Permit Compliance System database indicates two noncompliance reports since the permit was renewed.

Warrick County Coal had an NPDES permit to discharge to Big Creek, Permit No. IN0047287. The Permit Compliance System no longer includes this permit, so it has likely been abandoned.

**Bluegrass Creek**

Bluegrass Creek is the receiving water for Elberfeld WWTP, located in HUC 05140202040020. The facility is permitted to discharge 0.3 millon gallons per day of treated municipal wastewater to Bluegrass Creek. The permit requires the following effluent parameters to be limited and/or monitored: flow, carbonaceous BOD5, total suspended solids, ammonia nitrogen, dissolved oxygen, pH and total residual chlorine. While the facility has a poor compliance record, with numerous noncompliance reports in the EPA's Permit Compliance System database, the bioassessment sites on Bluegrass Creek did not indicate significant impairment. Elberfeld's WWTP is currently being upgraded.

**Lower Pigeon Creek**

While the EWSU wastewater treatment plants discharge to the Ohio River, the sewer system carries both stormwater and wastewater, and there are nine combined sewer outfalls that discharge to Pigeon Creek during wet weather. These discharges are permitted under NPDES Permits IN0032956 and IN0033073, which require the preparation of a Stream Reach Characterization Evaluation Report (see Appendix C) evaluating the impacts of these CSOs.

4. **<u>Identifying Problem Causes & Stressors:</u> Identify known or probable causes of water quality impairments and threats. Stressors may include specific pollutants, changes in land use, hydrologic changes, and other factors.**

- The Harza Diagnostic Study of Pigeon Creek surveyed the physical habitat, water quality and benthic community at 36 sites in the watershed. The 36 survey sites were selected to represent the 26 subwatersheds (14-digit hydrologic unit codes) in the Pigeon Creek study area. The physical habitat survey method used was the same as that used by IDEM in its surface water assessment program, the Qualitative Habitat Evaluation Index (QHEI). All sites surveyed failed to meet IDEM's QHEI score for full support of aquatic life, indicating a watershed-wide need for improved physical habitat. Water samples were collected for analysis of nutrients, suspended solids, coliform bacteria, and other parameters. The Rapid Bioassessment Protocol, a standardized assessment tool developed by the U.S. Environmental Protection Agency (USEPA), was performed to evaluate the health of the macroinvertebrate community in streams of the watershed. One of the metrics in that protocol is the modified Family Biotic Index (FBI), developed to detect organic pollution. The FBI is a product of pollution tolerance values for family levels and the quantity of individuals within each family. Key indicators of stream biotic integrity were judged to be coliform bacteria levels, nutrient concentrations, suspended solids concentrations, substrate siltation scores and the FBI. The FBI was selected as the key benthic indicator as it incorporates both diversity and pollution tolerance.

Using these five key stream biotic integrity health variables, we ranked the 36 monitoring sites into four groups. The more healthy subwatersheds are those included in the first quartile and warrant protection against degradation: Smith Fork (subwatersheds 20 and 21),Clear Fork Pigeon Creek (subwatershed 25) Little Pigeon Cr.(subwatershed 12) and Big Creek (subwatersheds 17, 18 and 19). Sites in the fourth quartile are considered the most degraded sites.

Table 8: tributary integrity

**RELATIVE TRIBUTARY BIOTIC INTEGRITY**

| First Quartile | | Second Quartile | | Third Quartile | | Fourth Quartile | |
|---|---|---|---|---|---|---|---|
| **Site** | **Water Body** | **Site** | **Water Body** | **Site** | **Water Body** | **Site** | **Water Body** |
| SF3 | Smith Fork | PC4 | Pigeon Creek | WF2 | West Fork | HC1 | Hurricane Creek |
| BG1 | Big Creek | PC5 | Pigeon Creek | WF3 | West Fork | PC8 | Pigeon Creek |
| BG2 | Big Creek | PC12 | Pigeon Creek | PC13 | Pigeon Creek | BC3 | Bluegrass Creek |
| PC15 | Pigeon Creek | SC1 | Squaw Creek | PC1 | Pigeon Creek | WD1 | Weinsheimer Ditch |
| SF1 | Smith Fork | WF1 | West Fork | PC3 | Pigeon Creek | PC7 | Pigeon Creek |
| SF2 | Smith Fork | PC2 | Pigeon Creek | BC1 | Bluegrass Creek | BC2 | Bluegrass Creek |
| PC14 | Pigeon Creek | PC11 | Pigeon Creek | LP1 | Little Pigeon Creek | PC6 | Pigeon Creek |
| SA1 | Sand Creek | PC16 | Pigeon Creek | LC2 | Locust Creek | PC9 | Pigeon Creek |
| LP2 | Little Pigeon Creek | LC1 | Locust Creek | UN1 | Unnamed Tributary | SD1 | Stollberg Ditch |

**SOURCES OF POLLUTANTS**

- Permitted point sources include EWSU's eight CSO discharges to lower Pigeon Creek, five industrial discharges, and six municipal wastewater treatment plants (WWTP). The CSOs are addressed under the context of the SRCER (Appendix C). The five industrial discharges appear to be minor contributors of pollutants to Pigeon Creek, with generally good compliance records. In general, the municipal WWTPs in the watershed do not have acceptable performance records and require expansion, upgrading, and/or additional operator training. Three municipal WWTPs are currently being upgraded, but more should be studied for possible upgrade or expansion.
- Point source discharges: Evansville is the largest community in the watershed, having a 1990 population of 126,272 person residing in 53,058 households. Other communities in the watershed include Chandler, Elberfeld, Fort Branch, Haubstadt, and portions of Owensville and Princeton. Many of these communities, as well as some industrial facilities, are permitted to discharge treated wastewater to directly to Pigeon Creek or its tributaries. In this section we qualitatively evaluate the effects of these discharges on watershed health. Where possible, we relate NPDES compliance with our bioassessment data. The EWSU CSOs are addressed in detail in Appendix C.

• The Chandler WWTP has a history of poor compliance, but has been upgraded, so pollutant discharges from this point source may be reduced at the present.

• The Haubstadt WWTP also has a history of poor compliance. At the time of Harza's Diagnostic Study, there were still some indications of operational problems. This WWTP has also being upgraded to reduce wet weather overflows and improve effluent quality.

• The Fort Branch WWTP also has noncompliance reports to its records. We measured high coliform bacteria concentrations, high nitrates, ammonia and supersaturated dissolved oxygen conditions downstream of this facility. Plans for expansion or upgrading have been talked about for several years, but no action for improvement has been taken.

• The Elberfeld WWTP has numerous noncompliance reports in the EPA's Permit Compliance System database. It is currently being expanded.

- Major nonpoint sources of pollutants to the watershed are row crop agriculture, mined lands, and urban runoff. Cropland area in the watershed has been reasonably constant since 1997. Watershed wide, conservation tillage systems were used on 25% of cropland in 1997, 16% of cropland in 1998, and 33% of cropland in 2000. Data on the conservation tillage in the watersheds are insufficient to statistically demonstrate trends. In the year 2000, the Warrick County portion of the study area had the highest rate of conservation tillage adoption, with 51% of its cropland in some type of conservation tillage.

We prepared a model of agricultural nonpoint source sediment and phosphorus pollution in the Pigeon Creek watershed using the best available data. The details of our estimates are tabulated below.

Table 9: annual sediment yield

**SUBWATERSHED ANNUAL SEDIMENT YIELD (tons)**

| Subwatershed | Annual Yield | Area (acres) | Unit Areal Loading (tons/acre) |
|---|---|---|---|
| 1. Locust Creek Lower | 294 | 6,101 | 0.05 |
| 2. Locust Creek Headwaters | 501 | 6,497 | 0.08 |
| 3. Kleymeyer Park | 9 | 4,176 | 0.00 |
| 4. Harper Ditch | 118 | 6,544 | 0.02 |
| 5. Crawford Brandeis Ditch | 321 | 5,903 | 0.05 |
| 6. Weinsheimer Ditch | 1,559 | 9,103 | 0.17 |
| 7. Barnes Ditch | 759 | 13,216 | 0.06 |
| 8. Dennis Wagner Ditch | 236 | 4,231 | 0.06 |
| 9. Firlick Creek | 205 | 4,171 | 0.05 |
| 10. Stubbs Fruedenberg Ditch | 194 | 3,911 | 0.05 |
| 11. Schlensker Ditch | 377 | 4,622 | 0.08 |
| 12. Little Pigeon Creek | 308 | 11,209 | 0.03 |
| 13. Unnamed Trib to Bluegrass | 370 | 5,247 | 0.07 |
| 14. Bluegrass Creek Headwaters | 448 | 6,190 | 0.07 |
| 15. Clear Branch | 939 | 14,582 | 0.06 |
| 16. Squaw Creek | 846 | 8,543 | 0.10 |
| 17. Big Creek - Little Creek | 878 | 10,524 | 0.08 |
| 18. Big Creek Headwaters | 1,623 | 11,604 | 0.14 |
| 19. Big Creek – Wye | 465 | 7,117 | 0.07 |
| 20. Smith Fork Headwaters | 1,148 | 14,573 | 0.08 |
| 21. Smith Fork - Halfmoon Cr | 832 | 10,672 | 0.08 |
| 22. Snake Run | 1,301 | 14,449 | 0.09 |
| 23. Hurricane Ditch Creek | 2,327 | 10,420 | 0.22 |
| 24. West Fork Creek | 6,712 | 19,064 | 0.35 |
| 25. Clear Fork Ditch | 5,299 | 11,359 | 0.47 |
| 26. Sand Creek - Muddy Fork | 1,643 | 11,200 | 0.15 |
| **TOTAL** | **29,712** | **235,228** | |

Table 10: annual phosphorous loading

**SUBWATERSHED ANNUAL PHOSPHORUS LOADING (kg)**

| Subwatershed | Load (kg) | Area (acres) | Unit Areal Loading (kg/acre) |
|---|---|---|---|
| 1. Locust Creek Lower | 388 | 6,101 | 0.06 |
| 2. Locust Creek Headwaters | 662 | 6,497 | 0.10 |
| 3. Kleymeyer Park | 12 | 4,176 | 0.00 |
| 4. Harper Ditch | 156 | 6,544 | 0.02 |
| 5. Crawford Brandeis Ditch | 424 | 5,903 | 0.07 |
| 6. Weinsheimer Ditch | 2,058 | 9,103 | 0.23 |
| 7. Barnes Ditch | 1,002 | 13,216 | 0.08 |
| 8. Dennis Wagner Ditch | 312 | 4,231 | 0.07 |
| 9. Firlick Creek | 271 | 4,171 | 0.06 |
| 10. Stubbs Fruedenberg Ditch | 255 | 3,911 | 0.07 |
| 11. Schlensker Ditch | 498 | 4,622 | 0.11 |
| 12. Little Pigeon Creek | 406 | 11,209 | 0.04 |
| 13. Unnamed Trib to Bluegrass Cr | 488 | 5,247 | 0.09 |
| 14. Bluegrass Creek Headwaters | 591 | 6,190 | 0.10 |
| 15. Clear Branch | 1,239 | 14,582 | 0.08 |
| 16. Squaw Creek | 1,117 | 8,543 | 0.13 |
| 17. Big Creek - Little Creek | 1,159 | 10,524 | 0.11 |
| 18. Big Creek Headwaters | 2,142 | 11,604 | 0.18 |
| 19. Big Creek – Wye | 614 | 7,117 | 0.09 |
| 20. Smith Fork Headwaters | 1,515 | 14,573 | 0.10 |
| 21. Smith Fork - Halfmoon Creek | 1,098 | 10,672 | 0.10 |
| 22. Snake Run | 1,718 | 14,449 | 0.12 |
| 23. Hurricane Ditch Creek | 3,071 | 10,420 | 0.29 |
| 24. West Fork Creek | 8,860 | 19,064 | 0.46 |
| 25. Clear Fork Ditch | 6,994 | 11,359 | 0.62 |
| 26. Sand Creek - Muddy Fork Ditch | 2,168 | 11,200 | 0.19 |
| **TOTAL** | **39,218** | **235,228** | |

The data from Harza's Diagnostic Study and Pigeon-Highland Watershed Steering Committee's monitoring reveals that human-induced changes to the watershed have resulted in degradation of water quality, loss of floodplain storage, diminished wildlife populations, and decreased aesthetic and recreational values. Specifically, the watershed upstream of Evansville is subject to nonpoint source pollution from agricultural, mining and other land use detrimental to stream health. Within the City of Evansville, Pigeon Creek is impacted by combined-sewer overflows (CSO) which contribute nutrients and bacteria to the stream. *See Appendix C for CSO data summary and recommendations.*

- Sediment from erosion is indicated as the greatest pollutant problem. The Harza study estimated that the sediment yield in the Pigeon Creek watershed was 29,712 tons per year. Well correlated to the sediment yield is the phosphorous loading of 39,218 kg per year. Other indicators of poor water quality were dry-weather *E. coli* bacteria levels well-above the state standard, high nitrate and phosphate levels, and poor diversity among the macroinvertebrates sampled.
- Pigeon-Highland Watershed Steering Committee's data reflected similar conditions. Obenshain was able to witness first-hand the destruction of habitat and sedimentation

problems associated with development of land in the watershed area. In the spring of 2003, extremely high nitrate levels were detected at several monitoring points- in the absence of known human or animal waste discharges. Further testing revealed that the nitrate source was farm field drainage tile. Obenshain theorizes that the corn crop of 2002, which was well below average in yield in many areas of the watershed, failed to utilize the available nitrogen in the soil. With 12+ inches of snow and significant rain events early this year, the nitrate was subsequently leached through the soil into the groundwater, and discharged through the drainage tiles into the creeks.

- In a separate study of McFadden Creek watershed (05140202070050)in Posey County, both Harza and Pigeon-Highland Watershed Committee produced quality-assured data. Water quality analyses found: supersaturated oxygen levels, generally high nutrient and suspended solids concentrations, and high fecal coliform counts. The Harza study noted the following trends from downstream to upstream reaches: increased dissolved oxygen supersaturation, increased nitrate nitrogen concentrations and degraded physical habitat- particularly in the substrate and riparian ratings. *See Appendix D for raw data, sampling dates & sample site locations.*

  Summary of Harza's data from McFadden Creek watershed:

  Examined on a stream-reach scale, the data indicates that nonpoint source pollution from agriculture (82% of land-use) is resulting in degradation of water quality. In addition, the riparian zones, especially the upper reaches, have been cleared of all trees- resulting in diminished wildlife values, lack of woody debris in the channel and higher stream temperatures. Higher than normal conductivity readings at some sample sites may indicate brine contamination from oil wells in the watershed. There are three livestock operations in the watershed: one turkey farm, one swine operation and a dairy that all warrant attention. In addition, illegal disposal of solid waste is a problem in some areas of McFadden Creek.

- Pigeon-Highland Watershed Steering Committee's data on Carpentier Creek (05140202050010)revealed widely-fluctuating E. coli bacteria levels: 0 to 5400 col/100 ml, occasional alkaline spikes in pH, and normal nutrient and sediment loads. However, this urban subwatershed is under tremendous pressure from development, and in fact, the riparian habitat at the sampling location was recently completely removed by a developer. *See Appendix B for raw data.*
- IDEM's Assessment Branch also sampled in the Bayou Creek subwatershed (05140202070020). Their data, from the summer of 2000, indicate critically low dissolved oxygen levels and lower than normal pH. Volunteer data (non quality-assured), from Hoosier Riverwatch taken at two sites upstream from IDEM's site indicates phosphate enrichment, E. coli bacteria counts from 0 to 3600 col/100 ml, poor macroinvertebrate pollution tolerance scores, and poor habitat scores, indicating impaired water quality and habitat. *See Appendix E for the raw data and sample site locations.*
- A WRAS (watershed restoration action study) was completed by USDA-Natural Resources Conservation Service employee Andy Ertel in 2000. The study found similar conditions within the watershed.
- Impaired streams indicated in IDEM's 303(d)& 305(b) lists: Nine 14-digit subwatersheds of Pigeon-Highland watershed appear in IDEM's 2002 303(d) list: Crawford Brandeis Ditch (Vand) (PCB's); Pigeon Cr.-Lower Locust Cr.(Vand) (PCB's); Harper Ditch (Vand) (PCB's,low dissolved oxygen, high TDS, pathogens); Pigeon Creek at Kleymeyer Park (Vand)(PCB's, sulfates, TDS,pathogens and low dissolved oxygen); and the Ohio River from the confluence of the Green River to the confluence of the Wabash River (Vand, Posey)(PCB's, pathogens, dioxin); Hovey Lake(Posey) (PCB's); Squaw Creek (Warrick) (sulfates, TDS). It should be noted that PCB's are "legacy" contaminants usually found in the sediment of the affected water bodies. "Legacy" means that the original source of the contaminant may not be known, but is no longer actively contributing contaminants to the water body. The 305(b) report states that in the Ohio River Basin- of which Pigeon-Highland is a subbasin- 67% of stream miles do

not provide aquatic life support. This is well documented for Pigeon-Highland watershed in the data we have.

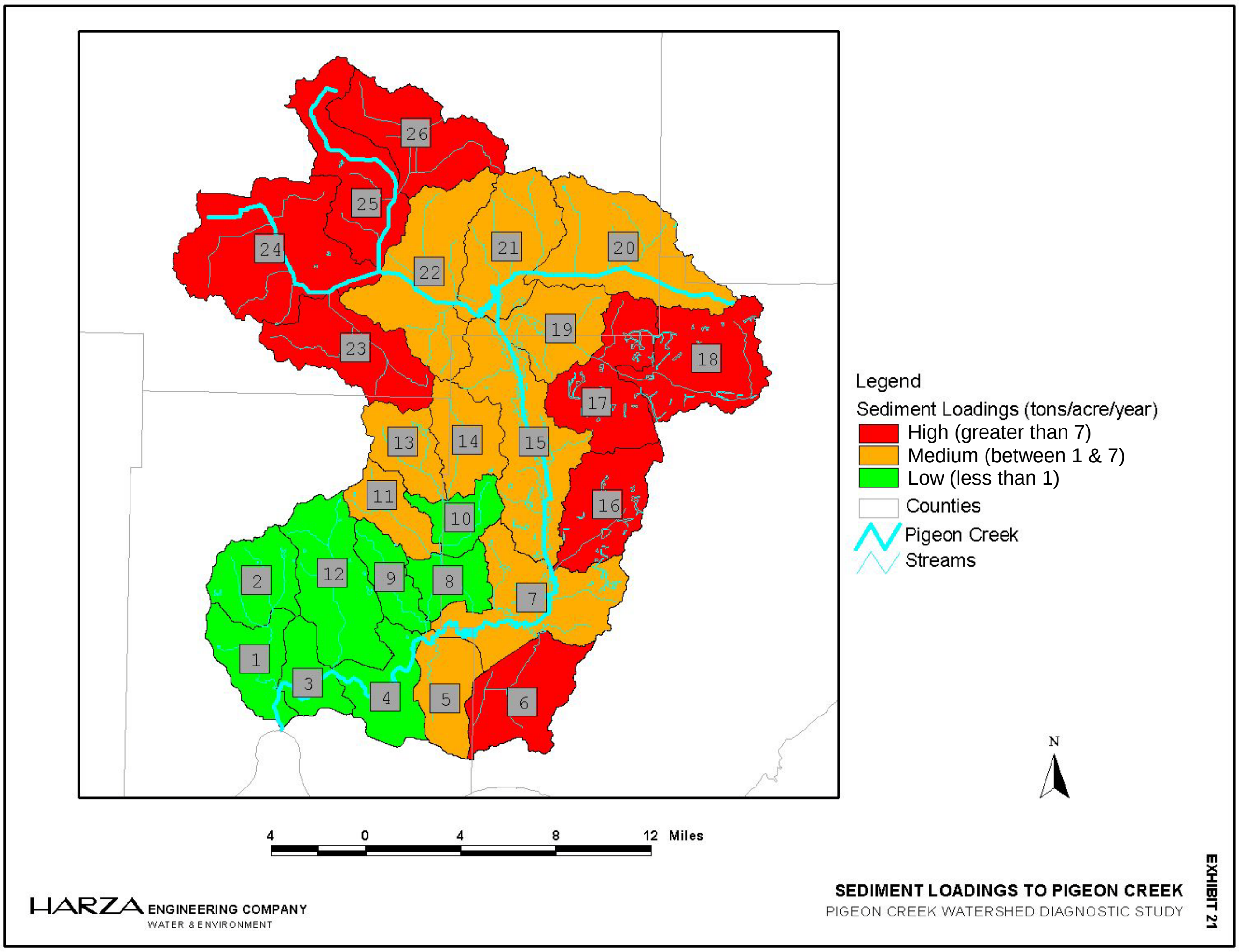
**Problem Statements:**

1. Sediment is the greatest contaminant by volume of the streams in Highland – Pigeon watershed. Confirmed by the data? YES.
2. Loss of riparian habitat and channel modification have impaired Aquatic Life Use Support. Confirmed by the data? YES.
3. High levels of phosphorous and nitrate are impairing aquatic life by encouraging algal growth- leading to eutrophication. Confirmed by the data? YES.
4. Discharges of raw or inadequately treated sewage, and/or runoff from livestock operations make water unsafe for full-body contact recreation. Confirmed by the data? YES.
5. Illegal dumping of solid waste diminishes aesthetic values and poses a possible health threat. Confirmed by visual observation? YES.
6. Loss of wetlands reduces runoff storage and cleansing of water- also loss of habitat. Confirmed by the data? IMPLIED.
7. Urban erosion control practices are not being followed/need to be improved. Confirmed by the data? YES- as evidenced by high sediment loading in urban subwatersheds.
8. Streams in watershed are unsafe for children. Confirmed by the data? YES- see Statements #4 and #5.
9. Lack of education about water, watersheds and land use has contributed to above problems. Confirmed by experiences of PHWSC over the past four years? YES.

**5. Identifying Sources:** Identify the source of the stressors and threats.

- As stated in Item 4, sedimentation from soil erosion has been identified as the greatest stream contaminant. According to the Harza study, the majority of the stressor originates from agriculture (subwatersheds 23-26) and mining (subwatersheds 16-18) although erosion from ag/urban development (subwatershed 6) is an increasing problem. The map below indicates the subwatersheds of Pigeon Creek where soil loss is most prevalent (Figure 12).

Figure 12: sediment loading



The Harza data for McFadden Creek indicates that sedimentation from soil erosion originates from agriculture. The concentration of highly-erodable soil in the higher elevations of the watershed can be identified as the source. The data indicates the problem on a stream reach scale, as indicated in Table 11 below:

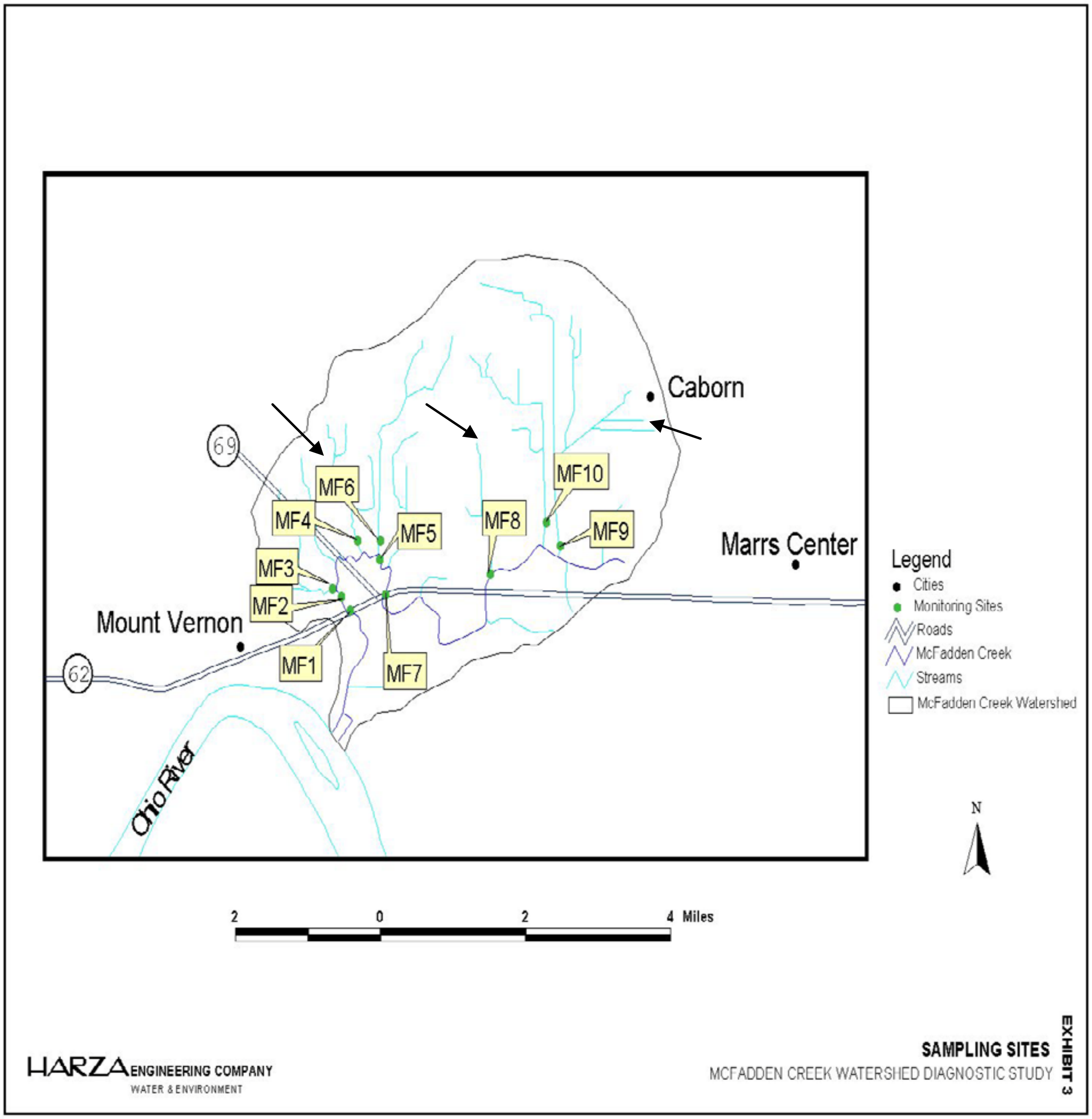
Table 11

**SUBSTRATE QUALITY SCORING**

| Site | Waterbody | Silt Cover (points) | Extent of Embeddness (points) |
|---|---|---|---|
| MF-1 | McFadden Creek | Silt normal (0) | Moderate (-1) |
| MF-2 | McFadden Creek | Silt normal (0) | Low (0) |
| MF-3 | Second Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-4 | Fourth Tributary* | Silt normal (0) | Low (0) |
| MF-5 | McFadden Creek | Silt moderate (-1) | Moderate (-1) |
| MF-6 | Fifth Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-7 | McFadden Creek | Silt normal (0) | Low (0) |
| MF-8 | McFadden Creek | Silt moderate (-1) | Moderate (-1) |
| MF-9 | Eleventh Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-10 | Tenth Tributary* | Silt heavy (-2) | Extensive (-2) |

- In addition, three livestock operations have been identified in McFadden Creek watershed. While it is not possible to make an exact determination based upon such limited data, these facilities may be contributing E. coli and nutrients to the stream. Facilities include a hog operation, a turkey raising and processing facility, and one dairy. These are indicated on the map below.

Figure 13: Location of livestock operations in McFadden Creek watershed



Another prevalent stressor in Highland – Pigeon watershed is loss of riparian habitat- leading to decreased aquatic life use support(ALUS) and aesthetic value. This stressor is caused by human alteration of the landscape, mainly for agricultural use, but destruction of habitat in developing areas is also a factor. In combination with the sedimentation problem, this has resulted in 100% of the streams in the eight-digit watershed being impaired- to some degree- for aquatic life use support. Harza ranked the subwatersheds in the Pigeon Creek basin according to degree of impairment, the First Quartile being the least impaired, and the Fourth being the most impaired:

Table 12

## RELATIVE TRIBUTARY BIOTIC INTEGRITY

| First Quartile | | Second Quartile | | Third Quartile | | Fourth Quartile | |
|---|---|---|---|---|---|---|---|
| Site | Water Body | Site | Water Body | Site | Water Body | Site | Water Body |
| SF3 | Smith Fork | PC4 | Pigeon Creek | WF2 | West Fork | HC1 | Hurricane Creek |
| BG1 | Big Creek | PC5 | Pigeon Creek | WF3 | West Fork | PC8 | Pigeon Creek |
| BG2 | Big Creek | PC12 | Pigeon Creek | PC13 | Pigeon Creek | BC3 | Bluegrass Creek |
| PC15 | Pigeon Creek | SC1 | Squaw Creek | PC1 | Pigeon Creek | WD1 | Weinsheimer Ditch |
| SF1 | Smith Fork | WF1 | West Fork | PC3 | Pigeon Creek | PC7 | Pigeon Creek |
| SF2 | Smith Fork | PC2 | Pigeon Creek | BC1 | Bluegrass Creek | BC2 | Bluegrass Creek |
| PC14 | Pigeon Creek | PC11 | Pigeon Creek | LP1 | Little Pigeon Creek | PC6 | Pigeon Creek |
| SA1 | Sand Creek | PC16 | Pigeon Creek | LC2 | Locust Creek | PC9 | Pigeon Creek |
| LP2 | Little Pigeon Creek | LC1 | Locust Creek | UN1 | Unnamed Tributary | SD1 | Stollberg Ditch |

- A third identified stressor is E. coli bacteria. This stressor can be traced to both point and nonpoint sources. Permitted point sources include EWSU's eight CSO discharges to lower Pigeon Creek, five industrial dischargers, and six municipal wastewater treatment plants (WWTP). The CSOs are addressed under the context of the SRCER (Appendix C). The five industrial discharges appear to be minor contributors of pollutants to Pigeon Creek, with generally good compliance records. In general, the municipal WWTPs in the watershed do not have acceptable performance records and require expansion, upgrading, and/or additional operator training. Three municipal WWTPs are currently being upgraded, but more should be studied for possible upgrade or expansion.

• The Chandler WWTP has a history of poor compliance, but has been upgraded, so pollutant discharges from this point source may be reduced at the present.

• The Haubstadt WWTP also has a history of poor compliance. At the time of Harza's Diagnostic Study, there were still some indications of operational problems. This WWTP has since been upgraded to reduce wet weather overflows and improve effluent quality.

• The Fort Branch WWTP also has noncompliance reports to its records. We measured high coliform bacteria concentrations, high nitrates, ammonia and supersaturated dissolved oxygen conditions downstream of this facility. Plans for expansion or upgrading have been talked about for several years, but no action for improvement has been taken.

• The Elberfeld WWTP has numerous noncompliance reports in the EPA's Permit Compliance System database. It has recently been expanded.

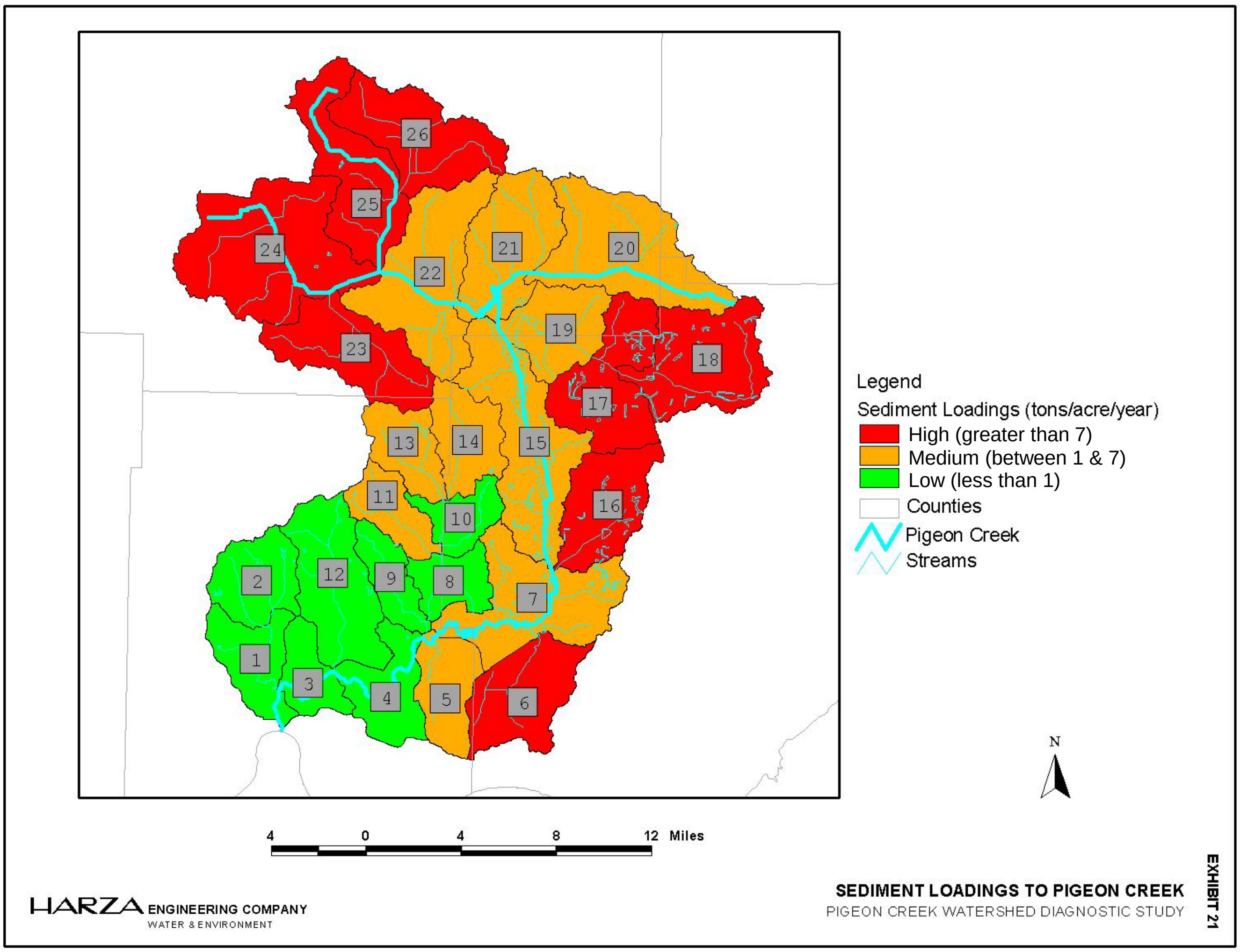
- Nonpoint sources of E. coli are much harder to identify and quantify. From limited visual observance, malfunctioning home septic systems are a problem, but as to the magnitude of their contribution of E. coli to the streams of the watershed, much more study needs to be done.

**6. Identifying Critical Areas:** Target areas within the watershed where the sources/stressors are causing the greatest damage, and where applying treatment measures will have the greatest effect.

Targeted areas. Areas selected for restoration efforts fall into two categories: those subwatersheds where erosion control, improved point source control, nutrient management and riparian restoration will have the greatest impact; and subwatersheds that still retain good habitat values and acceptable water quality and are thus worthy of protection and enhancement.

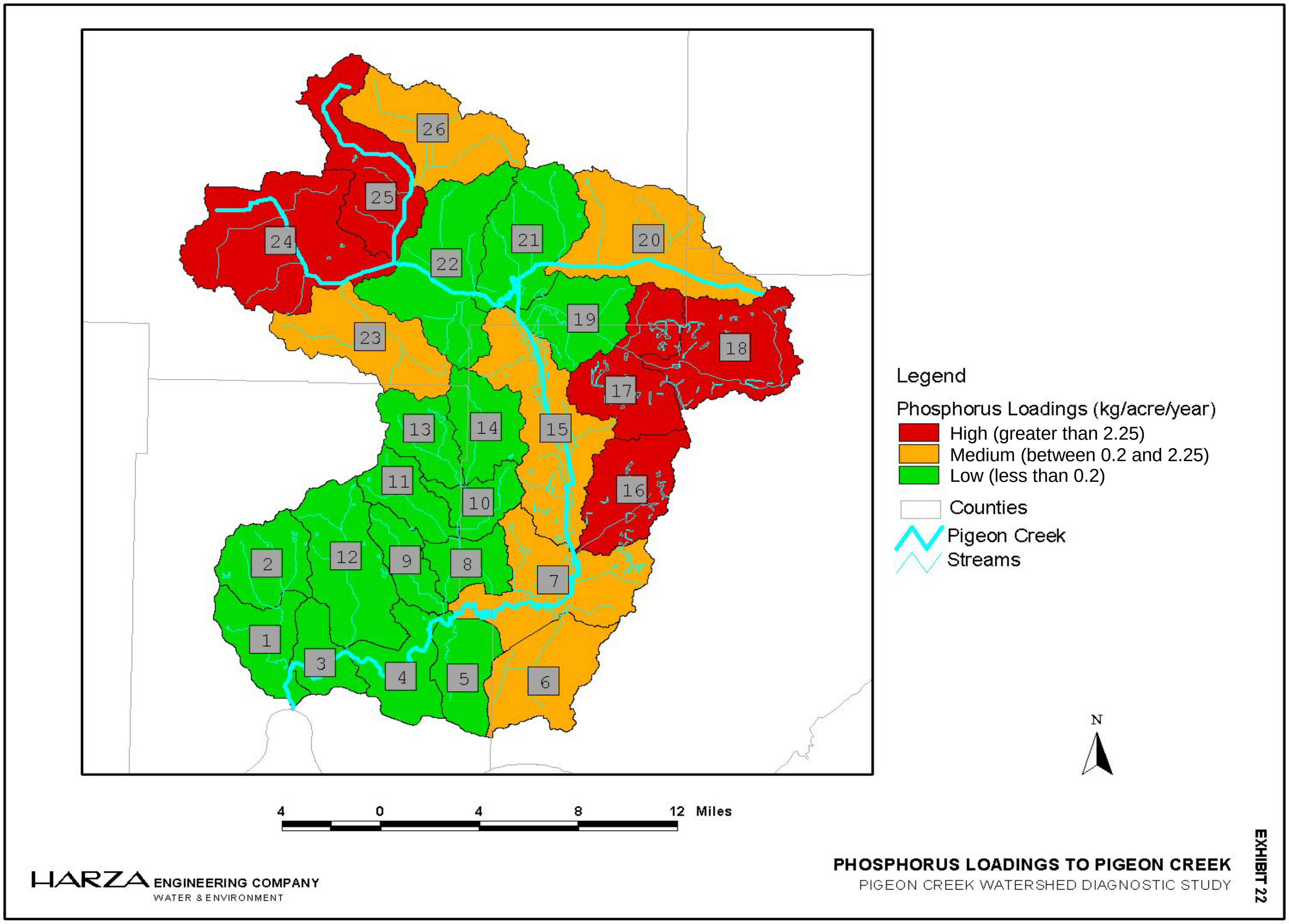
- In the Pigeon Creek basin, subwatersheds 6,16,17,18,23,24,25 and 26 exhibit the highest areal (tons/acre/yr) sediment loading and should be considered priority for erosion control best management practices.

Figure 14: sediment loading



In the Pigeon Creek basin, subwatersheds 16,17,18,24 and 25 exhibit the highest areal (kg/acre/yr) phosphorous loading and should be considered priority for applying nutrient management practices.

Figure 15: phosphorous loading



In the Pigeon Creek basin, subwatersheds 7,10,15,23 and 24 exhibited the highest nitrate concentrations and should be considered priority for applying nutrient management practices and/or further investigation into septic tank and WWTP discharges.

The surface water quality standard set by the State for nitrite and nitrate is a maximum of 10 mg/L. This is based upon human health criteria and has no wildlife basis.

Nitrate values for the August survey ranged from less than the detection limit of 0.05 mg/L as N at several sites, to a high of 6.7 mg/L at WF2 downstream of the Fort Branch wastewater treatment plant (WWTP) effluent on the West Fork Pigeon Creek. We also measured high nitrate at SD1, Stollberg Ditch at SR 62, of 5.4 mg/L as N.

Nitrate values for the May 2000 survey ranged from less than the detection limit of 0.05 mg/L as N at several sites, to a highs of 9.3 mg N/L at WF3, 8.9 at WF2 and 8.0 at WF1, all on West Fork Pigeon Creek. WF3 is upstream of all NPDES discharges and high nitrate levels there reflect agricultural nonpoint sources. We also measured high nitrate at SD1, Stollberg Ditch, of 5.7 mg N/L, and at Hurricane Creek, HC1, of 4.9 mg N/L; both SD1 and HC1 are downstream of WWTP discharges.

The surface water quality standard set by the State for ammonia nitrogen is pH and temperature dependent. Ammonia nitrogen values for the August survey ranged from less than 0.03 mg/L at PC3 (Pigeon Creek upstream of First Avenue), to a high of 2.88 mg/L at PC6, at US 41. Ammonia nitrogen values for the May survey ranged from 0.11 mg/L at PC6, to a high of 6.5 mg/L at PC9 (Stevenson Station Road). This high value at PC9 is suspect, as total Kjeldahl nitrogen (TKN) at PC9 during the May survey was 1.5 mg/L. As ammonia is operationally defined to be less than TKN, we attribute this value to laboratory error.

There is no state water quality standard for TKN. TKN values for the August 1999 survey ranged from less than the detection limit of 1.0 mg/L at several sites to 4.6 in Stollberg Ditch. TKN values for the May 2000 survey ranged from less than the detection limit of 1.0 mg/L at several sites to 10.0 in Stollberg Ditch. Other high TKN values found during May were at UN1, an unnamed tributary near Chandler, of 8.4 mg/L, and PC4, at Heidelbach Avenue of 5.0 mg/L.

- From the Harza study of McFadden Creek subwatershed, we estimated the following loadings (see map next page):
    Reach MF1
    836.4 kg/yr phosphorous, 10,418 lbs/yr nitrate,
    66.2 tons/yr sediment
    Reach MF2
    836.4 kg/yr phosphorous, 10,418 lbs/yr nitrate,
    79.2 tons/yr sediment
    Reach MF3
    114.5 kg/yr phosphorous, 1181 lbs/yr nitrate,
    6.3 tons/yr sediment
    Reach MF4
    64.4 kg/yr phosphorous, 1892.7 lbs/yr nitrate,
    1.2 tons/yr sediment
    Reach MF5
    No loading- stream flow not measured
    Reach MF6
    274.5 kg/yr phosphorous, 79.2 lbs/yr nitrate,
    65.3 tons/yr sediment
    Reach MF7
    549 kg/yr phosphorous, 125.2 lbs/yr nitrate,

- McFadden…Continued

107.1 tons/yr sediment

Reach MF8

656.2 kg/yr phosphorous, 11,676 lbs/yr nitrate,
212.6 tons/yr sediment

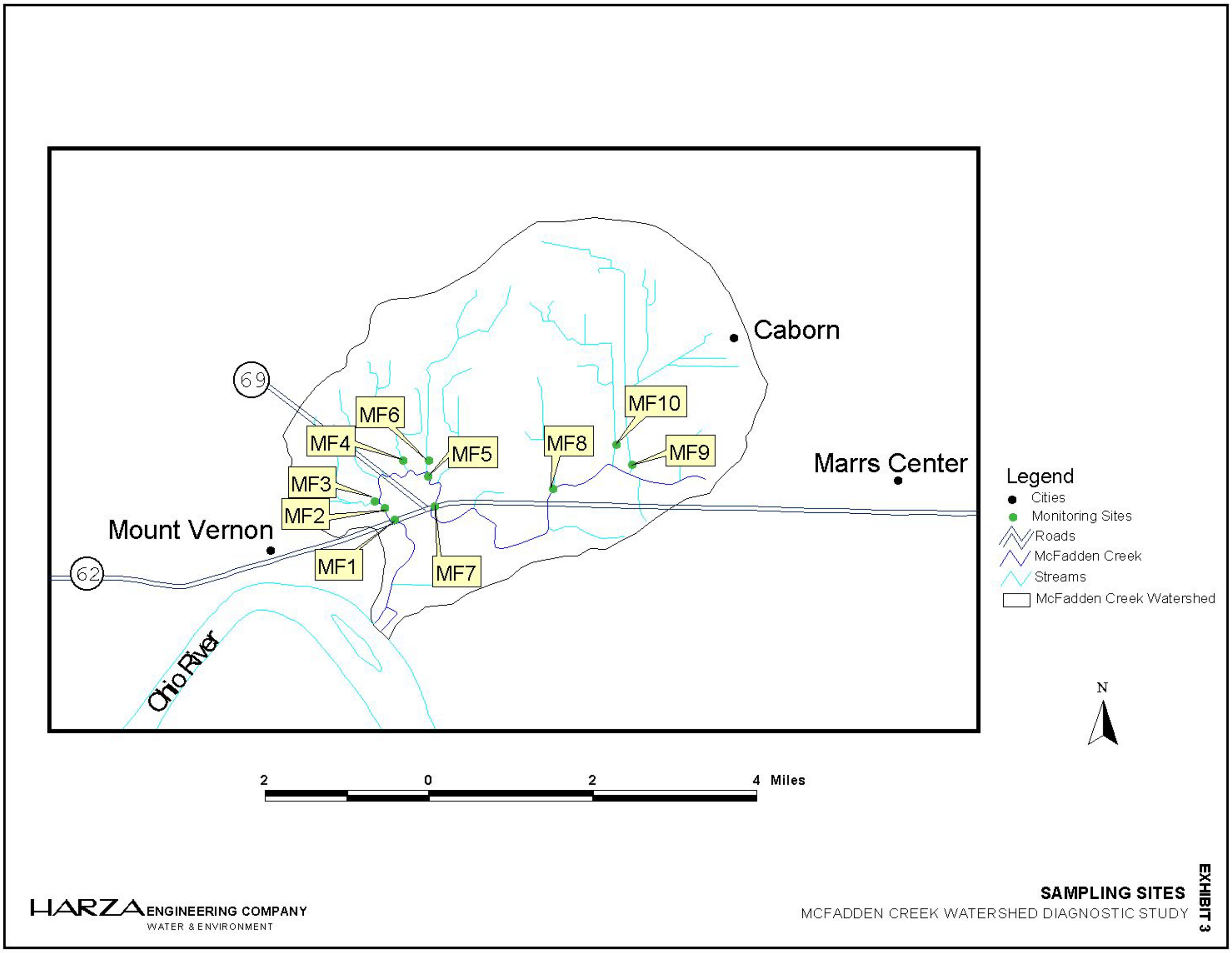
Reach MF9

210 kg/yr phosphorous, 4953 lbs/yr nitrate,
6.9 tons/yr sediment

Reach MF10

47.2 kg/yr phosphorous, 1378 lbs/yr nitrate,
0.7 tons/yr sediment

Figure 16: sampling sites in McFadden Creek subwatershed



- From Pigeon-Highland Watershed Steering Committee's quality-assured data for Carpentier Creek subwatershed:

  Phosphorous loading = 0.28 kg/yr/ac

  Nitrate loading = 0.29 lbs/yr/ac

  Sediment loading not calculated, due to no suspended solids tests done. However, given the average turbidity of 16.78 NTU, sediment loading can be assumed to be fairly low.
- No flow data was collected by IDEM Assessment Branch for the Bayou Creek subwatershed. Hoosier Riverwatch volunteers did collect flow data, unfortunately, there was no detectable flow in the channel on that particular date. Concentrations indicate phosphate enrichment and low dissolved oxygen.

- *E. coli* bacteria. *Escherichia coli* is the most widely known member of the coliform group of bacteria. *E. coli* is abundant in fecal matter and is often used as an indicator of sanitary discharges and pathogenic organisms. *E. coli* is estimated colony forming units (cfu) per 100ml of sample. Indiana's standard for recreational waters state "E. coli bacteria, using membrane filter (MF) count, shall not exceed one hundred twenty-five (125) colony forming units per one hundred (100) milliliters as a geometric mean based on not less than five (5) samples equally spaced over a thirty (30) day period nor exceed two hundred thirty-five (235) colony forming units per one hundred (100) milliliters in any one (1) sample in a thirty (30) day period" (IAC 327 2-1-6).

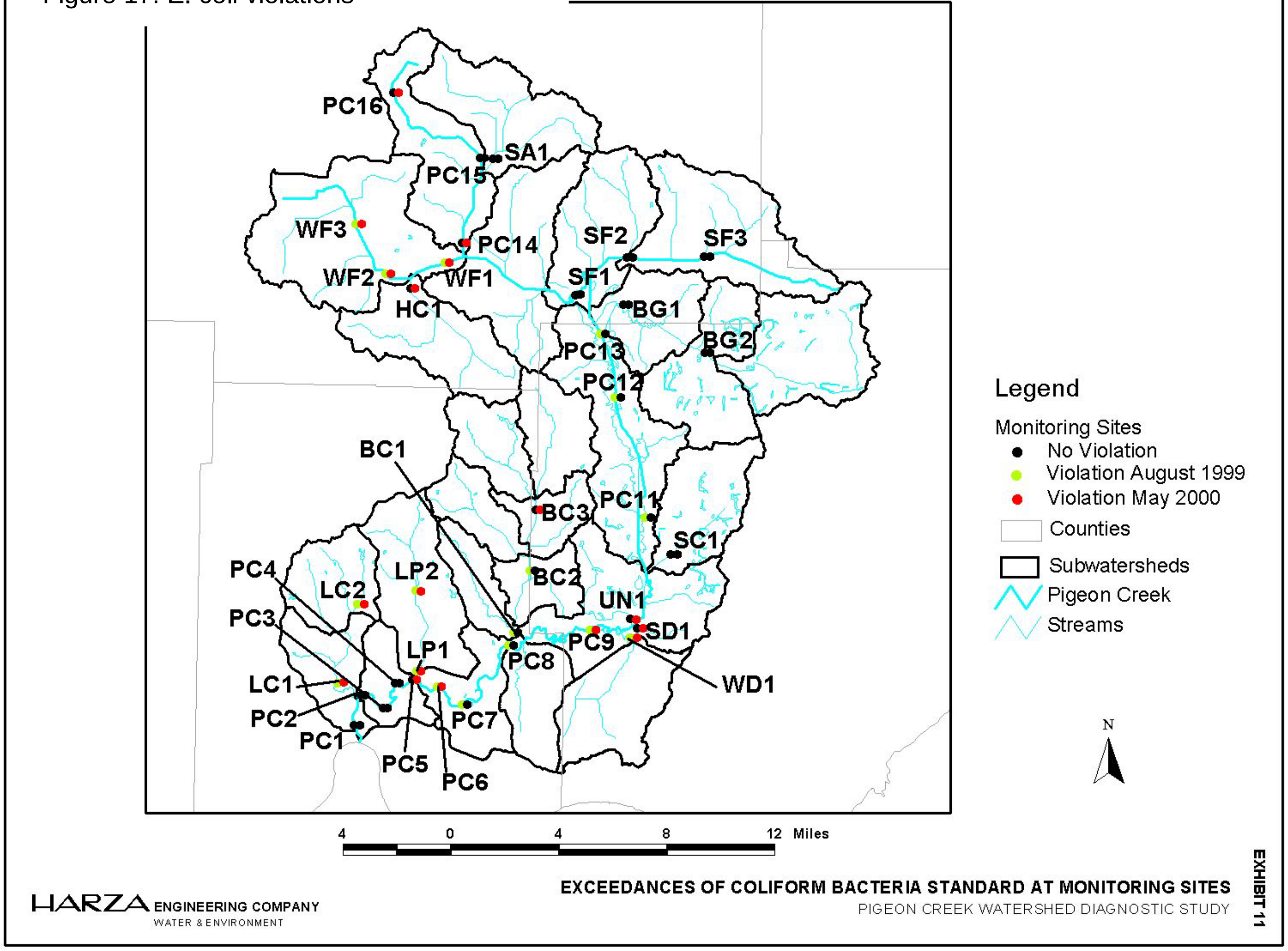
  Samples were collected for measurement of *Escherichia coli* at each site during the bioassessments of August 1999 and May 2000, as well as during CSO and wet weather sampling. The results of the latter are presented in the Stream Reach Characterization and Evaluation (Appendix C). Results from the August *E. coli* survey range from zero to 24,000 colony-forming units per 100 mL. Seventeen out of 36 sites were found to be in excess of the 235/100 mL water quality standard (Table 14) and an equal number, albeit at some different sites, exceeded the standard during the May survey. Nine sites exceeded the standard during both surveys: two locations on Pigeon Creek (PC6 and PC9), both sites on Locust Creek, both sites on Little Pigeon Creek, Weinsheimer Ditch, and all sites on West Fork Pigeon Creek (WF1, WF2, WF3).

Table 13
**SITES DOCUMENTED DURING DRY WEATHER**
**TO EXCEED THE *E. COLI* STANDARD**

| **August 1999** | **May 2000** |
|---|---|
| PC6, PC7, PC8, PC9, PC 11, PC12, PC13, LC1, LC2, LP1, LP2, BC1, BC2, WD1, WF1, WF2, WF3 | PC5, PC6, PC9, PC14, PC16, LC1, LC2, LP1, LP2, BC3, WD1, SD1, UN1, WF1, WF2, WF3, HC1 |

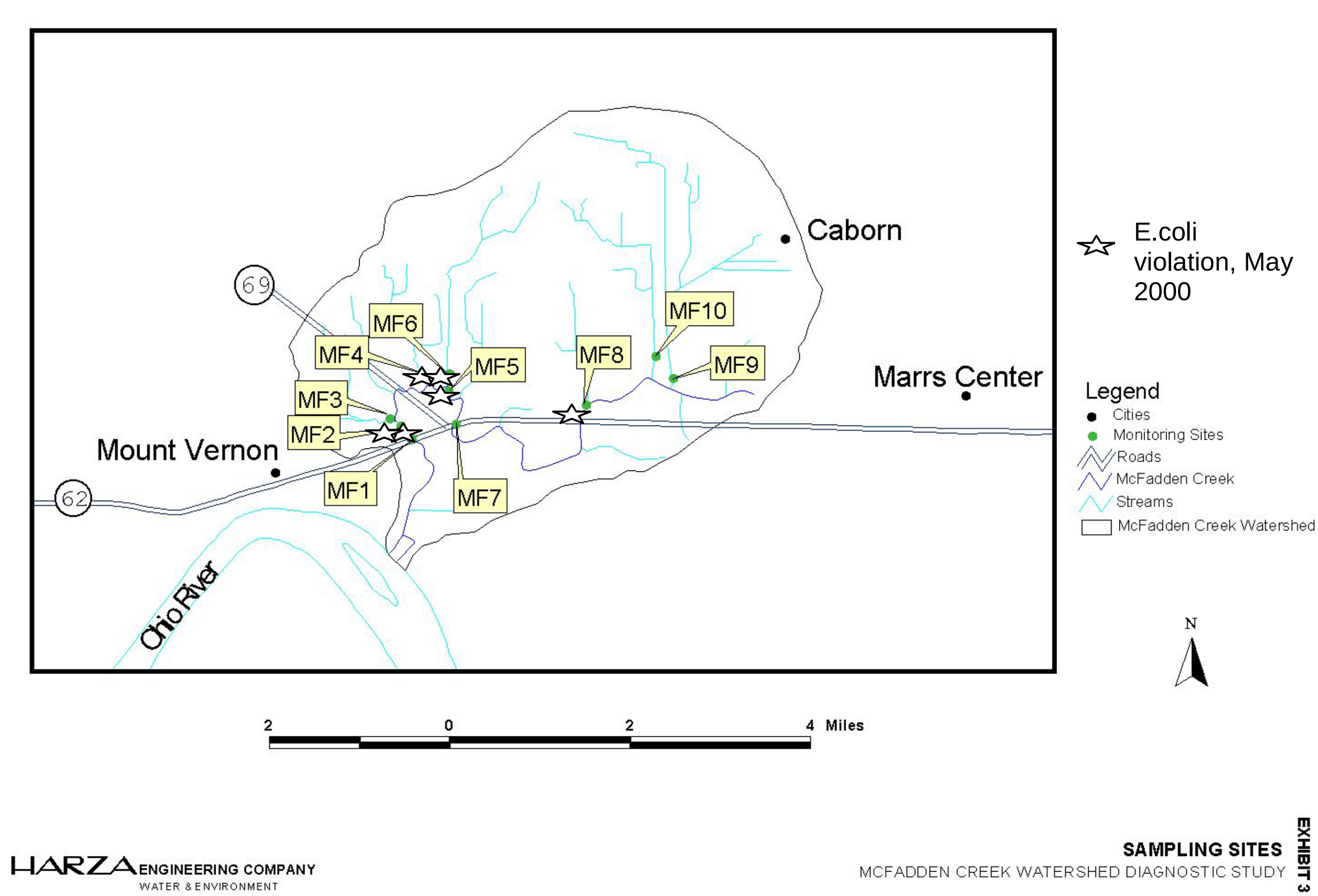
In their 305(b) assessment process, IDEM does not use the water quality standard to determine recreational use support of streams. IDEM considers streams with no more than one grab sample slightly exceeding 235 colonies/100mL and the geometric mean not exceeded to support recreational use. In the August survey, 13 sites exceeded 235/100mL. During the May survey, 12 sites exceeded 235/100mL.

Figure 17: E. coli violations



In McFadden Creek subwatershed, sites MF-1, MF-2, MF-4, MF-5, MF-6, and MF-8 exceeded the state standard for *E. coli* bacteria during the May 2000 monitoring period.

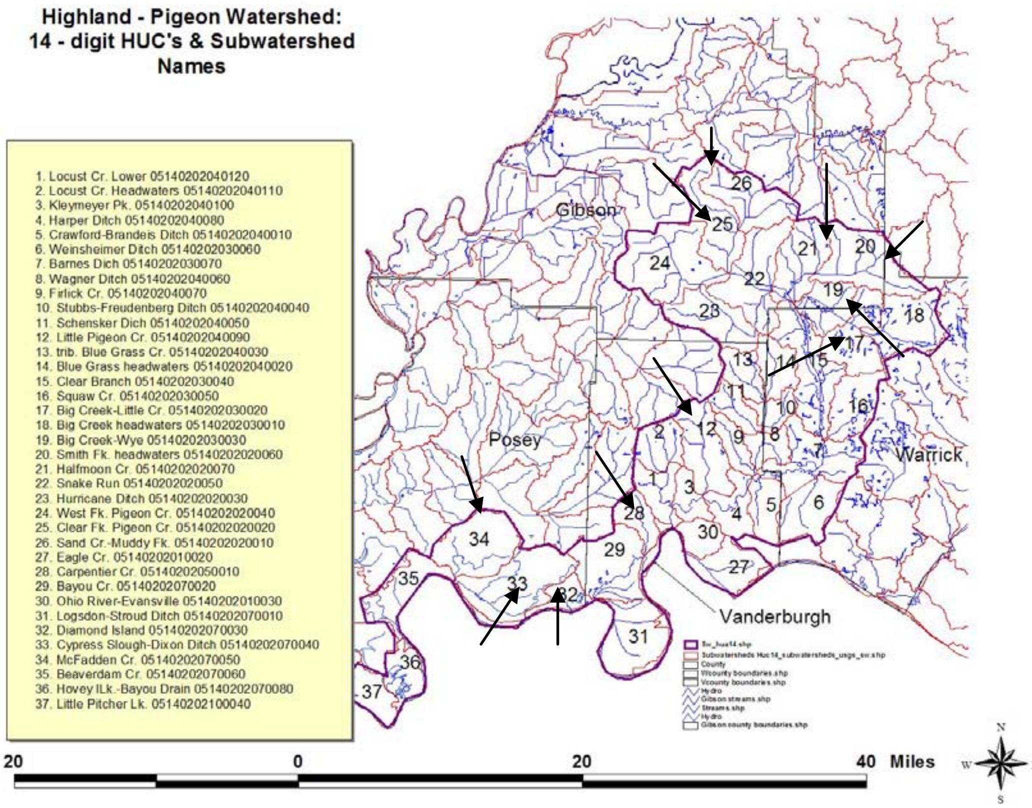
Figure 18: E. coli violations, McFadden Creek




The only site not covered by both the Harza study and the PHWSC study, for which E.coli data exists, is Carpentier Creek, #28. E. coli counts ranged from 0 to 2500 colonies per 100 ml and the state standard of 235 col/100ml was exceeded in 5 of 14 sampling events.

Subwatersheds identified in the Harza study that warrant protection/conservation efforts- due to inherent habitat quality and relatively good water quality- include: 17- Big Creek/Little Creek; 19- Big Creek/Wye; 20- Smith Fork headwaters; 21- Halfmoon Ditch; and 25- Pigeon Creek/Clear Fork; 26- Sand Creek; and 12- Little Pigeon Cr.

*Figure 19: Subwatersheds warranting protection*




- Carpentier Creek subwatershed, #28, is slated for study by the Vanderburgh Co. Surveyor's Office-Drainage Board as the watershed is increasingly affected by urbanization.
- Subwatersheds not covered in either Harza's or PHWSC's studies, but warranting protection because of significant wetlands and cypress groves include: 32- Diamond Island/Dixon Ditch and 33- Cypress Slough. Subwatershed 36- Hovey Lake/Bayou Drain, is already protected under state and federal agencies.

- The remainder of the subwatersheds in the Pigeon Creek basin are ranked from highest quality to worst, the very best being discussed on the previous page:

Table 14

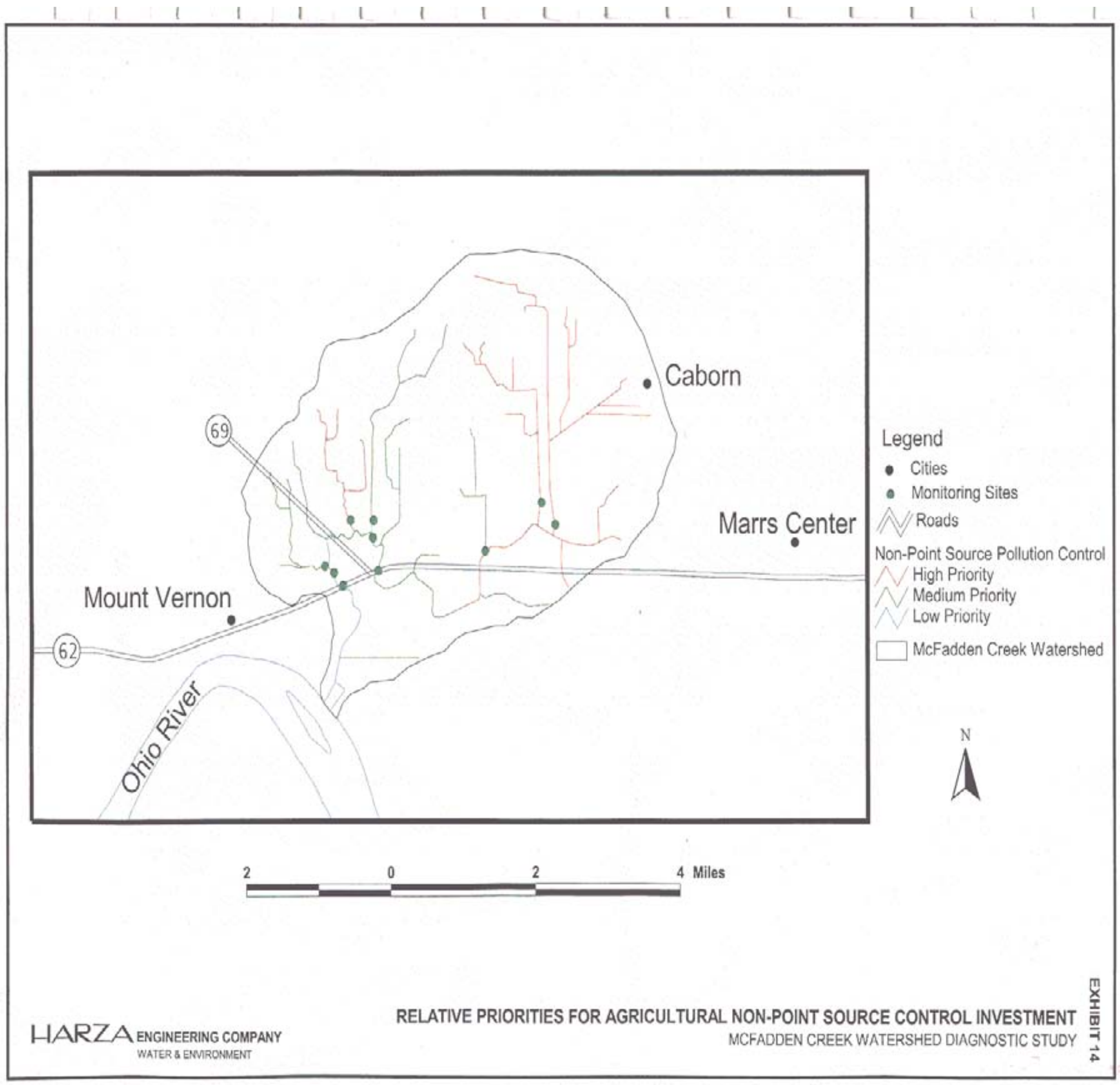
RELATIVE TRIBUTARY BIOTIC INTEGRITY

| Monitoring Site | Water Body | Points | Rank |
|---|---|---|---|
| | ***First Quartile*** | | |
| SF3 | Smith Fork | 13 | 1 |
| BG1 | Big Creek | 16 | 2 |
| BG2 | Big Creek | 16 | 3 |
| PC15 | Pigeon Creek | 18 | 4 |
| SF1 | Smith Fork | 18 | 5 |
| SF2 | Smith Fork | 18 | 6 |
| PC14 | Pigeon Creek | 20 | 7 |
| **Monitoring Site** | **Water Body** | **Points** | **Rank** |
| SA1 | Sand Creek | 22 | 8 |
| LP2 | Little Pigeon Creek | 23 | 9 |
| | ***Second Quartile*** | | |
| PC4 | Pigeon Creek | 24 | 10 |
| PC5 | Pigeon Creek | 24 | 11 |
| PC12 | Pigeon Creek | 24 | 12 |
| SC1 | Squaw Creek | 24 | 13 |
| WF1 | West Fork | 25 | 14 |
| PC2 | Pigeon Creek | 26 | 15 |
| PC11 | Pigeon Creek | 26 | 16 |
| PC16 | Pigeon Creek | 27 | 17 |
| LC1 | Locust Creek | 27 | 18 |
| | ***Third Quartile*** | | |
| WF2 | West Fork | 27 | 19 |
| WF3 | West Fork | 27 | 20 |
| PC13 | Pigeon Creek | 28 | 21 |
| PC1 | Pigeon Creek | 29 | 22 |
| PC3 | Pigeon Creek | 29 | 23 |
| BC1 | Bluegrass Creek | 30 | 24 |
| LP1 | Little Pigeon Creek | 31 | 25 |
| LC2 | Locust Creek | 33 | 26 |
| UN1 | Unnamed Tributary | 33 | 27 |
| | ***Fourth Quartile*** | | |
| HC1 | Hurricane Creek | 33 | 28 |
| PC8 | Pigeon Creek | 35 | 29 |
| BC3 | Bluegrass Creek | 35 | 30 |
| WD1 | Weinsheimer Ditch | 35 | 31 |
| PC7 | Pigeon Creek | 36 | 32 |
| BC2 | Bluegrass Creek | 37 | 33 |
| PC6 | Pigeon Creek | 39 | 34 |
| PC9 | Pigeon Creek | 41 | 35 |
| SD1 | Stollberg Ditch | 41 | 36 |

- McFadden Creek, subwatershed #34, is currently the recipient of IDNR LARE (lake & river enhancement) funding for erosion control and manure management practices. McFadden Creek enters the Ohio River in close proximity to Mount Vernon's drinking water intake.
- McFadden Creek was also prioritized for agricultural nonpoint source control on a stream reach basis:

***Figure 20***

| Prioriy | Stream reach |
|---|---|
| HIGH | MF-10,MF-4,MF-8,MF-9 |
| MODERATE | MF-7,MF-5,MF-6,MF-3 |
| LOW | MF-1,MF-2 |



**<u>7. Setting Goals and Selecting Indicators:</u>** State the water quality improvement or protection goals that were agreed upon by the group. Goals must include specific, realistic targets for reducing pollutants or mitigating impacts, and identify timeframes for accomplishment.

- **Goals:**

1. Reduce sediment loading in subwatersheds 23,24, 25,26,MF4,MF8,MF9,MF10 by 50% OR to “T” levels for prevailing soil types. 5 to 10 years.

2. Restore riparian habitat to improve Aquatic Life Use Support/aesthetic value in subwatersheds 23,24,25,26,MF8,MF9,MF10. 5 to 15 years.

3. Reduce levels of phosphorous by at least 50% in subwatersheds 16,17,18,24 and 25. 5 to 10 years.

4. Eliminate discharges of raw or inadequately treated sewage, by supporting preparation of preliminary engineering reports for Gibson, Warrick, and Posey counties. 5-10 years. Support continued work on combined sewer overflow elimination in Evansville. Also encourage upgrade at Ft. Branch WWTP (subwatershed 24) 5 to 25 years.

5. Reduce runoff from livestock operations in subwatersheds MF4,MF8,MF9,and 20. 3 to 5 years.

6. Reduce illegal dumping of solid waste and cleanup existing sites in subwatersheds MF2, 7,15,16,25. 5 to 10 years.

7. Restore impaired wetlands and/or create new wetlands by enrolling at least 100 acres in USDA-NRCS Wetland Reserve Program. Potential watersheds: 16,25,and 33. 5 to 10 years.

8. Encourage adoption of urban erosion control practices and enforce current rules and ordinances. Ongoing.

9. Provide education opportunities- field days, public meetings, school visits, etc. regarding water, watersheds and land use to all stakeholders. Ongoing.

*(See Table in Appendix F)*

**<u>8. CHOOSING MEASURES TO APPLY:</u> Describe what needs to be implemented or changed to achieve the goals of the watershed plan. Select an array of measures or alternatives to accomplish this.**

- **Sedimentation from erosion on agricultural land.**

There are many types of Best Management Practices (BMP's) available for erosion control on agricultural land. Ranging from the simple, but very effective vegetative filter strip, up to engineered practices such as WASCoB's (water and sediment control basins). Practices are field –specific, not all practices are appropriate on every farm.
Practices are usually designed by USDA-NRCS personnel, under the guidance of an Agricultural Engineer, to NRCS specifications as found in the Field Office Technical Guide (FOTG).

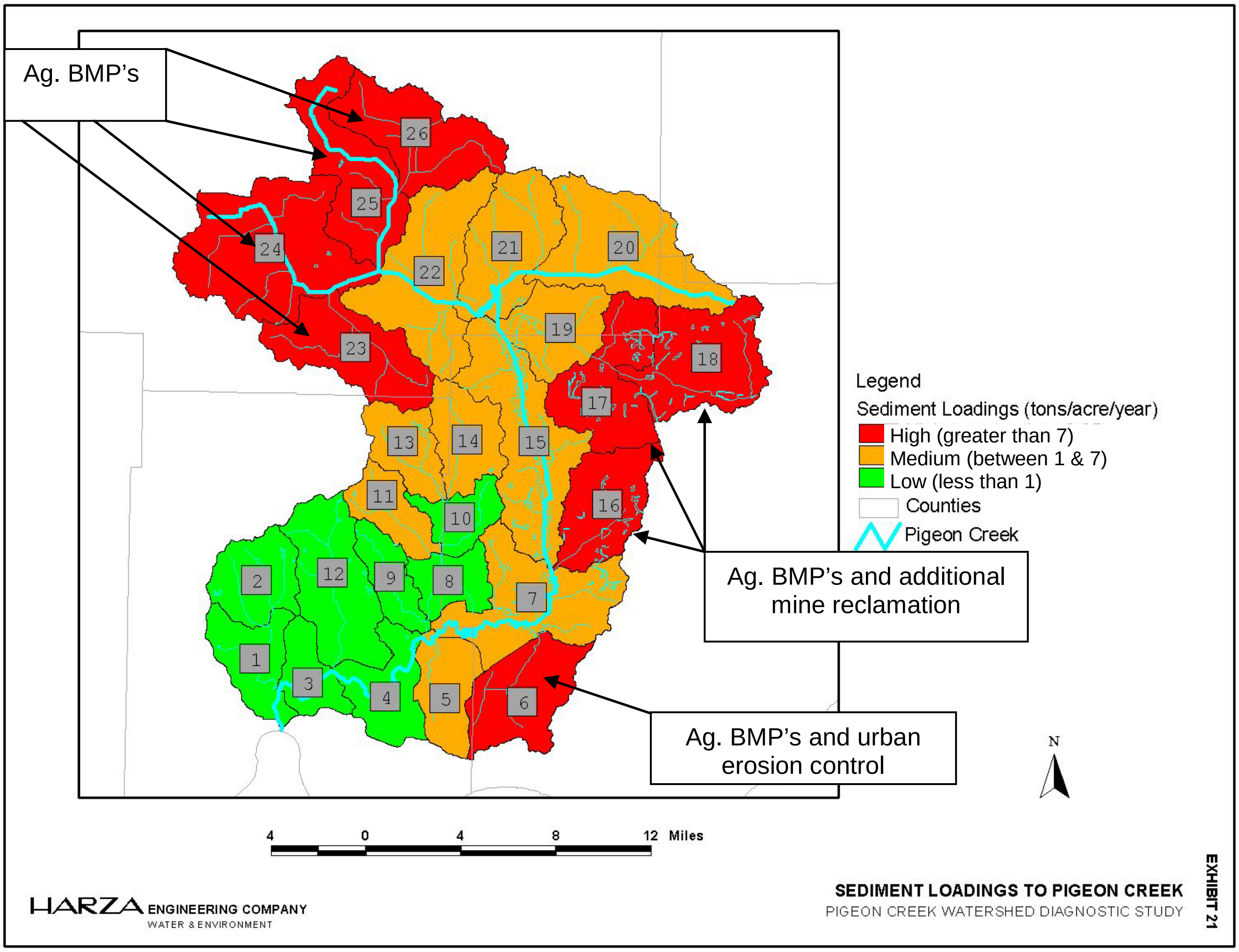
Continuous cropping systems- utilizing cover crops or corn-wheat-soybean-hay rotations- are also effective in reducing soil erosion. No-till corn planting is very effective, but adoption rates are low in Gibson County, the area of the watershed with the most highly erodable land.
For subwatersheds 23,24,25 and 26 the following BMP's are recommended: vegetative filter strips on any land adjacent to a stream to control sheet & rill erosion, grassed waterways and/or WASCoB's to control gully erosion, and cover crops or no-till systems to reduce soil loss from fallow fields. Filter strips have the added advantage of moving all chemical application away from surface water.

For subwatersheds 16,17 and 18, the same practices would be appropriate on the land that is in crop production. However, these three subwatersheds also have large areas of minimally-reclaimed strip mine land, and also active mining. In the case of the reclaimed ground, critical area planting that includes: additional tree planting, warm-season grasses, retention basins and other practices would be appropriate. Additional buffers and retention would also be appropriate on the active mine land.

Subwatershed 6 is a combination of agriculture and rapidly-urbanizing land. BMP's suggested for the other agricultural subwatersheds would be appropriate on the cropped area. For the land under development, increased attention should be paid by the regulatory authority to erosion control plans required of any project disturbing 5 acres or more. Such plans should meet guidelines found in "Indiana Handbook for Erosion Control in Developing Areas", otherwise known as "Rule 5". A local ordinance requiring a vegetative buffer between any watercourse and development would be very effective.

Technical assistance and financial incentives are available for most agricultural BMP's through USDA programs such as: Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP) and state programs such as IDNR's Lake and River Enhancement (LARE) program and IDEM's Section 319 nonpoint source program.

*Figure 21*


Ag. BMP's
26
25
24
22
21
20
19
18
23
17
13
14
15
11
10
16
2
12
9
8
7
1
3
4
5
6
Legend
Sediment Loadings (tons/acre/year)
High (greater than 7)
Medium (between 1 & 7)
Low (less than 1)
Counties
Pigeon Creek
Ag. BMP's and additional mine reclamation
Ag. BMP's and urban erosion control
N
4 0 4 8 12 Miles
HARZA ENGINEERING COMPANY
WATER & ENVIRONMENT
SEDIMENT LOADINGS TO PIGEON CREEK
PIGEON CREEK WATERSHED DIAGNOSTIC STUDY
EXHIBIT 21

- **Runoff from livestock operations.** Once again, NRCS is the lead agency on the planning and design of livestock and manure management practices. The Field Office Technical Guide and the National Grazing Handbook give design requirements and applications.

For the Smith Fork headwaters subwatershed (#20), manure management plans should be prepared for each of the five identified producers. These plans, developed to FOTG specifications by a Certified Crop Consultant, spell out the rate, timing and location of all manure application to the land. Manure composting facilities are another possibility for these producers, and have the advantage of reducing the volume of manure ultimately needing to be disposed of. Rotational grazing and pasture renovation would be appropriate for at least one of the beef cattle producers, where destruction of the sod leaves the soil and manure readily available for transport to the nearest stream. A remote watering system is also need at this same site, as the cattle are permitted access to the stream at the present. Technical assistance for this subwatershed is available from NRCS and IDNR Resource Specialists. Financial assistance is available through USDA's EQIP and CRP programs. (See map below)

For the MF4 reach of McFadden Creek subwatershed (#34), a manure management plan is needed for a small turkey growing and processing facility. It has been observed that the manure is being applied in the same field year after year. The resulting nutrient overload in the soil is assumed to be contributing excess nutrients to this stream reach. In addition, the waste disposal system for the processing plant is not adequate, and is contributing E. coli and nutrients directly to the stream.

The swine facility in Reach MF8 has numerous problems. A manure management plan should be developed- as well as a manure application system of some kind. This facility also requires a composter for dead animals and bedding. Terraces need to be constructed to divert runoff from entering and hydraulically overloading the manure holding basins. Two abandoned water wells need to be properly closed.

The small dairy in Reach MF9 needs a manure management plan and a retention basin for feedlot runoff (See map next page).

Technical assistance for these practices is available from NRCS and IDNR Resource Specialists. Additional guidance is available from Purdue University: http://agry.purdue.edu/mmp/ Financial assistance from IDNR's LARE program is already in place for McFadden Creek subwatershed, and working relationships between the facility owners and technical assistance providers are already being forged.

*Figure 22*

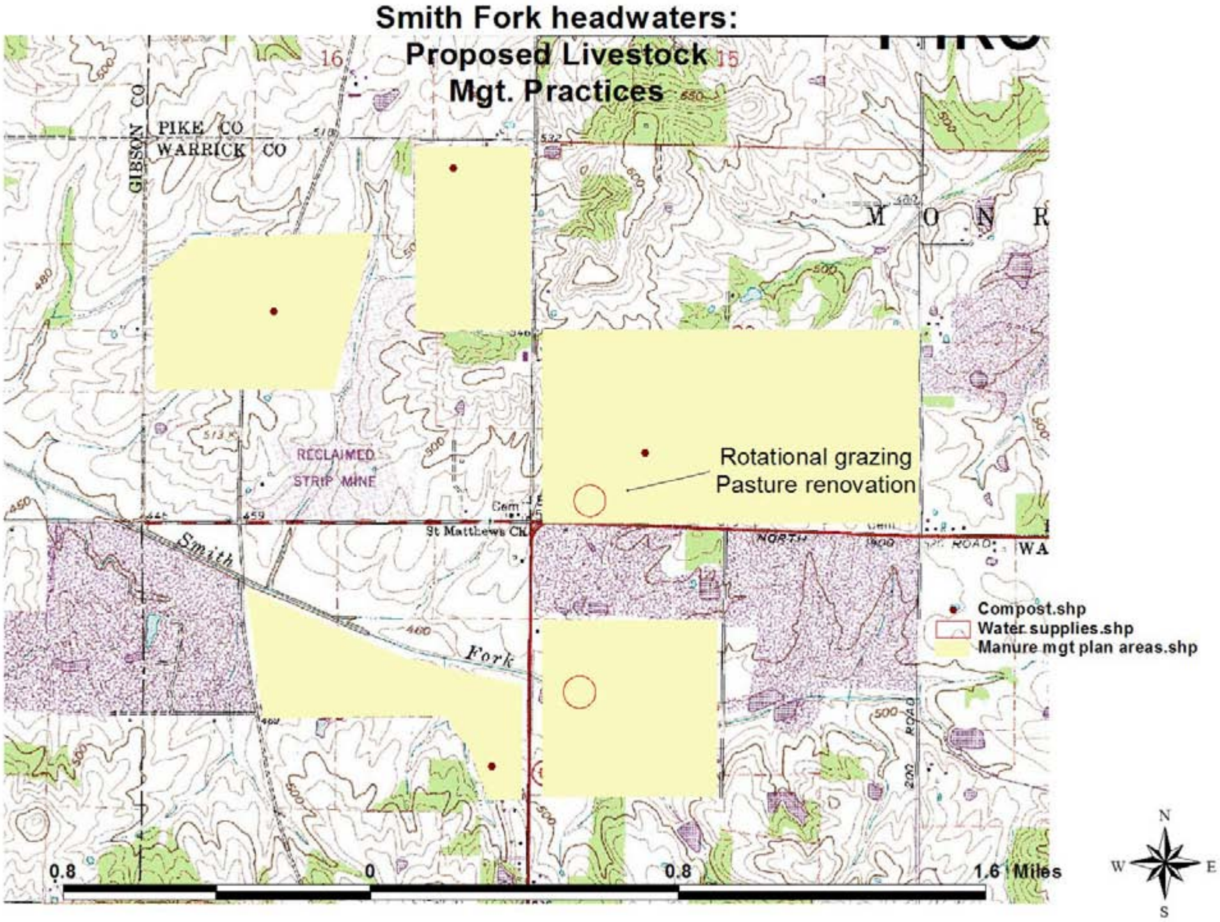
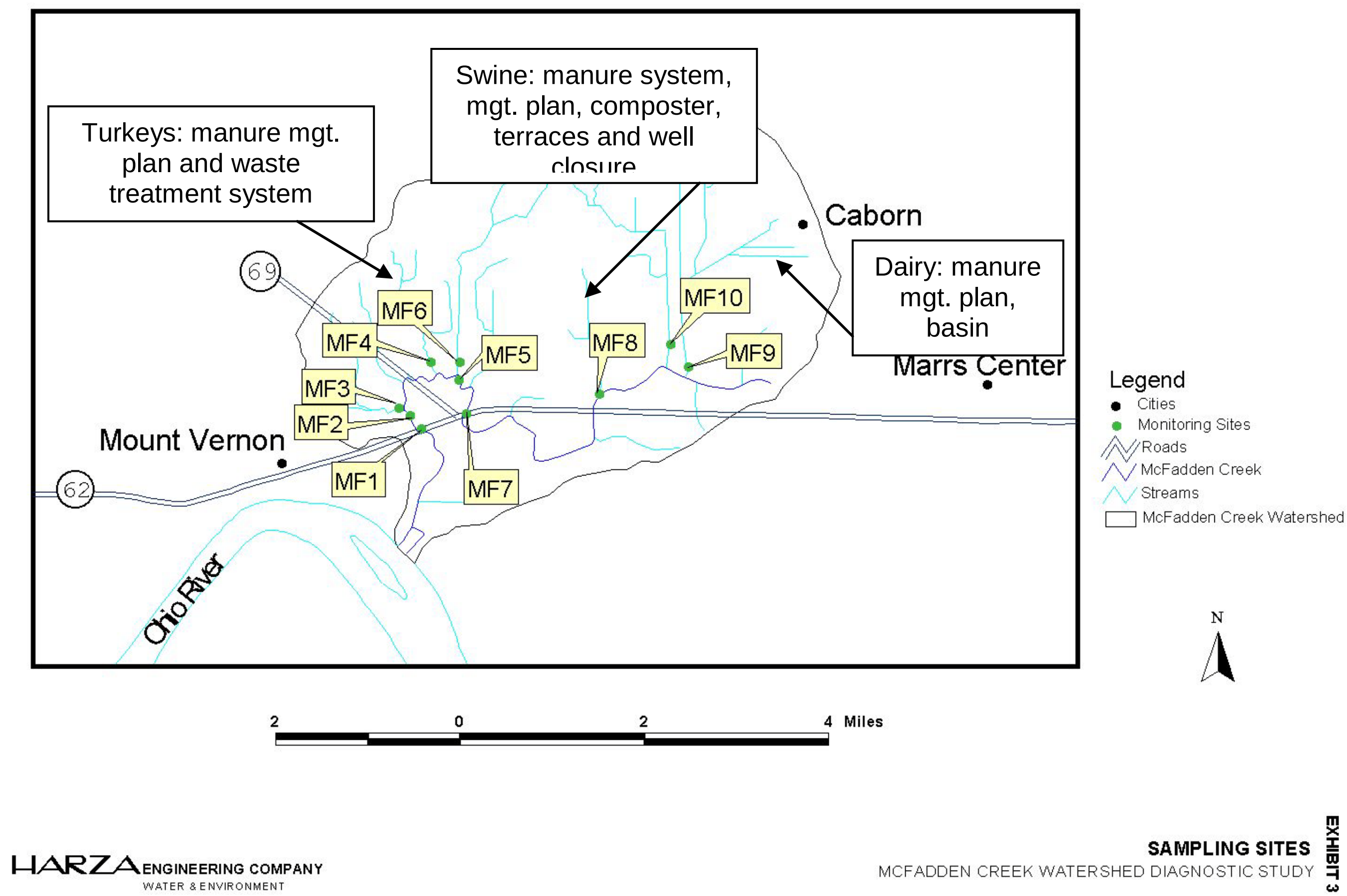
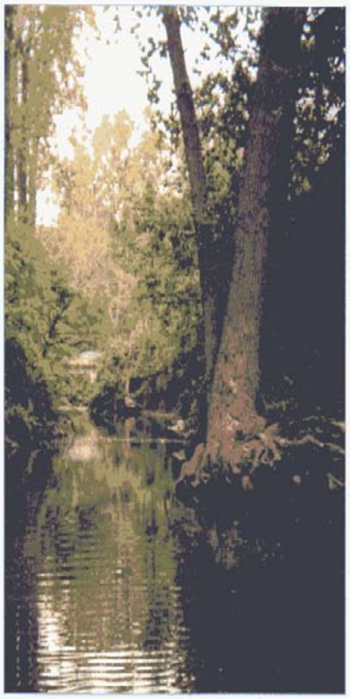

Smith Fork headwaters:
Proposed Livestock
Mgt. Practices
Rotational grazing
Pasture renovation
RECLAIMED
STRIP MINE
PIKE CO
WARRICK CO
GIBSON CO
St Matthews Ch
Smith
Fork
Compost.shp
Water supplies.shp
Manure mgt plan areas.shp
0.8
0
0.8
1.6 Miles
N
W
E
S

**Figure 23: McFadden Creek: Proposed livestock mgt. practices**



**Educational opportunities.** A major cause of ambivalence towards watersheds has been the lack of a coordinated educational effort. During PHWSC's four years of Section 319 funding, well over a thousand students, from 4th grade to university, were exposed to watershed and water quality information. Several field days for adult citizens were also held, and programs, displays and materials were presented to agricultural stakeholders at public meetings. With the end of grant funding in June 2003, this effort will cease, leaving a definite need for more educational opportunities. The Soil & Water Conservation Districts have traditionally been the leaders at the county level for environmental education. Currently, only Gibson County has a full-time Educator on staff, and as a county employee, she is constrained from working outside the county. Educational opportunities are an integral part of the other eight goals of this plan. For the sake of future planning, we propose that the four county area seek funding from local and state government, and private partners to create the position of Watershed Education Coordinator.

*Figure 24: Examples of Printed Educational Material*
*IDNR LARE Brochure*



In 2000, the State Soil Conservation Board awarded $1.1 million of Lake and River Enhancement funds as grants to protect the water quality of Indiana lakes and streams and to reduce soil erosion. The funded projects will improve water quality through the installation of grass cover, filter strips and structures to reduce sedimentation and nutrient runoff. Some will result in the production of scientific studies that document water-related problems and solutions. Since 1988, The LARE program grants have assisted nearly 200 projects.

**DNR**
Indiana Department of Natural Resources

The Department of Natural Resouces' Division of Soil Conservation belongs to the Indiana Conservation Partnership. The partnership includes Indiana's 92 soil and water conservation districts (SWCDs), the USDA Natural Resources Conservation Service, and the Purdue University Cooperative Extension Service.

Working together, the Indiana Conservation Partnership provides technical, educational, and financial assistance to citizens in order to solve erosion and sediment-related problems occurring on the land or impacting public waters.

If you are a landowner in the Pigeon Creek Watershed and are interested in improving our water resources and conserving soil, please contact us.

Contacts for additional information:

Department of Natural Resources
Division of Soil Conservation
402 W. Washington St., W265
Indianapolis, In 46204-2739
Telephone 317-233-3870
www.state.in.us/dnr/soilcons

Evansville Water and Sewer Utility
Telephone 812-421-2130

DNR Agricultural Conservation Specialist
Mr. Ronnie Boehm
Telephone 812-482-1171 ext. 3

Vanderburgh County Soil and Water Conservation District, Evansville, Indiana
Telephone 812-867-0729

Gibson County Soil and Water Conservation District
Princeton, Indiana
Telephone 812-385-5033 ext. 3

Warrick County Soil and Water Conservation District
Boonville, Indiana
Telephone 812-897-2840 ext. 3

Four Rivers Resource
Conservation and Development Area, Inc.
Telephone 812-354-6808 ext. 5

Photographs courtesy of USDA NRCS and Harza Engineering Company.

**Pigeon Creek Watershed**

**Conserving Natural Resources in the Pigeon Creek Watershed**

A partnership of the Vanderburgh, Gibson and Warrick County Soil and Water Conservation Districts, Evansville Water Sewer Utility, Four Rivers Conservation and Development Area, Indiana Department of Environmental Management and Indiana Department of Natural Resources

## Mission

The Pigeon-Highland Watershed Steering Committee was formed out of concern for the health of the watershed. It originated in 1999 as a 319a grant through the Indiana Dept. of Environmental Management. Administered through Four Rivers R.C.& D.,the project involves many groups and agencies, including the USDA Natural Resource Conservation Service, the Indiana Dept. of Natural Resources, Div. of Soil Conservation, and the local Soil and Water Conservation Districts. But most importantly, the project depends on landowners and communities in the watershed.

Scenic stretch of Pigeon Creek near Port Gibson......

## Goals

- Coordinate volunteer water quality monitoring efforts.
- Submit information to the media on at least a quarterly basis.
- Develop and implement a cost-share program for landowners for the installation of best management practices on their land.
- Document via photographs the condition of land before and after implementation of best management practices.
- Develop a database to identify tributaries, land use and ownership within the watershed.

Filter strip planted in cool-season grasses

## Services

Amy Steeples, IDNR, working with Boonville H.S. class

GET INVOLVED!! You can do your part to improve water quality. There are many benefits to participants of the project. Farmers can help improve water quality by participating in the buffer initiative which has cost share opportunities.

Citizens can participate in water quality monitoring through the RiverWatch program

To participate, or for more information, call the Watershed Restoration Coordinator, Rick Obenshain at (812) 385-4849 ext.3

*Figure 25: PHWSC Brochure*

- Another function of the Watershed Educator may be contacting agricultural land owners and operators to encourage BMP installation. This approach has worked quite well during the four years the Watershed Coordinator position was funded through IDEM's 319 grant program.

- **Discharges of raw or inadequately treated sewage.** This problem presents challenges on many levels- funding being the major obstacle. The city of Evansville has completed a Long Term Control Plan (LTCP) for the combined sewer overflows (CSO's) and is making headway on the construction of a new north-side treatment plant (see Appendix C for more info). The plant alone is projected to cost $53,000,000, but is vital to meet the rapid growth of the north-side. One interesting fact about the new plant is that while it will significantly reduce CSO volume to Pigeon Creek, the plant will discharge treated effluent to Pigeon Creek. All told, Evansville will spend over $130,000,000 to eliminate or control CSO discharges to Pigeon Creek and the Ohio River.
- The Fort Branch wastewater treatment plant (WWTP) is in dire need of expansion and upgrade. It is the only remaining small WWTP in the watershed that has NOT been recently upgraded. As was mentioned in ITEM's 4 and 5 of this plan, local government has been discussing this problem for years, and action is long overdue. Given Ft. Branch's proximity to the Toyota Motor Manufacturing Plant and its' satellite industries, it is critical that this WWTP becomes capable of handling the ever-increasing flows associated with rapid growth in the US41 corridor. Several county councilmen and commissioners are pressing for action at the present time.
- Outside of the communities served by WWTP's, individual septic systems are the method of wastewater treatment. While many septic systems in the watershed may function adequately, enough systems have been observed contaminating land and water to warrant surveys or preliminary engineering reports (PER) in all four counties of the Highland-Pigeon watershed. The impetus for this first step has to originate with the county commissioners and council. Gibson County Commissioners recently applied to IDEM for Section 205j funds to conduct a PER, but unfortunately, funding was denied. Gibson and the other three counties of the watershed need to keep pursuing means to make these PER's a reality. While the costs associated with repairing or retrofitting septic systems may be prohibitively expensive for individual property owners, funding mechanisms exist that subsidize costs, thereby reducing the owner's expense.


Figure 26: Discharge from failed septic system, Gibson Co., IN

**High phosphorous levels.** There are many types of Best Management Practices (BMP's) available for erosion control on agricultural land. Ranging from the simple, but very effective vegetative filter strip, up to engineered practices such as WASCoB's (water and sediment control basins). Practices are field –specific, not all practices are appropriate on every farm.

These same practices also are effective in reducing phosphorous mobilization and runoff, because phosphorous is usually found attached to soil particles. This fact is somewhat validated by the data- showing that some of the subwatersheds with highest soil loss rates also demonstrate the highest phosphorous loadings. In addition, BMP's to reduce erosion and phosphorous loading also can reduce nitrate concentrations in water leaving agricultural fields.

Practices are usually designed by USDA-NRCS personnel, under the guidance of an Agricultural Engineer, to NRCS specifications as found in the Field Office Technical Guide (FOTG).

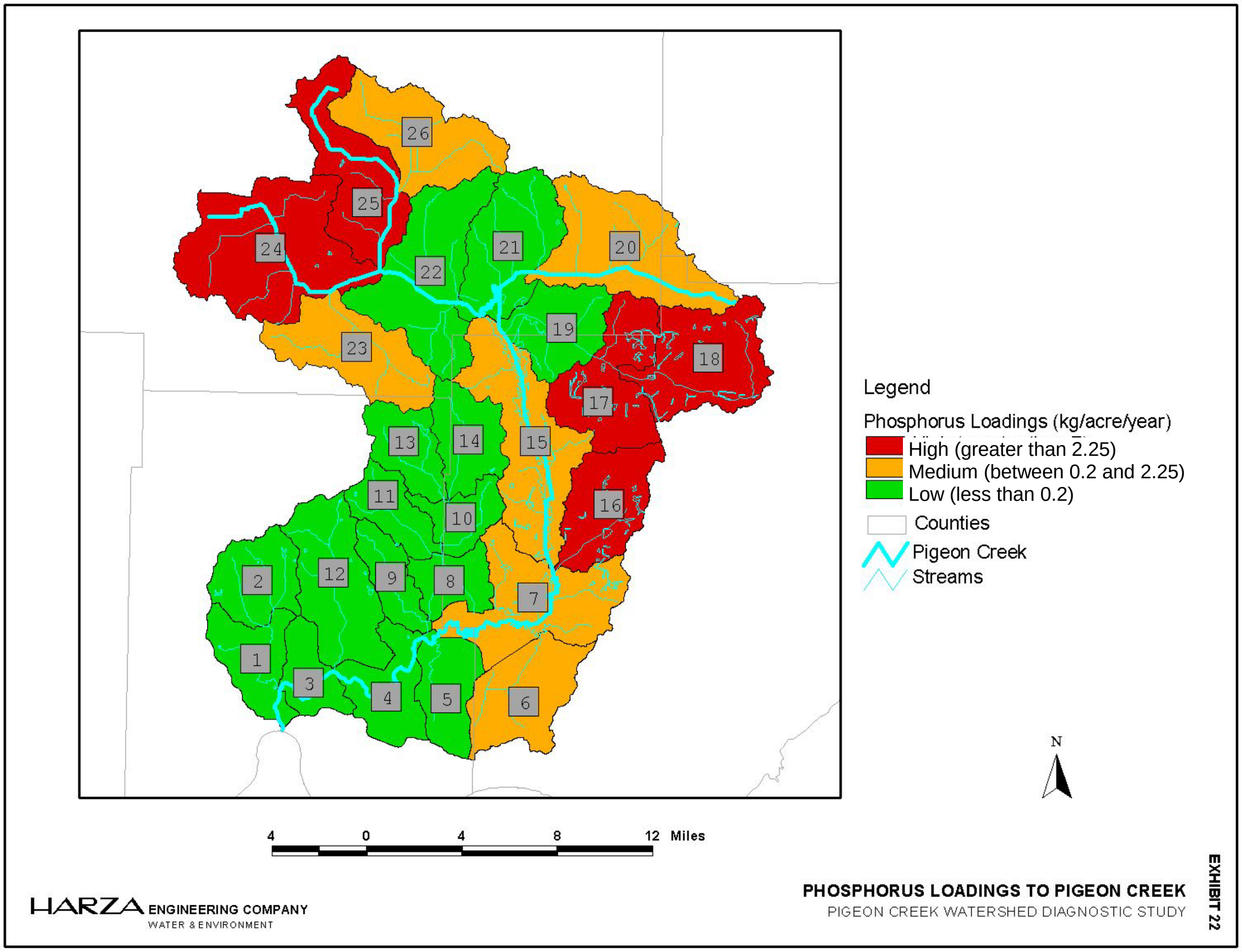
Continuous cropping systems- utilizing cover crops or corn-wheat-soybean-hay rotations- are also effective in reducing phosphorous loading to the stream. No-till corn planting is very effective, but adoption rates are low in Gibson County, the area of the watershed with the most highly erodable land.

For subwatersheds 24 and 25, the following BMP's are recommended: vegetative filter strips on any land adjacent to a stream to control sheet & rill erosion, grassed waterways and/or WASCoB's to control gully erosion, and cover crops or no-till systems to reduce soil- and nutrient-loss from fallow fields. Filter strips have the added advantage of moving all chemical and fertilizer application away from surface water. In addition, a Nutrient Management Plan, prepared by a Certified Crop Consultant, should be executed on every farm in the watershed.

For subwatersheds 16,17 and 18, the same practices would be appropriate on the land that is in crop production. However, these three subwatersheds also have large areas of minimally-reclaimed strip mine land, and also active mining. In the case of the reclaimed ground, additional tree planting, warm-season grasses, retention basins and other practices would be appropriate. Additional buffers and retention would also be appropriate on the active mine land.

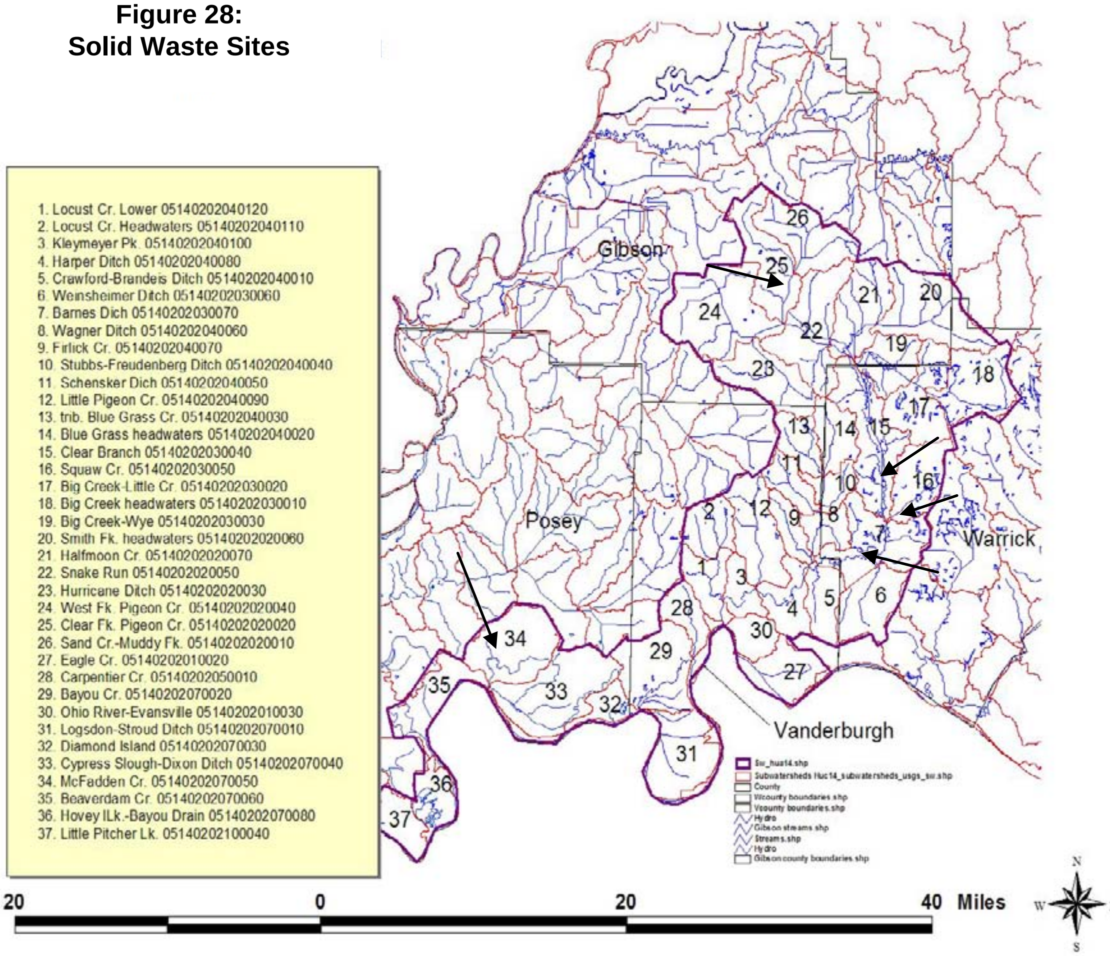
Technical assistance and financial incentives are available for most agricultural BMP's through USDA programs such as: Conservation Reserve Program (CRP), Environmental Quality Incentives Program (EQIP) and state programs such as IDNR's Lake and River Enhancement (LARE) program and IDEM's Section 319 nonpoint source program.

*Figure 27*


26
25
24
22
21
20
19
18
23
17
13
14
15
11
16
10
2
12
9
8
7
1
3
4
5
6
Legend
Phosphorus Loadings (kg/acre/year)
High (greater than 2.25)
Medium (between 0.2 and 2.25)
Low (less than 0.2)
Counties
Pigeon Creek
Streams
N
4 0 4 8 12 Miles
HARZA ENGINEERING COMPANY
WATER & ENVIRONMENT
PHOSPHORUS LOADINGS TO PIGEON CREEK
PIGEON CREEK WATERSHED DIAGNOSTIC STUDY
EXHIBIT 22

**Illegal solid waste disposal.** "Dumping attracts dumping"- the saying is sad but true. The measure we want to apply to this issue is multi-fold: to begin with, we want to form a partnership of citizens, SWCD, Solid Waste Management District(SWMD), business and industry, county government and others to physically remove and properly dispose of the solid waste dumps in subwatersheds 7,15,16,25 and Reach MF2. As both prelude to and follow-up, news releases and field days will be provided as part of the Educational Opportunities component of this watershed management plan. Funding will be furnished by the partnership through cash, budget line items and in-kind donations. Another parameter of this measure is to restore the riparian vegetation- either destroyed in the process of the cleanup, or removed sometime in the past. The final on-site measure will be the posting of signs describing the cleanup, the partnership, and a reminder to the public of the legal penalties for illegal dumping. All counties in the watershed have SWMD districts that subsidize the cost of citizens' solid waste disposal. It is disheartening that no matter how inexpensive or convenient waste disposal is made, some people still dispose of their unwanted items in an illegal and irresponsible manner. Because of this fact of society, it is imperative that solid waste be a topic of the Educational Opportunities component.

**Figure 28:**
**Solid Waste Sites**



- **Streams impaired for Aquatic Life Use Support (ALUS).**

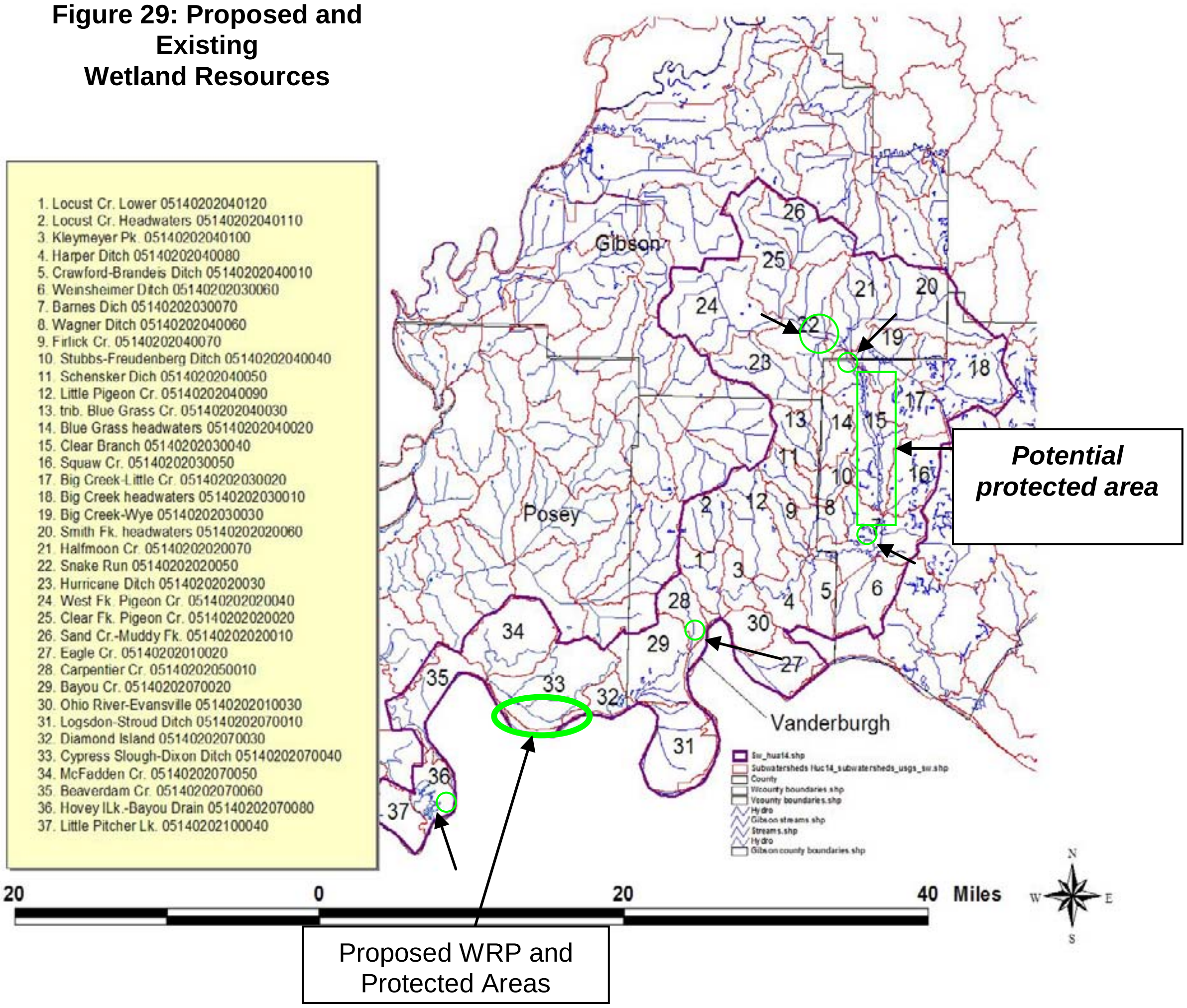
Subwatersheds 23,24,25,26 and McFadden stream reaches MF8,MF9,MF10 will be evaluated for riparian restoration, or at the minimum, filter strips. USDA-NRCS has specifications and planting guidelines for this best management practice, and technical assistance will be provided by SWCD staff, IDNR Resource Specialists and NRCS. Financial incentives are available for this practice through USDA's Conservation Reserve Program, EQIP, DNR's LARE program, and IDEM's Section 319 grants. Given the slow rate of growth for most trees, measures of success, i.e. lower water temperature, woody debris in the channel, increased macroinvertebrate diversity, may not be quantifiable for many years. Estimates of potential riparian restoration (stream miles include both banks):

Watershed 23: 10% existing cover, 22 stream miles
Watershed 24: 0% existing cover, 40 stream miles
Watershed 25: 20% existing cover, 23 stream miles
Watershed 26: 15% existing cover, 26 stream miles
Watershed 34: reaches MF8, MF9, MF10 0% existing cover, 15 stream miles

It should be noted that trees are not widely popular with most farmers, especially adjacent to crop fields. Therefore, the potential for actual riparian restoration is probably a small percentage of the stream miles noted above. Filter strips, while not as effective a riparian cover, are better than doing nothing, and in the absence of significant additional financial incentive, have a better chance of adoption by the land owner. Filter strips were identified in previous sections as a suitable BMP for sedimentation and nutrient control.

- **Only 6% of watershed consists of wetlands.** Currently, the natural wetland areas of the watershed are limited to the stream corridor of Pigeon Creek through parts of Gibson and Warrick counties. Other small areas exist in southeastern Posey County, and the Hovey Lake Fish and Wildlife Area in southwest Posey contains significant wetlands. At present, three areas of constructed and /or enhanced wetland exist- two in Warrick County, and one in Vanderburgh. Our recommendation is to work with the landowners in southeastern Posey County to protect the existing wetlands and cypress groves. In addition, we would like to see at least 100 acres of cropland that was converted from wetland restored to its natural state. NRCS' Wetland Reserve Program is an excellent way to meet this goal and has many benefits: NRCS pays for the restoration- tree planting, creation of shallow water areas, etc.; a 30-year or a permanent easement is placed on the acreage, preserving wetlands for future generations; and the landowner retains ownership of the property and is paid an assessed value for the easement.

**Figure 29: Proposed and Existing Wetland Resources**



- **Urban erosion control.** Urban best management practices (BMPs) are actions or methods that could be used to reduce flow rates and contaminant concentrations in urban runoff. There are essentially two types of urban BMPs: source controls and treatment controls. Source controls are practices that prevent pollution by reducing the amount of pollutants at their source from entering the runoff. Treatment controls refer to devices that remove pollutants from the runoff.

Source controls are pollution prevention programs that target contaminants at their source. Since BMP technology is still imperfect, a good urban BMP program will require certain source controls be implemented in addition to the existing development. Some of the more appropriate and effective source control BMPs are described below.

Public education is a practice intended to educate the general public the proper way of using, storing, and disposal of a variety of hazardous household products that will enter stormwater. The public must become aware that many of the constituents are used in the home and that the way these products are used and disposed of can affect the stormwater quality.

The promotion of good housekeeping practices by municipal employees, the general public, and small businesses can be another effective source control BMP. Good housekeeping practices include storing hazardous products securely, safely, and in original containers; reading and following product instructions; and properly disposing of products. Staffs are needed to train municipal employees and coordinate public education efforts.

Conducting street sweeping on a regular basis can reduce the runoff of pollutants with storm water from street surfaces. When done regularly, street sweeping can remove 50 to 90% of street pollutants from polluting stormwater. Street cleaning program requires a significant capital and O&M budget. A sweeper can cost from $65,000 to $120,000 per machine, depending on the type. Evansville has a street sweeping program.

Catch basins must be cleaned periodically to maintain their ability to trap sediment and thereby prevent sewer blockages. Catch basin cleaning can improves both the aesthetics and the quality of the receiving water body. A catch basin that becomes a source rather than a sink for sediments is not being cleaned frequently enough. A catch basin cleaning program also requires a significant capital and O&M budget. For budgetary purposes, Southeastern Wisconsin Regional Planning Commission (1991) recommended a $8 cleaning cost per basin in communities equipped with vacuum street sweepers. Manual basin cleaning typically costs approximately $16 per basin. Institutional changes are recommended for improvements to Evansville's catch basin cleaning program.

Since vegetation can help to prevent erosion, take up nutrients, reduce the volume and rate of runoff, and increase groundwater recharge, control can help to maintain the vegetative ground cover on land. Vegetation control typically involves a combination of mechanical methods and careful application of herbicides.

Unlike source controls, treatment controls remove pollutants from the runoff. Treatment controls are most applicable in developing and redeveloping areas. To enhance the performance and longevity of treatment control BMPs, source controls should also be part of the treatment train. Without implementing source controls, the investment in the treatment control facilities will be lost. Some of the more appropriate and effective treatment control BMPs are described below.

Biofilters are vegetation filter strips designed to remove suspended solids by filtering through the vegetation and settling. Dissolved constituents may also be removed through chemical or biological mechanisms mediated by the vegetation and the soil. Some infiltration also occurs through the underlying soil cover.

Detention/retention ponds are the most effective management practices at removing pollutants through settling. Soluble nutrients and organic matter are removed through plant uptake and bacterial activity in the permanent pool of water. They also provide full control of peak discharges for large design storms.

The use of constructed wetlands to treat urban and agricultural storm water is popular. With functions similar to those of retention/detention ponds, constructed wetlands remove pollutants by impounding runoff and settle and retain suspended solids and associated pollutants. They can also be beneficial in the preservation and restoration of the natural balance between surface and ground water, and wildlife habitats. In urban surroundings, the availability of land is frequently a constraint on the applicability of this BMP. Constructed wetlands are discussed in greater detail below.

Hydrodynamic separators are structures built to remove sediments and other pollutants. Having a settling unit in the structure, sediments are efficiently separated by the flowing water. These separators are most effective in removing heavy particulates and floatables. The capital cost of these structures can range from $2,300 to $40,000 per pre-cast unit.

Street storage can be used to reduce the rate of runoff entering the sewer system. Street cross sections and storm drain inlets have to be modified so that the street surfaces can store and convey runoff during peak storm events and reduce the hydraulic loading to the combined sewer.

Source controls alone may not be sufficient to bring pollution loadings to levels where aquatic life is not stressed. Over the last two decades, interest has increased for the use of constructed wetlands for treatment of nonpoint source pollution. Constructed wetlands are designed specifically for water treatment and serve in a similar capacity as other water quality BMPs, to minimize pollution prior to its entry into streams, lakes and other receiving waters.

Among the most important treatment processes in wetlands are the purely physical processes of sedimentation. Sedimentation accounts for the relatively high removal rates for suspended solids, the particulate fraction of organic matter and sediment-bound nutrients and metals. Pathogens show good removal rates in constructed wetlands via sedimentation, natural die-off, and UV degradation. Dissolved constituents such as soluble organic matter, ammonia and orthophosphorus tend to have lower removal rates. Soluble organic matter is largely degraded aerobically by bacteria and periphyton. Ammonia is removed through microbial nitrification-denitrification, plant uptake, and volatilization. Nitrate is removed through denitrification and plant uptake. Phosphorus is removed mainly through soil sorption, plant assimilation and burial. Phosphorus removal rates are variable and, while phosphorus removal may be very high in newly constructed wetlands, phosphorus removal rates typically are lower than those of nitrogen in older, established wetlands.
General ranges of removal for various pollutants by constructed wetlands are given below.

***Table 15***

**CONSTRUCTED WETLAND POLLUTANT REMOVAL EFFICIENCY**

**(Source: Schueler, 1987, Schueler *et al.* 1992)**

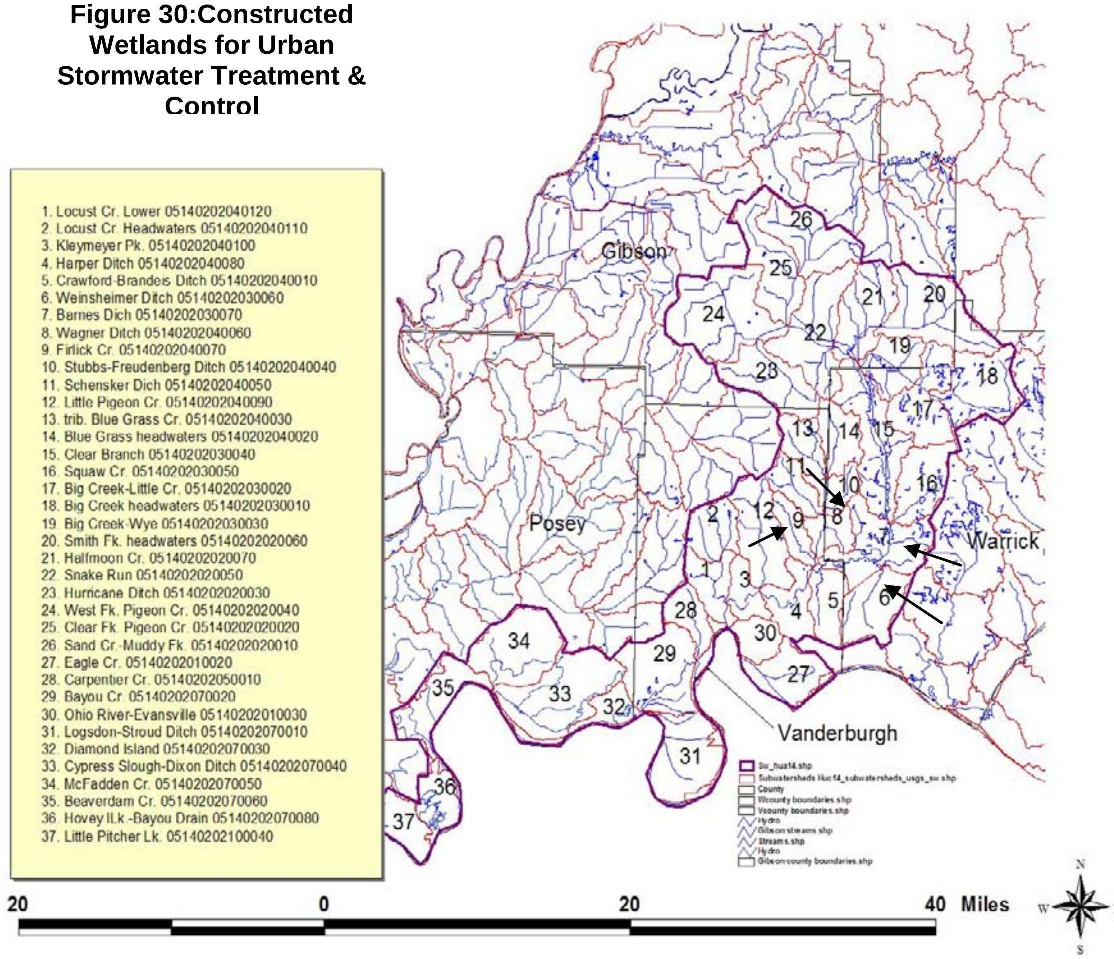
| Pollutant | Efficiency |
|---|---|
| Bacteria | High |
| Oil and Grease | Very high |
| BOD | Moderate |
| Trace metals (sediment-bound) | High |
| Sediment | High |
| Total Phosphorus | High |
| Total Nitrogen | Moderate |

Development of constructed wetlands for treatment remains an emerging technology and design criteria continue to evolve. General design considerations include the requirement to reduce runoff velocities and provide opportunities for sedimentation. Generally designers attempt to maximize the hydraulic residence time and the distribution of flow over the treatment area. Constructed wetlands can be a very effective part of a BMP system. While constructed wetlands can be nearly universally applied to point and nonpoint sources in the study area, we have recommended constructed wetlands be considered for priority development in four subwatersheds: 6, 7, 8 and 9 (see map, Figure 30 last pg. this section). Costs for development of wetlands can vary with size, site topography and other factors. Wetlands are generally sized according to treatment needs for the volume and quality of inflows. Treatment wetland unit costs can range from $5,000 per acre to upwards of $25,000 per acre. Wetland construction requires permits from the US Army Corps of Engineers, the IDNR, Indiana Department of Environmental Management (IDEM) and, if the site in on a regulated drain, the approval of the County Drainage Board.
We recommend that the appropriate SWCD (or other local sponsor) actively seek the involvement of local landowners in these four subwatersheds. We recommend their involvement initially be as advisors to a LARE-sponsored engineering feasibility study for constructed wetlands in Weinsheimer Ditch, Barnes Ditch, Dennis Wagner Ditch and Firlick Creek subwatersheds. As landowner interest and understanding of wetland systems and their benefits increases, one or more could possibly serve as co-sponsor for construction of the wetland.

There are several agencies providing funding for projects which address water quality, erosion control, storm water, nonpoint source pollution, wetlands, and wildlife. Funding agencies include the branches of the United States Department of Agriculture (Natural Resources Conservation Service (NRCS) and the United States Forest Service), branches of the United States Department of Interior (Fish and Wildlife Service and the Bureau of Reclamation), United States Environmental Protection Agency, and the United States Army Corps of Engineers.

Many of these funding agencies provide money to the states, which in turn, fund such programs as IDEM's Section 319 Nonpoint Source (NPS) Program. Other programs are financed at the state level, such as the LARE Program. At the county level, Indiana's Drainage Code provides authority to Drainage Boards to finance certain types of watershed management projects. We believe that this is an underutilized source of financing of watershed management projects.

**Figure 30:Constructed Wetlands for Urban Stormwater Treatment & Control**



**<u>9. Calculating Load Reductions:</u> Using methods appropriate to the situations present in the watershed, calculate estimated load reductions for the management measures identified.**

- Load reductions can be estimated for many agricultural and urban best management practices. For agricultural practices financed by Section 319 grant funds, IDEM's "Loading Workbook" is the required method. This may be used to calculate soil, nitrate and phosphate load reductions for: "Ag. Fields and filter strips" -filter strips, prescribed grazing, residue mgt., conservation crop rotation, conservation cover, cover & green manure, critical area planting and strip cropping practices. Under the "Gully Stabilization" heading, practices include grade stabilization structures, grassed waterways, critical area plantings in gully zones, and water & sediment control basins (WASCoB's). Using the spreadsheet under the "Feedlots" heading gives reductions for chemical oxygen demand (COD) and phosphate.
- Urban runoff loadings can also be estimated using the IDEM "Loading Workbook". Reductions by BMP's for: BOD,COD,TSS,lead, copper, zinc, TDS, total nitrate, total kjedahl nitrogen, dissolved phosphate, total phosphate and cadmium can be estimated once the site-specific information is entered. Practices appropriate for this model include: filter strips, grass swales, infiltration devices, wet detention, wetland detention, dry detention, settling basin, sand filter, water quality inlets, street sweeping, infiltration basins, infiltration trench, porous pavement, concrete grid pavement, sand filter/detention basin, water quality inlet/sand filter, oil & grit separator, and wet pond.
- Load reductions from improvements to Evansville's combined sewer system cannot be estimated at this point. Needless to say, if a particular overflow is eliminated, then that point is no longer a source of contaminant loading. See Appendix C for an idea of what contaminants would be affected by a reduction or elimination in overflows at the three representative CSO's.
- Load reduction estimates: the calculations underlying the IDEM "Loading Workbook" require farm field specific information. And, not every BMP is needed or appropriate on every farm. For the purposes of this watershed management plan, we have made generalizations about soil type, slope, cover factor and acres treated by the BMP.

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 20%- on the 81% of land that is farmland- we estimated the following load reductions for subwatersheds 23,24,25,26:

***Table 16***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-86 | 95-992 |
| Landowner Initials: | Pigeon Creek | HJK |
| Date practices completed: | 8/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**

- ☐ Agricultural Field Practices
- ☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 195 | 195 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.42 | 0.42 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.93 | 4.93 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 8327 | 14 |

The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.

**Please select a gross soil texture:**

- ○ Clay (clay, clay loam, and silt clay)
- ◉ Silt (silt, silty clay loam, loam, and silt loam)
- ○ Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- ○ Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 8133 | 92 |
| Phosphorus Load Reduction (lb/year) | 13837 | 114 |
| Nitrogen Load Reduction (lb/yr) | 25795 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 8133 | 177 |
| Phosphorus Load Reduction (lb/year) | 13837 | 214 |
| Nitrogen Load Reduction (lb/yr) | 25795 | 427 |

- Comparing these reductions to the loadings from the Harza study for these four subwatersheds:

  Sediment load reduction through filter strips,
  8133 tons/year
  divided by
  Initial sediment loading, 15,981 tons/year
  Equals 51% reduction (goal is 50%)

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 20%- on the 15% of area that is farmland- we estimated the following sediment load reductions for subwatersheds 16,17 and 18:

***Table 17***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-86 | 95-992 |
| Landowner Initials: | S&P 16-18 | HJK |
| Date practices completed: | 6/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**
☐ Agricultural Field Practices
☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 195 | 195 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.42 | 0.42 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.93 | 4.93 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 910 | 14 |

**The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.**

**Please select a gross soil texture:**

- ○ Clay (clay, clay loam, and silt clay)
- ● Silt (silt, silty clay loam, loam, and silt loam)
- ○ Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- ○ Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 92 |
| Phosphorus Load Reduction (lb/year) | 1887 | 114 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 177 |
| Phosphorus Load Reduction (lb/year) | 1887 | 214 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 427 |

- Comparing these reductions to the loadings from the Harza study for these three subwatersheds:

  Sediment load reduction through filter strips, 1172 tons/year
  divided by
  Initial sediment loading, 3347 tons/year

Equals 35% reduction (goal is 50%)

- Goal must be met through higher landowner adoption rate or additional field practices. Keep in mind that these three areas contain significant areas of reclaimed and active mining

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 20%- on the 50% of area that is farmland- we estimated the following sediment reductions for subwatershed 6:

***Table 18***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-66 | 95-992 |
| Landowner Initials: | SS | HJK |
| Date practices completed: | 6/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**

- ☐ Agricultural Field Practices
- ☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 195 | 195 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.42 | 0.42 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.93 | 4.93 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 910 | 14 |

**The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.**

**Please select a gross soil texture:**

- (  ) Clay (clay, clay loam, and silt clay)
- (•) Silt (silt, silty clay loam, loam, and silt loam)
- (  ) Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- (  ) Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 92 |
| Phosphorus Load Reduction (lb/year) | 1887 | 114 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 177 |
| Phosphorus Load Reduction (lb/year) | 1887 | 214 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 427 |

- Comparing these reductions to the loadings from the Harza study for this subwatershed:

Sediment load reduction through filter strips,

1172 tons/year
divided by

Initial sediment loading, 1559 tons/year

Equals 75% reduction (goal is 50%)

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 20%- on the 81% of land that is farmland- we estimated the following phosphorous reductions for subwatersheds 24 and 25:

***Table 19***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-55 | 95-992 |
| Landowner Initials: | P 24, 25 | HJK |
| Date practices completed: | 6/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**

- ☐ Agricultural Field Practices
- ☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 195 | 195 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.42 | 0.42 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.93 | 4.93 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 4929 | 14 |

**The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.**

**Please select a gross soil texture:**

- ○ Clay (clay, clay loam, and silt clay)
- ◉ Silt (silt, silty clay loam, loam, and silt loam)
- ○ Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- ○ Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 5140 | 92 |
| Phosphorus Load Reduction (lb/year) | 8631 | 114 |
| Nitrogen Load Reduction (lb/yr) | 16091 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 5140 | 177 |
| Phosphorus Load Reduction (lb/year) | 8631 | 214 |
| Nitrogen Load Reduction (lb/yr) | 16091 | 427 |

- Comparing these reductions to the phosphorous loadings from the Harza study for these two subwatersheds:

  Phosphorous load reduction through filter strips, 3923 kg/year

  divided by

  Initial phosphorous loading, 15,854 kg/year

Equals 25% reduction (goal is 50%).

- Goal will need to be met through other practices: no-till, residue mgt., cover crops, etc.

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 20%- on the 15% of land that is farm- we estimated the following phosphorous reductions for subwatersheds 16,17 and 18:

***Table 20***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-86 | 95-992 |
| Landowner Initials: | S&P 16-18 | HJK |
| Date practices completed: | 6/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**

☐ Agricultural Field Practices
☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 195 | 195 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.42 | 0.42 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.93 | 4.93 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 910 | 14 |

**The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.**

**Please select a gross soil texture:**

- ○ Clay (clay, clay loam, and silt clay)
- ● Silt (silt, silty clay loam, loam, and silt loam)
- ○ Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- ○ Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 92 |
| Phosphorus Load Reduction (lb/year) | 1887 | 114 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 1172 | 177 |
| Phosphorus Load Reduction (lb/year) | 1887 | 214 |
| Nitrogen Load Reduction (lb/yr) | 3518 | 427 |

- Comparing these reductions to the loadings from the Harza study for these three subwatersheds:

Phosphorous load reduction through filter strips,
858 kg/year
divided by
Initial phosphorous loading, 4418 kg/year

Equals 19% reduction (goal is 50%)

- Again, goal must be met by higher adoption on farmland, additional practices and/or addressing other sources of loading, i.e. mining.

- Assuming filter strips are the prevalent BMP for farm land, and assuming a landowner adoption rate of 50%, we estimate the following reductions for stream reaches MF4,8,9 and 10 of subwatershed 34, McFadden Creek:

***Table 21***

**Agricultural Fields and Filter Strips**

**Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies of this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).**

| | | Example |
|---|---|---|
| IDEM Project Manager: | RBO | WWS |
| Project ARN: | 00-98 | 95-992 |
| Landowner Initials: | McFadden Cr | HJK |
| Date practices completed: | 6/15/2013 | 8/8/1999 |

**These may include:**
Prescribed Grazing
Residue Management, Mulch Till
Conservation Crop Rotation
Conservation Cover
Cover and Green Manure
Critical Area Planting
Stripcropping, Contour
Stripcropping, Field
Filter Strips

**Please check which BMPs apply:**

- ☐ Agricultural Field Practices
- ☑ Filter Strips

| RUSLE | Before Treatment | After Treatment | Example Before Treatment | Example After Treatment |
|---|---|---|---|---|
| Rainfall-Runoff Erosivity Factor (R) | 210 | 210 | 120 | 120 |
| Soil Erodibility Factor (K) | 0.36 | 0.36 | 0.35 | 0.35 |
| Length-Slope Factor (LS) | 0.14 | 0.14 | 0.44 | 0.44 |
| Cover Management Factor (C) | 0.43 | 0.43 | 0.7 | 0.5 |
| Support Practice Factor (P) | 1 | 1 | 0.775 | 0.11 |
| Predicted Avg Annual Soil Loss (ton/acre/year) | 4.55 | 4.55 | 10.03 | 1.02 |

| | | Example |
|---|---|---|
| Contributing Area (acres) | 3345 | 14 |

**The portion of the treated field which contributes eroded soil to the waterbody. The contributing area is defined by the runoff flowpath and by topography and may differ in size from the actual treated field.**

**Please select a gross soil texture:**

- ○ Clay (clay, clay loam, and silt clay)
- ◉ Silt (silt, silty clay loam, loam, and silt loam)
- ○ Sand (sand, sandy clay, sandy clay loam, sandy loam, and loamy sand)
- ○ Peat

**Estimated Load Reductions for Agricultural Field Practices**

| | Treated | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 0 | 85 |
| Phosphorus Load Reduction (lb/year) | 0 | 100 |
| Nitrogen Load Reduction (lb/yr) | 0 | 200 |

**Estimated Additional Load Reductions through Filter Strips**

| | Filter Strips | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 3380 | 92 |
| Phosphorus Load Reduction (lb/year) | 5711 | 114 |
| Nitrogen Load Reduction (lb/yr) | 10647 | 227 |

**Total Estimated Load Reductions**

| | Total | Example |
|---|---|---|
| Sediment Load Reduction (ton/year) | 3380 | 177 |
| Phosphorus Load Reduction (lb/year) | 5711 | 214 |
| Nitrogen Load Reduction (lb/yr) | 10647 | 427 |

- These reductions are significantly higher than the calculated pre-BMP loadings, indicating that the limited data for this watershed- taken one time during dry weather- is not sufficient to accurately predict soil erosion. The same problem exists for the phosphorous loadings, since phosphorous is frequently bound to soil particles. For nitrogen, however, the IDEM "Loading Workbook" produced meaningful results:

Nitrogen load reduction, 10,647 lbs/year
Divided by
Pre-BMP nitrogen load, 19,890 lbs/year
Equals 53% reduction (goal is 50%)

- Feedlots and other livestock areas: Phosphorous and chemical oxygen demand (COD)load reductions can be estimated using IDEM's "Loading Workbook". Two assumptions exist with this method: the feedlot is adjacent to a hydrologic system without any buffering; and installing the animal waste system will prevent any further pollutants from reaching the hydrological system. In situations where the feedlot cannot be shown directly impacting the stream, this method should not be used. In subwatershed 20, Smith Fork headwaters, only one livestock operation fits the assumptions of this method (see worksheet next page). That is not to say that developing manure management plans and other BMP's for the other operations will not have a positive effect on water quality, it cannot be estimated using IDEM's "Loading Workbook". It is possible that NRCS has other methods to estimate load reductions. If so, we will use them when the practice is actually being planned.

## Feedlot Pollution Reduction

Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).

Notes: An animal lot refers to an open lot or combination of open lots intended for confined feeding, breeding, raising or holding animals. It is specifically designed as a confinement area in which manure accumulates or where the concentration of animals is such that vegetation cannot be maintained. The purpose of these calculations is to represent Chemical Oxygen Demand (COD) and phosphorus (P) reductions after an animal waste system is installed. This method has two assumptions: 1) the feedlot is adjacent to a receiving hydrological system without any buffering areas; and 2) installing the animal waste system will prevent any further pollutants from the lot from reaching the hydrologic system. Feedlots that cannot show impact to the hydrologic system being protected should not be evaluated with this computation.

**STEP 1**

5 — **Contributing Area (acres): the area contributing polluted water to the discharge point(s).**

**STEP 2**

**Percent Paved: Percent of the contributing area that is paved**

- (•) 0-24%
- ( ) 25-49%
- ( ) 50-74%
- ( ) 75-100%

**STEP 3**

4 — **Design rainfall (inches) based on 25 year frequency - 24 hour duration event (consult your local NRCS staff)**

**STEP 4**

| Animal Numbers | Animal Type | Design Weight* |
|---|---|---|
| 100 | Slaughter Steer | 1,000 |
| 0 | Young Beef | 500 |
| 0 | Dairy Cow | 1,400 |
| 0 | Young Dairy Stock | 500 |
| 0 | Swine | 200 |
| 0 | Feeder Pig | 50 |
| 0 | Sheep | 100 |
| 0 | Turkey | 10 |
| 0 | Chicken | 4 |
| 0 | Duck | 4 |
| 0 | Horse | 1,000 |

*Design weight in pounds. Interpolation of values should be based on the maximum weight animals would be expected to reach.

**END**

**Pollutant Load Reductions**

| | |
|---|---|
| **Chemical Oxygen Demand reduction (lbs)** | **3,082** |
| **Phosphorus reduction (lbs)** | **58** |

***Table 22***

Load reductions can be calculated for the swine operation in subwatershed 34, reach 8:

### Feedlot Pollution Reduction

Please fill in the gray areas below. Once you have successfully estimated the sediment and nutrient load reductions, please print two (2) copies this worksheet. Attach both copies to the 319A or 319U cost-share form. If you have any questions, please contact Wes Stone (317/233-6299).

Notes: An animal lot refers to an open lot or combination of open lots intended for confined feeding, breeding, raising or holding animals. It is specifically designed as a confinement area in which manure accumulates or where the concentration of animals is such that vegetation cannot be maintained. The purpose of these calculations is to represent Chemical Oxygen Demand (COD) and phosphorus (P) reductions after an animal waste system is installed. This method has two assumptions: 1) the feedlot is adjacent to a receiving hydrological system without any buffering areas; and 2) installing the animal waste system will prevent any further pollutants from the lot from reaching the hydrologic system. Feedlots that cannot show impact to the hydrologic system being protected should not be evaluated with this computation.

**STEP 1** | 3 | **Contributing Area (acres): the area contributing polluted water to the discharge point(s).**

**STEP 2** **Percent Paved: Percent of the contributing area that is paved**

- (●) 0-24%
- ( ) 25-49%
- ( ) 50-74%
- ( ) 75-100%

**STEP 3** | 4 | **Design rainfall (inches) based on 25 year frequency - 24 hour duration event (consult your local NRCS staff)**

**STEP 4**

| Animal Numbers | Animal Type | Design Weight* |
|---|---|---|
| 0 | Slaughter Steer | 1,000 |
| 0 | Young Beef | 500 |
| 0 | Dairy Cow | 1,400 |
| 0 | Young Dairy Stock | 500 |
| 300 | Swine | 200 |
| 1200 | Feeder Pig | 50 |
| 0 | Sheep | 100 |
| 0 | Turkey | 10 |
| 0 | Chicken | 4 |
| 0 | Duck | 4 |
| 0 | Horse | 1,000 |

*Design weight in pounds. Interpolation of values should be based on the maximum weight animals would be expected to reach.

**END**

| Pollutant Load Reductions | |
|---|---|
| Chemical Oxygen Demand reduction (lbs) | 3,051 |
| Phosphorus reduction (lbs) | 96 |

***Table 23***

And for the dairy operation in Reach MF9:

## Feedlot Pollution Reduction

Please fill in the gray areas below. Once you have successfully estimated
the sediment and nutrient load reductions, please print two (2) copies this worksheet.
Attach both copies to the 319A or 319U cost-share form.
If you have any questions, please contact Wes Stone (317/233-6299).

Notes: An animal lot refers to an open lot or combination of open lots intended for confined feeding, breeding, raising or holding animals. It is specifically designed as a confinement area in which manure accumulates or where the concentration of animals is such that vegetation cannot be maintained. The purpose of these calculations is to represent Chemical Oxygen Demand (COD) and phosphorus (P) reductions after an animal waste system is installed. This method has two assumptions: 1) the feedlot is adjacent to a receiving hydrological system without any buffering areas; and 2) installing the animal waste system will prevent any further pollutants from the lot from reaching the hydrologic system. Feedlots that cannot show impact to the hydrologic system being protected should not be evaluated with this computation.

**STEP 1**

| 1 | **Contributing Area (acres): the area contributing polluted water to the discharge point(s).** |
|---|---|

**STEP 2**

**Percent Paved: Percent of the contributing area that is paved**

- ( ) 0-24%
- ( ) 25-49%
- (•) 50-74%
- ( ) 75-100%

**STEP 3**

| 4 | **Design rainfall (inches) based on 25 year frequency - 24 hour duration event (consult your local NRCS staff)** |
|---|---|

**STEP 4**

| Animal Numbers | Animal Type | Design Weight* |
|---|---|---|
| 0 | Slaughter Steer | 1,000 |
| 0 | Young Beef | 500 |
| 50 | Dairy Cow | 1,400 |
| 10 | Young Dairy Stock | 500 |
| 0 | Swine | 200 |
| 0 | Feeder Pig | 50 |
| 0 | Sheep | 100 |
| 0 | Turkey | 10 |
| 0 | Chicken | 4 |
| 0 | Duck | 4 |
| 0 | Horse | 1,000 |

*Design weight in pounds. Interpolation of values should be based on the maximum weight animals would be expected to reach.

**END**

| Pollutant Load Reductions | |
|---|---|
| Chemical Oxygen Demand reduction (lbs) | 3,289 |
| Phosphorus reduction (lbs) | 31 |

***Table 24***

The turkey operation in MF4 is contributing inadequately-treated wastewater to the stream, but that does not fit this loading model.  As in the Smith Fork subwatershed, a manure management plan will be developed, but that, too cannot be quantified with this model.

- Urban erosion:  IDEM's "Loading Workbook" is available to calculate load reductions from urban stormwater control.  We do not have data for particular sites at the present time, but this model will be useful in the near future.

**<u>10. Implementing the Measures:</u> Describe the planned order of implementation, the time requirements for implementing the plan, who is responsible for carrying out tasks, and what milestones to check.**

- Highland-Pigeon watershed has been subjected to human alteration-and in some cases-abuse over the past 200 years. It is reasonable to say that meaningful recovery and restoration will take at least 20 to 50 years. To that end, we need to narrow our focus and start with areas of the watershed where we can make the greatest impact in the shortest time- with the available resources. ***<u>An "Action Register" has been developed for the goals of this watershed management plan, and may be found on the last page of this section.</u>***

- In order to implement this plan over the next three to five years, we will need the following estimated financial resources:
    1. Install 75 acres (at 20ft. wide) of filter strip in subwatersheds 6,16,17,18,23,24,25,26, MF4,8 and 9: **$15,000 (source: CRP cost share for installation X stream length in feet X 20ft. width, divided by 43,560 ft2/acre X 20% participation)**
    2. Develop and implement nutrient management plans for subwatersheds 16,17,18,24 and 25: **$60,000 (source: subwatershed acreage X % agric. X 20% participation X $10 acre)**
    3. Develop and implement manure mgt. plans in subwatersheds 20, MF4, 8 and 9: **$40,000 (source: based on size of facility)**
    4. Plan, survey, design and install waste mgt. practices in subwatersheds 20, MF4, 8 and 9: **$33,000 (source NRCS estimates, DNR-LARE estimates)**
    5. Preliminary Engineering Reports for wastewater disposal systems, Gibson, Vanderburgh, Warrick and Posey counties: **Gibson, $30,000; Vanderburgh, $20,000; Warrick, $30,000; Posey, $7500 (25% of county in watershed) Total: $87,500 (source RCAP estimate on Gibson 205j application)**
    6. Provide educational opportunities specific to watersheds and water quality for all citizens of the watershed. Encourage landowners to install BMP's. Our proposal is to hire a "Watershed Educator": **$35,000 to $50,000 annually (source: current SWCD Educator salary & benefits, current Watershed Coordinator salary, benefits & mileage + materials)**

- Sources of financial and technical assistance: We anticipate that most agricultural BMP's will be funded through USDA programs, including: For privately owned land, the USDA offers landowners natural resource programs that provide incentives and assistance to landowners for implementing conservation practices on the land. Some of the USDA's natural resource programs include :
  • Conservation Reserve Program (CRP)
  • Conservation Reserve Enhancement Program (CREP)
  • Environmental Quality Incentives Program (EQIP)
  • Forest Legacy Program (FLP)
  • Forest Stewardship Program (FSP)
  • Forestry Incentives Program (FIP)
  • Small Watershed Program
  • Stewardship Incentive Program
  • Wetlands Reserve Program
  • Wildlife Habitat Incentives Program

    - It is also anticipated that additional IDNR Lake and River Enhancement (LARE) areas will be designated within the watershed. In fact, subwatershed 34- McFadden Creek has recently been awarded an additional $20,000 for land treatment projects. When combined with the incentives of the USDA programs, BMP's become very attractive to landowners and operators.

- We also plan to apply for additional 319 grants for priority subwatersheds to provide cost share, educational opportunities and technical assistance.
- Technical assistance will be provided by the Indiana Conservation Partnership, which includes NRCS, IDNR-Div. Of Soil Conservation and the Soil & Water Conservation Districts.
- Technical assistance for domestic wastewater issues will be provided by county health departments, Indiana State Dept. of Health, Rural Community Assistance Program and various branches of IDEM. Financial assistance will be provided through the state revolving loan fund and other grants.
- Progress reporting details are included in the “Action Register” at the end of this section.
- As noted earlier in this section, it took 200 years of human alteration to degrade the watershed to its current condition. It will take much more than 3-5 years to show progress on an eight-digit hydrologic unit code area, especially an area of 300,000 + acres. We intend to concentrate our BMP efforts on the 14-digit subwatersheds, one or two at a time, where we can make a measurable difference. Our success with this approach has been demonstrated in subwatershed 34, McFadden Creek. This document, through regular review and update, can serve as the basis for long-term planning for Highland-Pigeon watershed.
- Agreements with landowners installing BMP’s generally take one year from initial application to actual installation of the pratice. An exception to this generalization is the Wetland Reserve Program (WRP) which can be a lengthy process due the requirements of the program. If the funding is available for WRP, and the application ranks high on the competitive list, it should not take more than 3-5 years from initial application to protected/enhanced wetland.

- **Milestones: Measuring progress.**

1. Progress for Goals 1 and 2 above will be quantified by number of acres installed (for filter strips and other buffer BMP’s) and number of acres planned for nutrient management.
2. For Goal 3, number of manure management plans written and implemented out of total number plans possible (6), for the designated subwatersheds.
3. For Goal 4, number of practices completed.
4. For Goal 5, number of PER’s completed out of 4 needed.
5. For Goal 6, number of educational programs presented, articles published, landowners contacted.

*Table 25*

| ACTION REGISTER | HIGHLAND – PIGEON WATERSHED MANAGEMENT PLAN | | |
|---|---|---|---|
| GOAL | BY WHEN | BY WHOM | WITH WHAT RESOURCES |
| 1. **Install 75 acres of filter strip in subwatersheds 6,16,17,18,23,24,25,26, MF4,8 and 9** | October 31, 2008 | Agricultural Landowners | Tech. assistance from In. Conservation Ptnshp. Financial assistance from USDA, IDEM and IDNR |
| 2. **Develop and implement nutrient management plans on 6000 acres in subwatersheds 16,17,18,24 and 25** | October 31, 2008 | Agricultural Landowners | Tech. assistance from In. Conservation Ptnshp. Financial assistance from USDA, IDEM and IDNR |
| 3. **Develop and implement manure mgt. plans in subwatersheds 20, MF4, 8 and 9** | October 31, 2005 | Agricultural Landowners | Tech. assistance from In. Conservation Ptnshp. Financial assistance from USDA, IDEM and IDNR |
| 4. **Plan, survey, design and install waste mgt. practices in subwatersheds 20, MF4, 8 and 9** | October 31, 2005 | Agricultural Landowners | Tech. assistance from In. Conservation Ptnshp. Financial assistance from USDA, IDEM and IDNR |

## ACTION REGISTER: HIGHLAND – PIGEON WATERSHED MANAGEMENT PLAN… *continued*

| | | | |
|---|---|---|---|
| 5. **Preliminary Engineering Reports for wastewater disposal systems, Gibson, Vanderburgh, Warrick and Posey counties** | October 31, 2008 | County Commissioners, County Council, others. | Tech. Assistance from IDEM, RCAP, ISDH, engineering firms.<br>Financial assistance from Revolving Loan Fund, IDEM. |
| 6. **Provide educational opportunities specific to watersheds and water quality for all citizens of the watershed. Encourage landowners to install BMP's.** | Continuously. | SWCD's, local government. | Tech. Assistance from In. Conservation Partnership, IDEM, Purdue Extension Svc., others.<br><br>Financial assistance from: SWCD's, IDEM, corporate partners. |

**11. Monitoring Indicators: Describe how indicators will be monitored to evaluate the effectiveness of implementation. If water quality standards and criteria are selected as indicators, describe how water quality will be monitored. Monitoring for other goals may include spot-checking, landowner participation, adoption of practices, or other measurements.**

## Monitoring Plan for short-term goals:

1. Reduce sediment loading by 50% or to "T" levels Action:
   - Install 75 acres (at 20ft. wide) of filter strip in subwatersheds 6,16,17,18,23,24,25,26, MF4,8,9 and 10.
2. Action:
   - Develop and implement nutrient management plans for subwatersheds 16,17,18,24 and 25.

   Monitoring:
   - Gauged by landowner participation, progress will be tracked by In. Conservation Partnership members using ArcView, and reported semi-annually to Partnership and IDEM. Progress will be noted in updates/revisions to this Watershed Management Plan.
   - Gauged by load reduction over time, water quality monitoring will be performed using Hoosier Riverwatch "Advanced Chemical Monitoring" and "Stream Flow" methods, except for Total Suspended Solids (TSS), which will need to be performed by a laboratory. Samples for stream flow, TSS, nitrate, and ortho & total phosphate will be analyzed biannually- during both wet-season and dry-season conditions, by trained personnel. Results will be used to compute loadings and compared to baseline measurements. Monitoring sites will be the same as those used during Harza's Diagnostic Study of Pigeon Creek and McFadden Creek.(see map, Figure 30, at end of this section) Monitoring will not begin until significant adoption of BMP's has occurred.
3. Action:
   - Develop and implement manure mgt. plans in subwatersheds 20, MF4, 8 and 9.

   Monitoring:
   - Gauged by percentage of landowner participation in targeted watersheds, progress will be tracked by In. Conservation Partnership members using ArcView, and reported semi-annually to Partnership and IDEM. Progress will be noted in updates/revisions to this Watershed Management Plan.
4. Action:
   - Plan, survey, design and install waste mgt. practices in subwatersheds 20, MF4, 8 and 9.

   Monitoring:
   - Gauged by percentage of landowner participation in targeted watersheds (confirmed by site visits), progress will be tracked by In. Conservation Partnership members using ArcView, and reported semi-annually to Partnership and IDEM. Progress will be noted in updates/revisions to this Watershed Management Plan.
5. Action:
   - Preliminary Engineering Reports for wastewater disposal systems, Gibson, Vanderburgh, Warrick and Posey counties.

Monitoring:

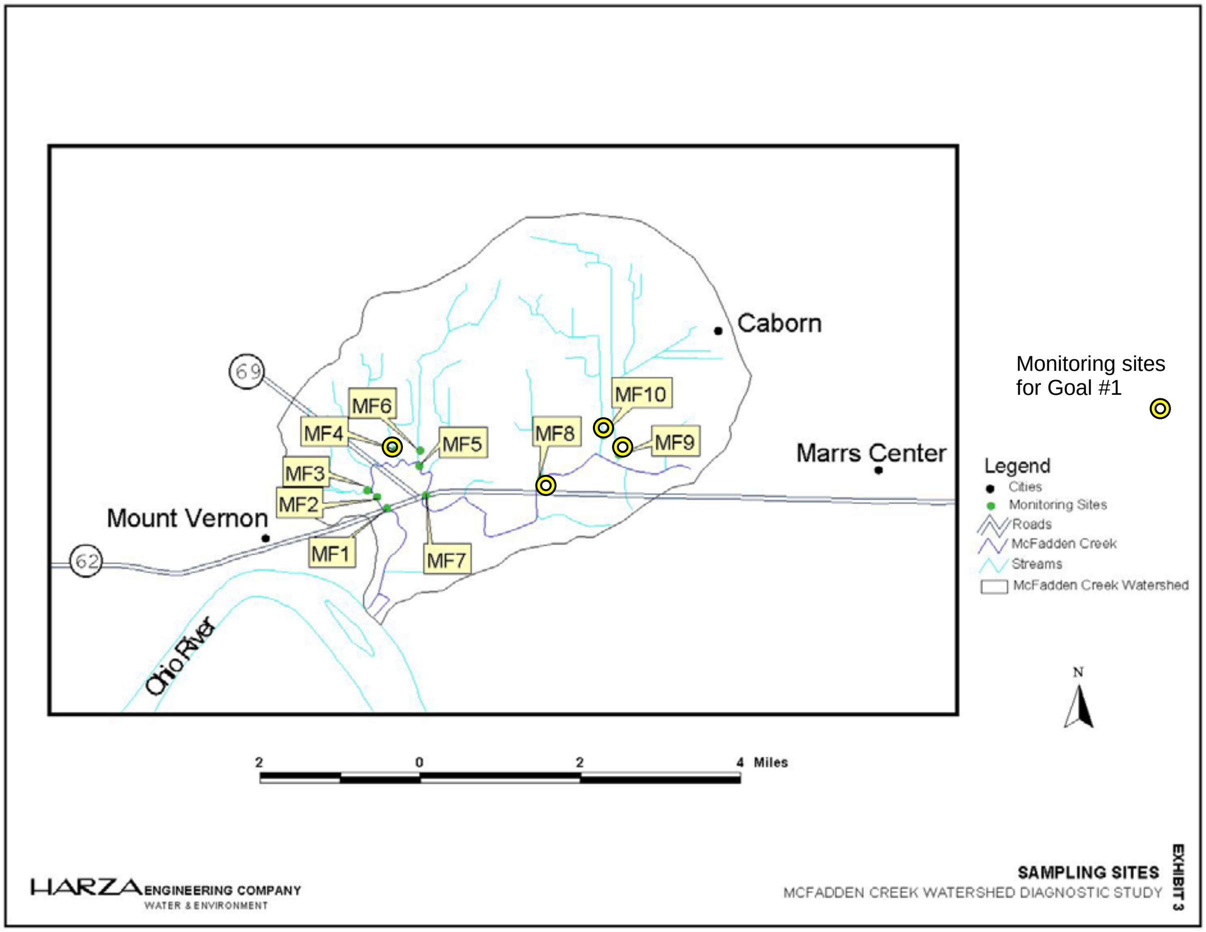
- Gauged by initiation and completion of PER's in four counties in the watershed. Reported semi-annually to Partnership and IDEM. Progress will be noted in updates/revisions to this Watershed Management Plan.

6. Action:
   - Provide educational opportunities specific to watersheds and water quality for all citizens of the watershed. Encourage landowners to install BMP's. Our proposal is to hire a "Watershed Educator".

Monitoring:

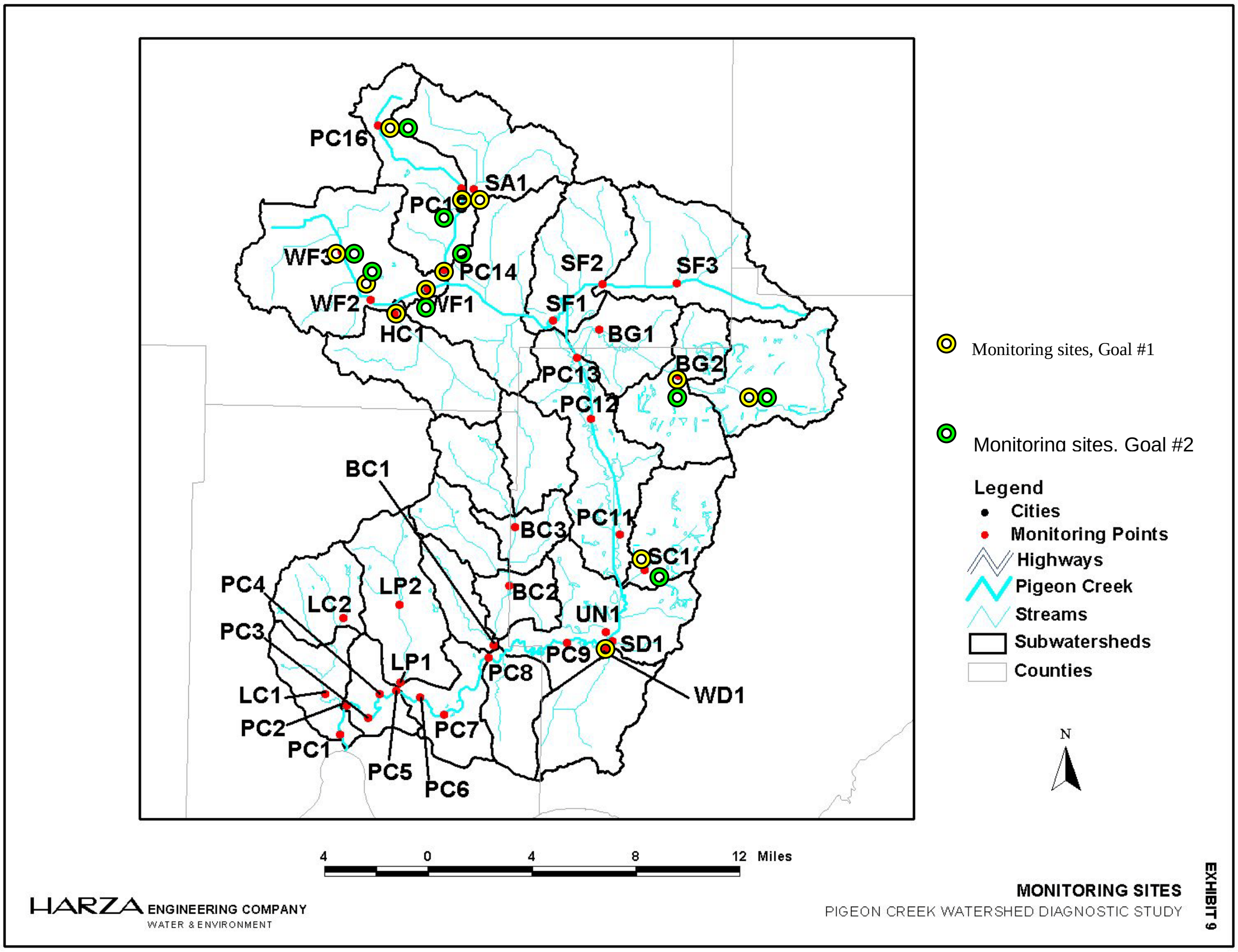
- After hiring Watershed Educator, success will be gauged by: number of stakeholders exposed to watershed information or programs; quantity of programs presented; quantity of news releases/articles published; number of students exposed to hands-on water quality testing; number of agricultural land owners/users contacted about best management pratices. Reported monthly to SWCD's, semiannually to Partnership and IDEM. Progress will be noted in updates/revisions to this Watershed Management Plan.

***Figure 31***



Caborn
Monitoring sites
for Goal #1
MF10
MF6
MF4
MF5
MF8
MF9
Marrs Center
MF3
MF2
Mount Vernon
MF1
MF7
69
62
Ohio River
Legend
Cities
Monitoring Sites
Roads
McFadden Creek
Streams
McFadden Creek Watershed
N
2
0
2
4 Miles
HARZA ENGINEERING COMPANY
WATER & ENVIRONMENT
SAMPLING SITES
MCFADDEN CREEK WATERSHED DIAGNOSTIC STUDY
EXHIBIT 3

***Figure 32***



PC16
SA1
PC1
WF3
PC14
SF2
SF3
WF2
WF1
SF1
HC1
BG1
PC13
BG2
PC12
BC1
BC3
PC11
SC1
PC4
LP2
BC2
LC2
UN1
PC3
SD1
PC9
LP1
PC8
WD1
LC1
PC2
PC7
PC1
PC5
PC6
Monitoring sites, Goal #1
Monitoring sites, Goal #2
Legend
Cities
Monitoring Points
Highways
Pigeon Creek
Streams
Subwatersheds
Counties
N
4
0
4
8
12 Miles
HARZA ENGINEERING COMPANY
WATER & ENVIRONMENT
MONITORING SITES
PIGEON CREEK WATERSHED DIAGNOSTIC STUDY
EXHIBIT 9

**12. Evaluating and Adapting the Plan: Describe when the watershed plan will be re-evaluated; who will do it; who is responsible for revisions or adaptations to the plan.**

- The Highland – Pigeon Watershed Management Plan should be re-evaluated after the first 3 to 5 years of implementation.
- Re-evaluation should be the responsibility of the Pigeon-Highland Watershed Steering Committee (PHWSC), with input from the members of the Indiana Conservation Partnership and IDEM Watershed Management Section.
- Revisions, updates and/or adaptations should be brought to the attention of PHWSC by Partnership staff.
- While no TMDL's are scheduled for implementation in the near future, revision and adaptation to the Plan will be made to include the provisions of the TMDL when it occurs.

## Figures


1. Highland-Pigeon Watershed
2. Location relative to State
3. Location within SW Indiana
4. 14-digit subwatersheds
5. Location of watershed
6. Location within SW Indiana
7. Soils associations
8. 14-digit subwatersheds
9. Land use/land cover
10. Managed natural areas
11. Land use-McFadden Creek
12. Sediment loading
13. Location of livestock operations-McFadden Creek
14. Sediment Loading
15. Phosphorous Loading
16. McFadden Creek sample sites
17. Pigeon Creek E. Coli exceedances
18. McFadden Creek E. Coli exceedances
19. Subwatersheds warranting protection
20. McFadden Creek priority reaches
21. Priorities for best management practices
22. Smith Fork livestock BMP’s
23. McFadden Creek livestock BMP’s
24. IDNR-LARE brochure
25. PHWSC brochure
26. Septic discharge
27. Phosphorous loading
28. Solid waste sites
29. Wetland areas
30. Potential locations- constructed wetlands
31. Mcfadden Cr. monitoring sites for Goal #1
32. Pigeon Cr. monitoring sites for Goals #1 and #2


## Tables


1. Watershed climate data
2. Wetlands
3. Threatened & endangered species
4. Natural areas
5. Land use in Pigeon Creek watershed
6. Land use in McFadden Creek watershed
7. NPDES discharges
8. Relative tributary biotic integrity
9. Annual sediment yield
10. Annual phosphorous loading
11. McFadden Creek substrate quality scoring
12. Relative tributary biotic integrity
13. Sites exceeding E. coli standard- Pigeon Creek
14. Relative tributary biotic integrity
15. Constructed wetland efficiency
16. Sediment load reductions for subwatersheds 23,24,25,26
17. Sediment load reductions for subwatersheds 16,17,18
18. Sediment load reductions for subwatershed 6
19. Phosphorous load reductions for subwatersheds 24,25
20. Phosphorous load reductions for subwatersheds 16,17,18
21. Load reductions for McFadden Creek
22. Feedlot reductions-Smith Fork
23. Feedlot reduction-McFadden Creek- swine
24. Feedlot reduction-McFadden Creek- dairy
25. Action register

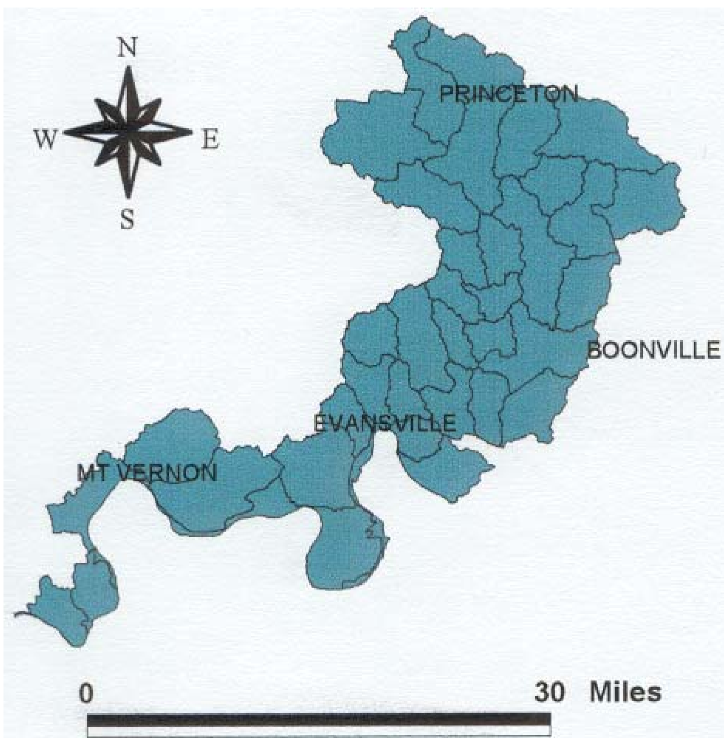
**List of Acronyms with Definitions**

ALUS Aquatic Life Use Support
BMP Best Management Practice
BOD Biochemical Oxygen Demand
CRP Conservation Reserve Program
CSO Combined Sewage Overflow
CSS Combined Sewage System
DO Dissolved Oxygen
EMC Environmental Management Corporation
EPA United States Environmental Protection Agency
EQIP Environmental Quality Incentives Program
EWSU Evansville Water and Sewer Utility
FBI Family Biotic Index
GIS Geographic Information System
HUC Hydrologic Unit Code
IDEM Indiana Department of Environmental Management
IDNR Indiana Department of Natural Resources
ISDH Indiana State Department of Health
LARE Lake and River Enhancement Program
LTCP Long Term Control Plan
NPDES National Pollutant Discharge Elimination System
NPS Nonpoint Source Pollution
NRCS Natural Resources Conservation Service
PCS Permit Compliance System
PER Preliminary Engineering Report
PHWSC Pigeon Highland Watershed Steering Committee
QHEI Qualitative Habitat Evaluation Index
RBP Rapid Bioassessment Protocol
RC&D Resource Conservation & Development
SRCER Stream Reach Characterization and Evaluation Report
STORET Storage and Retrieval Database System
SWCD Soil & Water Conservation District
TKN Total Kjeldahl Nitrogen
TSS Total Suspended Solids
UAA Use Attainability Analysis
USDA United States Department of Agriculture
USLE Universal Soil Loss Equation
WWTP Wastewater Treatment Plant
WRP Wetlands Reserve Program

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**<u>Appendix A:</u> Data from Harza's Diagnostic Study of Pigeon Creek; Data from IDEM Assessment Branch Study of Pigeon Creek within Vanderburgh Co., IN**

WATER QUALITY RESULTS FROM MAY 2000

| Site | Water body | Temp (C) | Conductivity (umhos) | pH | DO (mg/L) | % DO Saturation | Ammonia N (mg/L) | Total Kjeldahl N (mg/L) | Nitrate N (mg/L) | Phosphorus (mg/L) | BOD (mg/L) | Suspended solids (mg/L) | E. coli (per 100 mL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC1 | Pigeon Creek | 22 | 1,192 | 7.82 | 17 | 206 | 0.33 | <1.0 | 0.87 | 0.4 | <2.5 | 32 | 50 |
| PC2 | Pigeon Creek | 22.5 | 1,724 | 7.9 | 18.9 | 230 | 0.13 | 1.1 | 1.0 | 0.41 | <2.5 | 66 | 50 |
| PC3 | Pigeon Creek | 21.3 | 1,303 | 7.74 | 14.8 | 172 | 0.43 | 1.7 | 2.0 | 0.68 | <2.5 | 83 | 110 |
| PC4 | Pigeon Creek | 21.4 | 1,643 | 7.97 | 15 | 180 | 0.36 | 5.0 | 0.87 | 0.43 | <2.5 | 65 | 120 |
| PC4 dupl | | | | | | | 0.22 | <1.0 | 0.88 | 0.42 | <2.5 | 62 | 70 |
| PC5 | Pigeon Creek | 22.8 | 1,667 | 7.88 | 17.3 | 213 | 1.8 | <1.0 | 0.78 | 0.4 | <2.5 | 51 | 130 |
| PC6 | Pigeon Creek | 20.6 | 1,663 | 7.89 | 14.3 | 168 | 0.11 | <1.0 | 0.68 | 0.42 | <2.5 | 200 | 2000 |
| PC7 | Pigeon Creek | 22.3 | 1,227 | 7.89 | 17.2 | 209 | 2.0 | <1.0 | 0.96 | 0.43 | <2.5 | 79 | 48 |
| PC8 | Pigeon Creek | 20.5 | 1,793 | 7.8 | 8.5 | 100 | 0.65 | 3.5 | 0.52 | 0.59 | <2.5 | 54 | 63 |
| PC9 | Pigeon Creek | 23.5 | 1,765 | 8.01 | 20.1 | 254 | 6.5 | 1.5 | 1.1 | 0.81 | 3 | 130 | 470 |
| PC11 | Pigeon Creek | 20.2 | 1,673 | 8.12 | 20.2 | 235 | 1.2 | <1.0 | 1.4 | 0.75 | <2.5 | 160 | 110 |
| PC12 | Pigeon Creek | 22.1 | 1,149 | 8.17 | 18.7 | 222 | 2.0 | <1.0 | 1.5 | 0.7 | 2.6 | 86 | 40 |
| PC13 | Pigeon Creek | 23.6 | 1,640 | 8.11 | 18.7 | 233 | 0.82 | <1.0 | 2.9 | 0.64 | <2.5 | 54 | 100 |
| PC14 | Pigeon Creek | 25.3 | 542 | 8.46 | 12.6 | 153 | 1.0 | <1.0 | 1.4 | 0.39 | <2.5 | 9 | 134 |
| PC15 | Pigeon Creek | 24.5 | 6,309 | 8.01 | 10.3 | 124 | 0.82 | 2.7 | 1.3 | 0.55 | <2.5 | 4 | 18 |
| PC16 | Pigeon Creek | 23.2 | 675 | 8.05 | 21.1 | 252 | 0.11 | 1.3 | 1.2 | 0.5 | <2.5 | 32 | 230 |
| LC1 | Locust Creek | 20.7 | 418 | 7.75 | 14.4 | 160 | 0.82 | <1.0 | 0.23 | 0.07 | <2.5 | 6 | 190 |
| LC2 | Locust Creek | 23 | 316 | 7.92 | 18.5 | 219 | 0.28 | <1.0 | <0.05 | 0.08 | <2.5 | 22 | 580 |
| LP1 | Little Pigeon Creek | 21 | 346 | 7.67 | 11.7 | 130 | 0.37 | 1.4 | 0.09 | 0.18 | <2.5 | 21 | 480 |
| LP2 | Little Pigeon Creek | 21.5 | 369 | 7.92 | 15.5 | 178 | 0.51 | <1.0 | 0.13 | 0.11 | <2.5 | 15 | 390 |
| BC1 | Bluegrass Creek | 21.7 | 1,488 | 8 | 13.8 | 164 | 0.22 | 1.4 | 0.11 | 0.45 | <2.5 | 46 | 86 |
| BC2 | Bluegrass Creek | 23.2 | 1,871 | 8.5 | 15.8 | 170 | 0.42 | <1.0 | 0.33 | 0.44 | <2.5 | 29 | 60 |
| BC3 | Bluegrass Creek | 24 | 548 | 7.71 | 14.2 | 170 | 1.9 | 4.2 | 3.7 | 0.65 | 3.9 | 76 | 830 |
| BC3 dup | | | | | | | 1.9 | 4.2 | 3.4 | 0.62 | 3.6 | 77 | 1000 |
| WD1 | Weinsheimer Ditch | 20 | 334 | 7.6 | 13.4 | 146 | 0.62 | 1.7 | 1.4 | 0.25 | 4 | 250 | 8800 |
| SD1 | Stollberg Ditch | 17.5 | 860 | 7.37 | 11.5 | 122 | 0.95 | 10 | 5.7 | 2.4 | 11 | 34 | 4500 |
| UN1 | Unnamed Tributary | 18.5 | 1,070 | 7.58 | 14 | 152 | 0.36 | 8.4 | 0.05 | 0.11 | <2.5 | 36 | 3000 |
| SC1 | Squaw Creek | 17.9 | 3,295 | 8.08 | 23 | 286 | 4.9 | <1.0 | 0.11 | 0.47 | <2.5 | 37 | 79 |
| BG1 | Big Creek | 22.2 | 2,304 | 8.1 | 18.7 | 232 | 1.1 | 1.4 | 0.43 | 0.03 | <2.5 | 48 | 50 |
| BG2 | Big Creek | 22.2 | 2,450 | 7.99 | 18.7 | 234 | 0.21 | 1.1 | 0.16 | 0.03 | <2.5 | 7 | 16 |
| SF1 | Smith Fork | 22.4 | 1,672 | 8.04 | 17 | 219 | 0.16 | <1.0 | 0.14 | 0.28 | <2.5 | 22 | 40 |
| SF2 | Smith Fork | 22.3 | 1,693 | 8.46 | 24 | 305 | 0.78 | <1.0 | <0.05 | 0.04 | <2.5 | 3 | 9 |
| SF3 | Smith Fork | 22.5 | 1,703 | 8.34 | 19 | 232 | 0.33 | 1.4 | 0.12 | 0.04 | <2.5 | 3 | 10 |
| SF3 dupl | | | | | | | 0.66 | 1.4 | 0.13 | 0.04 | <2.5 | 4 | 16 |
| WF1 | West Fork | 20.5 | 572 | 7.68 | 15 | 172 | 0.46 | 2.8 | 8 | 0.71 | 3.9 | 110 | 7500 |
| WF2 | West Fork | 24 | 636 | 7.89 | 15.6 | 188 | 2.7 | <1.0 | 8.9 | 0.23 | 2.5 | 70 | 810 |
| WF3 | West Fork | 24 | 638 | 8.3 | 19 | 230 | 0.58 | <1.0 | 9.3 | 0.1 | <2.5 | 21 | 310 |
| HC1 | Hurricane Creek | 25 | 633 | 8.02 | 17.3 | 212 | 1.0 | 2.1 | 4.9 | 2.5 | 3.9 | 12 | 2300 |
| SA1 | Sand Creek | 27.1 | 507 | 8.56 | 13.2 | 193 | 4.3 | <1.0 | 0.66 | 0.43 | <2.5 | 9 | 41 |

Diagnostic Study of Pigeon Creek Watershed

Harza Engineering, Inc.

# May 2000 Data Sheets:

## Qualitative Habitat Evaluation Index

## Rapid Bioassessment Protocol II for Macroinvertebrates

## Flow measurements, on-site tests, physical description

QA Manual (5th Update) — Fish — September 30, 1989

Procedure No. WQPA-SWS-3 Date Issued 9-30-89
Revision No. 6 Date Effective 9-30-89

SA1
5/2/00

e V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ________________

Additional Comments/Pollution Impacts: ________________

MusKrat

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) ______ GRADIENT: ☐-LOW ☐-MODERATE ☐-HIGH PHOTOS: KS-25 05-24 Cam ①

STREAM MEASUREMENTS: AVERAGE WIDTH ________ AVERAGE DEPTH ________ MAX DEPTH ________

| LENGTH | WIDTH | DEPTHS (ft) | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300' | 10' | 4" | 16" | 6" | | | | | | | Pool |
| 5' | 6' | 2" | 3" | 2" | | | | | | | RIF |
| 10' | 8' | 4" | 6" | 3" | | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Depth (ft) | Vel (ft/sec) |
|---|---|
| 0.1 | — |
| 0.3 | 0.06 |
| 0.6 | 0.1 |
| 0.7 | 0.18 |
| 0.7 | 0.18 |
| 0.8 | 0.21 |
| 0.8 | 0.22 |
| 0.6 | 0.26 |
| 0.6 | 0.22 |
| 0.5 | 0.21 |
| 0.5 | 0.20 |
| 0.5 | 0.15 |
| 0.5 | 0.16 |
| 0.3 | 0.06 |
| 0.2 | 0.05 |
| 0.1 | = |
| 0.1 | |

RWE

HC-1
5/5/00



Procedure No. WQPA-SWS-3 Date Issued 9-30-89
Revision No. 5 Date Effective 9-30-89

re V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) ______ GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: US-2 DS-1 Cam 1

STREAM MEASUREMENTS: AVERAGE WIDTH 6' AVERAGE DEPTH 9" MAX DEPTH 16"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 6 | 8" | 14" | 14" | | | | | | | Pool |
| 10 | 5 | 3" | 2" | 4" | | | | | | | RIF |
| 20 | 6' | 5" | 6" | 4" | | | | | | | RUN |
| 10 | 4 | 3" | 3" | 4" | | | | | | | RIF |
| 100 | 6' | 7" | 10" | 8" | | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| [illegible](ft) | Vel(ft/sec) |
|---|---|
| .5 | .11 |
| .7 | .09 |
| 1.0 | .21 |
| 1.1 | .33 |
| 1.0 | .43 |
| 1.0 | .43 |
| 1.0 | .49 |
| 1.0 | .47 |
| 0.8 | .24 |
| 0.7 | .13 |
| 0.5 | .15 |
| 0.3 | 0.0 |

RWE

QA Manual (6th Update) – Fish – September 30, 1989

| | | | |
|---|---|---|---|
| Procedure No. | WQPA-SWS-3 | Date Issued | 9-30-89 |
| Revision No. | 6 | Date Effective | 9-30-89 |

WF-3
5/5/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____________

Additional Comments/Pollution Impacts: ____________

Photos 27 + 26 of Softshell Turtle

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) 85  GRADIENT: 1-LOW 2-MODERATE 3-HIGH  PHOTOS: 25-US 24-DS Cam 2

STREAM MEASUREMENTS: AVERAGE WIDTH 10' AVERAGE DEPTH 8" MAX. DEPTH 16"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 12 | 10" | 14" | 8" | | | | | | | POOL |
| 50 | 6 | 3" | 5" | 2" | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| (ft) | Velocity (ft/sec) |
|---|---|
| 3 | .26 |
| 6 | .27 |
| .0 | .38 |
| 2 | .59 |
| 1 | .69 |
| .5 | .34 |
| 2 | .48 |
| 3 | .51 |
| 1.1 | .50 |
| 0.8 | .38 |
| 0.8 | .38 |
| 0.7 | .27 |
| 0.6 | .23 |
| 0.6 | .21 |
| 0.6 | .20 |
| 0.6 | .14 |
| 0.5 | .05 |
| 0.3 | -.05 |
| 0.2 | -.06 |

DRAWING OF STREAM

WF-2
5/5/00



Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not, ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) 90   GRADIENT: X LOW O-MODERATE O-HIGH   PHOTOS: 23-45 22-25

STREAM MEASUREMENTS: AVERAGE WIDTH 15' AVERAGE DEPTH 8" MAX DEPTH 16"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 15' | 10" | 14" | 8" | | | | | | | Pool |
| 50 | 10' | 4" | 6" | 3" | | | | | | | Run |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dep (m) | Velocity ft/sec |
|---|---|
| 0.6 | -.07 |
| 0.7 | +.36 |
| .6 | 0.69 |
| .5 | 2.90 |
| .6 | 1.01 |
| .7 | 0.95 |
| 1.0 | 0.88 |
| 1.3 | 0.60 |
| 1.4 | 0.79 |
| 1.4 | 0.62 |
| 1.2 | 0.30 |
| 0.9 | 0.02 |
| 0.6 | -0.14 |
| 0.3 | -0.15 |

RWE

WF-1
5/5/00

[Figur]e V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 90 GRADIENT: ~~L-LOW~~ M-MODERATE H-HIGH PHOTOS: 4-US 3-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 20' AVERAGE DEPTH 8" MAX DEPTH 16"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 150 | 16 | 2" | 4" | 6" | | | | | | | RUN |
| 100 | 22 | 10" | 3" | 15" | | | | | | | POOL |
| 90 | 18 | 5" | 7" | 6" | | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

(a) Velocity

| | |
|---|---|
| 1 | – |
| 5 | .18 |
| 3 | .18 |
| 5 | .33 |
| 6 | .58 |
| 7 | 1.04 |
| 5 | 1.25 |
| 3 | 1.60 |
| 8 | 1.86 |
| 7 | 1.80 |
| 7 | 1.76 |
| 7 | 1.66 |
| 6 | 1.10 |
| 1 | – |

DRAWING OF STREAM

SF-3
5/7/00
2nd Duplicate for water Samples

Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ____ If not, ____________________

Additional Comments/Pollution Impacts: ____________________

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) ______ GRADIENT: O-LOW O-MODERATE O-HIGH

PHOTO: 11-US 7/10-DS Cam ②

STREAM MEASUREMENTS: AVERAGE WIDTH 25' AVERAGE DEPTH 8" MAX DEPTH 24"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 23' | 16" | 8" | | | | | | | POOL |
| 15 | 20 | 3" | 4" | 3" | | | | | | | G.F |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| D (ft) | Velocity (ft/sec) |
|---|---|
| 1.3 | 0.14 |
| 1.5 | 0.20 |
| 1.5 | 0.23 |
| 1.4 | 0.46 |
| 1.4 | 0.40 |
| 1.3 | 0.67 |
| 1.1 | 0.64 |
| 0.9 | 0.49 |
| 0.8 | 0.51 |
| 0.5 | 0.54 |
| 0.7 | 0.44 |
| 0.5 | 0.25 |
| 0.5 | 0.14 |
| 0.4 | 0.0 |
| 0.3 | −0.06 |
| 0.2 | −0.06 |
| 0.1 | — |

RWE

DRAWING OF STREAM

SF-2
5/7/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ____ If not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) ____ GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 13-15/1? - PS Cam (3)

STREAM MEASUREMENTS: AVERAGE WIDTH ____ AVERAGE DEPTH ____ MAX DEPTH ____

| LENGTH | WIDTH | DEPTHS → | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| (ft) | Velocity (ft/sec) |
|---|---|
| .8 | .2[illegible] |
| .3 | .25 |
| .3 | .24 |
| 1.0 | .36 |
| 1.0 | .46 |
| 0.9 | .46 |
| 0.7 | .53 |
| 0.9 | .48 |
| 0.9 | .53 |
| 0.9 | .57 |
| 0.8 | .50 |
| 0.8 | .48 |
| 0.7 | .40 |
| 0.7 | .33 |
| 0.5 | .31 |
| 0.5 | .36 |
| 0.4 | + .31 |
| 0.2 | -.05 |

RWE

SF-1
5/9/00



Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 10 GRADIENT: X-LOW O-MODERATE O-HIGH PHOTOS: 26-4/25-DS

STREAM MEASUREMENTS: AVERAGE WIDTH: 20 AVERAGE DEPTH: 1' MAX DEPTH 18"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 30 | 10" | 18" | 8" | | | | | | | POOL |
| 100 | 25 | 4" | 6" | 4" | | | | | | | RUN |
| 20 | 30 | 3" | 3" | 2" | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

(4) Velocity (ft/sec)

.02
.30
.38
.55
.59
.58
.60
.61
.65
6 .70
6 .70
.75
.5 .69
.79
.6 .60
.6 .60
.56
.41

DRAWING OF STREAM

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ____ If Not ____

Additional Comments/Pollution Impacts ____

| | GEAR | DIST/AC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 5 GRADIENT: LOW MODERATE HIGH PHOTOS: 1-45/8-D5

STREAM MEASUREMENTS: AVERAGE WIDTH 34' AVERAGE DEPTH 10" MAX DEPTH 42"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | | | | [illegible] |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

BG 1
5/7/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y  If Not: ____________

Additional Comments/Pollution Impacts: ____________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) [ ]  AESTHETIC RATING (1-10) [ ]

CANOPY (% OPEN) 75  GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH  PHOTOS: US-7/DS-6

STREAM MEASUREMENTS: AVERAGE WIDTH: 20  AVERAGE DEPTH: 10"  MAX DEPTH: 30"

| LENGTH | WIDTH | DEPTHS | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 10" | 24 | 6" | | | | | | POOL |
| 50 | 15 | 4" | 6" | 6" | | | | | | RUN |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| D (ft) | Velocity |
|---|---|
| .5 | 0.16 |
| .7 | 0.42 |
| .8 | 1.01 |
| .8 | 1.38 |
| .9 | 1.45 |
| 1.0 | 1.00 |
| 1.2 | 0.80 |
| 1.5 | 0.34 |
| 1.6 | 0.56 |
| 1.5 | 0.70 |
| 1.2 | 0.62 |
| 1.1 | 0.66 |
| 1.0 | 1.01 |
| 0.8 | 1.01 |
| 0.6 | 1.04 |
| 0.5 | 1.59 |
| 0.4 | 0.62 |
| 0.1 | — |

FWE

SC-1
5/10/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 8%   GRADIENT: O-LOW X MODERATE O-HIGH   PHOTOS: 20-45/19 - DS

STREAM MEASUREMENTS: AVERAGE WIDTH 25' AVERAGE DEPTH 12" MAX DEPTH 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 10" | 24" | 18" | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Depth (ft) | Velocity (ft/sec) |
|---|---|
| .4 | .04 |
| .4 | .16 |
| .6 | .17 |
| .6 | .17 |
| .7 | .21 |
| .8 | .22 |
| .8 | .26 |
| .8 | .27 |
| .8 | .29 |
| .9 | .27 |
| 1.0 | .28 |
| 1.0 | .27 |
| 1.1 | .26 |
| 1.3 | .22 |
| 1.6 | .25 |
| 1.7 | .23 |
| 1.8 | .25 |
| 1.9 | .23 |
| 1.4 | .21 |
| 1.3 | .08 |
| 1.1 | -.02 |

RWE

DRAWING OF STREAM

KN-1
5/4/00



gure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not, ______

Additional Comments/Pollution Impacts: ______

Raining

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 40 GRADIENT: ~~LOW~~ MODERATE HIGH

PHOTOS: 15-U, 14-D

STREAM MEASUREMENTS: AVERAGE WIDTH 6' AVERAGE DEPTH 5" MAX DEPTH 10"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | 7' | [illegible] | [illegible] | 6" | | | | | | | Pool |
| [illegible] | [illegible] | [illegible] | [illegible] | 4" | | | | | | | Riffle |
| [illegible] | 8' | [illegible] | | 4" | | | | | | | Pool |
| | | | | | | | | | | | Run |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

0.52
0.66
0.83
1.15
1.05
1.53
1.30
1.09
0.90
0.84

Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: Down stream of Industrial Discharge
Bad Smell
A lot of flocculate like silt

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 5 GRADIENT: ~~O-LOW~~ O-MODERATE O-HIGH PHOTOS: 13-45 / 12-DS Cam ①

STREAM MEASUREMENTS: AVERAGE WIDTH 15 AVERAGE DEPTH 8" MAX DEPTH 18"

| LENGTH | WIDTH | DEPTHS (?) | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 15 | 8" | 14 | 10" | | | | | | | Pool |
| 20 | 10' | 3" | 4 | 2" | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| D(ft) | Vel (ft/sec) |
|---|---|
| [illegible] | 0.14 |
| [illegible] | 0.18 |
| [illegible] | 0.22 |
| 3 | 0.19 |
| .2 | 0.60 |
| .0 | 0.20 |
| .8 | 0.18 |
| .7 | 0.11 |
| .6 | 0.08 |
| .9 | 0.06 |
| .0 | 0.02 |
| .9 | 0.04 |
| .7 | 0.06 |
| .4 | 0.03 |

RWE

| | | | |
|---|---|---|---|
| Procedure No. | WQPA-SWS-3 | Date Issued | 9-30-89 |
| Revision No. | 6 | Date Effective | 9-30-89 |

WD-1
5/4/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: Picture 10 & 11 crayfish
Additional Comments/Pollution Impacts: Picture [illegible] snake

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) 10%  GRADIENT: 1-LOW 2-MODERATE 3-HIGH  PHOTOS: US-8 DS-7 Cam 1

STREAM MEASUREMENTS: AVERAGE WIDTH 18' AVERAGE DEPTH 2' MAX DEPTH 4'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 18 | 2' | 3' | 1.5' | | | | | | | Run | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dep (ft) | Velocity (ft/sec) |
|---|---|
| 0.7 | 0.14 |
| 1.1 | 0.23 |
| 1.3 | 0.28 |
| 1.6 | 0.24 |
| 2.0 | 0.27 |
| 2.0 | 0.23 |
| 2.8 | 0.26 |
| 3.2 | 0.27 |
| 3.3 | 0.28 |
| 3.3 | 0.27 |
| 3.3 | 0.28 |
| 3.0 | 0.13 |
| 2.8 | 0.26 |
| 2.5 | 0.35 |
| 2.3 | 0.27 |
| 2.0 | 0.17 |
| 1.9 | 0.12 |
| 1.4 | 0.11 |
| 0.8 | 0.03 |
| Rwe | |

BC-3
5/4/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____________________

Additional Comments/Pollution Impacts: ____________________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) ______ GRADIENT: ○-LOW ○-MODERATE ○-HIGH PHOTOS: ______

STREAM MEASUREMENTS: AVERAGE WIDTH 30' AVERAGE DEPTH 10" MAX DEPTH 3.5'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 30' | 8" | 18" | 12" | | | | | | | | Pool |
| 50 | 20' | 4" | 6" | 5" | | | | | | | | Run |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dep (ft) | Vel (ft/sec) |
|---|---|
| 1.5 | 0.02 |
| 1.7 | 0.15 |
| 1.6 | 0.13 |
| 1.5 | 0.12 |
| 1.5 | 0.14 |
| 1.5 | 0.17 |
| 1.3 | 0.16 |
| 1.2 | 0.14 |
| 1.2 | 0.17 |
| 1.1 | 0.17 |
| 1.1 | 0.13 |
| 1.1 | 0.14 |
| 1.1 | 0.12 |
| 1.0 | 0.14 |
| 1.0 | 0.13 |
| 1.0 | 0.14 |
| 1.0 | 0.13 |
| 1.0 | 0.11 |
| 1.1 | 0.14 |
| 1.0 | 0.03 |
| 0.8 | -0.01 |
| 0.1 | — |

REW

BC-2
5/3/00

re V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) 85  GRADIENT: LOW MODERATE HIGH  PHOTOS: 45-17 DS-16 Gn (1)

STREAM MEASUREMENTS: AVERAGE WIDTH 7' AVERAGE DEPTH 8" MAX DEPTH 12"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75' | 4' | 4" | 6" | 3" | | | | | | | RUN |
| 225' | 8' | 6" | 10" | 7" | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Depth (ft) | Vel ft/sec |
|---|---|
| 0.1 | – |
| 0.4 | 0.24 |
| 0.6 | 0.44 |
| 0.7 | 0.47 |
| 0.9 | 0.34 |
| 0.5 | 0.51 |
| 1.1 | 0.52 |
| 1.3 | 0.36 |
| 1.2 | 0.44 |
| 1.1 | 0.50 |
| 1.1 | 0.40 |
| 1.1 | 0.37 |
| 0.8 | 0.40 |
| 0.9 | 0.28 |
| 0.8 | 0.20 |
| | 0.22 |
| 0.6 | 0.06 |
| 0.3 | |

RWE

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y  If Not: ________

Additional Comments/Pollution Impacts: ________

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10): ☐  AESTHETIC RATING (1-10): ☐

CANOPY (%OPEN) 5  GRADIENT: ☒LOW ☐MODERATE ☐HIGH  PHOTOS: US-1[illegible] DS-1R

STREAM MEASUREMENTS: AVERAGE WIDTH 12'  AVERAGE DEPTH 5"  MAX DEPTH 12"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | [illegible] | 20 | | | | | | | | | Pool |
| 150 | [illegible] | 15 | | | | | | | | | Run |
| 10 | [illegible] | 10 | | | | | | | | | Rif |
| 5' | [illegible] | 15 | | | | | | | | | Run |
| - | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

Vel (4cfs)
5.40

– DRAWING OF STREAM –

LP-2
5/6/00



Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: 2 musk rats

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 10 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 17-45 16 - DS

STREAM MEASUREMENTS: AVERAGE WIDTH 20' AVERAGE DEPTH 10" MAX DEPTH 30"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25' | 15" | 26" | 14" | | | | | | | POOL |
| 50 | 10' | 4" | 6" | 3" | | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dep (ft) | Vel (ft/sec) |
|---|---|
| [illegible] | [illegible] |
| 1.1 | 0.0 |
| 1.2 | -.02 |
| 1.2 | +.04 |
| 1.3 | .03 |
| 1.3 | .06 |
| 1.4 | .03 |
| 1.4 | .06 |
| 1.5 | .08 |
| 1.5 | .08 |
| 1.6 | .09 |
| 1.6 | .08 |
| 1.6 | .07 |
| 1.6 | .05 |
| 1.6 | .03 |
| 1.4 | .03 |
| 1.3 | .03 |
| 0.4 | .01 |
| 0.6 | 0.0 |
| 0.4 | -0.04 |

RWE

LP-1
5-6-00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts: 2 kids throw rocks at us

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN): 10  GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH  PHOTO: 15-US/14-DS

STREAM MEASUREMENTS: AVERAGE WIDTH: 30 AVERAGE DEPTH: 12" MAX DEPTH: 4'

| LENGTH | WIDTH | DEPTHS (in) | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 16" | 36" | 20" | | | | | | | POOL |
| 50 | 25 | 5" | 4" | 12" | | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

2(ft) Velocity (ft/sec)

DRAWING OF STREAM

-, also has concrete tripping hazards

LC-2
5/6/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: Mallard Duck w/ Ducklings

Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) AESTHETIC RATING (1-10)

CANOPY (% OPEN) 65 GRADIENT: ☐LOW ☐MODERATE ☐HIGH PHOTOS: 19-15 18-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 15' AVERAGE DEPTH 6" MAX DEPTH 12"

| LENGTH | WIDTH | DEPTH(S) | | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 80 | 17 | 8" | 10" | 12" | | | | | | | | POOL |
| 20 | 10 | 3" | 4" | 5" | | | | | | | | RUN |
| 200 | 16 | 6" | 6" | 12" | | | | | | | | POOL |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| D (ft) | Velocity (ft/sec) |
|---|---|
| .3 | -.03 |
| .7 | +.03 |
| .6 | .04 |
| .9 | .07 |
| 1.0 | .07 |
| 1.0 | .08 |
| .9 | .06 |
| .9 | .06 |
| .6 | .09 |
| .5 | .10 |
| .5 | .10 |
| .7 | .11 |
| .7 | .10 |
| .6 | .11 |
| .6 | .09 |
| .5 | .09 |
| .5 | .09 |
| .5 | .04 |
| .3 | .01 |
| .3 | -.07 |
| .3 | |
| .1 | |
| .1 | |

DRAWING OF STREAM

LC-1
5/6/00



Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ____ If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

Cam (2)

CANOPY (% OPEN) 25% GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 21-US 20-DS

STREAM MEASUREMENTS: AVERAGE WIDTH: 25 AVERAGE DEPTH: 12" MAX DEPTH: 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25' | 10" | 30" | 16" | | | | | | | POOL |
| 10 | 4' | 2" | 3" | 3" | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Dep (ft) | Velocity (ft) |
|---|---|
| .1 | — |
| .1 | — |
| .3 | -.02 |
| .3 | 0.0 |
| .3 | -.03 |
| .4 | -.04 |
| .5 | -.03 |
| .5 | -.03 |
| .6 | -.02 |
| .6 | -.01 |
| .6 | -.03 |
| .6 | -.02 |
| .8 | 0.0 |
| .9 | +0.03 |
| 1.0 | +0.08 |
| 1.1 | 0.09 |
| 1.2 | 0.12 |
| 1.3 | 0.30 |
| 1.3 | 0.43 |
| 1.3 | 0.43 |
| 1.3 | 0.52 |

DRAWING OF STREAM

| Dist fm LB | Dep | Vel |
|---|---|---|
| 11.0 | 1.2 | 0.51 |
| 11.5 | 0.7 | 0.46 |
| 12.0 | 0.4 | 0.63 |
| 12.5 | 0.3 | 0.36 |
| 13.0 | 0.2 | 0.23 |
| 13.5 | 0.1 | — |
| 14.0 | RWE | |

PC-16
5/8/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:
Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)
AESTHETIC RATING (1-10)

CANOPY (%OPEN) 90% GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 3U+2D

STREAM MEASUREMENTS: AVERAGE WIDTH 10' AVERAGE DEPTH 5" MAX DEPTH 1½'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist. from LB (ft) | Dep (ft) | Velocity (ft/sec) |
|---|---|---|
| Edge of Water | 0.5 | 0.01 |
| .5 | 0.8 | -0.05 |
| 1.0 | 1.0 | 0.00 |
| 1.5 | 1.1 | 0.00 |
| 2.0 | 1.1 | 0.02 |
| 2.5 | 1.3 | 0.01 |
| 3.0 | 1.3 | 0.05 |
| 3.5 | 1.3 | 0.06 |
| 4.0 | 1.3 | 0.05 |
| 4.5 | 1.3 | 0.06 |
| 5.0 | 1.4 | 0.05 |
| 5.5 | 1.4 | 0.05 |
| 6.0 | 1.4 | 0.04 |
| 6.5 | 1.3 | 0.03 |
| 7.0 | 1.3 | 0.02 |
| 7.5 | 1.3 | 0.04 |
| 8.0 | 1.4 | 0.03 |
| 8.5 | 1.3 | 0.03 |
| [illegible] | [illegible] | 0.01 |
| 9.5 | 1.3 | -0.06 |
| 10.0 | 1.2 | 0.00 |
| 10.5 | 1.0 | 0.00 |
| 11.0 | 0.9 | 0.06 |
| 11.5 | 0.8 | -.03 |

Edge of Bank

PC-16
5/8/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN): 90% GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 2U+2D

STREAM MEASUREMENTS: AVERAGE WIDTH: 10' AVERAGE DEPTH: 5" MAX DEPTH: 1½'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Dep (ft) | Velocity (ft/sec) |
|---|---|
| 0.5 | 0.01 |
| 0.8 | -0.05 |
| 1.0 | 0.00 |
| 1.1 | 0.00 |
| 1.1 | 0.02 |
| 1.3 | 0.01 |
| 1.3 | 0.05 |
| 1.3 | 0.06 |
| 1.3 | 0.05 |
| 1.3 | 0.06 |
| 1.4 | 0.05 |
| 1.4 | 0.05 |
| 1.4 | 0.04 |
| 1.3 | 0.03 |
| 1.3 | 0.02 |
| 1.3 | 0.04 |
| 1.4 | 0.03 |
| 1.3 | 0.03 |
| [illegible] | 0.01 |

DRAWING OF STREAM

| | | |
|---|---|---|
| 9.5 | 1.3 | -0.06 |
| 10.0 | 1.2 | 0.00 |
| 10.5 | 1.0 | 0.00 |
| 11.0 | 0.9 | 0.00 |
| 11.5 | 0.8 | -.03 |

Edge of Bank

PC-15
5/2/00

Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

Field tiles on Both banks with discharge to stream

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) 90 GRADIENT: LOW MODERATE HIGH PHOTOS: US-27, DS-26 Camera (1)

STREAM MEASUREMENTS: AVERAGE WIDTH 7 AVERAGE DEPTH 6" MAX DEPTH 18"

| LENGTH | WIDTH | DEPTHS (") | | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 45' | 5' | 4" | 5" | 3" | | | | | | | | RUN |
| 65' | 10' | 12" | 8" | 6" | | | | | | | | Pool |
| 40' | 7' | 4" | 6" | 3" | | | | | | | | RUN |
| 170' | 10' | 12" | 8" | 8" | | | | | | | | POOL |
| 25' | 4' | 8" | 8" | 4" | | | | | | | | RUN |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

B

| Depth (ft) | Vel ft/sec |
|---|---|
| .2 | -0.36 |
| .3 | -0.33 |
| .5 | -0.13 |
| .5 | 0.14 |
| .6 | 0.68 |
| .6 | 1.23 |
| .7 | 1.84 |
| .8 | 2.10 |
| .8 | 2.18 |
| .8 | 2.03 |
| .8 | 1.99 |
| .8 | 1.74 |

| | Depth ft | Vel ft/sec |
|---|---|---|
| 4.3 | .8 | 1.2 |
| 4.7 | .7 | 0.64 |
| 5.0 | .4 | 0.20 |
| 5.3 - RWE | | |

PC-14
5/2/00

gure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:
Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) ____ GRADIENT: LOW MODERATE HIGH PHOTOS: US-23 DS-22 Cam 1

STREAM MEASUREMENTS: AVERAGE WIDTH 10' AVERAGE DEPTH 8" MAX DEPTH 18"

| LENGTH | WIDTH | DEPTHS D | | | | | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 10' | 8" | 14" | 7" | | | | | | | Pool |
| 20 | 8' | 6" | 8" | 4" | | | | | | | Run |
| 20 | 6' | 2" | 4" | 4" | | | | | | | Rif |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| ftm L Bank | Depth | Vel |
|---|---|---|
| LP | 0.3' | 0.03 |
| | 0.6' | 0.60 |
| | 0.8' | 0.76 |
| | 1.0' | 0.52 |
| | 0.9' | 0.75 |
| | 1.0' | 0.70 |
| | 1.0' | 0.86 |
| | 1.0' | 0.93 |
| | 1.0' | 0.94 |
| | 0.9' | 0.81 |
| | 0.8' | 0.81 |
| | 0.9' | 0.78 |
| | 0.8' | 0.84 |
| | 0.8' | 0.86 |
| | 0.6' | 0.48 |
| | 0.6' | 0.27 |
| | 0.4' | 0.08 |
| EWE | | |

PC-13
5/8/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 65 GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: Camera 2 - 15 / Camera 3 - 27

STREAM MEASUREMENTS: AVERAGE WIDTH 40 AVERAGE DEPTH 2' MAX DEPTH 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 40 | 1.5' | 2' | 2' | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Depth (ft) | Velocity (ft/sec) |
|---|---|
| .8 | .05 |
| 1.1 | .05 |
| 1.1 | .24 |
| 1.5 | .38 |
| 1.6 | .38 |
| 1.9 | .33 |
| 1.4 | .61 |
| 1.5 | .55 |
| 1.7 | .66 |
| 1.7 | .66 |
| 1.5 | .71 |
| 1.7 | .62 |
| 2.1 | .58 |
| 1.9 | .62 |
| 1.8 | .59 |
| 2.2 | .45 |
| 1.8 | .42 |
| 1.8 | .51 |
| 1.4 | .50 |
| 1.4 | .27 |

RWE

DRAWING OF STREAM

PC-12
5/10/00



Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 65 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTO: 16-43/75-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 35' AVERAGE DEPTH 12" MAX DEPTH 24"

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | | 6" | 12" | 6" | | | | | | | RUN |
| 300 | | 10" | 20" | 18" | | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dep (ft) | Velocity |
|---|---|
| 0.4 | 1.76 |
| 0.5 | 2.10 |
| 0.5 | 1.98 |
| 0.8 | 1.66 |
| 0.6 | 1.94 |
| 0.9 | 1.78 |
| 0.7 | 1.84 |
| 0.8 | 1.86 |
| 0.6 | 1.95 |
| 0.7 | 1.74 |
| 0.7 | 1.79 |
| 0.5 | 1.55 |
| 0.6 | 2.00 |
| 0.9 | 2.44 |
| 1.1 | 2.01 |
| 1.0 | 2.37 |
| 0.8 | 2.56 |
| 0.7 | 2.30 |
| 0.8 | 2.00 |
| 0.5 | 1.29 |
| 0.3 | 0.60 |

RWE

PC-11
5/10/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 10 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 19-49 / 18-05

STREAM MEASUREMENTS: AVERAGE WIDTH 35' AVERAGE DEPTH 1.5' MAX DEPTH 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 30 | 1.5' | 2.5' | 1.0' | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Dep (ft) | Velocity (ft/sec) |
|---|---|
| 1.0 | 1.09 |
| 1.3 | 0.88 |
| 1.1 | 1.37 |
| 1.1 | 1.67 |
| 1.4 | 1.22 |
| 1.6 | 1.55 |
| 2.0 | 1.48 |
| 2.0 | 1.88 |
| 2.0 | 1.88 |
| 2.0 | 1.65 |
| 1.9 | 1.70 |
| 2.2 | 1.68 |
| 1.8 | 1.51 |
| 1.2 | 1.20 |
| 1.3 | 0.75 |
| 1.3 | 0.09 |
| 0.5 | -0.05 |

DRAWING OF STREAM

PC-9

5/10/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) 85 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: ______

STREAM MEASUREMENTS: AVERAGE WIDTH 60 AVERAGE DEPTH 3' MAX DEPTH 5+ feet

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 60 | 3' | 5' | 3' | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

Dep (ft) Velocity (ft/sec)

pp for flow measurements

DRAWING OF STREAM

PC-8
5/3/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Greater than 4'

Is Reach Representative of Stream? (Y/N) Y If Not, ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) ______ GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 21 22

STREAM MEASUREMENTS: AVERAGE WIDTH ______ AVERAGE DEPTH ______ MAX. DEPTH ______

| LENGTH | WIDTH | DEPTHS (ft) | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

PC-7
5/12/00



Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____________________

Additional Comments/Pollution Impacts: ____________________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) 10 GRADIENT: X-LOW □-MODERATE □-HIGH PHOTOS: 25-05/24-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 25' AVERAGE DEPTH 3' MAX. DEPTH 5'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 25 | 2' | 4' | 3' | | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

Dep (e) Velocity (ft/sec)

P, No Velocity readings taken

DRAWING OF STREAM

PC-6
5/14/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN): 20 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 15-45/14-PS

STREAM MEASUREMENTS: AVERAGE WIDTH: 75' AVERAGE DEPTH: 3' MAX DEPTH: 5+'

| LENGTH | WIDTH | DEPTHS(ft) | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 500 | 75 | 3' | 5' | 1.5' | | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

for Velocity readings

DRAWING OF STREAM

PC-5
5/12/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

4

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10): ______ AESTHETIC RATING (1-10): ______

CANOPY (% OPEN) 25 GRADIENT: X LOW O MODERATE O HIGH PHOTOS: 27-US/26-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 50 AVERAGE DEPTH 1.5' MAX DEPTH 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 50 | 8" | 14" | 6" | | | | | | | Pool |
| 25 | 20 | 4" | 3" | 6" | | | | | | | Riff |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Dp (ft) | Velocity (ft/sec) |
|---|---|
| .4 | 0.69 |
| .6 | 1.06 |
| .5 | 1.19 |
| 1.0 | 1.06 |
| 1.0 | 1.24 |
| 0.8 | 1.04 |
| 0.7 | 1.18 |
| 0.7 | 0.89 |
| 0.6 | 0.89 |
| 0.5 | 1.11 |
| 0.5 | 1.16 |
| 0.5 | 0.97 |
| 0.5 | 0.74 |
| 0.6 | 1.11 |
| 0.3 | 0.74 |

RWE

DRAWING OF STREAM

PC-4
5/14/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN): 60 GRADIENT: X LOW O MODERATE O HIGH PHOTOS: 13-14/B-DS

STREAM MEASUREMENTS: AVERAGE WIDTH: 65 AVERAGE DEPTH: ______ MAX DEPTH: 3'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 65 | 2' | 3' | 2.5' | | | | | | | POOL |
| 300 | 65 | 1' | 1.5' | 1' | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

| Dep (ft) | Velocity (ft/sec) |
|---|---|
| 0.7 | [illegible] |
| 0.7 | 1.77 |
| 0.7 | 3.16 |
| 0.[illegible] | 2.86 |
| 1.0 | 2.47 |
| 1.3 | 2.11 |
| 1.5 | 2.27 |
| 1.[illegible] | 1.66 |
| 2.1 | 1.76 |
| 1.6 | 1.94 |
| 1.1 | 2.02 |
| 0.6 | 0.54 |

[illegible]

DRAWING OF STREAM

PC-3
5/8/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 55 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: SU+9D

STREAM MEASUREMENTS: AVERAGE WIDTH 40' AVERAGE DEPTH ______ MAX DEPTH 4'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

B Dep Velocity

DRAWING OF STREAM

and precarious

PC-2
5/12/00

Figure V-4-5. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

-3

Is Reach Representative of Stream? (Y/N) ✓ If Not, ________

Additional Comments/Pollution Impacts: ________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 40% GRADIENT: ☐-LOW ☐-MODERATE ☐-HIGH PHOTOS: 2 upstream + 3 down

STREAM MEASUREMENTS: AVERAGE WIDTH: ________ AVERAGE DEPTH: ________ MAX DEPTH ________

| LENGTH | WIDTH | DEPTHS (D) | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

Too Deep.

PC-1

5/12/00

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not: ____________________

Additional Comments/Pollution Impacts: ____________________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 90 GRADIENT: ~~O~~-LOW O-MODERATE O-HIGH PHOTOS: 4-15/3-DS

STREAM MEASUREMENTS: AVERAGE WIDTH 70' AVERAGE DEPTH 5+' MAX DEPTH 5+'

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 70 | 4' | 6' | 5' | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

locity readings, too deep.

5A-1
5/2/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Isopoda - 𝍸𝍸𝍸 1 (16)
Amphipoda - 𝍸𝍸𝍸𝍸 111 (23)

Anisoptera

Gastropoda LHS - 𝍸𝍸 11 (12)

Coleoptera

Zygoptera calop - 1 (1)

Bivalvia - 1 (1)
Crayfish - 11 (2)

Plecoptera

Diptera Bloodred - 𝍸𝍸𝍸 1111 (19)
Brown Chir ~~𝍸𝍸𝍸𝍸𝍸𝍸 111~~
Simulidae - ~~𝍸𝍸𝍸𝍸𝍸𝍸~~ 𝍸𝍸 1 (36)

Ephemeroptera Hept - 1 (1)

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 8

Total Org. in Sample 58

Observations Gyrinidae - Whirligig
Coleoptera - Water strider

Water temp 27.1 °C
Cond = 507
DO = 13.2
%DO = 193%
pH = 8.56

HC-1
5-5-00

Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

Some silty material as SD-1, which also was dominated by Blood-red Chironomids

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta – (5)

Amphipoda – (3)

Anisoptera Stout – Aeshnidae (5)

Gastropoda LHS – (10)

Gomphidae – (6)

Coleoptera

Zygoptera Coli: Calopterydae – (2)

Bivalvia

Crayfish – 1 (1)

Plecoptera

Diptera Blood red – (90)

Brown Chir – 1 (1)

Ephemeroptera

Culicidae – 1 (1)

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders | Total Org. in Sample

Observations

Water temp = 25°C
DO = 17.3 mg/L
DO% = 212%
pH = 8.02
Cond = 633 umhos

X

WF-3
5/5/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**   (17)

List Families, Presence/Relative Abundance

Oligochaeta – HHT HHT HHT III (18)

Isopoda – HHT HHT HHT II (17)

Asellidae – (3)

Amphipod – HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT III (63)

Anisoptera Stout – III

Gastropoda LHS – HHT HHT IIII (14)

Coleoptera Dytiscidae – I (1)

Elmidae – I (1)

Zygoptera Calopteryx – I (1)

Bivalvia

Diptera Blood(?) – HHT I (6)

Chironomid – HHT HHT HHT HHT HHT HHT HHT HHT III (43)

Simuliidae – II (2)

Crayfish – I (1)

Plecoptera

Ephemeroptera

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS   (Indicate No. of Individuals Representing Group)

Scrapers   | Filtering Collectors

CPOM SAMPLE  FUNCTIONAL FEEDING GROUPS  (Indicate No. of Individuals Representing Group)

Shredders 5   | Total Org. in Sample 50

Observations

water temp = 24°C
DO = 19 mg/L
DO% = 230%
Cond = 638 µmhos
pH = 8.3

WF-2
5/5/00

X

## Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta – (17)

Amphipod – 1 (1)

Planarian – 11 (5)

Anisoptera

Gastropoda LHS – (24)

RHS – 1 (1)

Coleoptera Hairy – 1 (1)

Zygoptera Coenagrionidae – 1 (1)

Calopterygidae – 1111 (4)

Bivalvia – (13)

Crayfish – 1 (1)

Diptera Bloodred – 111 (3)

Plecoptera

Brn Chirnd –

Simuliidae – (14)

Ephemeroptera

Trichoptera Hydropsychid – 11 (2)

Other

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 1 | Total Org. in Sample 50

Observations

Water temp = 24°C
DO = 15.6 mg/L
%DO = 188%
pH = 7.89
Cond = 636 μmhos

WF-1 X
5/5/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

Use Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta | Amphipoda - II (2) | Planaria - II (2) |
| | | Isopoda - I (1) |
| | Anisoptera | Annelid - I (1) |
| Gastropoda LHS - I (1) | | Coleoptera Hairy - I (1) |
| | Zygoptera Calopterid - IIII (4) | |
| Bivalvia - HHT HHT II (12) | Coenagrionidae - I (1) | Diptera Simuliidae - HHT HHT HHT HHT I (21) |
| | Plecoptera | Bloodred - HHT HHT III (13) |
| | | Brn Chir - HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT IIII (69) |
| Ephemeroptera | | Ceratopogonidae - III (3) |
| Caenidae - I (1) | Trichoptera | |
| Other | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders | Total Org. in Sample 50

Observations

water temp = 20.5 °C
DO = 15.0 mg/L
%DO = 172%
Cond = 572 µmhos
pH = 7.68

SF-3 X
5/7/00
2nd Duplicate

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST (List Families Present/Indicate Abundance)

Oligochaeta — 𝍸𝍸𝍸𝍸 𝍸𝍸𝍸 II 37 ✓

Isopod — 𝍸𝍸𝍸𝍸𝍸𝍸𝍸 𝍸𝍸𝍸𝍸𝍸 (62) ✓

Anisoptera

Gastropoda LHS — I (1) ✓

Coleoptera Hairy — I (1) ✓

Zygoptera Coenagrionidae — II (2)

Bivalvia

Diptera Brn Chiro — 𝍸𝍸𝍸 II (17) ✓

Plecoptera

Ceratopogonidae — I (1)

Blood red — I (1) ✓

Ephemeroptera Baetids — 𝍸𝍸𝍸 (15)

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 22 | Total Org. in Sample 52

Observations

Water temp = 22.5
DO = 19 mg/L
%DO = 232%
Cond = 1703 μmhos
pH = 8.34

SF-2
5/7/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed    1 = Rare    2 = Common    3 = Abundant    4 = Dominant

Shad
Bass
Large Carp
Sunfish
Gambusia/Chubs

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Isopoda - (14)

Asellidae (1)

Anisoptera Gomph - 1

Gastropoda

Coleoptera dytiscid - 1 (1)

Zygoptera coenagrionid - III (4)

Bivalvia

Diptera Simuliidae - (36)

Plecoptera

Chironomid - (52)

Blood red - 1 (1)

Ceratopogonidae - II (2)

Ephemeroptera

Caenidae - (16)

Trichoptera Hydropsychid - (1)

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 3

Total Org. in Sample 50

Observations

water temp = 22.3 °C
Cond = 1,693 µmhos
DO = 24.0 mg/L
%DO = 305%
pH = 8.46

SF-7 X
5/9/00

# Rapid Bioassessment Protocol II

*Biosurvey Field Data Sheet*

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Taxa Present/Estimate Abundance

| | | |
|---|---|---|
| Oligochaeta – I (1) | | [illegible] – [illegible] (6) |
| | Anisoptera | |
| Gastropoda [illegible] – II (2) | | Coleoptera [illegible] (1) |
| | | [illegible] – III (3) |
| Bivalvia – [illegible] (41) | Zygoptera [illegible] (1) | [illegible] – I (1) |
| | Plecoptera | Diptera [illegible] – [illegible] (26) |
| | | [illegible] – II (2) |
| Ephemeroptera [illegible] I (1) | | [illegible] – [illegible] (17) |
| [illegible] – [illegible] (16) | Trichoptera [illegible] – I (1) | [illegible] III (3) |
| Other | | |

**RIFFLE SAMPLE**
**FUNCTIONAL FEEDING GROUPS** — Indicate No. of Individuals Representing Group

Scrapers | Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** — Indicate No. of Individuals Representing Group

Shredders 2 2 | Total Org. in Sample

Observations

water temp = 22.4°C
DO = 17.0 mg/L
%DO = 210%
pH = 8.04
Cond = 1,670 µmhos

BG-2 X
5/7/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Relative Abundance

Oligochaeta – || (2)
Annelid – | (1)
(1) Corixidae – | Isopod – || (2)
Anisoptera long leg – |
Gastropoda LHS – ||| (3)
Scuds – ||| (3)
Coleoptera Dytiscid – HHT |||| (9)
(12) Dryopidae – HHT HHT ||
Zygoptera Coenagrionidae – ||||
Bivalvia – HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT (45)
Ephemeroptera
Caenidae – HHT | (6)
Coenagrionidae – ||| (3)
Plecoptera
Diptera Bra Chironomid – HHT HHT HHT HHT HHT ||| (28)
Simuliid – | (1)
Blephariceridae – || (2)
Trichoptera Hydro – | (1)
Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS — Indicate No. of Individuals Representing Group
Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS — Indicate No. of Individuals Representing Group
Shredders 2 | Total Org. in Sample 50

Observations

Water temp = 22.2
DO - 18.7 mg/L
%DO - 234%
Cond = 2,450 umhos
pH - 7.99

BG-1
5/7/00

## Rapid Bioassessment Protocol II

### Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

Some beds of broad leaf plants

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta | | Isopod - ⅢⅠ 1 (7) |
| | Corduliidae (3) | |
| | Anisoptera big bo - III | |
| Gastropoda | Snail - III Aeshnidae - (3) | Coleoptera Dytiscid - ⅢⅢ (11) |
| | Big - II Gomphidae (2) | Dryopid - ⅢⅢⅢⅢ II (22) |
| | Zygoptera Coenagrionid - ⅢⅢ III (13) | |
| Bivalvia - ⅢⅢⅢ (16) | | Diptera Bm Chirid - ⅢⅢⅢⅢⅢ II (27) |
| Crayfish - IIII (4) | Plecoptera | Culicid - I (1) |
| Ephemeroptera | | |
| Caenidae - ⅢⅢⅢⅢⅢ ⅢⅢ IIII (44) | Trichoptera | |
| Other | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS Indicate No. of Individuals Representing Group

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS Indicate No. of Individuals Representing Group

Shredders 3 | Total Org. in Sample 50

Observations

water temp = 22.2°C
Cond = 2304 µmhos
DO = 18.7 mg/L
%DO = 232%
pH = 8.10

5/10/00
SC-1

## Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta 1 0 1

Isopods 52

[illegible] 1

[illegible] 1

Anisoptera

[illegible] 2

[illegible] 10

Gastropoda 0

Coleoptera

[illegible] 1

Zygoptera

Bivalvia 1 1

Diptera

Plecoptera

Perlidae

~~[illegible]~~ 1

[illegible] 3

[illegible] 22

Ephemeroptera

[illegible] 12 10

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 26

Total Org. in Sample 50

Observations

after temp = 17.9°C
DO = 23 mg/L
%DO = 286%
Cond = 3,295 µmhos
pH = 8.08

UN-1 X
5/4/00

# Rapid Bioassessment Protocol II

*Biosurvey Field Data Sheet*

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List families present/indicate abundance

Oligochaeta – 2 ✓

Isopoda – 77 ✓

Anisoptera

Gastropoda LHS – 1 ✓
RHS – 2 ✓

Coleoptera Dryopidae – 2
Whirligig – 1 Gyrinidae 1

Zygoptera

Bivalvia

Crayfish – 6 ✓

Diptera Simulid – 44
Brown Chir – 9 ✓
Blood red – 2 ✓

Plecoptera

Ephemeroptera

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 50 | Total Org. in Sample 68

Observations

Water temp = 18.5°C
DO = 14.0 mg/L
DO% = 152%
pH = 7.58
Cond = 1,070 µmhos

SD-1 X
5-4-00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

Oligochaeta – 15 ✓

List Families Predominantly Abundance

Amphipoda – 1 ✓

Anisoptera

Gastropoda – 11 ✓

Coleoptera

Zygoptera

Bivalvia

Diptera Bloodred – 105

Plecoptera

Other Chir – 4

Ephemeroptera

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate no. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate no. of Individuals Representing Group)

Shredders

Total Org. in Sample 50

Observations

water temp = 17.5°C
DO = 11.5
% DO = 122%
Cond = 860 µmhos
pH = 7.37

WD-1
5/4/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta (11) | (13) | (1) |
| | | (1) |
| | Anisoptera (1) | |
| Gastropoda | (1) | Coleoptera |
| (2) | | (1) |
| (7) | Zygoptera | (1) |
| Bivalvia | | Diptera |
| | Plecoptera | (55) |
| | | (1) |
| Ephemeroptera | | (1) |
| (5) | Trichoptera | (1) |
| (12) | | (2) |
| Other | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors 50 |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders | Total Org. in Sample |

Observations

water temp = 20°C
DO = 13.4 mg/L
%DO = 146%
Cond = 334 µmhos
pH = 7.60

X

BC-3
5/4/00

## Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

8

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Hirudinea

Isopoda - HHT HHT HHT HHT HHT HHT IIII (34)

Asellidae - (3)

Amphipoda - II (2)

Anisoptera Stout - III

Daphnia - HHT III (8)

Gastropoda 4/5 - HHT HHT HHT I HHT HHT HHT I (31)

Coleoptera Dytiscidae - IIII (4)

Zygoptera

Bivalvia - J

Crayfish - HHT HHT HHT I (16)

Plecoptera

Diptera Bm. Chironomid - HHT HHT HHT HHT HHT I (26)

Ceratopogonidae - HHT (5)

Bloodred - III (3)

Hairy - I (1)

Ephemeroptera Heptageniidae - III (3)

Corixidae - HHT I (6)

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 7 | Total Org. in Sample 50

Observations

water temp = 24 °C
DO = 14.2
% DO = 170%
pH = 7.71
Cond = 548 μmhos

LP-3X
5/6/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST** (52)

Oligochaeta – | (1)

Gastropoda LHS – || (5)

Bivalvia

crayfish – 卌| (6)

Ephemeroptera heptagen – | (1)

Conidae – 卌卌||| (13)

Anisoptera

Zygoptera

Plecoptera

Trichoptera

List Families Present/Indicate Abundance 卌||

Isopoda – 卌卌卌卌卌卌卌卌

Amphipod – 卌卌卌卌卌卌||| (34)

Coleoptera

Diptera Bld red – 卌| (6) (24)

Brachio – 卌卌卌卌|||

Simuliidae – || (2)

Ceratopogonidae – | (1)

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 50 | Total Org. in Sample 52

Observations

Water temp : 21.5°C
DO : 15.5 mg/L
%DO : 178%
pH : 7.92
Cond : 369 μmhos

LP-1
5/6/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta – HHT HHT HHT II (17)

Isopoda – HHT HHT HHT HHT HHT HHT IIII (34)

Amphipod – HHT I (6)

Anisoptera

Gastropoda – II physa (2)

Coleoptera

Zygoptera caliptd – II (2)

Coenagrionid – I (1)

Bivalvia

Diptera Bro Chiro – HHT HHT HHT I (16)

Blood red – II (2)

Plecoptera

Ephemeroptera Baetid – HHT HHT HHT HHT HHT HHT HHT II (37)

Trichoptera

Other

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 5

Total Org. in Sample 60

Observations

water temp = 21°C
DO = 11.7 mg/L
% DO = 130%
pH = 7.67
Cond = 346 µmhos

X

LC-2
5/6/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta — | (1) ✓

Isopoda - 𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸𝍸 (53)

Amphipoda - 𝍸𝍸𝍸𝍸 (21)

Anisoptera

Gastropoda LHS - 𝍸𝍸𝍸|| (17)

Planorbe - 1 (1) ✓

Coleoptera Dytiscid - 𝍸|||| (9) ✓

Zygoptera Coenagrionidae - ||| (3)

Bivalvia

Diptera Bloodworm - 𝍸||| (8) ✓

Crayfish - 𝍸||| (8)

Plecoptera

Chironomid - 𝍸𝍸𝍸𝍸|| (27)

Ephemeroptera Heptageniid - 𝍸| (6)

Caenidae - 𝍸|| (7) ✓

Trichoptera

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 47 | Total Org. in Sample 74

Observations

water temp = 23°C
DO = 18.5 mg/L
% DO = 219%
Cond = 316 µmhos
pH = 7.92

X

PC15
5/2/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance (3) ✓

Oligochaeta

Isopods - ]

Libellulidae (1)   Amphipod - (5) ✓

Crayfish - 1 (1) ✓

Anisoptera Cordulidae (1)   Annelid - 1 (1)

Gastropoda — LHS - 1 (1)   long leg - 1

Coleoptera

RHS - 1   Shredder - 1

Lymnaeidae (1) ✓

Zygoptera coena - (25)

Bivalvia (46)   - / (6)

Diptera Blepharid - (7) ✓

Plecoptera

Brown CAIT - (42) ✓

Ephemeroptera

Trichoptera Hydropsychid - 1 (1) ✓

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS   Indicate No. of Individuals Representing Group

Scrapers   Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS   Indicate No. of Individuals Representing Group

Shredders 15   Total Org. in Sample 65

Observations   Several misquito fish (gambusia)

clear sunny
water temp = 24.5
pH = 8.01
DO = 10.3 mg/L
% DO = 124

PC-14 X
5/2/00

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

Misquitoe Fish and Sunfish

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta | Isopoda - (26)

Amphipoda

Gastropoda - LHS - 1111 (4) | Coleoptera

Zygoptera

Bivalvia - (15)

Crayfish - 1 | Plecoptera | Diptera Simulidae - (20)

Blood Red - 111 (3)

Ephemeroptera Baetid - 11 (36) | Other Chir - 1111 (37)

Trichoptera | Ceratopogonidae - (5)

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 18 | Total Org. in Sample 50

Observations

Water Temp = 25.3°C
pH = 8.46
Cond = 542
DO = 12.6
DO% = 153%

Work up in Lab

PC-13
5/8/00

## Rapid Bioassessment Protocol II

### Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST** — List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta ||| (7) | | Amphipoda - I (1) |
| [illegible] - IIII (4) | | Asellidae - III (3) Isopoda |
| Tubificidae - [illegible] (9) | Anisoptera | |
| Gastropoda Physidae - II (2) | | Coleoptera |
| | | Dryopidae - [illegible] (12) |
| Bivalvia | Zygoptera ~~[illegible]~~ | Haliplidae - II (2) |
| | Coenagrionidae - [illegible] | Diptera |
| | Plecoptera (30) | Culicidae - I (1) |
| Ephemeroptera | | Green Chironomidae - [illegible] (20) |
| Caenidae - [illegible] (56) | Trichoptera | Blood red Chironomidae - [illegible] (5) |
| | | Ceratopogonidae I (1) |
| Other | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2 | Total Org. in Sample 570

Observations

water temp = 23.6
pH = 8.0
Cond = 1640
DO = 16.7
% DO = 233

PG-12
5/10/06
X

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta | Anisoptera | Coleoptera Dryopidae - II 2 |
| Gastropoda | Zygoptera | Elmidae - 7 |
| Bivalvia - II 2 | Plecoptera | Hairy - I 1 |
| Ephemeroptera Caenidae - IIII 4 | | Diptera Blk Chird 68 |
| Baetidae 13 | Trichoptera Hydropsychidae 29 | Simuliidae 15 |
| | | Bld red - I 1 |
| | | Ceratopogonidae - I 1 |
| Other | | |

**RIFFLE SAMPLE**
**FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders 0 | Total Org. in Sample 50

Observations

water quality = 22.1°C
DO = 18.7 mg/L
%DO = 222%
pH = 8.17
cond = 1,149 µmhos

PC-11 X
5/10/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed    1 = Rare    2 = Common    3 = Abundant    4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Water [illegible] 1

Anisoptera

Gastropoda Lps-1 1

Coleoptera [illegible] 5

[illegible] - 1 1

Zygoptera

Bivalvia 5

Elmidae - 1 1

Diptera [illegible] 106

Plecoptera

Simuliidae - 1 1

Ephemeroptera [illegible] 4

Blephar[illegible] 10

[illegible] 4

Leptoceridae 1

Tipulidae - 1 1

Trichoptera [illegible] - 1

Hydrops[illegible] 4

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers 1    Filtering Collectors 30

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders    Total Org. in Sample

Observations

water temp = 20.2
DO = 20.15
%DO = 234.9%
Cnd = 1673 umhos
pH = 8.12

PC-9X
5/10/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed    1 = Rare    2 = Common    3 = Abundant    4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta – 2 | | Water boatmen – 9 |
| Planaria – 1 | | Water strider – 2 |
| | Anisoptera | |
| Gastropoda RHS – 1 | | Coleoptera Dryopidae – 6 |
| | | Dytiscid – 3 |
| | Zygoptera Coenagrionid – 5 | |
| Bivalvia | | Diptera Br. Chir. – 83 |
| | Plecoptera | |
| | | Bld red – 67 |
| Ephemeroptera | | |
| Caenidae – 8 | Trichoptera | |
| Other | | |

**RIFFLE SAMPLE**
**FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers    Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders –    Total Org. in Sample 50

Observations

water temp = 23.5°C
DO = 20.14 mg/L
%DO = 254%
pH = 8.01
Cond = 1,765 µmhos

PC-8
5/3/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta - [illegible] 5 | Isopod - [illegible] 12 | Planaria - 0 - [illegible] |
| Annelid - II 2 | | |
| | Anisoptera | |
| Gastropoda | | Coleoptera |
| Physa - [illegible] 19 | | riffle - III - Elmidae 3 |
| Limnaeid - [illegible] II | Zygoptera | [illegible] - II Dryopidae 2 |
| Bivalvia - II 2 | Calop - [illegible] 20 | Diptera |
| | Plecoptera | Chironomid - [illegible] 12 |
| | | [illegible] 15 |
| Ephemeroptera | | Simuliidae - [illegible] 6 |
| [illegible] 10 | Trichoptera | [illegible] 1 |
| | Hydro - I 2 | [illegible] - I Ceratopog. 1 |
| Other | | |

Amphipoda - 1

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers 5 | Filtering Collectors 55 |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders | Total Org. in Sample |

Observations

Pictures 21 - upstream
20 - downstream

air temp = 22.5
water temp = 20.5
DO = 8.5 mg/L
% DO = 100%
pH = 7.8
Cond = 1,793

PC-5
5/12/0

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta 1
Planaria - 1 2
Annelida - 111 2
Amphipoda
Gastropoda LHS - 11
Lang. lag. - 1 1
Zygoptera Calopterygidae - 6
Bivalvia - 2
[illegible] - 2
Plecoptera
Ephemeroptera Caenidae - 111 3
Trichoptera
[illegible] - 5
Water strider - 1 2
Water [illegible] - 1 2
Coleoptera Dytiscidae - 1 2
Diptera Bra Chrd - 23
Bld red - 1 2

Other

**RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers 20
Filtering Collectors 60

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders
Total Org. in Sample

Observations

Water temp = 22.3°C
DO = 17.2 mg/L
% DO = 209%
Cond = 1,227 µmhos
pH = 7.89

PC-6
5/14/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

Circled: Periphyton 1; Filamentous Algae 0; Macrophytes 0; Slimes 0; Macroinvertebrates 2; Fish 1

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda LHS - II (2) ✓

Bivalvia - I (1) ✓

Crayfish - [illegible] (8?) ✓

Ephemeroptera

Anisoptera

Zygoptera coliceetrdae - II (2) ✓

Plecoptera

Trichoptera

Water boatmen (Corixidae?) - [illegible] (23?) ✓

Isopoda - I (1) ✓

Coleoptera Dytiscidae - [illegible] (9) ✓

Diptera Bra Card - [illegible] (3?) ✓

Eldrod - II (2) ✓

Ceratopogonidae - [illegible] (12)

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders I

Total Org. in Sample 50

Observations

water temp = 20.6 °C
DO = 14.3 mg/L
%DO = 168 %
Cond = 1,663 µmhos
pH = 7.89

PC-5
5/17/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | (1) | 2 | 3 | 4 | Slimes | (0) | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | (2) | 3 | 4 | Macroinvertebrates | 0 | 1 | (2) | 3 | 4 |
| Macrophytes | (0) | 1 | 2 | 3 | 4 | Fish | (0) | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta - ||| (3) ✓

Gastropoda LHS - | (1) ✓
Limpet - || (2)

Bivalvia - [illegible] (6) ✓
Crayfish - ||| (4) ✓

Ephemeroptera
[illegible] - | (1) ✓

Planaria - | (1) ✓

Anisoptera

Zygoptera Calopterygidae - | (1) ✓

Plecoptera

Trichoptera Hydropsychid - ||| (4)

Isopoda - [illegible] (54) ✓

Coleoptera Dryopidae - | (1) ✓
Dytiscid - | (1) ✓

Diptera Br. Chiro - [illegible] (?)
Bl. Fly - ||| (3) (2)
Simuliidae - [illegible] (12)

Other

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 3

Total Org. in Sample 50

Observations

water temp = 22.8 °C
DO = 17.3 mg/L
%DO = 213%
pH = 7.88
Cond = 1667 umhos

PC-4
5/14/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST   List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta - HHT II (7) | Asellid - I (1) | |
| | Planaria - HHT (5) | [illegible] - HHT HHT IIII (14) |
| Gastropoda | Anisoptera | |
| | | Coleoptera |
| Bivalves - HHT II (7) | Zygoptera [illegible] - I (1) | |
| | | Diptera [illegible] - HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT HHT |
| | Plecoptera | Ceratopogonidae - IIII (4) |
| Ephemeroptera | | Elmidae - IIII (4) |
| | Trichoptera | |
| Other | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS   (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders 8 | Total Org. in Sample 50 |

Observations:

water temp = 21.4 °C
DO = 15.0 mg/L
% DO = 180%
Cond = 1,643 µmhos
pH 7.97

PC-3 X
5/8/00

# Rapid Bioassessment Protocol II

**Biosurvey Field Data Sheet**

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta – 17
Ae[illegible] – 1   1

Gastropoda LHS – 9
Limn[illegible] – III   3

Bivalvia
Cray[illegible] – III   3

Ephemeroptera

Anisoptera

Zygoptera [illegible]   2

Plecoptera

Trichoptera

Coleoptera El[illegible]   11
[illegible] – II   3

Diptera [illegible]   53
Blood[illegible] – III   4

Other

**RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 50

Observations

water temp = 21.3
DO = 14.8
%DO = 172
Cond = 1,303
pH = 7.74

PC-2
5/13/02

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Relative Presence/Numbers Abundance

Oligochaeta 1 (1)

Isopoda 1 (1)

Anisoptera

Gastropoda Phy 8

Lym 10

Limn 8

Coleoptera 2

Zygoptera

Bivalvia

Diptera

Plecoptera

Chiro 70

Ephemeroptera

Simul 10

Trichoptera

Other

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers 0 Filtering Collectors 5

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders Total Org. in Sample

Observations

water temp = 22.5
DO = 18.90
% DO = 230
Cond = 1724
pH = 7.70

PC-1
5/12/00

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

Oligochaeta [illegible] 3
Annelida - [illegible] 2
[illegible] 5
Anisoptera
Gastropoda LHS - [illegible] 9
Zygoptera
Bivalvia
[illegible] 9
Plecoptera
Ephemeroptera [illegible] 11
[illegible] Baetid 1
Trichoptera
List Families Present/Relative Abundance
[illegible] 6 16
[illegible] 11
Daphnia - [illegible] 9
Coleoptera [illegible] 14 14
Diptera [illegible] 26
Blood [illegible] 6

Other

**RIFFLE SAMPLE**
**FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers
Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders 5
Total Org. in Sample 50

Observations

water temp = 22.0°C
DO = 17 mg/L

SA-1
5/2/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 41

Stream Sand Creek RM ____ Date 5/2/00 River Code ____
Location SA 1 Crew EJS ____

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 11

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| ☐ ☐-BLDER /SLABS [10] | | | ☐ X-GRAVEL [7] | X | X | Substrate Origin (Check all) |
| ☐ ☐-BOULDER [9] | | | ☐ X-SAND [6] | X | X | ☐-LIMESTONE [1] ☐-RIP/RAP [0] |
| ☐ ☐-COBBLE [8] | | | ☐ ☐-BEDROCK [5] | | | ☐-TILLS [1] X-HARDPAN [0] |
| ☐ ☐-HARDPAN [4] | X | | ☐ ☐-DETRITUS [3] | | | ☐-SANDSTONE [0] |
| ☐ ☐-MUCK [2] | | | ☐ ☐-ARTIFIC. [0] | | | ☐-SHALE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: ☐ > 4 [2] X <= 4 [0] ☐-COAL FINES [-2]

Silt Cover (Check One): ☐ SILT HEAVY [-2] X SILT MODERATE [-1] ☐ - SILT NORMAL [0] ☐ - SILT FREE [1]

Extent Of Embeddedness (Check One): ☐-EXTENSIVE [-2] X-MODERATE [-1] ☐-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 4

2) INSTREAM COVER

TYPE (Check All That Apply)

☐ - UNDERCUT BANKS [1] X-DEEP POOLS [2] ☐ -OXBOWS [1]
X-OVERHANGING VEGETATION [1] ☐ -ROOTWADS [1] X-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] ☐ -BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND |
| ☐ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | ☐ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| X - LOW [2] | ☐ - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | X - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐ ☐ - WIDE > 50m [4] | ☐ ☐-FOREST, SWAMP [3] | ☐ ☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐ ☐ - MODERATE 10-50 [3] | X X-OPEN PASTURE/ ROWCROP [0] | ☐ ☐-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| ☐ ☐ - NARROW 5-10m [2] | ☐ ☐- RESID., PARK, NEW FIELD [1] | ☐ ☐-CONSERV. TILLAGE [1] | ☐ ☐-HEAVY OR SEVERE [1] |
| X X - VERY NARROW 1-5m [1] | ☐ ☐-FENCED PASTURE [1] | ☐ ☐-MINING/CONSTRUCTION [0] | |
| ☐ ☐ - NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/GLIDE & CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐ - > 1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| ☐ - 0.7-1m [4] | ☐ -POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| X - 0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐ -INTERMITTENT [-2] |
| ☐ - < 0.4m [1] | | X-SLOW [1] | |
| ☐ - < 0.2m [Pool = 0] | | | |

☐-NO POOL [0]

COMMENTS ____

RIFFLE: 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐ - GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g. Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | X-MODERATE [0] |
| ☐ - GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| X - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | ☐-NO RIFFLE [0] |
| ☐ - GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ GRADIENT: 2

5) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

HC-
5/5/



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 45

Stream Hurricane Creek RM ____ Date ____ River Code ____

Location HC 1 Crew ESE/CWB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE |
|---|---|---|---|---|---|
| □□-BLDER /SLABS [10] | | | □X-GRAVEL [7] | X | X |
| □□-BOULDER [9] | | | □□-SAND [6] | | X |
| □□-COBBLE [8] | | | □□-BEDROCK [5] | | |
| X□-HARDPAN [4] | X | | □□-DETRITUS [3] | X | |
| □□-MUCK [2] | X | X | □□-ARTIFIC [0] | | |

SUBSTRATE QUALITY: Substrate Origin (Check all): □-LIMESTONE [1] □-RIP/RAP [0] □-TILLS [1] X-HARDPAN [0] □-SANDSTONE [0] □-SHALE [-1] □-COAL FINES [-2]

SUBSTRATE SCORE: 1

Silt Cover (Check One): □-SILT HEAVY [-2] X-SILT MODERATE [-1] □-SILT NORMAL [0] □-SILT FREE [1]

Extent Of Embeddedness (Check One): □-EXTENSIVE [-2] X-MODERATE [-1] □-LOW [0] □-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: X-> 4 [2] □-<= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 5

TYPE (Check All That Apply)

□-UNDERCUT BANKS [1] X-DEEP POOLS [2] □-OXBOWS [1]
X-OVERHANGING VEGETATION [1] □-ROOTWADS [1] □-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE): □-EXTENSIVE > 75% [11] □-MODERATE 25-75% [7] X-SPARSE 5-25% [3] □-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY |
|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] |
| □-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | □-MODERATE [2] |
| X-LOW [2] | □-FAIR [3] | X-RECOVERING [3] | X-LOW [1] |
| □-NONE [1] | X-POOR [1] | □-RECENT OR NO RECOVERY [1] | |

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

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

RIPARIAN WIDTH (L R (Per Bank)): □□-WIDE > 50m [4] □□-MODERATE 10-50m [3] □□-NARROW 5-10m [2] X-VERY NARROW 1-5m [1] □□-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY (L R (Most Predominant Per Bank)): □□-FOREST, SWAMP [3] X-OPEN PASTURE/ROWCROP [0] □□-RESID.,PARK,NEW FIELD [1] □□-FENCED PASTURE [1] □□-URBAN OR INDUSTRIAL [0] □□-SHRUB OR OLD FIELD [2] □□-CONSERV. TILLAGE [1] □□-MINING/CONSTRUCTION [0]

BANK EROSION: □□-NONE OR LITTLE [3] X-MODERATE [2] □□-HEAVY OR SEVERE [1]

COMMENTS: ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 4

MAX. DEPTH (Check 1): □-> 1m [6] □-0.7-1m [4] □-0.4-0.7m [2] X-< 0.4m [1] □-< 0.2m [Pool = 0]

MORPHOLOGY (Check 1): X-POOL WIDTH > RIFFLE WIDTH [2] □-POOL WIDTH = RIFFLE WIDTH [1] □-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply): □-TORRENTIAL [-1] □-FAST [1] □-MODERATE [1] X-SLOW [1] □-EDDIES [1] □-INTERSTITIAL [-1] □-INTERMITTENT [-2]

□-NO POOL [0]

COMMENTS: ____

RIFFLE: 0

RIFFLE/RUN DEPTH: □-GENERALLY > 10 cm, MAX > 50 [4] □-GENERALLY > 10 cm, MAX < 50 [3] □-GENERALLY 5-10 cm [1] X-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE: □-STABLE (e.g., Cobble, Boulder) [2] □-MOD. STABLE (e.g., Pea Gravel) [1] X-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS: □-EXTENSIVE [-1] □-MODERATE [0] □-LOW [1] □-NONE [2]

□-NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

WF-3
5/5/00

Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 42

Stream West Fork of Pigeon RM Date River Code
Location WF-3 Crew EJB/CMR

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 11

- BLDER/SLABS [10] — X GRAVEL [7] X X — Substrate Origin (Check all) — Silt Cover (Check One)
- BOULDER [9] — SAND [6] X X — LIMESTONE [1] — RIP/RAP [0] — SILT HEAVY [-2] — X SILT MODERATE [-1]
- COBBLE [8] — BEDROCK [5] — TILLS [1] — X HARDPAN [0] — SILT NORMAL [0] — SILT FREE [1]
- HARDPAN [4] X — DETRITUS [3] X — SANDSTONE [0] — Extent Of Embeddedness (Check One)
- MUCK [2] X — ARTIFIC. [0] — SHALE [-1] — EXTENSIVE [-2] — X MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] — <= 4 [0] — COAL FINES [-2] — LOW [0] — NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS

2] INSTREAM COVER COVER SCORE: 8

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- UNDERCUT BANKS [1] — X DEEP POOLS [2] — OXBOWS [1] — EXTENSIVE > 75% [11]
- X OVERHANGING VEGETATION [1] — ROOTWADS [1] — AQUATIC MACROPHYTES [1] — MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1] — BOULDERS [1] — X LOGS OR WOODY DEBRIS [1] — X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | X LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 4
*River Right Looking Downstream*

RIPARIAN WIDTH — EROSION/RUNOFF - FLOOD PLAIN QUALITY — BANK EROSION

L R (Per Bank) — L R (Most Predominant Per Bank) — L R (Per Bank)

- WIDE > 50m [4] — FOREST, SWAMP [3] — URBAN OR INDUSTRIAL [0] — NONE OR LITTLE [3]
- MODERATE 10-50 [3] — X OPEN PASTURE/ ROWCROP [0] — SHRUB OR OLD FIELD [2] — X MODERATE [2]
- NARROW 5-10m [2] — RESID., PARK, NEW FIELD [1] — CONSERV. TILLAGE [1] — HEAVY OR SEVERE [1]
- X VERY NARROW 1-5m [1] — FENCED PASTURE [1] — MINING/CONSTRUCTION [0]
- NONE [0]

COMMENTS

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

MAX. DEPTH (Check 1) — MORPHOLOGY (Check 1) — POOL/GLIDE/RIFFLE/RUN CURRENT VELOCITY (Check All That Apply)

- > 1m [6] — X POOL WIDTH > RIFFLE WIDTH [2] — TORRENTIAL [-1] — X EDDIES [1]
- 0.7-1m [4] — POOL WIDTH = RIFFLE WIDTH [1] — FAST [1] — INTERSTITIAL [-1] — NO POOL [0]
- X 0.4-0.7m [2] — POOL WIDTH < RIFFLE W. [0] — MODERATE [1] — INTERMITTENT [-2]
- < 0.4m [1] — X SLOW [1]
- < 0.2m (Pool = 0)

COMMENTS

RIFFLE: 1

RIFFLE/RUN DEPTH — RIFFLE/RUN SUBSTRATE — RIFFLE/RUN EMBEDDEDNESS

- GENERALLY > 10 cm, MAX > 50 [4] — STABLE (e.g., Cobble, Boulder) [2] — EXTENSIVE [-1] — X MODERATE [0]
- GENERALLY > 10 cm, MAX < 50 [3] — MOD. STABLE (e.g., Pea Gravel) [1] — LOW [1] — NONE [2]
- X GENERALLY 5-10 cm [1] — X UNSTABLE (Gravel, Sand) [0] — NO RIFFLE [0]
- GENERALLY < 5 cm (Riffle = 0)

COMMENTS GRADIENT: 4

5] Gradient (feet/mile): ______ %POOL: ______ %RIFFLE: ______ %RUN: ______

WF-[illegible]
5/5/[illegible]



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [39] 39

Stream West Fork of Pigeon RM ____ Date ____ River Code ____
Location WF-2 Crew ES B/cw B

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES: Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: [10]

- ☐☐-BLDER/SLABS[10] ____ ____ ☐X-GRAVEL[7] ____ X Substrate Origin (Check all) Silt Cover (Check One)
- ☐☐-BOULDER[9] ____ ____ ☐☐-SAND[6] ____ ____ ☐-LIMESTONE[1] ☐-RIP/RAP[0] ☐-SILT HEAVY[-2] X-SILT MODERATE[-1]
- ☐☐-COBBLE[8] ____ ____ ☐☐-BEDROCK[5] ____ ____ ☐-TILLS[1] X-HARDPAN[0] ☐-SILT NORMAL[0] ☐-SILT FREE[1]
- X☐-HARDPAN[4] X X ☐☐-DETRITUS[3] X ____ ☐-SANDSTONE[0] Extent Of Embeddedness (Check One)
- ☐☐-MUCK[2] X ____ ☐☐-ARTIFIC.[0] ____ ____ ☐-SHALE[-1] ☐-EXTENSIVE[-2] ☐-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐->4 [2] X-<=4 [0] ☐-COAL FINES[-2] X-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: [7]

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐-UNDERCUT BANKS[1] X-DEEP POOLS[2] ☐-OXBOWS[1] ☐-EXTENSIVE >75%[11]
- X-OVERHANGING VEGETATION[1] ☐-ROOTWADS[1] ☐-AQUATIC MACROPHYTES[1] ☐-MODERATE 25-75%[7]
- X-SHALLOWS (IN SLOW WATER)[1] ☐-BOULDERS[1] ☐-LOGS OR WOODY DEBRIS[1] X-SPARSE 5-25%[3]
- ☐-NEARLY ABSENT <5%[1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [7]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH[4] | ☐-EXCELLENT[7] | ☐-NONE[6] | ☐-HIGH[3] | ☐-SNAGGING | ☐-IMPOUND |
| ☐-MODERATE[3] | ☐-GOOD[5] | ☐-RECOVERED[4] | ☐-MODERATE[2] | ☐-RELOCATION | ☐-ISLANDS |
| X-LOW[2] | ☐-FAIR[3] | X-RECOVERING[3] | X-LOW[1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE[1] | X-POOR[1] | ☐-RECENT OR NO RECOVERY[1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [5]

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOODPLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE >50m[4] | ☐☐-FOREST, SWAMP[3] | ☐☐-URBAN OR INDUSTRIAL[0] | ☐-NONE OR LITTLE[3] |
| ☐☐-MODERATE 10-50m[3] | X X-OPEN PASTURE/ROWCROP[0] | ☐☐-SHRUB OR OLD FIELD[2] | ☐ X-MODERATE[2] |
| ☐☐-NARROW 5-10m[2] | ☐☐-RESID.,PARK,NEW FIELD[1] | ☐☐-CONSERV. TILLAGE[1] | X ☐-HEAVY OR SEVERE[1] |
| X X-VERY NARROW 1-5m[1] | ☐☐-FENCED PASTURE[1] | ☐☐-MINING/CONSTRUCTION[0] | |
| ☐☐-NONE[0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [6]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| ☐->1m[6] | X-POOL WIDTH > RIFFLE WIDTH[2] | ☐-TORRENTIAL[-1] | X-EDDIES[1] | ☐-NO POOL[0] |
| ☐-0.7-1m[4] | ☐-POOL WIDTH = RIFFLE WIDTH[1] | ☐-FAST[1] | ☐-INTERSTITIAL[-1] | |
| X-0.4-0.7m[2] | ☐-POOL WIDTH < RIFFLE W.[0] | X-MODERATE[1] | ☐-INTERMITTENT[-2] | |
| ☐-<0.4m[1] | | ☐-SLOW[1] | | |
| ☐-<0.2m (Pool = 0) | | | | |

COMMENTS ____

RIFFLE: [7]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY >10 cm, MAX.>50[4] | ☐-STABLE (e.g., Cobble, Boulder)[2] | ☐-EXTENSIVE[-1] | ☐-MODERATE[0] |
| ☐-GENERALLY >10 cm, MAX.<50[3] | ☐-MOD. STABLE (e.g., Pea Gravel)[1] | X-LOW[1] | ☐-NONE[2] |
| X-GENERALLY 5-10 cm[1] | X-UNSTABLE (Gravel, Sand)[0] | | ☐-NO RIFFLE[0] |
| ☐-GENERALLY <5 cm (Riffle = 0) | | | |

COMMENTS ____ GRADIENT: [7] 2

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

WF-1
5/5/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [34]

Stream West Fork of Pigeon RM ____ Date ____ River Code ____
Location WF-1 ____ Crew ED B / C W/ H

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

| TYPE | POOL RIFFLE | | POOL RIFFLE | | SUBSTRATE QUALITY | SUBSTRATE SCORE: [6] |
|---|---|---|---|---|---|---|
| O-BOULDER/SLABS [10] | ____ ____ | X GRAVEL [7] | X | X | Substrate Origin (Check all) | Silt Cover (Check One) |
| O-BOULDER [9] | ____ ____ | X SAND [6] | X | X | LIMESTONE [1] O-RIPRAP [0] | X SILT HEAVY [-2] O-SILT MODERATE [-1] |
| O-COBBLE [8] | ____ ____ | O-BEDROCK [5] | ____ | X | TILLS [1] O-HARDPAN [0] | O - SILT NORMAL [0] O - SILT FREE [1] |
| O-HARDPAN [4] | ____ ____ | O-DETRITUS [3] | X | ____ | O-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| O-MUCK [2] | ____ ____ | O-ARTIFIC [0] | ____ | ____ | O-SHALE [-1] | X EXTENSIVE [-2] O-MODERATE [-1] |
| | | | | | | O-LOW [0] O-NONE [1] |

TOTAL NUMBER OF SUBSTRATE TYPES: O-> 4 [2] X <= 4 [0] O-COAL FINES [-2]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: [6] 8

2] INSTREAM COVER

TYPE (Check All That Apply)
O - UNDERCUT BANKS [1]
X OVERHANGING VEGETATION [1]
X SHALLOWS (IN SLOW WATER) [1]
X DEEP POOLS [2]
O - ROOTWADS [1]
O - BOULDERS [1]
O - OXBOWS [1]
O - AQUATIC MACROPHYTES [1]
X LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [7] 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X LOW [2] | O - FAIR [3] | X RECOVERING [3] | X LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [6]
*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | X X OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X X MODERATE [2] |
| O O-NARROW 5-10m [2] | O O- RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [4] 4

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O- > 1m [6] | | | | |
| O- 0.7-1m [4] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] | |
| X 0.4-0.7m [2] | X POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] | O-NO POOL [0] |
| O- < 0.4m [1] | O-POOL WIDTH < RIFFLE W. [0] | X MODERATE [1] | O-INTERMITTENT [-2] | |
| O- < 0.2m (Pool = 0) | | O-SLOW [1] | | |

COMMENTS ____

RIFFLE: [1]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] X MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g. Pea Gravel) [1] | O-LOW [1] O-NONE [2] |
| X GENERALLY 5-10 cm [1] | X UNSTABLE (Gravel, Sand) [0] | O-NO RIFFLE [0] |
| O - GENERALLY < 5 cm (Riffle = 0) | | |

COMMENTS ____ GRADIENT: [2]

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

SF-3
5/7/c



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**

QHEI SCORE: 49

Stream Smith Fork RM ____ Date ____ River Code ____
Location SF-3 Crew ____

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 12

- BLDER /SLABS [10]
- BOULDER [9]
- COBBLE [8]
- HARDPAN [4]
- MUCK [2]
- GRAVEL [7] X X
- SAND [6] X X
- BEDROCK [5] X
- DETRITUS [3]
- ARTIFIC [0]
- Substrate Origin (Check all)
- LIMESTONE [1]
- RIPRAP [0]
- TILLS [1]
- HARDPAN [0]
- SANDSTONE [0]
- SHALE [-1]
- COAL FINES [-2]

Silt Cover (Check One)
- SILT HEAVY [-2]
- SILT MODERATE [-1]
- SILT NORMAL [0]
- SILT FREE [1]

Extent Of Embeddedness (Check One)
- EXTENSIVE [-2]
- MODERATE [-1]
- LOW [0]
- NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐ > 4 [2] ☐ <= 4 [0]

NOTE: Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: ____

2) INSTREAM COVER

TYPE (Check All That Apply)
- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

SINUOSITY
- HIGH [4]
- MODERATE [3]
- LOW [2]
- NONE [1]

DEVELOPMENT
- EXCELLENT [7]
- GOOD [5]
- FAIR [3]
- POOR [1]

CHANNELIZATION
- NONE [6]
- RECOVERED [4]
- RECOVERING [3]
- RECENT OR NO RECOVERY [1]

STABILITY
- HIGH [3]
- MODERATE [2]
- LOW [1]

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

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 9

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)
- WIDE > 50m [4]
- MODERATE 10-50 [3]
- NARROW 5-10m [2]
- VERY NARROW 1-5m [1]
- NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)
- FOREST, SWAMP [3]
- OPEN PASTURE/ ROWCROP [0]
- RESID., PARK, NEW FIELD [1]
- FENCED PASTURE [1]
- URBAN OR INDUSTRIAL [0]
- SHRUB OR OLD FIELD [2]
- CONSERV. TILLAGE [1]
- MINING/CONSTRUCTION [0]

BANK EROSION
- NONE OR LITTLE [3]
- MODERATE [2]
- HEAVY OR SEVERE [1]

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 4

MAX. DEPTH (Check 1)
- > 1m [6]
- 0.7-1m [4]
- 0.4-0.7m [2]
- < 0.4m [1]
- < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- POOL WIDTH > RIFFLE WIDTH [2]
- POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- TORRENTIAL [-1]
- FAST [1]
- MODERATE [1]
- SLOW [1]
- EDDIES [1]
- INTERSTITIAL [-1]
- INTERMITTENT [-2]

☐ NO POOL [0]

COMMENTS: ____

RIFFLE: 7

RIFFLE/RUN DEPTH
- GENERALLY > 10 cm, MAX. > 50 [4]
- GENERALLY > 10 cm, MAX. < 50 [3]
- GENERALLY 5-10 cm [1]
- GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- STABLE (e.g., Cobble, Boulder) [2]
- MOD. STABLE (e.g., Pea Gravel) [1]
- UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- EXTENSIVE [-1]
- MODERATE [0]
- LOW [1]
- NONE [2]

☐ NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

SF-2
5/7/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [44] 44

Stream Smith Fork RM ____ Date ____ River Code ____
Location SF-2 Crew [illegible]

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: [11]

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS[10]; X GRAVEL [7] ✓ X; Substrate Origin (Check all); Silt Cover (Check One)
- BOULDER [9]; SAND [6] X X; LIMESTONE [1]; RIP/RAP [0]; SILT HEAVY [-2]; SILT MODERATE [-1]
- COBBLE [8]; BEDROCK [5]; TILLS [1]; X HARDPAN [0]; X SILT NORMAL [0]; SILT FREE [1]
- X HARDPAN [4] X X; DETRITUS [3]; SANDSTONE [0]; Extent Of Embeddedness (Check One)
- MUCK [2]; ARTIFIC. [0]; SHALE [-1]; EXTENSIVE [-2]; MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: >4 [2] X <=4 [0]; COAL FINES [-2]; X LOW [0]; NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER — COVER SCORE: [9]

TYPE (Check All That Apply); AMOUNT (Check One, or check 2 and AVERAGE)

- UNDERCUT BANKS [1]; X DEEP POOLS [2]; OXBOWS [1]; EXTENSIVE > 75% [11]
- X OVERHANGING VEGETATION [1]; ROOTWADS [1]; AQUATIC MACROPHYTES [1]; MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1]; BOULDERS [1]; X LOGS OR WOODY DEBRIS [1]; X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: [7]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | X LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: [6]
*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank); EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank); BANK EROSION

- WIDE > 50m [4]; FOREST, SWAMP [3]; URBAN OR INDUSTRIAL [0]; NONE OR LITTLE [3]
- MODERATE 10-50 [3]; X X OPEN PASTURE/ ROWCROP [0]; SHRUB OR OLD FIELD [2]; X X MODERATE [2]
- NARROW 5-10m [2]; RESID., PARK, NEW FIELD [1]; CONSERV. TILLAGE [1]; HEAVY OR SEVERE [1]
- X X VERY NARROW 1-5m [1]; FENCED PASTURE [1]; MINING/CONSTRUCTION [0]
- NONE [0]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: [4]

MAX. DEPTH (Check 1); MORPHOLOGY (Check 1); POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- > 1m [6]; X POOL WIDTH > RIFFLE WIDTH [2]; TORRENTIAL [-1]; EDDIES [1]
- 0.7-1m [4]; POOL WIDTH = RIFFLE WIDTH [1]; FAST [1]; INTERSTITIAL [-1]; NO POOL [0]
- 0.4-0.7m [2]; POOL WIDTH < RIFFLE W. [0]; MODERATE [1]; INTERMITTENT [-2]
- X < 0.4m [1]; X SLOW [1]
- < 0.2m (Pool = 0)

COMMENTS ____

RIFFLE: [2]

RIFFLE/RUN DEPTH; RIFFLE/RUN SUBSTRATE; RIFFLE/RUN EMBEDDEDNESS

- GENERALLY > 10 cm, MAX > 50 [4]; STABLE (e.g., Cobble, Boulder) [2]; EXTENSIVE [-1]; MODERATE [0]
- GENERALLY > 10 cm, MAX < 50 [3]; MOD. STABLE (e.g., Pea Gravel) [1]; X LOW [1]; NONE [2]
- X GENERALLY 5-10 cm [1]; X UNSTABLE (Gravel, Sand) [0]; NO RIFFLE [0]
- GENERALLY < 5 cm (Riffle = 0)

COMMENTS ____ GRADIENT: [4]

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

SF-
5/9/0

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 49

Stream Smith Fork RM Date River Code

Location SF-1 Crew EB/CWB/AR

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 12

O O-BLDER/SLABS[10] ___ ___ X O-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)

O O-BOULDER [9] ___ ___ O X-SAND [6] X X O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] O-SILT MODERATE [-1]

O O-COBBLE [8] ___ ___ O O-BEDROCK[5] ___ ___ X-TILLS [1] O-HARDPAN [0] X-SILT NORMAL [0] O-SILT FREE [1]

O O-HARDPAN [4] X ___ O O-DETRITUS[3] ___ ___ O-SANDSTONE [0] Extent Of Embeddedness (Check One)

O O-MUCK [2] ___ ___ O O-ARTIFIC [0] ___ ___ O-SHALE [-1] O—EXTENSIVE [-2] O—MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: O-> 4 [2] X—<= 4 [0] X-SOCAL FINES [-2] X—LOW [0] O—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS________

COVER SCORE: 7

2) INSTREAM COVER

TYPES (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

O - UNDERCUT BANKS [1] X - DEEP POOLS [2] O - OXBOWS [1] O - EXTENSIVE > 75% [11]

O - OVERHANGING VEGETATION [1] O - ROOTWADS [1] O - AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]

X - SHALLOWS (IN SLOW WATER) [1] O - BOULDERS [1] X - LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3]

O - NEARLY ABSENT < 5% [1]

COMMENTS________

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:________

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | X O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X O-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS________

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O - > 1m [6] | X - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | O - EDDIES [1] | O NO POOL [0] |
| O - 0.7-1m [4] | O - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] | |
| X - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | O - MODERATE [1] | O - INTERMITTENT [-2] | |
| O - < 0.4m [1] | | X - SLOW [1] | | |
| O - < 0.2m (Pool = 0) | | | | |

COMMENTS________

RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX. > 50 [4] | O STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O - GENERALLY > 10 cm MAX. < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X-LOW [1] | O-NONE [2] |
| X - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | O NO RIFFLE [0] |
| O - GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS________ GRADIENT: 4

6) Gradient (feet/mile):____ %POOL:____ %RIFFLE:____ %RUN:____

EPA 4520

5/7/00
BG-2



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [illegible]

Stream Big Creek RM ____ Date ____ River Code ____
Location ~ BG-2 Crew CJB / CWR

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 12

- □ □-BLDER/SLABS[10] ☒ □-GRAVEL [7] X X Substrate Origin (Check all)
- □ □-BOULDER [9] □ □-SAND [6] X X □-LIMESTONE [1] □-RIPRAP [0] □-SILT HEAVY [-2] □-SILT MODERATE [-1]
- □ □-COBBLE [8] X X □ □-BEDROCK [5] □-TILLS [1] ☒-HARDPAN [0] ☒-SILT NORMAL [0] □-SILT FREE [1]
- □ □-HARDPAN [4] X □ □-DETRITUS [3] X □-SANDSTONE [0] Extent Of Embeddedness (Check One)
- □ □-MUCK [2] □ □-ARTIFIC [0] □-SHALE [-1] □-EXTENSIVE [-2] ☒-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☒ > 4 [2] □ <= 4 [0] ☒ COAL FINES [-2] □-LOW [0] □-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 7

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]
- ☒-OVERHANGING VEGETATION [1] ☒-ROOTWADS [1] □-AQUATIC MACROPHYTES [1] □-MODERATE 25-75% [7]
- ☒-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1] ☒-SPARSE 5-25% [3]
- □-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 11

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING | □-IMPOUND. |
| ☒-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | ☒-MODERATE [2] | □-RELOCATION | □-ISLANDS |
| □-LOW [2] | ☒-FAIR [3] | ☒-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL | □-LEVEED |
| □-NONE [1] | □-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING | □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [illegible]
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| □ □-WIDE > 50m [4] | ☒ ☒-FOREST, SWAMP [3] | □ □-URBAN OR INDUSTRIAL [0] | □ □-NONE OR LITTLE [3] |
| □ □-MODERATE 10-50 [3] | □ □-OPEN PASTURE/ ROWCROP [0] | □ □-SHRUB OR OLD FIELD [2] | ☒ ☒-MODERATE [2] |
| □ □-NARROW 5-10m [2] | □ □-RESID., PARK, NEW FIELD [1] | □ □-CONSERV. TILLAGE [1] | □ □-HEAVY OR SEVERE [1] |
| ☒ ☒-VERY NARROW 1-5m [1] | □ □-FENCED PASTURE [1] | □ □-MINING/CONSTRUCTION [0] | |
| □ □-NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☒ > 1m [6] | | | |
| □ 0.7-1m [4] | □-POOL WIDTH > RIFFLE WIDTH [2] | □-TORRENTIAL [-1] | □-EDDIES [1] |
| □ 0.4-0.7m [2] | ☒-POOL WIDTH = RIFFLE WIDTH [1] | □-FAST [1] | □-INTERSTITIAL [-1] |
| □ < 0.4m [1] | □-POOL WIDTH < RIFFLE W. [0] | □-MODERATE [1] | □-INTERMITTENT [-2] |
| □ < 0.2m [Pool = 0] | | ☒-SLOW [1] | |

□ NO POOL [0]

COMMENTS ____

RIFFLE: 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| □-GENERALLY > 10 cm, MAX > 50 [4] | □-STABLE (e.g., Cobble, Boulder) [2] | □-EXTENSIVE [-1] | □-MODERATE [0] |
| ☒-GENERALLY > 10 cm, MAX < 50 [3] | □-MOD. STABLE (e.g., Pea Gravel) [1] | ☒-LOW [1] | □-NONE [2] |
| □-GENERALLY 5-10 cm [1] | ☒-UNSTABLE (Gravel, Sand) [0] | | |
| □-GENERALLY < 5 cm [Riffle = 0] | | | |

□ NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

5] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

BG
5/7

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [54] 52

Stream Big Creek RM ____ Date ____ River Code ____
Location > BG - 1 Crew ESB/CW/B

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

SUBSTRATE SCORE: [12]

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|
| O O-BLDER/SLABS[10] | ____ | X O-GRAVEL [7] | X X | Substrate Origin (Check all) |
| O O-BOULDER [9] | ____ | O O-SAND [6] | X X | O-LIMESTONE [1] O-RIP/RAP [0] |
| O O-COBBLE [8] | ____ | O O-BEDROCK[5] | ____ | X TILLS [1] X HARDPAN [0] |
| O X HARDPAN [4] | X X | O O-DETRITUS[3] X | ____ | O-SANDSTONE [0] |
| O O-MUCK [2] | ____ | O O-ARTIFIC.[0] | ____ | O-SHALE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] O <= 4 [0] X COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

Silt Cover (Check One): O-SILT HEAVY [-2] O-SILT MODERATE [-1] X SILT NORMAL [0] O-SILT FREE [1]

Extent Of Embeddedness (Check One): O—EXTENSIVE [-2] O—MODERATE [-1] X—LOW [0] O—NONE [1]

COMMENTS ____

COVER SCORE: [12]

2) INSTREAM COVER

TYPE (Check All That Apply)

O - UNDERCUT BANKS [1] X DEEP POOLS [2] O - OXBOWS [1]
O - OVERHANGING VEGETATION [1] O - ROOTWADS [1] X AQUATIC MACROPHYTES [1]
X - SHALLOWS (IN SLOW WATER) [1] O - BOULDERS [1] X LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [6]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| X - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (Check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [5]

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | X X OPEN PASTURE/ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X O-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O X HEAVY OR SEVERE [1] |
| X X VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [7]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O- > 1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| X 0.7-1m [4] | O-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O 0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] |
| O < 0.4m [1] | | X SLOW [1] | |
| O—< 0.2m [Pool = 0] | | | |

O-NO POOL [0]

COMMENTS ____

RIFFLE: [4]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| X GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X LOW [1] | O-NONE [2] |
| O - GENERALLY 5-10 cm [1] | X UNSTABLE (Gravel, Sand) [0] | | |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

O-NO RIFFLE [0]

COMMENTS ____ GRADIENT: [4]

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

SC-
5/10/

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 60

Stream Squaw Creek RM ____ Date ____ River Code ____
Location SC-1 Crew 23? / [illegible]

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: 14

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY
O O-BLDER/SLABS [10] ____ ____ X O-GRAVEL [7] X ____ Substrate Origin (Check all) Silt Cover (Check One)
O O-BOULDER [9] ____ ____ O X SAND [6] X ____ O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] O-SILT MODERATE [-1]
O O-COBBLE [8] ____ ____ O O-BEDROCK [5] ____ ____ X TILLS [1] O-HARDPAN [0] X SILT NORMAL [0] O-SILT FREE [1]
O O-HARDPAN [4] ____ ____ O O-DETRITUS [3] X ____ O-SANDSTONE [0] Extent Of Embeddedness (Check One)
O O-MUCK [2] ____ ____ O O-ARTIFIC [0] ____ ____ O-SHALE [-1] O-EXTENSIVE [-2] O-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: O > 4 [2] X <= 4 [0] O-COAL FINES [-2] X LOW [0] O-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

2] INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)
O-UNDERCUT BANKS [1] X DEEP POOLS [2] O-OXBOWS [1] O - EXTENSIVE > 75% [11]
X OVERHANGING VEGETATION [1] X ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]
X SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X LOGS OR WOODY DEBRIS [1] X SPARSE 5-25% [3]
O - NEARLY ABSENT < 5% [1]
COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 8

SINUOSITY / DEVELOPMENT / CHANNELIZATION / STABILITY / MODIFICATIONS/OTHER
O - HIGH [4] O - EXCELLENT [7] O - NONE [6] O - HIGH [3] O - SNAGGING O - IMPOUND.
X MODERATE [3] O - GOOD [5] O - RECOVERED [4] O - MODERATE [2] O - RELOCATION O - ISLANDS
O - LOW [2] O - FAIR [3] X RECOVERING [3] X LOW [1] O - CANOPY REMOVAL O - LEVEED
O - NONE [1] X POOR [1] O - RECENT OR NO RECOVERY [1] O - DREDGING O - BANK SHAPING
O - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION – (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12
*River Right Looking Downstream*

RIPARIAN WIDTH / EROSION/RUNOFF - FLOOD PLAIN QUALITY / BANK EROSION
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)
O O-WIDE >50m [4] X X FOREST, SWAMP [3] O O-URBAN OR INDUSTRIAL [0] O O-NONE OR LITTLE [3]
O O-MODERATE 10-50 [3] O O-OPEN PASTURE/ ROWCROP [0] O O-SHRUB OR OLD FIELD [2] X X MODERATE [2]
O O-NARROW 5-10m [2] O O-RESID.,PARK,NEW FIELD [1] O O-CONSERV. TILLAGE [1] O O-HEAVY OR SEVERE [1]
X X VERY NARROW 1-5m [1] O O-FENCED PASTURE [1] O O-MINING/CONSTRUCTION [0]
O O-NONE [0]
COMMENTS ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 4

MAX. DEPTH (Check 1) / MORPHOLOGY (Check 1) / POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
X >1m [6] 
O- 0.7-1m [4] O-POOL WIDTH > RIFFLE WIDTH [2] O-TORRENTIAL [-1] O-EDDIES [1]
O- 0.4-0.7m [2] X POOL WIDTH = RIFFLE WIDTH [1] O-FAST [1] O-INTERSTITIAL [-1] O-NO POOL [0]
O- < 0.4m [1] O-POOL WIDTH < RIFFLE W. [0] O-MODERATE [1] O-INTERMITTENT [-2]
O— < 0.2m [Pool = 0] X SLOW [1]
COMMENTS: ____

RIFFLE: 5

RIFFLE/RUN DEPTH / RIFFLE/RUN SUBSTRATE / RIFFLE/RUN EMBEDDEDNESS
X GENERALLY > 10 cm, MAX > 50 [4] O-STABLE (e.g., Cobble, Boulder) [2] O-EXTENSIVE [-1] O-MODERATE [0]
O - GENERALLY > 10 cm, MAX < 50 [3] O-MOD. STABLE (e.g., Pea Gravel) [1] X LOW [1] O-NONE [2]
O - GENERALLY 5-10 cm [1] X UNSTABLE (Gravel, Sand) [0] O-NO RIFFLE [0]
O - GENERALLY < 5 cm (Riffle = 0)
COMMENTS ____ GRADIENT: 4

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

UN-1
5/4/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 30

Stream Unidentified Tributary RM ____ Date 5/4/00 River Code ____

Location UN-1 - Trib to Sewell Creek near Chandler Crew E3B/CWR

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):  SUBSTRATE SCORE: 2

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

O-O-BLDER/SLABS[10] ____ O-O-GRAVEL[7] ____ Substrate Origin (Check all) Silt Cover (Check One)

O-O-BOULDER[9] ____ O-O-SAND[6] ____ O-LIMESTONE[1] O-RIPRAP[0] X SILT HEAVY[-2] O-SILT MODERATE[-1]

O-O-COBBLE[8] ____ O-O-BEDROCK[5] ____ X TILLS[1] O-HARDPAN[0] O-SILT NORMAL[0] O-SILT FREE[1]

O-O-HARDPAN[4] ____ O-O-DETRITUS[3] X ____ O-SANDSTONE[0] Extent Of Embeddedness (Check One)

X O-MUCK[2] X ____ O-O-ARTIFIC[0] ____ O-SHALE[-1] O-EXTENSIVE[-2] X-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] O-<=4 [0] O-COAL FINES[-2] O-LOW[0] O-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER COVER SCORE: 6

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

O-UNDERCUT BANKS [1] O-DEEP POOLS [2] O-OXBOWS [1] O - EXTENSIVE > 75% [11]

X-OVERHANGING VEGETATION [1] O-ROOTWADS [1] X-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]

O-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3]

O - NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O - WIDE > 50m [4] | O X FOREST, SWAMP [3] | O O URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O - MODERATE 10-50 [3] | X O-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X O-MODERATE [2] |
| O O - NARROW 5-10m [2] | O O- RESID.,PARK,NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X - VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O - NONE [0] | | | |

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 3

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O - >1m [6] | O - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | O - EDDIES [1] | |
| O - 0.7-1m [4] | X - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] | O NO POOL [0] |
| O - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | O - MODERATE [1] | O - INTERMITTENT [-2] | |
| X - <0.4m [1] | | X - SLOW [1] | | |
| O - <0.2m [Pool = 0] | | | | |

COMMENTS: ____

RIFFLE: X 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY >10 cm, MAX>50 [4] | O - STABLE (e.g., Cobble, Boulder) [2] | O - EXTENSIVE [-1] | X - MODERATE [0] |
| O - GENERALLY >10 cm, MAX<50 [3] | O - MOD. STABLE (e.g., Pea Gravel) [1] | O - LOW [1] | O - NONE [2] |
| X - GENERALLY 5-10 cm [1] | X - UNSTABLE (Gravel, Sand) [0] | | O NO RIFFLE [0] |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ GRADIENT: 2

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

SD-1
5-4-00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 39

Stream Stallbaum Ditch RM ____ Date ____ River Code ____
Location SD-1 Crew RSB / CWB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY | SUBSTRATE SCORE: 5 |
|---|---|---|---|---|---|
| O-O-BLDER /SLABS [10] | ____ | O-O-GRAVEL [7] | ____ X | Substrate Origin (Check all) | Silt Cover (Check One) |
| O-O-BOULDER [9] | ____ | O-X-SAND [6] | ____ X | O-LIMESTONE [1] O-RIPRAP [0] | X-SILT HEAVY [-2] O-SILT MODERATE [-1] |
| O-O-COBBLE [8] | ____ | O-O-BEDROCK [5] | ____ X | TILLS [1] O-HARDPAN [0] | O-SILT NORMAL [0] O-SILT FREE [1] |
| O-O-HARDPAN [4] | ____ | O-O-DETRITUS [3] X | ____ | O-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| X-O-MUCK [2] | X X | O-O-ARTIFIC [0] | ____ | O-SHALE [-1] | X-EXTENSIVE [-2] O-MODERATE [-1] |
| TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] X-<=4 [0] | | | | O-COAL FINES [-2] | O-LOW [0] O-NONE [1] |

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: 16

2] INSTREAM COVER

TYPE (Check All That Apply)

| | | | AMOUNT (Check ONLY One or check 2 and AVERAGE) |
|---|---|---|---|
| O-UNDERCUT BANKS [1] | O-DEEP POOLS [2] | O-OXBOWS [1] | O-EXTENSIVE > 75% [11] |
| X-OVERHANGING VEGETATION [1] | O-ROOTWADS [1] | O-AQUATIC MACROPHYTES [1] | O-MODERATE 25-75% [7] |
| X-SHALLOWS (IN SLOW WATER) [1] | O-BOULDERS [1] | X-LOGS OR WOODY DEBRIS [1] | X-SPARSE 5-25% [3] |
| | | | O-NEARLY ABSENT < 5% [1] |

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH [4] | O-EXCELLENT [7] | O-NONE [6] | O-HIGH [3] | O-SNAGGING | O-IMPOUND. |
| O-MODERATE [3] | O-GOOD [5] | O-RECOVERED [4] | O-MODERATE [2] | O-RELOCATION | O-ISLANDS |
| X-LOW [2] | O-FAIR [3] | X-RECOVERING [3] | X-LOW [1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE [1] | X-POOR [1] | O-RECENT OR NO RECOVERY [1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12
*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O-O-WIDE > 50m [4] | X-FOREST, SWAMP [3] | O-O-URBAN OR INDUSTRIAL [0] | O-O-NONE OR LITTLE [3] |
| O-O-MODERATE 10-50 [3] | O-O-OPEN PASTURE/ROWCROP [0] | O-O-SHRUB OR OLD FIELD [2] | X-O-MODERATE [2] |
| O-O-NARROW 5-10m [2] | O-O-RESID., PARK, NEW FIELD [1] | O-O-CONSERV. TILLAGE [1] | O-O-HEAVY OR SEVERE [1] |
| X-VERY NARROW 1-5m [1] | O-O-FENCED PASTURE [1] | O-O-MINING/CONSTRUCTION [0] | |
| O-O-NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O->1m [6] | | | | |
| O-0.7-1m [4] | X-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] | O-NO POOL [0] |
| X-0.4-0.7m [2] | O-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] | |
| O-<0.4m [1] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] | |
| O-<0.2m [Pool = 0] | | X-SLOW [1] | | |

COMMENTS ____

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O-GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | X-EXTENSIVE [-1] | O-MODERATE [0] |
| O-GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | O-LOW [1] | O-NONE [2] |
| O-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | O-NO RIFFLE [0] |
| X-GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ GRADIENT: 4

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

WD 1
5/4/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 38

Stream Weinsheimer Ditch RM ____ Date 5/4/00 River Code ____
Location WD-1 Crew ESB/CWB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 2

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY
- ☐☐-BLDER/SLABS[10] ___ ___ ☐☐-GRAVEL [7] ___ ___ Substrate Origin (Check all) Silt Cover (Check One)
- ☐☐-BOULDER [9] ___ ___ ☐☐-SAND [6] ___ ___ ☐-LIMESTONE [1] ☐-RIPRAP [0] X SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ☐☐-COBBLE [8] ___ ___ ☐☐-BEDROCK [5] ___ ___ X-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐☐-HARDPAN [4] ___ ___ X☐-DETRITUS [3] X ___ ☐-SANDSTONE [0] Extent Of Embeddedness (Check One)
- ☐X-MUCK [2] X ___ ☐☐-ARTIFIC [0] ___ ___ ☐-SHALE [-1] X-EXTENSIVE [-2] ☐-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] X-<= 4 [0] ☐-COAL FINES [-2] ☐-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 6

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)
- ☐-UNDERCUT BANKS [1] X-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]
- ☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐ - MODERATE 25-75% [7]
- ☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3]
- ☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☐ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | ☐ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| X - LOW [2] | ☐ - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | X - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

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

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | X☐-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☐☐-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | ☐ ☐-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | X ☐-HEAVY OR SEVERE [1] |
| XX-VERY NARROW < 5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS: ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| X - > 1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] | |
| ☐ - 0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] | ☐-NO POOL [0] |
| ☐ - 0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] | |
| ☐ - < 0.4m [1] | | X-SLOW [1] | | |
| ☐ - < 0.2m [Pool = 0] | | | | |

COMMENTS ____

RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐ - GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | X-EXTENSIVE [-1] | ☐-MODERATE [0] |
| X - GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐ - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | X-NO RIFFLE [0] |
| ☐ - GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ GRADIENT: 2

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN ____

BC
5/4
Duplicated Samp

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 30

Stream Bluegrass Creek RM ____ Date ____ River Code ____

Location BC-5 ... Mercer ... Waffle ... County ... Crew EOB / CWB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE:** 10

- O O-BLDER/SLABS[10] ____ ____ ☒ O-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
- O O-BOULDER [9] ____ ____ ☒ O-SAND [6] X X O-LIMESTONE [1] O-RIPRAP [0] ☒ SILT HEAVY [-2] O-SILT MODERATE [-1]
- O O-COBBLE [8] ____ ____ O O-BEDROCK[5] ____ ☒ TILLS [1] O-HARDPAN [0] O - SILT NORMAL [0] O - SILT FREE [1]
- O O-HARDPAN [4] ____ ____ O O-DETRITUS[3] ____ ____ O-SANDSTONE [0] Extent Of Embeddedness (Check One)
- O O-MUCK [2] X ____ O O-ARTIFIC.[0] ____ ____ O-SHALE [-1] ☒ EXTENSIVE [-2] O-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: O> 4 [2] ☒ <= 4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

**COVER SCORE:** 6

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O - UNDERCUT BANKS [1] ☒ - DEEP POOLS [2] O - OXBOWS [1] O - EXTENSIVE > 75% [11]
- ☒ - OVERHANGING VEGETATION [1] O - ROOTWADS [1] O - AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]
- O - SHALLOWS (IN SLOW WATER) [1] O - BOULDERS [1] O - LOGS OR WOODY DEBRIS [1] ☒ SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 0

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | ☒ - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| ☒ - LOW [2] | O - FAIR [3] | ☒ - RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | ☒ - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 6

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O - WIDE > 50m [4] | O O - FOREST, SWAMP [3] | O O - URBAN OR INDUSTRIAL [0] | O O - NONE OR LITTLE [3] |
| O O - MODERATE 10-50 [3] | ☒☒ - OPEN PASTURE/ ROWCROP [0] | O O - SHRUB OR OLD FIELD [2] | ☒☒ - MODERATE [2] |
| O O - NARROW 5-10m [2] | O O - RESID.,PARK,NEW FIELD [1] | O O - CONSERV. TILLAGE [1] | O O - HEAVY OR SEVERE [1] |
| ☒☒ - VERY NARROW 1-5m [1] | O O - FENCED PASTURE [1] | O O - MINING/CONSTRUCTION [0] | |
| O O - NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 4

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O - > 1m [6] | O - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | O - EDDIES [1] | O - NO POOL [0] |
| O - 0.7-1m [4] | ☒ - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] | |
| ☒ - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | O - MODERATE [1] | O - INTERMITTENT [-2] | |
| O - < 0.4m [1] | | ☒ - SLOW [1] | | |
| O - < 0.2m (Pool = 0) | | | | |

COMMENTS ____

**RIFFLE:** 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O - STABLE (e.g. Cobble, Boulder) [2] | ☒ - EXTENSIVE [-1] | O - MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O - MOD. STABLE (e.g. Pea Gravel) [1] | O - LOW [1] | O - NONE [2] |
| ☒ - GENERALLY 5-10 cm [1] | ☒ - UNSTABLE (Gravel, Sand) [0] | | O - NO RIFFLE [0] |
| O - GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ____ **GRADIENT:** 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

BC-2
5/3/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** OHEI SCORE: 2? – 32 31

Stream Bluegrass Creek RM ______ Date ______ River Code ______

Location BC-2 Crew EPB, SWR, ARS

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 7

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

O O-BLDER/SLABS[10] ___ ___ O O-GRAVEL [7] ___ ___ Substrate Origin (Check all) Silt Cover (Check One)

O O-BOULDER [9] ___ ___ O O-SAND [6] ___ ___ O-LIMESTONE [1] O-RIP/RAP [0] O-SILT HEAVY [-2] O-SILT MODERATE [-1]

O O-COBBLE [8] ___ ___ O O-BEDROCK [5] ___ ___ O-TILLS [1] O-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]

O O-HARDPAN [4] ___ ___ O O-DETRITUS [3] X ___ O-SANDSTONE [0] Extent Of Embeddedness (Check One)

O O-MUCK [2] X ___ O O-ARTIFIC [0] ___ ___ O-SHALE [-1] O-EXTENSIVE [-2] O-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] O-<=4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2) INSTREAM COVER COVER SCORE: 6

TYPE (Check All That Apply) AMOUNT (Check Only One or check 2 and AVERAGE)

O-UNDERCUT BANKS [1] O-DEEP POOLS [2] O-OXBOWS [1] O - EXTENSIVE > 75% [11]

O-OVERHANGING VEGETATION [1] O-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]

O-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] O-LOGS OR WOODY DEBRIS [1] O - SPARSE 5-25% [3]

O - NEARLY ABSENT < 5% [1]

COMMENTS: ______

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | O - FAIR [3] | O - RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | O - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ______

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

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | O O-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| O O-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ______

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 3 X3

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O - >1m [6] | | | | |
| O - 0.7-1m [4] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] | |
| O - 0.4-0.7m [2] | O-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] | O NO POOL [0] |
| O - <0.4m [1] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] | |
| O - <0.2m [Pool = 0] | | O-SLOW [1] | | |

COMMENTS: ______

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g. Pea Gravel) [1] | O-LOW [1] | O-NONE [2] |
| O - GENERALLY 5-10 cm [1] | O-UNSTABLE (Gravel, Sand) [0] | | O-NO RIFFLE [0] |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ______ GRADIENT: 2

6) Gradient (feet/mile): ______ %POOL: ______ %RIFFLE: ______ %RUN: ______

BC-1
5/3/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 41

Stream Bluegrass Creek RM ____ Date ____ River Code ____
Location BC-1 Crew EJR, CWR, ABS

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

SUBSTRATE SCORE: 9

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- O O-BLDER/SLABS[10] ___ ___ / X O-GRAVEL [7] ___ X / Substrate Origin (Check all) / Silt Cover (Check One)
- O O-BOULDER [9] ___ ___ / X O-SAND [6] ___ X / O-LIMESTONE [1] O-RIPRAP [0] / O-SILT HEAVY [-2] X SILT MODERATE [-1]
- O O-COBBLE [8] ___ ___ / O O-BEDROCK [5] ___ / O-TILLS [1] O-HARDPAN [0] / O-SILT NORMAL [0] O-SILT FREE [1]
- O O-HARDPAN [4] ___ ___ / X O-DETRITUS [3] X ___ / O-SANDSTONE [0] / Extent Of Embeddedness (Check One)
- O O-MUCK [2] X ___ / O O-ARTIFIC. [0] ___ ___ / O-SHALE [-1] / O-EXTENSIVE [-2] X MODERATE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: O >= 4 [2] X <= 4 [0] / X COAL FINES [-2] / O-LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 5

2) INSTREAM COVER

TYPE (Check All That Apply) / AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-UNDERCUT BANKS [1] / O-DEEP POOLS [2] / O-OXBOWS [1] / O - EXTENSIVE > 75% [11]
- O-OVERHANGING VEGETATION [1] / O-ROOTWADS [1] / O-AQUATIC MACROPHYTES [1] / O - MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1] / O-BOULDERS [1] / X-LOGS OR WOODY DEBRIS [1] / X - SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5% [1]

COMMENTS: ____

CHANNEL: 9 7

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

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

RIPARIAN: 12

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

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | X X-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ ROW CROP [0] | O O-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O- RESID.,PARK,NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ____

POOL: 4

POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| O >1m [6] | X POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] | O-NO POOL [0] |
| O 0.7-1m [4] | O-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] | |
| O 0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | X-MODERATE [1] | O-INTERMITTENT [-2] | |
| X < 0.4m [1] | | O-SLOW [1] | | |
| O < 0.2m [Pool = 0] | | | | |

COMMENTS: ____

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O STABLE (e.g.,Cobble, Boulder) [2] | O-EXTENSIVE [-1] | X-MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g.,Pea Gravel) [1] | O-LOW [1] | O-NONE [2] |
| O - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel,Sand) [0] | | O-NO RIFFLE [0] |
| X - GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ____

GRADIENT: 4

5) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

LP-?
5/6/0

QA Manual (6th Update) - Fish - September 30, 1989

Procedure No. WQPA-SWS-3 Date Issued 9-30-89
Revision No. 5 Date Effective 9-30-89

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 49

Stream Little Pigeon RM Date River Code
Location LP-? Crew

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present) SUBSTRATE SCORE: 11

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

- BLDER/SLABS [10]; BOULDER [9]; COBBLE [8]; X HARDPAN [4] (pool X); MUCK [2]
- X GRAVEL [7] (pool X, riffle X); SAND [6]; BEDROCK [5]; DETRITUS [3]; ARTIFIC [0]
- LIMESTONE [1]; TILLS [1]; SANDSTONE [0]; X SHALE [-1] (riffle X); COAL FINES [-2]
- Substrate Origin (Check all): RIPRAP [0]; X HARDPAN [0]
- Silt Cover (Check One): SILT HEAVY [-2]; SILT MODERATE [-1]; X SILT NORMAL [0]; SILT FREE [1]
- Extent Of Embeddedness (Check One): EXTENSIVE [-2]; MODERATE [-1]; X LOW [0]; NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2]; X <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS

2] INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]; X OVERHANGING VEGETATION [1]; X SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]; X ROOTWADS [1]; BOULDERS [1]
- OXBOWS [1]; AQUATIC MACROPHYTES [1]; X LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]; MODERATE 25-75% [7]; X SPARSE 5-25% [3]; NEARLY ABSENT < 5% [1]

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 6

- SINUOSITY: HIGH [4]; X MODERATE [3]; LOW [2]; NONE [1]
- DEVELOPMENT: EXCELLENT [7]; GOOD [5]; FAIR [3]; X POOR [1]
- CHANNELIZATION: NONE [6]; RECOVERED [4]; X RECOVERING [3]; RECENT OR NO RECOVERY [1]
- STABILITY: HIGH [3]; MODERATE [2]; X LOW [1]
- MODIFICATIONS/OTHER: SNAGGING; RELOCATION; CANOPY REMOVAL; DREDGING; IMPOUND.; ISLANDS; LEVEED; BANK SHAPING; ONE SIDE CHANNEL MODIFICATIONS

COMMENTS:

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

- RIPARIAN WIDTH (L R Per Bank): WIDE > 50m [4]; MODERATE 10-50 [3]; NARROW 5-10m [2]; X X VERY NARROW 1-5m [1]; NONE [0]
- EROSION/RUNOFF - FLOOD PLAIN QUALITY (L R Most Predominant Per Bank): X X FOREST, SWAMP [3]; OPEN PASTURE/ ROWCROP [0]; RESID., PARK, NEW FIELD [1]; FENCED PASTURE [1]
- (L R Per Bank): URBAN OR INDUSTRIAL [0]; SHRUB OR OLD FIELD [2]; CONSERV. TILLAGE [1]; MINING/CONSTRUCTION [0]
- BANK EROSION: NONE OR LITTLE [3]; X X MODERATE [2]; HEAVY OR SEVERE [1]

COMMENTS:

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

- MAX. DEPTH (Check 1): > 1m [6]; 0.7-1m [4]; X 0.4-0.7m [2]; 0.2-0.4m [1]; < 0.2m [Pool = 0]
- MORPHOLOGY (Check 1): X POOL WIDTH > RIFFLE WIDTH [2]; POOL WIDTH = RIFFLE WIDTH [1]; POOL WIDTH < RIFFLE W. [0]
- POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply): TORRENTIAL [-1]; FAST [1]; MODERATE [1]; X SLOW [1]; EDDIES [1]; INTERSTITIAL [-1]; INTERMITTENT [-2]
- NO POOL [0]

COMMENTS

RIFFLE: 2

- RIFFLE/RUN DEPTH: GENERALLY > 10 cm, MAX > 50 [4]; GENERALLY > 10 cm, MAX < 50 [3]; X GENERALLY 5-10 cm [1]; GENERALLY < 5 cm [Riffle = 0]
- RIFFLE/RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2]; MOD. STABLE (e.g., Pea Gravel) [1]; X UNSTABLE (Gravel, Sand) [0]
- RIFFLE/RUN EMBEDDEDNESS: EXTENSIVE [-1]; X LOW [1]; MODERATE [0]; NONE [2]
- NO RIFFLE [0]

COMMENTS GRADIENT: 2

6] Gradient (feet/mile): ______ %POOL: ______ %RIFFLE: ______ %RUN: ______

EPA 4520

LP-1
5/6/01



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: ~~[ ]~~ 43

Stream Little Pigeon RM ____ Date ____ River Code ____

Location LP-1 Crew EBB/CWR

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 2

TYPES POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

- BLDER /SLABS [10]
- BOULDER [9]
- COBBLE [8]
- HARDPAN [4] X
- MUCK [2]
- GRAVEL [7]
- SAND [6]
- BEDROCK [5]
- DETRITUS [3]
- ARTIFIC [0] X X
- Substrate Origin (Check all): LIMESTONE [1]; RIP/RAP [0]; TILLS [1]; HARDPAN [0] X; SANDSTONE [0]; SHALE [-1] X; COAL FINES [-2]
- Silt Cover (Check One): SILT HEAVY [-2]; SILT MODERATE [-1] X; SILT NORMAL [0]; SILT FREE [1]
- Extent Of Embeddedness (Check One): EXTENSIVE [-2]; MODERATE [-1] X; LOW [0]; NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] X <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 10

TYPES (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- X SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]
- X ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- X LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]
- MODERATE 25-75% [7]
- X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| X MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| LOW [2] | FAIR [3] | X RECOVERING [3] | X LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | X POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____

4) RIPARIAN ZONE AND BANK EROSION – (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

River Right Looking Downstream

RIPARIAN WIDTH L R (Per Bank)

- WIDE > 50m [4]
- MODERATE 10-50 [3]
- NARROW 5-10m [2]
- X VERY NARROW 1-5m [1]
- NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)

- X FOREST, SWAMP [3]
- OPEN PASTURE/ ROWCROP [0]
- RESID., PARK, NEW FIELD [1]
- FENCED PASTURE [1]
- URBAN OR INDUSTRIAL [0]
- SHRUB OR OLD FIELD [2]
- CONSERV. TILLAGE [1]
- MINING/CONSTRUCTION [0]

BANK EROSION

- NONE OR LITTLE [3]
- X MODERATE [2]
- HEAVY OR SEVERE [1]

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: ~~[ ]~~ 8

MAX. DEPTH (Check 1)

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

MORPHOLOGY (Check 1)

- POOL WIDTH > RIFFLE WIDTH [2]
- X POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- TORRENTIAL [-1]
- FAST [1]
- MODERATE [1]
- X SLOW [1]
- EDDIES [1]
- INTERSTITIAL [-1]
- INTERMITTENT [-2]

NO POOL [0]

COMMENTS ____

RIFFLE: 1

RIFFLE/RUN DEPTH

- GENERALLY > 10 cm, MAX > 50 [4]
- GENERALLY > 10 cm, MAX < 50 [3]
- X GENERALLY 5-10 cm [1]
- GENERALLY < 5 cm (Riffle = 0)

RIFFLE/RUN SUBSTRATE

- STABLE (e.g., Cobble, Boulder) [2]
- MOD. STABLE (e.g., Pea Gravel) [1]
- X UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- EXTENSIVE [-1]
- X MODERATE [0]
- LOW [1]
- NONE [2]

NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL ____ %RIFFLE ____ %RUN ____

EPA 4520

LC-2
5/6/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [53] 53

Stream Locust Creek RM ____ Date ____ River Code ____
Location LC-2 Crew ESB/CWK

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: [14]

☐☐-BLDER/SLABS[10] ___ ___ ☒☐-GRAVEL [7] ___ X Substrate Origin (Check all) Silt Cover (Check One)
☐☐-BOULDER [9] ___ ___ ☐☐-SAND [6] ___ X ☐-LIMESTONE [1] ☐-RIPRAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐☐-COBBLE [8] ___ ___ ☐☐-BEDROCK [5] ___ X ☐-TILLS [1] ☐-HARDPAN [0] ☒-SILT NORMAL [0] ☐-SILT FREE [1]
☒☐-HARDPAN [4] X X ☐☐-DETRITUS [3] ___ ___ ☐-SANDSTONE [0] Extent Of Embeddedness (Check One)
☐☐-MUCK [2] X ___ ☐☐-ARTIFIC. [0] ___ ___ ☐-SHALE [-1] ☐-EXTENSIVE [-2] ☐-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ☒-> 4 [2] ☐-<= 4 [0] ☐-COAL FINES [-2] ☒-LOW [0] ☐-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: [15] 13

2] INSTREAM COVER AMOUNT (Check ONLY One or check 2 and AVERAGE)

TYPE (Check All That Apply)

☐-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
☒-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☒-AQUATIC MACROPHYTES [1] ☒-MODERATE 25-75% [7]
☒-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]
COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [10]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☒-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☐-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☐-LOW [2] | ☒-FAIR [3] | ☒-RECOVERING [3] | ☒-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [6]
*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| ☐☐-WIDE > 50m [4] | ☐☐-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☒☒-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | ☒☒-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐☐-HEAVY OR SEVERE [1] |
| ☒☒-VERY NARROW < 5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [4]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| ☐->1m [6] | ☒-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] | ☐-NO POOL [0] |
| ☐-0.7-1m [4] | ☐-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] | |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] | |
| ☒-<0.4m [1] | | ☒-SLOW [1] | | |
| ☐-<0.2m (Pool = 0) | | | | |

COMMENTS: ____

RIFFLE: [2]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☒-LOW [1] | ☐-NONE [2] |
| ☒-GENERALLY 5-10 cm [1] | ☒-UNSTABLE (Gravel, Sand) [0] | | ☐-NO RIFFLE [0] |
| ☐-GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ____ GRADIENT: [4]

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

LC-1
5/6/0C



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 46 47

Stream Locust Creek RM ___ Date ___ Area Code ___
Location LC-1 Crew ___

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present) SUBSTRATE SCORE: 5

TYPES POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

O-O-BLDER /SLABS[10] O-X-GRAVEL [7] X Substrate Origin (Check all)
O-O-BOULDER [9] O-O-SAND [6] O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] X-SILT MODERATE [-1]
O-O-COBBLE [8] O-O-BEDROCK [5] X-TILLS [1] X-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
X-HARDPAN [4] X O-O-DETRITUS [3] O-SANDSTONE [0] Extent Of Embeddedness (Check One)
O-O-MUCK [2] O-O-ARTIFIC [0] O-SHALE [-1] X-EXTENSIVE [-2] O-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: O> 4 [2] X<= 4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ___

2) INSTREAM COVER COVER SCORE: 5

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)
O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1] O - EXTENSIVE > 75% [11]
O-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]
X-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X SPARSE 5-25% [3]
O - NEARLY ABSENT < 5% [1]
COMMENTS ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 5

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| X - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION – (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O - WIDE > 50m [4] | X X - FOREST, SWAMP [3] | O O - URBAN OR INDUSTRIAL [0] | O O - NONE OR LITTLE [3] |
| O O - MODERATE 10-50 [3] | O O - OPEN PASTURE/ ROWCROP [0] | O O - SHRUB OR OLD FIELD [2] | X X - MODERATE [2] |
| O O - NARROW 5-10m [2] | O O - RESID., PARK, NEW FIELD [1] | O O - CONSERV. TILLAGE [1] | O O - HEAVY OR SEVERE [1] |
| X X - VERY NARROW 1-5m [1] | O O - FENCED PASTURE [1] | O O - MINING/CONSTRUCTION [0] | |
| O O - NONE [0] | | | |

COMMENTS ___

5.) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O - > 1m [6] | X - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | X - EDDIES [1] |
| X - 0.7-1m [4] | O - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] |
| O - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | O - MODERATE [1] | O - INTERMITTENT [-2] |
| O - < 0.4m [1] | | X - SLOW [1] | |
| O - < 0.2m [Pool = 0] | | | |

O - NO POOL [0]

COMMENTS ___

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O - STABLE (e.g., Cobble, Boulder) [2] | O - EXTENSIVE [-1] X - MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O - MOD. STABLE (e.g., Pea Gravel) [1] | O - LOW [1] O - NONE [2] |
| O - GENERALLY 5-10 cm [1] | X - UNSTABLE (Gravel, Sand) [0] | O - NO RIFFLE [0] |
| X - GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ___ GRADIENT: 2

6) Gradient (feet/mile): ___ %POOL: ___ %RIFFLE: ___ %RUN: ___

EPA 4520

PC-16
5/5/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 56

Stream Finger Creek RM ____ Date ____ River Code ____
Location PC-16 Crew EJB / SWB / J.

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY — SUBSTRATE SCORE: 14

- O-O-BLDER/SLABS[10] — X O-GRAVEL [7] ✓ — Substrate Origin (Check all) — Silt Cover (Check One)
- O-O-BOULDER [9] — X O-SAND [6] ✓ — O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] O-SILT MODERATE [-1]
- O-O-COBBLE [8] — O-O-BEDROCK [5] — X TILLS [1] — O-HARDPAN [0] X-SILT NORMAL [0] O-SILT FREE [1]
- O-O-HARDPAN [4] — O-O-DETRITUS [3] — O-SANDSTONE [0] — Extent Of Embeddedness (Check One)
- O-O-MUCK [2] — O-O-ARTIFIC. [0] — O-SHALE [-1] — O—EXTENSIVE [-2] O—MODERATE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: O- > 4 [2] X- <= 4 [0] O-COAL FINES [-2] — X—LOW [0] O—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER — COVER SCORE: 8

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-UNDERCUT BANKS [1] — X-DEEP POOLS [2] — O-OXBOWS [1] — O-EXTENSIVE > 75% [11]
- X-OVERHANGING VEGETATION [1] — O-ROOTWADS [1] — O-AQUATIC MACROPHYTES [1] — O-MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1] — O-BOULDERS [1] — X-LOGS OR WOODY DEBRIS [1] — X-SPARSE 5-25% [3]
- O-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH [4] | O-EXCELLENT [7] | O-NONE [6] | O-HIGH [3] | O-SNAGGING | O-IMPOUND. |
| O-MODERATE [3] | O-GOOD [5] | O-RECOVERED [4] | X-MODERATE [2] | O-RELOCATION | O-ISLANDS |
| X-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | O-LOW [1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE [1] | O-POOR [1] | O-RECENT OR NO RECOVERY [1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 9

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | X X-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | X O-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | O O-MODERATE [2] |
| O O-NARROW 5-10m [2] | O X RESID.,PARK,NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 6

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O- > 1m [6] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| X-0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O-0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] |
| O- < 0.4m [1] | | X-SLOW [1] | |
| O—<0.2m [Pool = 0] | | | |

O-NO POOL [0]

COMMENTS ____

RIFFLE: 5

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| O-GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] O-MODERATE [0] |
| X-GENERALLY > 10 cm, MAX < 50 [3] | X-MOD. STABLE (e.g. Pea Gravel) [1] | X-LOW [1] O-NONE [2] |
| O-GENERALLY 5-10 cm [1] | O-UNSTABLE (Gravel, Sand) [0] | O-NO RIFFLE [0] |
| O-GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

PC-15
5/2/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 42

Stream Pigeon RM ____ Date 5/2/00 River Code ____
Location PC-15 Crew ES/CMR

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 13

TYPE / POOL RIFFLE

- O O-BOULDER/SLABS[10] ____ ____
- O O-BOULDER [9] ____ ____
- O O-COBBLE [8] ____ ____
- O O-HARDPAN [4] ____ ____
- O O-MUCK [2] ____ ____
- O X-GRAVEL [7] ____ X
- X O-SAND [6] X ____
- O O-BEDROCK [5] ____ ____
- O O-DETRITUS [3] ____ ____
- O O-ARTIFIC. [0] ____ ____

TOTAL NUMBER OF SUBSTRATE TYPES: O- > 4 [2] X- <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE QUALITY

Substrate Origin (Check all): X
- O-LIMESTONE [1]
- O-TILLS [1]
- X-SANDSTONE [0]
- O-SHALE [-1]
- O-RIP/RAP [0]
- O-HARDPAN [0]
- O-COAL FINES [-2]

Silt Cover (Check One):
- O-SILT HEAVY [-2]
- O-SILT MODERATE [-1]
- X-SILT NORMAL [0]
- O-SILT FREE [1]

Extent Of Embeddedness (Check One):
- O-EXTENSIVE [-2]
- O-MODERATE [-1]
- X-LOW [0]
- O-NONE [1]

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 6

TYPE (Check All That Apply)

- X-UNDERCUT BANKS [1]
- X-OVERHANGING VEGETATION [1]
- X-SHALLOWS (IN SLOW WATER) [1]
- O-DEEP POOLS [2]
- O-ROOTWADS [1]
- O-BOULDERS [1]
- O-OXBOWS [1]
- O-AQUATIC MACROPHYTES [1]
- O-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-EXTENSIVE > 75% [11]
- O-MODERATE 25-75% [7]
- X-SPARSE 5-25% [3]
- O-NEARLY ABSENT < 5% [1]

COMMENTS: ____

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

CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

RIPARIAN: 6

RIPARIAN WIDTH
L R (Per Bank)
- O O-WIDE > 50m [4]
- O O-MODERATE 10-50 [3]
- O O-NARROW 5-10m [2]
- X X-VERY NARROW 1-5m [1]
- O O-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank) L R (Per Bank)
- O O-FOREST, SWAMP [3]
- X X-OPEN PASTURE, ROWCROP [0]
- O O-RESID., PARK, NEW FIELD [1]
- O O-FENCED PASTURE [1]
- O O-URBAN OR INDUSTRIAL [0]
- O O-SHRUB OR OLD FIELD [2]
- O O-CONSERV. TILLAGE [1]
- O O-MINING/CONSTRUCTION [0]

BANK EROSION
- O O-NONE OR LITTLE [3]
- X X-MODERATE [2]
- O O-HEAVY OR SEVERE [1]

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 4

MAX. DEPTH (Check 1)
- O - > 1m [6]
- O - 0.7-1m [4]
- O - 0.4-0.7m [2]
- X - < 0.4m [1]
- O - < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- X - POOL WIDTH > RIFFLE WIDTH [2]
- O - POOL WIDTH = RIFFLE WIDTH [1]
- O - POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- O - TORRENTIAL [-1]
- O - FAST [1]
- X - MODERATE [1]
- O - SLOW [1]
- O - EDDIES [1]
- O - INTERSTITIAL [-1]
- O - INTERMITTENT [-2]

O-NO POOL [0]

COMMENTS ____

RIFFLE: 2

RIFFLE/RUN DEPTH
- O - GENERALLY > 10 cm, MAX > 50 [4]
- O - GENERALLY > 10 cm, MAX < 50 [3]
- X - GENERALLY 5-10 cm [1]
- O - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- O-STABLE (e.g., Cobble, Boulder) [2]
- O-MOD. STABLE (e.g., Pea Gravel) [1]
- X-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- O-EXTENSIVE [-1]
- X-LOW [1]
- O-MODERATE [0]
- O-NONE [2]

O-NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

PC-1[illegible]
5/2/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: [illegible]

Stream: Pigeon RM ______ Date 5/2/00 River Code ______
Location: PC-14 County: [illegible]

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

SUBSTRATE SCORE: 13

TYPE — POOL RIFFLE — POOL RIFFLE

O O-BLDER/SLABS [10] ______ ______ O X-GRAVEL [7] X X
O O-BOULDER [9] ______ ______ O X-SAND [6] X X
O O-COBBLE [8] ______ ______ O O-BEDROCK [5] ______ ______
X-HARDPAN [4] X ______ O O-DETRITUS [3] ______ ______
O O-MUCK [2] ______ ______ O O-ARTIFIC. [0] ______ ______

SUBSTRATE QUALITY
Substrate Origin (Check all)
O-LIMESTONE [1] O-RIPRAP [0]
O-TILLS [1] X-HARDPAN [0]
O-SANDSTONE [0]
O-SHALE [-1]
O-COAL FINES [-2]

Silt Cover (Check One)
O-SILT HEAVY [-2] O-SILT MODERATE [-1]
X- SILT NORMAL [0] O- SILT FREE [1]

Extent Of Embeddedness (Check One)
O-EXTENSIVE [-2] O-MODERATE [-1]
X-LOW [0] O-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: O-> 4 [2] X-<= 4 [0]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ______

COVER SCORE: 8

2) INSTREAM COVER

TYPE (Check All That Apply)
O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1]
X-OVERHANGING VEGETATION [1] O-ROOTWADS [1] O-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS ______

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

CHANNEL: 7

SINUOSITY
O - HIGH [4]
O - MODERATE [3]
X - LOW [2]
O - NONE [1]

DEVELOPMENT
O - EXCELLENT [7]
O - GOOD [5]
O - FAIR [3]
X - POOR [1]

CHANNELIZATION
O - NONE [6]
O - RECOVERED [4]
X - RECOVERING [3]
O - RECENT OR NO RECOVERY [1]

STABILITY
O - HIGH [3]
O - MODERATE [2]
X - LOW [1]

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

COMMENTS: ______

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

RIPARIAN: 6

RIPARIAN WIDTH
L R (Per Bank)
O O-WIDE > 50m [4]
O O-MODERATE 10-50 [3]
O O-NARROW 5-10m [2]
X X-VERY NARROW < 5m [1]
O O-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
O O-FOREST, SWAMP [3]
X X-OPEN PASTURE/ ROWCROP [0]
O O- FEED. PARK/NEW FIELD [1]
O O-FENCED PASTURE [1]

L R (Per Bank)
O O-URBAN OR INDUSTRIAL [0]
O O-SHRUB OR OLD FIELD [2]
O O-CONSERV. TILLAGE [1]
O O-MINING/CONSTRUCTION [0]

BANK EROSION
O O-NONE OR LITTLE [3]
X X-MODERATE [2]
O O-HEAVY OR SEVERE [1]

COMMENTS: ______

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)
O- > 1m [6]
O- 0.7-1m [4]
X- 0.4-0.7m [2]
O- < 0.4m [1]
O- < 0.2m (Pool = 0)

MORPHOLOGY (Check 1)
X-POOL WIDTH > RIFFLE WIDTH [2]
O-POOL WIDTH = RIFFLE WIDTH [1]
O-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
O-TORRENTIAL [-1] O-EDDIES [1]
O-FAST [1] O-INTERSTITIAL [-1]
X-MODERATE [1] O-INTERMITTENT [-2]
O-SLOW [1]

O-NO POOL [0]

COMMENTS: ______

RIFFLE: 2

RIFFLE/RUN DEPTH
O - GENERALLY > 10 cm, MAX > 50 [4]
O - GENERALLY > 10 cm, MAX < 50 [3]
X - GENERALLY 5-10 cm [1]
O - GENERALLY < 5 cm (Riffle = 0)

RIFFLE/RUN SUBSTRATE
O-STABLE (e.g., Cobble, Boulder) [2]
O-MOD. STABLE (e.g., Pea Gravel) [1]
X-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
O-EXTENSIVE [-1] O-MODERATE [0]
X-LOW [1] O-NONE [2]

O-NO RIFFLE [0]

COMMENTS ______ GRADIENT: 7

6) Gradient (feet/mile): ______ %POOL: ______ %RIFFLE: ______ %RUN: ______

EPA 4520

PC-13
5/8/9?



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 52

Stream Pidgeon Creek RM ____ Date ____ River Code ____
Location PC-13 Crew EJB / CWR

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 1

TYPE POOL RIFFLE POOL RIFFLE

- ☐☐-BLDER/SLABS[10] ___ ☒☐-GRAVEL [7] ___
- ☐☐-BOULDER [9] ___ ☐☐-SAND [6] ___
- ☐☐-COBBLE [8] ___ ☐☐-BEDROCK[5] ___
- ☒☐-HARDPAN [4] X ☐☐-DETRITUS[3] X
- ☐☐-MUCK [2] ☐☐-ARTIFIC[0]

SUBSTRATE QUALITY — Substrate Origin (Check all): ☐-LIMESTONE [1] ☐-RIPRAP [0] ☐-TILLS [1] ☒-HARDPAN [0] ☐-SANDSTONE [0] ☐-SHALE [-1]

Silt Cover (Check One): ☐-SILT HEAVY [-2] ☒-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddedness (Check One): ☐-EXTENSIVE [-2] ☒-MODERATE [-1] ☐-LOW [0] ☐-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] ☒-<= 4 [0] ☒-COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 7

TYPE (Check All That Apply)

- ☐-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐-OXBOWS [1]
- ☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
- ☒-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE): ☐-EXTENSIVE > 75% [11] ☐-MODERATE 25-75% [7] ☒-SPARSE 5-25% [3] ☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☒-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☒-LOW [2] | ☒-FAIR [3] | ☒-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 14

*River Right Looking Downstream*

RIPARIAN WIDTH — L R (Per Bank)

- ☐☐-WIDE > 50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☒☒-VERY NARROW < 5m [1]
- ☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank) L R (Per Bank)

- ☒☒-FOREST, SWAMP [3] ☐☐-URBAN OR INDUSTRIAL [0]
- ☐☐-OPEN PASTURE/ROWCROP [0] ☐☐-SHRUB OR OLD FIELD [2]
- ☐☐-RESID., PARK, NEW FIELD [1] ☐☐-CONSERV. TILLAGE [1]
- ☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION

- ☒☒-NONE OR LITTLE [3]
- ☐☐-MODERATE [2]
- ☐☐-HEAVY OR SEVERE [1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 9

MAX. DEPTH (Check 1)

- ☒->1m [6]
- ☐-0.7-1m [4]
- ☐-0.4-0.7m [2]
- ☐-< 0.4m [1]
- ☐-< .2m [Pool = 0]

MORPHOLOGY (Check 1)

- ☐-POOL WIDTH > RIFFLE WIDTH [2]
- ☒-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- ☐-TORRENTIAL [-1] ☒-EDDIES [1]
- ☐-FAST [1] ☐-INTERSTITIAL [-1]
- ☐-MODERATE [1] ☐-INTERMITTENT [-2]
- ☒-SLOW [1]

☐-NO POOL [0]

COMMENTS ____

RIFFLE: 1

RIFFLE/RUN DEPTH

- ☐-GENERALLY > 10 cm, MAX > 50 [4]
- ☐-GENERALLY > 10 cm, MAX < 50 [3]
- ☒-GENERALLY 5-10 cm [1]
- ☐-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- ☐-STABLE (e.g., Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g., Pea Gravel) [1]
- ☒-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- ☐-EXTENSIVE [-1] ☒-MODERATE [0]
- ☐-LOW [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS ____ GRADIENT: 2

5) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

PC-57



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

**QHEI SCORE: 50**

Stream: Kinser Creek  RM ____ Date ____ River Code ____
Location: PC-12  Crew: ESG/CWB

**1) SUBSTRATE** (Check ONLY Two Substrate TYPE BOXES; Check all types present)

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY — **SUBSTRATE SCORE: 12**

- O-O-BLDR/SLABS [10] ____  O-X-GRAVEL [7] X X  Substrate Origin (Check all)  Silt Cover (Check One)
- O-O-BOULDER [9] ____  O-O-SAND [6] X X  O-LIMESTONE [1]  O-RIPRAP [0]  O-SILT HEAVY [-2]  O-SILT MODERATE [-1]
- O-O-COBBLE [8] ____  O-O-BEDROCK [5] ____  X-TILLS [1]  X-HARDPAN [0]  X-SILT NORMAL [0]  O-SILT FREE [1]
- X-O-HARDPAN [4] X X  O-O-DETRITUS [3] ____  O-SANDSTONE [0]  Extent Of Embeddedness (Check One)
- O-O-MUCK [2] ____  O-O-ARTIFIC. [0] ____  O-SHALE [-1]  O-EXTENSIVE [-2]  O-MODERATE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: O-> 4 [2]  X-<= 4 [0]  O-COAL FINES [-2]  X-LOW [0]  O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

**COVER SCORE: 8**

**2) INSTREAM COVER**

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-UNDERCUT BANKS [1]  X-DEEP POOLS [2]  O-OXBOWS [1]  O-EXTENSIVE > 75% [11]
- X-OVERHANGING VEGETATION [1]  O-ROOTWADS [1]  O-AQUATIC MACROPHYTES [1]  O-MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1]  O-BOULDERS [1]  X-LOGS OR WOODY DEBRIS [1]  X-SPARSE 5-25% [3]
- O-NEARLY ABSENT < 5% [1]

COMMENTS: ____

**3) CHANNEL MORPHOLOGY:** (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 7**

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH [4] | O-EXCELLENT [7] | O-NONE [6] | O-HIGH [3] | O-SNAGGING | O-IMPOUND |
| O-MODERATE [3] | O-GOOD [5] | O-RECOVERED [4] | O-MODERATE [2] | O-RELOCATION | O-ISLANDS |
| X-LOW [2] | O-FAIR [3] | X-RECOVERING [3] | X-LOW [1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE [1] | X-POOR [1] | O-RECENT OR NO RECOVERY [1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

**4) RIPARIAN ZONE AND BANK EROSION** - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 12**
"River Right Looking Downstream"

| RIPARIAN WIDTH L R (Per Bank) | FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O-O-WIDE > 50m [4] | X-X-FOREST, SWAMP [3] | O-O-URBAN OR INDUSTRIAL [0] | O-O-NONE OR LITTLE [3] |
| O-O-MODERATE 10-50m [3] | O-O-OPEN PASTURE/ROWCROP [0] | O-O-SHRUB OR OLD FIELD [2] | X-X-MODERATE [2] |
| O-O-NARROW 5-10m [2] | O-O-RESID., PARK, NEW FIELD [1] | O-O-CONSERV. TILLAGE [1] | O-O-HEAVY OR SEVERE [1] |
| X-X-VERY NARROW 1-5m [1] | O-O-FENCED PASTURE [1] | O-O-MINING/CONSTRUCTION [0] | |
| O-O-NONE [0] | | | |

COMMENTS: ____

**5) POOL/GLIDE AND RIFFLE/RUN QUALITY** **POOL: 8**

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| X->1m [6] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] | O-NO POOL [0] |
| O-0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] | |
| O-0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | X-MODERATE [1] | O-INTERMITTENT [-2] | |
| O-<0.4m [1] | | O-SLOW [1] | | |
| O-<0.2m [Pool = 0] | | | | |

COMMENTS: ____

**RIFFLE: 5**

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| X-GENERALLY >10 cm, MAX.>50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O-GENERALLY >10 cm, MAX.<50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X-LOW [1] | O-NONE [2] |
| O-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | O-NO RIFFLE [0] |
| O-GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ **GRADIENT: 4**

6) Gradient (feet/mile): ____  %POOL: ____  %RIFFLE: ____  %RUN: ____

EPA 4520

PC-11
5/10/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 57

Stream Pigeon Creek RM ____ Date ____ River Code ____
Location PC-11 Crew E??/C?/B/?

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 9

- O O-BLDER/SLABS[10] ____ O O-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
- O O-BOULDER [9] ____ O O-SAND [6] X X O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] X-SILT MODERATE [-1]
- O O-COBBLE [8] ____ O O-BEDROCK [5] ____ X-TILLS [1] O-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
- O O-HARDPAN [4] ____ X O-DETRITUS [3] X X O-SANDSTONE [0] Extent Of Embeddedness (Check One)
- O O-MUCK [2] ____ O O-ARTIFIC. [0] ____ O-SHALE [-1] O-EXTENSIVE [-2] X-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: O> 4 [2] X <= 4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 13

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1] O-EXTENSIVE > 75% [11]
- X-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] X-MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] O-SPARSE 5-25% [3]
- O-NEARLY ABSENT < 5% [1]

COMMENTS ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH [4] | O-EXCELLENT [7] | O-NONE [6] | O-HIGH [3] | O-SNAGGING | O-IMPOUND. |
| O-MODERATE [3] | O-GOOD [5] | O-RECOVERED [4] | O-MODERATE [2] | O-RELOCATION | O-ISLANDS |
| X-LOW [2] | O-FAIR [3] | X-RECOVERING [3] | X-LOW [1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE [1] | X-POOR [1] | O-RECENT OR NO RECOVERY [1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

RIPARIAN WIDTH — L R (Per Bank)
- O O-WIDE > 50m [4]
- O O-MODERATE 10-50 [3]
- O O-NARROW 5-10m [2]
- X X-VERY NARROW 1-5m [1]
- O O-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY — L R (Most Predominant Per Bank) L R (Per Bank)
- X X-FOREST, SWAMP [3]
- O O-OPEN PASTURE/ ROWCROP [0]
- O O-RESID.,PARK,NEW FIELD [1]
- O O-FENCED PASTURE [1]
- O O-URBAN OR INDUSTRIAL [0]
- O O-SHRUB OR OLD FIELD [2]
- O O-CONSERV. TILLAGE [1]
- O O-MINING/CONSTRUCTION [0]

BANK EROSION
- O O-NONE OR LITTLE [3]
- X X-MODERATE [2]
- O O-HEAVY OR SEVERE [1]

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

MAX. DEPTH (Check 1)
- X->1m [6]
- O-0.7-1m [4]
- O-0.4-0.7m [2]
- O-<0.4m [1]
- O-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- O-POOL WIDTH > RIFFLE WIDTH [2]
- X-POOL WIDTH = RIFFLE WIDTH [1]
- O-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That apply)
- O-TORRENTIAL [-1]
- O-FAST [1]
- X-MODERATE [1]
- O-SLOW [1]
- O-EDDIES [1]
- O-INTERSTITIAL [-1]
- O-INTERMITTENT [-2]

O-NO POOL [0]

COMMENTS ____

RIFFLE: 4

RIFFLE/RUN DEPTH
- X-GENERALLY > 10 cm, MAX > 50 [4]
- O-GENERALLY > 10 cm, MAX < 50 [3]
- O-GENERALLY 5-10 cm [1]
- O-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- O-STABLE (e.g., Cobble, Boulder) [2]
- O-MOD. STABLE (e.g., Pea Gravel) [1]
- X-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- O-EXTENSIVE [-1]
- X-MODERATE [0]
- O-LOW [1]
- O-NONE [2]

O-NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

PC-9
5/10/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habital Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: ~~[illegible]~~ 41

Stream: Pigeon Creek RM ____ Date ____ River Code ____

Location: PC-9 Crew: [illegible] / GWE / APB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

SUBSTRATE SCORE: ~~[illegible]~~ 2

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

- □ □-BLDER /SLABS [10] ____ ____ □ □-GRAVEL [7] ____ ____ Substrate Origin (Check all) Silt Cover (Check One)
- □ □-BOULDER [9] ____ ____ □ □-SAND [6] ____ ____ □-LIMESTONE [1] □-RIPRAP [0] X-SILT HEAVY [-2] □-SILT MODERATE [-1]
- □ □-COBBLE [8] ____ ____ □ □-BEDROCK [5] ____ ____ X-TILLS [1] X-HARDPAN [0] □-SILT NORMAL [0] □-SILT FREE [1]
- □ □-HARDPAN [4] ____ ____ □ □-DETRITUS [3] X ____ □-SANDSTONE [0] Extent Of Embeddedness (Check One)
- X-MUCK [2] X ____ □ □-ARTIFIC [0] ____ ____ □-SHALE [-1] □-EXTENSIVE [-2] X-MODERATE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: □-> 4 [2] X-<= 4 [0] □-COAL FINES [-2] □-LOW [0] □-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 6

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-UNDERCUT BANKS [1] X-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]
- X-OVERHANGING VEGETATION [1] X-ROOTWADS [1] □-AQUATIC MACROPHYTES [1] □-MODERATE 25-75% [7]
- □-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] □-SPARSE 5-25% [3]
- X-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER

- □-HIGH [4] □-EXCELLENT [7] □-NONE [6] □-HIGH [3] □-SNAGGING □-IMPOUND.
- □-MODERATE [3] □-GOOD [5] □-RECOVERED [4] □-MODERATE [2] □-RELOCATION □-ISLANDS
- X-LOW [2] □-FAIR [3] X-RECOVERING [3] X-LOW [1] □-CANOPY REMOVAL □-LEVEED
- □-NONE [1] X-POOR [1] □-RECENT OR NO RECOVERY [1] □-DREDGING □-BANK SHAPING
- □-ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: ~~[illegible]~~ 12

*River Right Looking Downstream*

RIPARIAN WIDTH EROSION/RUNOFF - FLOOD PLAIN QUALITY BANK EROSION

L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)

- □ □-WIDE > 50m [4] X-FOREST, SWAMP [3] □ □-URBAN OR INDUSTRIAL [0] □ □-NONE OR LITTLE [3]
- □ □-MODERATE 10-50 [3] □ □-OPEN PASTURE/ ROWCROP [0] □ □-SHRUB OR OLD FIELD [2] X-MODERATE [2]
- □ □-NARROW 5-10m [2] □ □-RESID., PARK, NEW FIELD [1] □ □-CONSERV. TILLAGE [1] □ □-HEAVY OR SEVERE [1]
- X-VERY NARROW 1-5m [1] □ □-FENCED PASTURE [1] □ □-MINING/CONSTRUCTION [0]
- □ □-NONE [0]

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8

MAX. DEPTH (Check 1) MORPHOLOGY (Check 1) POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- X->1m [6] □-POOL WIDTH > RIFFLE WIDTH [2] □-TORRENTIAL [-1] □-EDDIES [1]
- □-0.7-1m [4] X-POOL WIDTH = RIFFLE WIDTH [1] □-FAST [1] □-INTERSTITIAL [-1] [□-NO POOL [0]]
- □-0.4-0.7m [2] □-POOL WIDTH < RIFFLE W. [0] □-MODERATE [1] □-INTERMITTENT [-2]
- □-< 0.4m [1] X-SLOW [1]
- □-< 0.2m [Pool = 0]

COMMENTS: ____

RIFFLE: 4

RIFFLE/RUN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS

- X-GENERALLY > 10 cm, MAX > 50 [4] □-STABLE (e.g., Cobble, Boulder) [2] □-EXTENSIVE [-1] X-MODERATE [0]
- □-GENERALLY > 10 cm, MAX < 50 [3] □-MOD. STABLE (e.g., Pea Gravel) [1] □-LOW [1] □-NONE [2]
- □-GENERALLY 5-10 cm [1] X-UNSTABLE (Gravel, Sand) [0] [□-NO RIFFLE [0]]
- □-GENERALLY < 5 cm [Riffle = 0]

COMMENTS ____ GRADIENT: 2

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

PC-8
5/3/00.

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: ~~34~~ ~~42~~ 46

Stream PCB Pagan RM ____ Date 5/3/00 River Code ____
Location ____ Crew CJW/CWB/ARS

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: ~~X~~ ~~X~~ ~~X~~ 4

| TYPE | POOL | RIFFLE | | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| ☐☐-BLDER/SLABS [10] | | | ☐☐-GRAVEL [7] | X | | Substrate Origin (Check all) |
| ☐☐-BOULDER [9] | | | ☐☐-SAND [6] | X | | ☐-LIMESTONE [1] ☐-RIP/RAP [0] |
| ☐☐-COBBLE [8] | | | ☐☐-BEDROCK [5] | | | ☐-TILLS [1] X-HARDPAN [0] |
| X☐-HARDPAN [4] | X | | ☐☐-DETRITUS [3] | X | | ☐-SANDSTONE [0] |
| X☐-MUCK [2] | X | | ☐☐-ARTIFIC [0] | | | ☐-SHALE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: X-≥4 [2] ☐-<4 [0] X-COAL FINES [-2]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

Silt Cover (Check One): X-SILT HEAVY [-2] ☐-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
Extent Of Embeddedness (Check One): X-EXTENSIVE [-2] ☐-MODERATE [-1] ☐-LOW [0] ☐-NONE [1]

2) INSTREAM COVER

COVER SCORE: 13

TYPE (Check All That Apply)
- ☐-UNDERCUT BANKS [1]
- X-OVERHANGING VEGETATION [1]
- X-SHALLOWS (IN SLOW WATER) [1]
- X-DEEP POOLS [2]
- X-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS ____

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

CHANNEL: 4

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☐-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| X-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | X-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

RIPARIAN: 7

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | ☐☐-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | X☐-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | ☐☐-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID.,PARK,NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | XX-HEAVY OR SEVERE [1] |
| XX-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 5

MAX. DEPTH (Check 1)
- X->1m [6]
- ☐-0.7-1m [4]
- ☐-0.4-0.7m [2]
- ☐-<0.4m [1]
- ☐-<0.2m (Pool = 0)

MORPHOLOGY (Check 1)
- X-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- ☐-TORRENTIAL [-1]
- ☐-FAST [1]
- X-MODERATE [1]
- ☐-SLOW [1]
- ☐-EDDIES [1]
- ☐-INTERSTITIAL [-1]
- ☐-INTERMITTENT [-2]

☐-NO POOL [0]

COMMENTS ____

RIFFLE: 0

RIFFLE/RUN DEPTH
- ☐-GENERALLY >10 cm, MAX > 50 [4]
- ☐-GENERALLY >10 cm, MAX < 50 [3]
- ☐-GENERALLY 5-10 cm [1]
- ☐-GENERALLY < 5 cm (Riffle = 0)

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g., Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g., Pea Gravel) [1]
- ☐-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1]
- ☐-LOW [1]
- ☐-MODERATE [0]
- ☐-NONE [2]

X-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

PC-7
5/12/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [ ] 44

Stream Timber Creek RM ____ Date ____ River Code ____
Location PC-7 Crew EJB/CWB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| ☐☐-BLDER/SLABS[10] | | | ☐☐-GRAVEL [7] | X | | Substrate Origin (Check all) |
| ☐☐-BOULDER [9] | | | ☐☐-SAND [6] | | | ☐-LIMESTONE [1] ☐-RIP/RAP [0] |
| ☐☐-COBBLE [8] | | | ☐☐-BEDROCK [5] | | | X-TILLS [1] X-HARDPAN [0] |
| ☐X-HARDPAN [4] | X | | ☐☐-DETRITUS [3] | | | ☐-SANDSTONE [0] |
| X☐-MUCK [2] | X | | ☐☐-ARTIFIC [0] | X | | ☐-SHALE [-1] |
| | | | | | | ☐-COAL FINES [-2] |

SUBSTRATE SCORE: [7] 5

Silt Cover (Check One): ☐-SILT HEAVY [-2] X-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
Extent Of Embeddedness (Check One): ☐-EXTENSIVE [-2] X-MODERATE [-1] ☐-LOW [0] ☐-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐- > 4 [2] X- <= 4 [0]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: [8] 8

2] INSTREAM COVER
TYPE (Check All That Apply)
☐-UNDERCUT BANKS [1] X-DEEP POOLS [2] ☐-OXBOWS [1]
X-OVERHANGING VEGETATION [1] X-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONE or check 2 and AVERAGE)
☐-EXTENSIVE > 75% [11]
☐-MODERATE 25-75% [7]
X-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONE PER Category OR check 2 and AVERAGE) CHANNEL: [7]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☐-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| X-LOW [2] | ☐-FAIR [3] | X-RECOVERING [3] | X-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | X-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [10]
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | ☐X-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☐☐-OPEN PASTURE/ ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | XX-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | X☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐ ☐-HEAVY OR SEVERE [1] |
| XX-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [8]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| X- > 1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| ☐-0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] |
| ☐- < 0.4m [1] | | X-SLOW [1] | |
| ☐- < 0.2m [Pool = 0] | | | |

☐ NO POOL [0]

COMMENTS: ____

RIFFLE: [A]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| X-GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | X-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | |
| ☐-GENERALLY < 5 cm [Riffle = 0] | | | |

☐ NO RIFFLE [0]

COMMENTS ____ GRADIENT: [2]

6] Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

PC-6
5/11/00

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 30 38

Stream: Pigeon Creek RM ___ Date ___ River Code ___
Location: PC-6 Crew: EJE/CS/RB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present) SUBSTRATE SCORE: 5

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

O O-BLDER/SLABS [10] ___ O O-GRAVEL [7] ___ Substrate Origin (Check all) Silt Cover (Check One)
O O-BOULDER [9] ___ O O-SAND [6] ___ O-LIMESTONE [1] O-RIP/RAP [0] O-SILT HEAVY [-2] X-SILT MODERATE [-1]
O O-COBBLE [8] ___ O O-BEDROCK [5] ___ O-TILLS [1] X-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
O X-HARDPAN [4] X O O-DETRITUS [3] X O-SANDSTONE [0] Extent Of Embeddedness (Check One)
X O-MUCK [2] X O O-ARTIFIC [0] X O-SHALE [-1] O-EXTENSIVE [-2] X-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] X-<=4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ___

COVER SCORE: 6

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1] O-EXTENSIVE > 75% [11]
O-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O-MODERATE 25-75% [7]
X-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X-SPARSE 5-25% [3]
O-NEARLY ABSENT < 5% [1]
COMMENTS ___

CHANNEL: 7

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

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ___

RIPARIAN: 4

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | X X-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | O O-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | X X-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS: ___

POOL: 6

POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| X - > 1 m [6] | O - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | O - EDDIES [1] |
| O - 0.7-1m [4] | X - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] |
| O - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | O - MODERATE [1] | O - INTERMITTENT [-2] |
| O - < 0.4m [1] | | X - SLOW [1] | |
| O - < 0.2m (Pool = 0) | | | |

O NO POOL [0]

COMMENTS ___

RIFFLE: 4

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| X - GENERALLY > 10 cm, MAX > 50 [4] | O - STABLE (e.g., Cobble, Boulder) [2] | O - EXTENSIVE [-1] X - MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O - MOD. STABLE (e.g., Pea Gravel) [1] | O - LOW [1] O - NONE [2] |
| O - GENERALLY 5-10 cm [1] | X - UNSTABLE (Gravel, Sand) [0] | O - NO RIFFLE [0] |
| O - GENERALLY < 5 cm (Riffle = 0) | | |

COMMENTS ___

GRADIENT: 2

5) Gradient (feet/mile): ___ %POOL: ___ %RIFFLE: ___ %RUN: ___

PC-5
5/12/00

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 59

Stream: Green Creek RM ___ Date ___ River Code ___
Location: PC-5 Crew: ESB/CWP

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 11

- O-O-BLDER/SLABS[10] ___ ___ O-X-GRAVEL [7] X X
- O-O-BOULDER [9] ___ ___ O-O-SAND [6] X X
- O-O-COBBLE [8] ___ X X-O-BEDROCK[5] X ___
- O-O-HARDPAN [4] ___ ___ O-O-DETRITUS[3] ___ ___
- O-O-MUCK [2] ___ ___ O-O-ARTIFIC [0] ___ ___

Substrate Origin (Check all): X-O-LIMESTONE [1] O-RIPRAP [0]; X-TILLS [1] O-HARDPAN [0]; O-SANDSTONE [0]; X-SHALE [-1]; O-COAL FINES [-2]

Silt Cover (Check One): O-SILT HEAVY [-2] O-SILT MODERATE [-1] X-SILT NORMAL [0] O-SILT FREE [1]

Extent Of Embeddedness (Check One): O-EXTENSIVE [-2] X-MODERATE [-1] O-LOW [0] O-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] X-<=4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

2) INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply)

- O-UNDERCUT BANKS [1]
- X-OVERHANGING VEGETATION [1]
- X-SHALLOWS (IN SLOW WATER) [1]
- X-DEEP POOLS [2]
- X-ROOTWADS [1]
- O-BOULDERS [1]
- O-OXBOWS [1]
- O-AQUATIC MACROPHYTES [1]
- X-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O - EXTENSIVE > 75% [11]
- O - MODERATE 25-75% [7]
- X - SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5% [1]

COMMENTS ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O - WIDE > 50m [4] | X X - FOREST, SWAMP [3] | O O - URBAN OR INDUSTRIAL [0] | O - NONE OR LITTLE [3] |
| O O - MODERATE 10-50 [3] | O O - OPEN PASTURE/ROWCROP [0] | O O - SHRUB OR OLD FIELD [2] | X X - MODERATE [2] |
| O O - NARROW 5-10m [2] | O O - RESID.,PARK,NEW FIELD [1] | O O - CONSERV. TILLAGE [1] | O - HEAVY OR SEVERE [1] |
| X X - VERY NARROW 1-5m [1] | O O - FENCED PASTURE [1] | O O - MINING/CONSTRUCTION [0] | |
| O O - NONE [0] | | | |

COMMENTS: ___

5.) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O - >1m [6] | O - POOL WIDTH > RIFFLE WIDTH [2] | O - TORRENTIAL [-1] | O - EDDIES [1] |
| X - 0.7-1m [4] | X - POOL WIDTH = RIFFLE WIDTH [1] | O - FAST [1] | O - INTERSTITIAL [-1] |
| O - 0.4-0.7m [2] | O - POOL WIDTH < RIFFLE W. [0] | X - MODERATE [1] | O - INTERMITTENT [-2] |
| O - < 0.4m [1] | | O - SLOW [1] | |
| O - <0.2m [Pool = 0] | | | |

O - NO POOL [0]

COMMENTS: ___

RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| O - GENERALLY >10 cm, MAX.>50 [4] | X - STABLE (e.g., Cobble, Boulder) [2] | O - EXTENSIVE [-1] |
| O - GENERALLY >10 cm, MAX.<50 [3] | O - MOD. STABLE (e.g., Pea Gravel) [1] | X - MODERATE [0] |
| X - GENERALLY 5-10 cm [1] | O - UNSTABLE (Gravel, Sand) [0] | O - LOW [1] |
| O - GENERALLY < 5 cm [Riffle = 0] | | O - NONE [2] |

O - NO RIFFLE [0]

COMMENTS ___ GRADIENT: 2

6) Gradient (feet/mile): ___ %POOL: ___ %RIFFLE: ___ %RUN: ___

EPA 4520

PC-4
5/14/00
DUP-3 water Sampling tak

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**

QHEI SCORE: ~~50~~ 54 56

Stream Pigeon Creek RM ___ Date ___ River Code ___
Location PC-4 Street Bench Crew ___

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

SUBSTRATE SCORE: ~~10~~ 12

- O-O-BLDER/SLABS [10] ___ X-GRAVEL [7] X X Substrate Origin (Check all)
- O-O-BOULDER [9] ___ O-O-SAND [6] X X O-LIMESTONE [1] X-RIPRAP [0]
- X-O-COBBLE [8] X X O-O-BEDROCK [5] ___ X-TILLS [1] O-HARDPAN [0]
- O-O-HARDPAN [4] ___ O-O-DETRITUS [3] ___ O-SANDSTONE [0]
- O-O-MUCK [2] ___ O-O-ARTIFIC [0] X X O-SHALE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: O > 4 [2] X <= 4 [0] O-COAL FINES [-2]

Silt Cover (Check One): X SILT HEAVY [-2] O-SILT MODERATE [-1] O-SILT NORMAL [0] O-SILT FREE [1]

Extent Of Embeddedness (Check One): X-EXTENSIVE [-2] O-MODERATE [-1] O-LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

2) INSTREAM COVER

COVER SCORE: 13

TYPE (Check All That Apply)

- O-UNDERCUT BANKS [1]
- X-OVERHANGING VEGETATION [1]
- X-SHALLOWS (IN SLOW WATER) [1]
- X-DEEP POOLS [2]
- X-ROOTWADS [1]
- O-BOULDERS [1]
- O-OXBOWS [1]
- O-AQUATIC MACROPHYTES [1]
- X-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O - EXTENSIVE > 75% [11]
- X - MODERATE 25-75% [7]
- O - SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5% [1]

COMMENTS: ___

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

CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: Only Str... on ... with wetland ...

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

RIPARIAN: ~~8~~ 7

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)

- O-O-WIDE > 50m [4]
- O-O-MODERATE 10-50 [3]
- O-O-NARROW 5-10m [2]
- X-X-VERY NARROW 1-5m [1]
- O-O-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)

- X-X-FOREST, SWAMP [3]
- O-O-OPEN PASTURE/ROWCROP [0]
- O-O-RESID.,PARK,NEW FIELD [1]
- O-O-FENCED PASTURE [1]
- O-O-URBAN OR INDUSTRIAL [0]
- O-O-SHRUB OR OLD FIELD [2]
- O-O-CONSERV. TILLAGE [1]
- O-O-MINING/CONSTRUCTION [0]

BANK EROSION

- O O-NONE OR LITTLE [3]
- X X-MODERATE [2]
- O O-HEAVY OR SEVERE [1]

COMMENTS ___

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 6

MAX. DEPTH (Check 1)

- O- > 1m [6]
- X-0.7-1m [4]
- O-0.4-0.7m [2]
- O- < 0.4m [1]
- O- < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- O-POOL WIDTH > RIFFLE WIDTH [2]
- X-POOL WIDTH = RIFFLE WIDTH [1]
- O-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- O-TORRENTIAL [-1]
- O-FAST [1]
- X-MODERATE [1]
- O-SLOW [1]
- O-EDDIES [1]
- O-INTERSTITIAL [-1]
- O-INTERMITTENT [-2]

O-NO POOL [0]

COMMENTS ___

RIFFLE: 7

RIFFLE/RUN DEPTH

- X-GENERALLY > 10 cm, MAX > 50 [4]
- O - GENERALLY > 10 cm, MAX < 50 [3]
- O - GENERALLY 5-10 cm [1]
- O - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- X-STABLE (e.g., Cobble, Boulder) [2]
- O-MOD. STABLE (e.g., Pea Gravel) [1]
- O-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- O-EXTENSIVE [-1]
- X-LOW [1]
- O-MODERATE [0]
- O-NONE [2]

O-NO RIFFLE [0]

COMMENTS ___

GRADIENT: 4

6) Gradient (feet/mile): ___ %POOL: ___ %RIFFLE: ___ %RUN: ___

PC-3
5/8/00



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [X] 40

Stream [illegible] Creek RM ____ Date ____ River Code ____

Location PC-3 Crew [illegible]

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

SUBSTRATE SCORE: [10] 3

| TYPE | POOL | RIFFLE | | POOL | RIFFLE | SUBSTRATE QUALITY | |
|---|---|---|---|---|---|---|---|
| | | | | | | Substrate Origin (Check all) | Silt Cover (Check One) |
| ☐ ☐-BLDER/SLABS[10] | | | ☐ ☐-GRAVEL [7] | | | ☐-LIMESTONE [1] ☐-RIP/RAP [0] | X SILT HEAVY [-2] ☐-SILT MODERATE [-1] |
| ☐ ☐-BOULDER [9] | | | ☐ ☐-SAND [6] | | | ☐-TILLS [1] ☐-HARDPAN [0] | ☐-SILT NORMAL [0] ☐-SILT FREE [1] |
| ☐ ☐-COBBLE [8] | | | X ☐-BEDROCK [5] | X | | ☐-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| ☐ ☐-HARDPAN [4] | | | ☐ ☐-DETRITUS [3] | | | X SHALE [-1] | X EXTENSIVE [-2] ☐-MODERATE [-1] |
| ☐ X MUCK [2] | X | | ☐ ☐-ARTIFIC [0] | | | X COAL FINES [-2] | ☐-LOW [0] ☐-NONE [1] |

TOTAL NUMBER OF SUBSTRATE TYPES: ☐ > 4 [2] X <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER

COVER SCORE: [7]

TYPE (Check All That Apply)

| | | | AMOUNT (Check ONLY One or check 2 and AVERAGE) |
|---|---|---|---|
| ☐-UNDERCUT BANKS [1] | X DEEP POOLS [2] | ☐-OXBOWS [1] | ☐-EXTENSIVE > 75% [11] |
| ☐-OVERHANGING VEGETATION [1] | ☐-ROOTWADS [1] | ☐-AQUATIC MACROPHYTES [1] | ☐-MODERATE 25-75% [7] |
| X SHALLOWS (IN SLOW WATER) [1] | ☐-BOULDERS [1] | X LOGS OR WOODY DEBRIS [1] | X SPARSE 5-25% [3] |
| | | | ☐-NEARLY ABSENT < 5% [1] |

COMMENTS: ____

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

CHANNEL: [5]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| X MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☐-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| X LOW [2] | ☐-FAIR [3] | X RECOVERING [3] | X LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | X POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

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

RIPARIAN: [X] 5

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐ ☐-WIDE > 50m [4] | X X FOREST, SWAMP [3] | ☐ ☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐ ☐-MODERATE 10-50 [3] | ☐ ☐-OPEN PASTURE/ROWCROP [0] | ☐ ☐-SHRUB OR OLD FIELD [2] | ☐ ☐-MODERATE [2] |
| ☐ ☐-NARROW 5-10m [2] | ☐ ☐-RESID.,PARK,NEW FIELD [1] | ☐ ☐-CONSERV. TILLAGE [1] | X X HEAVY OR SEVERE [1] |
| X X VERY NARROW 1-5m [1] | ☐ ☐-FENCED PASTURE [1] | ☐ ☐-MINING/CONSTRUCTION [0] | |
| ☐ ☐-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: [6]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| X > 1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] | |
| ☐-0.7-1m [4] | X POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] | ☐-NO POOL [0] |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] | |
| ☐-< 0.4m [1] | | X SLOW [1] | | |
| ☐-< 0.2m (Pool = 0) | | | | |

COMMENTS: ____

RIFFLE: [5]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| X GENERALLY > 10 cm, MAX > 50 [4] | X STABLE (e.g., Cobble, Boulder) [2] | X EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g. Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | ☐-UNSTABLE (Gravel, Sand) [0] | | ☐-NO RIFFLE [0] |
| ☐-GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ____

GRADIENT: [X] 4

4) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

PC-2
5/17/00

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: ~~36~~ ~~36~~ 40

Stream: [illegible] Creek RM: ____ Date: 5/17/00 River Code: ____
Location: PC-2 Crew: [illegible]

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES: Check all types present); SUBSTRATE SCORE: 6

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS [10] ___ ___ / GRAVEL [7] ___ ___ / Substrate Origin (Check all) / Silt Cover (Check One)
- BOULDER [9] ___ ___ / SAND [6] ___ ___ / LIMESTONE [1] / RIP/RAP [0] / SILT HEAVY [-2] / SILT MODERATE [-1]
- COBBLE [8] ___ ___ / BEDROCK [5] ___ ___ / TILLS [1] / HARDPAN [0] / SILT NORMAL [0] / SILT FREE [1]
- HARDPAN [4] X ___ / DETRITUS [3] X ___ / SANDSTONE [0] / Extent Of Embeddedness (Check One)
- MUCK [2] X ___ / ARTIFIC. [0] ___ ___ / SHALE [-1] / EXTENSIVE [-2] / MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] / <= 4 [0] / COAL FINES [-2] / LOW [0] / NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ________

2] INSTREAM COVER COVER SCORE: 8

TYPE (Check All That Apply) / AMOUNT (Check ONLY One or check 2 and AVERAGE)

- UNDERCUT BANKS [1] / DEEP POOLS [2] / OXBOWS [1] / EXTENSIVE > 75% [11]
- OVERHANGING VEGETATION [1] / ROOTWADS [1] / AQUATIC MACROPHYTES [1] / MODERATE 25-75% [7]
- SHALLOWS (IN SLOW WATER) [1] / BOULDERS [1] / LOGS OR WOODY DEBRIS [1] / SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS: ________

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 8

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| LOW [2] | FAIR [3] | RECOVERING [3] | LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ________

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: ~~7~~ ~~3.5~~ 4

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| WIDE > 50m [4] | FOREST, SWAMP [3] | URBAN OR INDUSTRIAL [0] | NONE OR LITTLE [3] |
| MODERATE 10-50 [3] | OPEN PASTURE/ROWCROP [0] | SHRUB OR OLD FIELD [2] | MODERATE [2] |
| NARROW 5-10m [2] | RESID., PARK, NEW FIELD [1] | CONSERV. TILLAGE [1] | HEAVY OR SEVERE [1] |
| VERY NARROW 1-5m [1] | FENCED PASTURE [1] | MINING/CONSTRUCTION [0] | |
| NONE [0] | | | |

COMMENTS: ________

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| > 1m [6] | | | |
| 0.7-1m [4] | POOL WIDTH > RIFFLE WIDTH [2] | TORRENTIAL [-1] | EDDIES [1] |
| 0.4-0.7m [2] | POOL WIDTH = RIFFLE WIDTH [1] | FAST [1] | INTERSTITIAL [-1] |
| < 0.4m [1] | POOL WIDTH < RIFFLE W. [0] | MODERATE [1] | INTERMITTENT [-2] |
| < 0.2m [Pool = 0] | | SLOW [1] | |

NO POOL [0]

COMMENTS ________

RIFFLE: 4

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| GENERALLY > 10 cm, MAX > 50 [4] | STABLE (e.g., Cobble, Boulder) [2] | EXTENSIVE [-1] | MODERATE [0] |
| GENERALLY > 10 cm, MAX < 50 [3] | MOD. STABLE (e.g., Pea Gravel) [1] | LOW [1] | NONE [2] |
| GENERALLY 5-10 cm [1] | UNSTABLE (Gravel, Sand) [0] | | |
| GENERALLY < 5 cm [Riffle = 0] | | | |

NO RIFFLE [0]

COMMENTS ________ GRADIENT: 2

6] Gradient (feet/mile): ______ %POOL: ______ %RIFFLE: ______ %RUN: ______

P—

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: ~~[illegible]~~ 43

Stream [illegible] RM ____ Date ____ River Code ____
Location [illegible] Crew [illegible]

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|
| O O-BLDER/SLABS[10] | ___ ___ | O O-GRAVEL [7] | X ___ | Substrate Origin (Check all) |
| O O-BOULDER [9] | ___ ___ | O O-SAND [6] | X ___ | O-LIMESTONE [1] O-RIPRAP [0] |
| O O-COBBLE [8] | ___ ___ | O O-BEDROCK[5] | ___ ___ | O-TILLS [1] O-HARDPAN [0] |
| X O-HARDPAN [4] | X ___ | O O-DETRITUS[3] | ___ ___ | O-SANDSTONE [0] |
| O O-MUCK [2] | X ___ | O O-ARTIFIC.[0] | X ___ | O-SHALE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: X >4 [2] O— <=4 [0] O-COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE SCORE: ~~[illegible]~~ 7

Silt Cover (Check One): O-SILT HEAVY [-2] O-SILT MODERATE [-1] O-SILT NORMAL [0] O-SILT FREE [1]

Extent Of Embeddedness (Check One): O—EXTENSIVE [-2] X—MODERATE [-1] O—LOW [0] O—NONE [1]

COMMENTS ____

2) INSTREAM COVER

COVER SCORE: 6

TYPE (Check All That Apply)

O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1]
X-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1]
O-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

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

CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | X - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

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

RIPARIAN: ~~[illegible]~~ 5

"River Right Looking Downstream"

| RIPARIAN WIDTH L R (Per Bank) | FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | X O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | O X-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID.,PARK,NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | X O-HEAVY OR SEVERE [1] |
| X O-VERY NARROW < 5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 8

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/GLIDE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| X > 1m [6] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| O-0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O-0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] |
| O < 0.4m [1] | | X-SLOW [1] | |
| O—<0.2m (Pool = 0) | | | |

O-NO POOL [0]

COMMENTS: ____

RIFFLE: 4

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| X-GENERALLY > 10 cm, MAX. > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | X-MODERATE [0] |
| O - GENERALLY > 10 cm, MAX. < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | O-LOW [1] | O-NONE [2] |
| O - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

O-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 4

6) Gradient (feet/mile): ____ %POOL: ____ %RIFFLE: ____ %RUN: ____

EPA 4520

| Site | Waterbody | Taxa Richı | Family Biot | Ratio of Sc | Ratio of EF | % Contribu | EPT Index | Ratio of Sh | Total Number Collected | Ratio of Scraper+1/Filterer+1 | Ratio of EPT+1/Chironomidae+1 | Ratio of Shredder+1/Nonshredder+1 | Scrapers | Filterers | Shredders | EPT | Chironomids |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC1 | Pigeon Cre | 13 | 6.8 | (9/0) | 0.38 | 0.22 | 2 | 0.1 | 119 | 10 | | | | | | | |
| PC2 | Pigeon Cre | 8 | 6.4 | (20/0) | (0/80) | 0.67 | 0 | (0/50) | 104 | 21 | 0.012345679 | 0.019607843 | 20 | 0 | 0 | 0 | 80 |
| PC3 | Pigeon Cre | 10 | 6.2 | (22/0) | (0/57) | 0.56 | 0 | (0/50) | 116 | 23 | | 0.019607843 | | | | | |
| PC4 | Pigeon Cre | 9 | 6.3 | (0/7) | (0/88) | 0.68 | 0 | 0.16 | 127 | 0.125 | | | | | | | |
| PC5 | Pigeon Cre | 15 | 6.8 | 0.11 | 0.091 | 0.36 | 2 | 0.06 | 152 | 0.138 | | | | | | | |
| PC6 | Pigeon Cre | 10 | 6.1 | 2 | (0/65) | 0.51 | 0 | 0.02 | 123 | 1.5 | 0.015151515 | | | | | | |
| PC7 | Pigeon Cre | 15 | 7.3 | 0.92 | 0.12 | 0.42 | 1 | 0.5 | 134 | 0.923 | 0.16 | 0.508196721 | 11 | 12 | 30 | 3 | 24 |
| PC8 | Pigeon Cre | 17 | 6.6 | 1.9 | 0.44 | 0.18 | 2 | 0.091 | 112 | 1.818 | 0.461538462 | 0.107142857 | 19 | 10 | 5 | 11 | 25 |
| PC9 | Pigeon Cre | 11 | 6.7 | (1/0) | 0.053 | 0.44 | 1 | (0/50) | 190 | 2.000 | 0.059602649 | 0.019607843 | 1 | 0 | 0 | 8 | 150 |
| PC11 | Pigeon Cre | 14 | 6 | 0.1 | 0.11 | 0.73 | 4 | 0.02 | 145 | 0.182 | 0.11965812 | 0.039215686 | 1 | 10 | 1 | 13 | 116 |
| PC12 | Pigeon Cre | 11 | 5.3 | (0/46) | 0.67 | 0.48 | 3 | (0/50) | 143 | 0.021 | | 0.019607843 | | | | | |
| PC13 | Pigeon Cre | 14 | 7.3 | (2/0) | 1.4 | 0.27 | 1 | 0.04 | 134 | 3.000 | | | | | | | |
| PC14 | Pigeon Cre | 9 | 5.9 | 0.082 | 0.95 | 0.23 | 1 | 0.36 | 163 | 0.100 | 0.951219512 | 0.37254902 | 4 | 49 | 18 | 38 | 40 |
| PC15 | Pigeon Cre | 14 | 7.2 | 0.074 | 0.02 | 0.28 | 1 | 0.27 | 152 | | | | | | | | |
| PC16 | Pigeon Cre | 16 | 6.8 | 14 | 0.01 | 0.47 | 1 | 0.18 | 184 | | | | | | | | |
| LC1 | Locust Cre | 6 | 6.1 | (0/5) | (0/102) | 0.84 | 0 | (0/50) | 114 | 0.167 | 0.009708738 | 0.019607843 | 0 | 5 | 0 | 0 | 102 |
| LC2 | Locust Cre | 12 | 6.7 | (24/0) | 0.37 | 0.33 | 2 | 0.64 | 162 | 25.000 | | | | | | | |
| LP1 | Little Pigec | 9 | 5.9 | (2/0) | 2 | 0.32 | 1 | 0.1 | 117 | 3.000 | 2 | 0.117647059 | 2 | 0 | 5 | 37 | 18 |
| LP2 | Little Pigec | 11 | 6.4 | 1.5 | 0.47 | 0.37 | 2 | 0.61 | 142 | | | | | | | | |
| BC1 | Bluegrass | 13 | 6.6 | 1.4 | 0.11 | 0.53 | 2 | 0.02 | 110 | 1.333 | 0.123287671 | 0.039215686 | 11 | 8 | 1 | 8 | 72 |
| BC2 | Bluegrass | 8 | 6.9 | 34 | (0/68) | 0.39 | 0 | 0.06 | 174 | | | | | | | | |
| BC3 | Bluegrass | 14 | 7 | 34 | 0.31 | 0.24 | 2 | 0.14 | 143 | 17.5 | 0.333333333 | 0.352941176 | 34 | 1 | 17 | 9 | 29 |
| WD1 | Weinsheim | 16 | 6.6 | 9 | 0.077 | 0.38 | 1 | 0.02 | 101 | 5 | 0.1 | 0.039215686 | 9 | 1 | 1 | 3 | 39 |
| SD1 | Stollberg D | 5 | 7.9 | (2/0) | (0/109) | 0.9 | 0 | 0.02 | 117 | 3 | 0.009090909 | | | | | | |
| UN1 | Unnamed ' | 10 | 7 | 0.063 | (0/14) | 0.5 | 0 | 0.74 | 153 | | | | | | | | |
| SC1 | Squaw Cre | 12 | 7 | (0/1) | 0.44 | 0.47 | 2 | 0.52 | 110 | 0.5 | 0.5 | 0.529411765 | 0 | 1 | 26 | 11 | 23 |
| BG1 | Big Creek | 12 | 6 | (0/16) | 1.6 | 0.29 | 1 | 0.06 | 152 | 0.059 | 1.607142857 | 0.078431373 | 0 | 16 | 3 | 44 | 27 |
| BG2 | Big Creek | 16 | 6.2 | 0.06 | 0.23 | 0.38 | 2 | 0.04 | 126 | 0.078 | 0.258064516 | 0.058823529 | 3 | 50 | 2 | 7 | 30 |
| SF1 | Smith Fork | 15 | 6 | 0.025 | 1.4 | 0.31 | 3 | 0.57 | 134 | 0.038 | 1.380952381 | 0.578947368 | 2 | 79 | 32 | 28 | 20 |
| SF2 | Smith Fork | 10 | 6.4 | (0/37) | 0.4 | 0.34 | 2 | 0.06 | 122 | 0.026 | 0.418604651 | 0.078431373 | 0 | 37 | 3 | 17 | 42 |
| SF3 | Smith Fork | 9 | 7.5 | (1/0) | 0.83 | 0.46 | 1 | 0.31 | 138 | | | | | | | | |
| WF1 | West Fork | 14 | 6.2 | 0.03 | 0.012 | 0.52 | 1 | 0.02 | 132 | 0.059 | 0.024096386 | 0.039215686 | 1 | 33 | 1 | 1 | 82 |
| WF2 | West Fork | 14 | 6.5 | 0.86 | 0.038 | 0.38 | 1 | 0.02 | 130 | | | | | | | | |
| WF3 | West Fork | 12 | 5.6 | 7 | (0/55) | 0.36 | 0 | 0.1 | 177 | | 0.017857143 | | | | | | |
| HC1 | Hurricane ( | 10 | 7.2 | (10/0) | (0/91) | 0.7 | 0 | 0.02 | 129 | 11 | 0.010869565 | 0.039215686 | 10 | 0 | 1 | 0 | 91 |
| SA1 | Sand Cree | 10 | 6.3 | 0.35 | 0.013 | 0.34 | 1 | 0.14 | 169 | 0.368 | 0.025641026 | 0.152542373 | 13 | 37 | 8 | 1 | 77 |
| | average | 11.77778 | 6.547222 | 5.3737 | 0.482462 | 0.440278 | 1.194444 | 0.193903 | 137.5 | | | | | | | | |
| | max | 17 | 7.9 | 34 | 2 | 0.9 | 4 | 0.74 | 190 | | | | | | | | |
| | min | 5 | 5.3 | 0.025 | 0.01 | 0.18 | 0 | 0.02 | 101 | | | | | | | | |

BC1 5/3/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 1 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | 11 | 8 | 0.830 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 7 | 7 | 0.462 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 4 | 9 | 0.340 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.038 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 1 | 4 | 0.038 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 14 | 8 | 1.057 | Gathers | |
| | Other Chironomidae | 58 | 6 | 3.283 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 6 | 6 | 0.340 | Filters | Blackfly |
| | Ceratopogonidae | 3 | 6 | 0.170 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavengers | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.075 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavengers | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 13 | |
| **FBI** | 6.632 | |
| **Scraper/Filters** | 1.375 | |
| **EPT/Chironomidae** | 0.111 | |
| **% Contribution of Dominant Family** | 0.527 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.020 | |
| Total Number Collected | | 110 |

BC2 5/3/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 68 | 8 | 3.200 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 9 | 5 | 0.265 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 4 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.141 | Gathers | |
| | Other Chironomidae | 65 | 6 | 2.294 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 2 | 6 | 0.071 | Filters | Blackfly |
| | Ceratopogonidae | 16 | 6 | 0.565 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 7 | 8 | 0.329 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 8 | |
| **FBI** | 6.865 | |
| **Scraper/Filters** | 34.000 | |
| **EPT/Chironomidae** | 0.000 | 0/68 |
| **% Contribution of Dominant Family** | 0.391 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.060 | |
| Total Number Collected | | 174 |

BC3 5/4/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 31 | 8 | 1.922 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 6 | 7 | 0.326 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 3 | 4 | 0.093 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 3 | 3 | 0.070 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 4 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.186 | Gathers | |
| | Other Chironomidae | 26 | 6 | 1.209 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | 5 | 6 | 0.233 | Gathers | Bitingmidge |
| Ostracoda | | 8 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 34 | 8 | 2.109 | Shredders | Pillbug |
| Amphipod | | 2 | 4 | 0.062 | Shredders | Shrimp |
| Decapoda | | 16 | 6 | 0.744 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 6.953 | |
| **Scraper/Filters** | 34.000 | |
| **EPT/Chironomidae** | 0.310 | |
| **% Contribution of Dominant Family** | 0.238 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.140 | |
| Total Number Collected | | 143 |

BG1 5/7/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 2 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 16 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 44 | 7 | 2.484 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 3 | 3 | 0.073 | Predators | |
| | Corduliidae | 3 | 5 | 0.121 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| | Gomphidae | 2 | 1 | 0.016 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 13 | 5 | 0.524 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 22 | 5 | 0.887 | Predators | Longtoed |
| | Dytiscidae | 11 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | | 8 | 0.000 | Gathers | |
| | Other Chironomidae | 27 | 6 | 1.306 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 6 | 8 | 0.387 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 4 | 6 | 0.194 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 5.992 | |
| **Scraper/Filters** | 0.000 | 0/16 |
| **EPT/Chironomidae** | 1.630 | |
| **% Contribution of Dominant Family** | 0.289 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.060 | |
| Total Number Collected | | 152 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BG2 | 5/7/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 0 | | Slimes | 0 | | | |
| Filamentous Algae | 1 | | Macroinvertebrates | 1 | | | |
| Macrophytes | 0 | | Fish | 1 | | | |
| | | | | | | | |
| | Macrobenthos Qualitative Sample List | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 2 | | 0.000 | | | |
| Gastropoda | Physa | 3 | 8 | 0.381 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 48 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 6 | 7 | 0.667 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | 1 | 5 | 0.079 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 3 | 9 | 0.429 | Predators | | |
| | Calopterygidae | 4 | 5 | 0.317 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.063 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | 12 | 5 | 0.952 | Predators | Longtoed | |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.254 | Gathers | | |
| | Other Chironomidae | 28 | 6 | 2.667 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | 1 | 6 | 0.095 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | 3 | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 2 | 8 | 0.254 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 16 | | | | | | |
| **FBI** | 6.159 | | | | | | |
| **Scraper/Filters** | 0.060 | | | | | | |
| **EPT/Chironomidae** | 0.233 | | | | | | |
| **% Contribution of Dominant Family** | 0.381 | | | | | | |
| **EPT Index** | 2.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.040 | | | | | | |
| Total Number Collected | 126 | | | | | | |

HC1 5/5/2000

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | | Slimes | 0 |
| Filamentous Algae | 2 | | Macroinvertebrates | 3 |
| Macrophytes | 0 | | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 5 | | 0.000 | | |
| Gastropoda | Physa | 10 | 8 | 0.650 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 8 | 3 | 0.195 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | 8 | 3 | 0.195 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 2 | 5 | 0.081 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 90 | 8 | 5.854 | Gathers | |
| | Other Chironomidae | 1 | 6 | 0.049 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 3 | 4 | 0.098 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.049 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 10 | |
| **FBI** | 7.171 | |
| **Scraper/Filters** | #DIV/0! | 10/0 |
| **EPT/Chironomidae** | 0.000 | 0/91 |
| **% Contribution of Dominant Family** | 0.698 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.020 | |
| Total Number Collected | 129 | |

LC1 5/6/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 1 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 6 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 6 | 8 | 0.453 | Gathers | |
| | Other Chironomidae | 96 | 6 | 5.434 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 4 | 6 | 0.226 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 6 | |
| **FBI** | 6.113 | |
| **Scraper/Filters** | 0.000 | 0/5 |
| **EPT/Chironomidae** | 0.000 | 0/102 |
| **% Contribution of Dominant Family** | 0.842 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/50 |
| Total Number Collected | 114 | |

LC2 5/6/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 3 |
| Macrophytes | 1 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 17 | 8 | 0.901 | Scrapers | Lefthanded |
| | Planorbidae | 1 | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 7 | 7 | 0.325 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 6 | 4 | 0.159 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 3 | 5 | 0.099 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 8 | 8 | 0.424 | Gathers | |
| | Other Chironomidae | 27 | 6 | 1.073 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 53 | 8 | 2.808 | Shredders | Pillbug |
| Amphipod | | 21 | 4 | 0.556 | Shredders | Shrimp |
| Decapoda | | 9 | 6 | 0.358 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 6.702 | |
| **Scraper/Filters** | #DIV/0! | 24/0 |
| **EPT/Chironomidae** | 0.371 | |
| **% Contribution of Dominant Family** | 0.327 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.635 | |
| Total Number Collected | 162 | |

LP1 5/6/2000

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 17 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.160 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 37 | 4 | 1.480 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.090 | Predators | |
| | Calopterygidae | 2 | 5 | 0.100 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.160 | Gathers | |
| | Other Chironomidae | 16 | 6 | 0.960 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 34 | 8 | 2.720 | Shredders | Pillbug |
| Amphipod | | 6 | 4 | 0.240 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 9 | |
| **FBI** | 5.910 | |
| **Scraper/Filters** | #DIV/0! | 2/0 |
| **EPT/Chironomidae** | 2.056 | |
| **% Contribution of Dominant Family** | 0.316 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.100 | |
| Total Number Collected | | 117 |

LP2 5/6/2000

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.113 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 13 | 7 | 0.645 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 1 | 4 | 0.028 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 6 | 8 | 0.340 | Gathers | |
| | Other Chironomidae | 24 | 6 | 1.021 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 2 | 6 | 0.085 | Filters | Blackfly |
| | Ceratopogonidae | 1 | 6 | 0.043 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 52 | 8 | 2.950 | Shredders | Pillbug |
| Amphipod | | 34 | 4 | 0.965 | Shredders | Shrimp |
| Decapoda | | 6 | 6 | 0.255 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 11 |
| **FBI** | 6.447 |
| **Scraper/Filters** | 1.500 |
| **EPT/Chironomidae** | 0.467 |
| **% Contribution of Dominant Family** | 0.366 |
| **EPT Index** | 2.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.610 |
| Total Number Collected | 142 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC1 | 5/12/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 0 | | Slimes | 0 | | | |
| Filamentous Algae | 0 | | Macroinvertebrates | 1 | | | |
| Macrophytes | 0 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 3 | | 0.000 | | | |
| Gastropoda | Physa | 9 | 8 | 0.900 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 11 | 7 | 0.963 | Gathers | Backplate | |
| | Baetidae | 1 | 4 | 0.050 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | 14 | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 6 | 8 | 0.600 | Gathers | | |
| | Other Chironomidae | 26 | 6 | 1.950 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | 9 | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | 11 | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 16 | 8 | 1.600 | Shredders | Pillbug | |
| Amphipod | | 3 | 4 | 0.150 | Shredders | Shrimp | |
| Decapoda | | 8 | 6 | 0.600 | Predators | Crayfish | |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 13 | | | | | | |
| **FBI** | 6.813 | | | | | | |
| **Scraper/Filters** | #DIV/0! | 9/0 | | | | | |
| **EPT/Chironomidae** | 0.375 | | | | | | |
| **% Contribution of Dominant Family** | 0.218 | | | | | | |
| **EPT Index** | 2.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.100 | | | | | | |
| Total Number Collected | 119 | | | | | | |

PC2 5/12/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 1 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 10 | 8 | 0.833 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 5 | 6 | 0.313 | Scrapers | Righthanded |
| | Ancylidae | 5 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 2 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 10 | 8 | 0.833 | Gathers | |
| | Other Chironomidae | 70 | 6 | 4.375 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.083 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 8 | |
| **FBI** | 6.438 | |
| **Scraper/Filters** | #DIV/0! | 20/0 |
| **EPT/Chironomidae** | 0.000 | 0/80 |
| **% Contribution of Dominant Family** | 0.673 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | | 0/50 |
| Total Number Collected | 104 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PC3 | 5/8/2000 | | | | | | | |
| | | | | | | | | |
| Periphyton | 0 | | Slimes | 0 | | | | |
| Filamentous Algae | 0 | | Macroinvertebrates | 1 | | | | |
| Macrophytes | 0 | | Fish | 1 | | | | |
| | | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | | |
| | | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | | |
| Oligochaeta | | 17 | | 0.000 | | | | |
| Gastropoda | Physa | 19 | 8 | 1.600 | Scrapers | Lefthanded | | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | | |
| | Ancylidae | 3 | | 0.000 | Scrapers | Limpet | | |
| Bivalvia | | | | 0.000 | Filters | | | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate | | |
| | Baetidae | | 4 | 0.000 | Gathers | | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | | |
| | Libellulidae | | 9 | 0.000 | Predators | | | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | | | |
| | Calopterygidae | 2 | 5 | 0.105 | Predators | Stiffantaena | | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | | |
| | Philopotamide | | 3 | 0.000 | Gathers | | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | | |
| Coleoptera | Dryopidae | 3 | 5 | 0.158 | Predators | Longtoed | | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | | |
| | Elmidae | 11 | 4 | 0.463 | Gathers | Riffle | | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | | |
| Diptera | Blood-red Chironomidae | 4 | 8 | 0.337 | Gathers | | | |
| | Other Chironomidae | 53 | 6 | 3.347 | Gathers | | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | | |
| | Tabanidae | | 6 | 0.000 | Predators | | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | | |
| | Nepidae | | | 0.000 | | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | | |
| Decapoda | | 3 | 6 | 0.189 | Predators | Crayfish | | |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech | | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | | |
| | | | | | | | | |
| **TAXA RICHNESS** | 10 | | | | | | | |
| **FBI** | 6.200 | | | | | | | |
| **Scraper/Filters** | #DIV/0! | 22/0 | | | | | | |
| **EPT/Chironomidae** | 0.000 | 0/57 | | | | | | |
| **% Contribution of Dominant Family** | 0.457 | | | | | | | |
| **EPT Index** | 0.000 | | | | | | | |
| **Community Similarity Indices** | | | | | | | | |
| **CPOM** | 0.000 | 0/50 | | | | | | |
| Total Number Collected | 116 | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC4 | 5/14/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 2 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 0 | | Fish | 0 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 7 | | 0.000 | | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 7 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | | |
| | Calopterygidae | 1 | 5 | 0.047 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.150 | Gathers | | |
| | Other Chironomidae | 86 | 6 | 4.822 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | 4 | 6 | 0.224 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 14 | 8 | 1.047 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | 5 | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 9 | | | | | | |
| **FBI** | 6.290 | | | | | | |
| **Scraper/Filters** | 0.000 | 0/7 | | | | | |
| **EPT/Chironomidae** | 0.000 | 0/88 | | | | | |
| **% Contribution of Dominant Family** | 0.677 | | | | | | |
| **EPT Index** | 0.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.160 | | | | | | |
| Total Number Collected | 127 | | | | | | |

PC5 5/12/2000

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | Feeding | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 3 | | 0.000 | | |
| Gastropoda | Physa | 1 | 8 | 0.058 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 2 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 6 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 1 | 7 | 0.050 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 1 | 5 | 0.036 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 4 | 4 | 0.115 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 1 | 5 | 0.036 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.173 | Gathers | |
| | Other Chironomidae | 52 | 6 | 2.245 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 18 | 6 | 0.777 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 54 | 8 | 3.108 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 4 | 6 | 0.173 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 1 | | 0.000 | Scavenger | Planaria |

| | | | | | | |
|---|---|---|---|---|---|---|
| **TAXA RICHNESS** | 15 | | | | | |
| **FBI** | 6.770 | | | | Feeding | Feeding |
| **Scraper/Filters** | 0.107 | | Scrapers | 3 | Scrapers | Filters |
| **EPT/Chironomidae** | 0.091 | | Filterers | 28 | | |
| **% Contribution of Dominant Family** | 0.355 | | | | | |
| **EPT Index** | 2.000 | | | | | |
| **Community Similarity Indices** | | | | | | |
| **CPOM** | 0.060 | | | | | |
| Total Number Collected | | 152 | | | | |

PC6 5/14/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.178 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 2 | 5 | 0.111 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.178 | Gathers | |
| | Other Chironomidae | 63 | 6 | 4.200 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | 12 | 6 | 0.800 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 23 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.089 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 8 | 6 | 0.533 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 10 | |
| **FBI** | 6.089 | |
| **Scraper/Filters** | 2.000 | |
| **EPT/Chironomidae** | 0.000 | 0/65 |
| **% Contribution of Dominant Family** | 0.512 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.020 | |
| Total Number Collected | 123 | |

PC7 5/12/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 7 | | 0.000 | | |
| Gastropoda | Physa | 11 | 8 | 0.822 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 12 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 3 | 7 | 0.196 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | Stout |
| | Corduliidae | 1 | 5 | 0.047 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 5 | 5 | 0.234 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.075 | Gathers | |
| | Other Chironomidae | 23 | 6 | 1.290 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 2 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 57 | 8 | 4.262 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 6 | 6 | 0.336 | Predators | Crayfish |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 15 |
| **FBI** | 7.262 |
| **Scraper/Filters** | 0.917 |
| **EPT/Chironomidae** | 0.125 |
| **% Contribution of Dominant Family** | 0.425 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.500 |
| Total Number Collected | 134 |

PC8 5/3/2000

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | | Slimes | 0 |
| Filamentous Algae | 0 | | Macroinvertebrates | 1 |
| Macrophytes | 0 | | Fish | 0 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | Feeding | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 5 | | 0.000 | | |
| Gastropoda | Physa | 18 | 8 | 1.455 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 1 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 3 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 10 | 7 | 0.707 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 20 | 5 | 1.010 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.040 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 2 | 5 | 0.101 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 3 | 4 | 0.121 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 12 | 8 | 0.970 | Gathers | |
| | Other Chironomidae | 13 | 6 | 0.788 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 6 | 6 | 0.364 | Filters | Blackfly |
| | Ceratopogonidae | 1 | 6 | 0.061 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 12 | 8 | 0.970 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.061 | Predators | Crayfish |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | | | | | | |
|---|---|---|---|---|---|---|
| **TAXA RICHNESS** | 17 | | | | Feeding | Feeding |
| **FBI** | 6.646 | | Scrapers | 19 | Scrapers | Filters |
| **Scraper/Filters** | 1.900 | | Filterers | 10 | | |
| **EPT/Chironomidae** | 0.440 | | | | | |
| **% Contribution of Dominant Family** | 0.179 | | | | | |
| **EPT Index** | 2.000 | | | | | |
| **Community Similarity Indices** | | | | | | |
| **CPOM** | 0.091 | | | | | |
| Total Number Collected | | 112 | | | | |

PC9 5/10/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 1 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 1 | 6 | 0.035 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 8 | 7 | 0.324 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 7 | 5 | 0.202 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 7 | 5 | 0.202 | Predators | Longtoed |
| | Dytiscidae | 3 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 67 | 8 | 3.098 | Gathers | |
| | Other Chironomidae | 83 | 6 | 2.879 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 9 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 2 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 1 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 11 | |
| **FBI** | 6.740 | |
| **Scraper/Filters** | #DIV/0! | 1/0 |
| **EPT/Chironomidae** | 0.053 | |
| **% Contribution of Dominant Family** | 0.437 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/50 |
| Total Number Collected | 190 | |

PC11 5/10/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 1 | 8 | 0.060 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 5 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 4 | 7 | 0.209 | Gathers | Backplate |
| | Baetidae | 4 | 4 | 0.119 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 4 | 4 | 0.119 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | 1 | 1 | 0.007 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 1 | 5 | 0.037 | Predators | Longtoed |
| | Dytiscidae | 5 | | 0.000 | Predators | Predacious |
| | Elmidae | 1 | 4 | 0.030 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 10 | 8 | 0.597 | Gathers | |
| | Other Chironomidae | 106 | 6 | 4.746 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | 1 | 3 | 0.022 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 1 | 6 | 0.045 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 1 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 14 |
| **FBI** | 5.993 |
| **Scraper/Filters** | 0.100 |
| **EPT/Chironomidae** | 0.112 |
| **% Contribution of Dominant Family** | 0.731 |
| **EPT Index** | 4.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.020 |
| Total Number Collected | 145 |

PC12 5/10/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 2 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 4 | 7 | 0.200 | Gathers | Backplate |
| | Baetidae | 13 | 4 | 0.371 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 29 | 4 | 0.829 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 2 | 5 | 0.071 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 7 | 4 | 0.200 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.057 | Gathers | |
| | Other Chironomidae | 68 | 6 | 2.914 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 15 | 6 | 0.643 | Filters | Blackfly |
| | Ceratopogonidae | 1 | 6 | 0.043 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 11 | |
| **FBI** | 5.329 | |
| **Scraper/Filters** | 0.000 | 0/46 |
| **EPT/Chironomidae** | 0.667 | |
| **% Contribution of Dominant Family** | 0.476 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/50 |
| Total Number Collected | 143 | |

PC13 5/8/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 1 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 3 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.138 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 36 | 7 | 2.172 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 36 | 9 | 2.793 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 12 | 5 | 0.517 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 2 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 5 | 8 | 0.345 | Gathers | |
| | Other Chironomidae | 20 | 6 | 1.034 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | 1 | 6 | 0.052 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 3 | 8 | 0.207 | Shredders | Pillbug |
| Amphipod | | 1 | 4 | 0.034 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 4 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 8 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 7.293 | |
| **Scraper/Filters** | #DIV/0! | 2/0 |
| **EPT/Chironomidae** | 1.440 | |
| **% Contribution of Dominant Family** | 0.269 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.040 | |
| Total Number Collected | 134 | |

PC14 5/2/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 4 | 8 | 0.225 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 21 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 38 | 4 | 1.070 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.169 | Gathers | |
| | Other Chironomidae | 37 | 6 | 1.563 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 28 | 6 | 1.183 | Filters | Blackfly |
| | Ceratopogonidae | 5 | 6 | 0.211 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 26 | 8 | 1.465 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.042 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 9 |
| **FBI** | 5.930 |
| **Scraper/Filters** | 0.082 |
| **EPT/Chironomidae** | 0.950 |
| **% Contribution of Dominant Family** | 0.233 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.360 |
| Total Number Collected | 163 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC16 | 5/2/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 0 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 0 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | | | 0.000 | | | |
| Gastropoda | Physa | 1 | 8 | 0.064 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | 1 | 6 | 0.048 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 26 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | 1 | 5 | 0.040 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | 1 | 9 | 0.072 | Predators | | |
| Zygoptera | Coenagrioidae | 28 | 9 | 2.016 | Predators | | |
| | Calopterygidae | 6 | 5 | 0.240 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.032 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 7 | 8 | 0.448 | Gathers | | |
| | Other Chironomidae | 42 | 6 | 2.016 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 31 | 8 | 1.984 | Shredders | Pillbug | |
| Amphipod | | 5 | 4 | 0.160 | Shredders | Shrimp | |
| Decapoda | | 1 | 6 | 0.048 | Predators | Crayfish | |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 14 | | | | | | |
| **FBI** | 7.168 | | | | | | |
| **Scraper/Filters** | 0.074 | | | | | | |
| **EPT/Chironomidae** | 0.020 | | | | | | |
| **% Contribution of Dominant Family** | 0.276 | | | | | | |
| **EPT Index** | 1.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.273 | | | | | | |
| Total Number Collected | 152 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC16 | 5/8/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 1 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 3 | | | |
| Macrophytes | 0 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | **Feeding Group** | | |
| Oligochaeta | | 1 | | 0.000 | | | |
| Gastropoda | Physa | 26 | 8 | 1.216 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | 1 | 6 | 0.035 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 2 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 1 | 7 | 0.041 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | 1 | 3 | 0.018 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | 2 | 9 | 0.105 | Predators | | |
| Zygoptera | Coenagrioidae | 16 | 9 | 0.842 | Predators | | |
| | Calopterygidae | 1 | 5 | 0.029 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | 5 | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | 5 | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 13 | 8 | 0.608 | Gathers | | |
| | Other Chironomidae | 86 | 6 | 3.018 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | 1 | 6 | 0.035 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavengers | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 12 | 8 | 0.561 | Shredders | Pillbug | |
| Amphipod | | 11 | 4 | 0.257 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavengers | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 16 | | | | | | |
| **FBI** | 6.766 | | | | | | |
| **Scraper/Filters** | 13.500 | | | | | | |
| **EPT/Chironomidae** | 0.010 | | | | | | |
| **% Contribution of Dominant Family** | 0.467 | | | | | | |
| **EPT Index** | 1.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.180 | | | | | | |
| Total Number Collected | 184 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SA1 | 5/2/2000 | | | | | | |
| | | | | | | | |
| Periphyton | 0 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 1 | | Fish | 1 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | | | 0.000 | | | |
| Gastropoda | Physa | 12 | 8 | 0.571 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 1 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | 1 | 4 | 0.024 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | | |
| | Calopterygidae | 1 | 5 | 0.030 | Predators | Stiffantaena | |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 19 | 8 | 0.905 | Gathers | | |
| | Other Chironomidae | 58 | 6 | 2.071 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | 36 | 6 | 1.286 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | 16 | 8 | 0.762 | Shredders | Pillbug | |
| Amphipod | | 23 | 4 | 0.548 | Shredders | Shrimp | |
| Decapoda | | 2 | 6 | 0.071 | Predators | Crayfish | |
| Annelid | Hirudinea | | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 10 | | | | | | |
| **FBI** | 6.268 | | | | | | |
| **Scraper/Filters** | 0.351 | | | | | | |
| **EPT/Chironomidae** | 0.013 | | | | | | |
| **% Contribution of Dominant Family** | 0.343 | | | | | | |
| **EPT Index** | 1.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.138 | | | | | | |
| Total Number Collected | 169 | | | | | | |

SC1 5/10/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 10 | 7 | 0.660 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 2 | 9 | 0.170 | Predators | |
| | Calopterygidae | 14 | 5 | 0.660 | Predators | Stiffantaena |
| Plecoptera | Perlidae | 1 | 1 | 0.009 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.226 | Gathers | |
| | Other Chironomidae | 22 | 6 | 1.245 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 52 | 8 | 3.925 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 2 | 6 | 0.113 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 1 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 7.009 | |
| **Scraper/Filters** | 0.000 | 0/1 |
| **EPT/Chironomidae** | 0.440 | |
| **% Contribution of Dominant Family** | 0.473 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.520 | |
| Total Number Collected | | 110 |

SD1 5/4/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 3 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 5 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.143 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 105 | 8 | 7.500 | Gathers | |
| | Other Chironomidae | 4 | 6 | 0.214 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 1 | 4 | 0.036 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 5 | |
| **FBI** | 7.893 | |
| **Scraper/Filters** | #DIV/0! | 2/0 |
| **EPT/Chironomidae** | 0.000 | 0/109 |
| **% Contribution of Dominant Family** | 0.897 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.020 | |
| Total Number Collected | 117 | |

SF1 5/9/2000

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 0 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.178 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 42 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 16 | 7 | 1.244 | Gathers | Backplate |
| | Baetidae | 1 | 4 | 0.044 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 2 | 5 | 0.111 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 11 | 4 | 0.489 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 1 | 5 | 0.056 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | 3 | 4 | 0.133 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.267 | Gathers | |
| | Other Chironomidae | 17 | 6 | 1.133 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 26 | 6 | 1.733 | Filters | Blackfly |
| | Ceratopogonidae | 2 | 6 | 0.133 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 6 | 8 | 0.533 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 15 | |
| **FBI** | 6.056 | |
| **Scraper/Filters** | 0.025 | |
| **EPT/Chironomidae** | 1.400 | |
| **% Contribution of Dominant Family** | 0.313 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.571 | |
| Total Number Collected | | 134 |

SF2 5/7/2000

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | | Slimes | 0 |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 |
| Macrophytes | 0 | | Fish | 3 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 16 | 7 | 0.926 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.025 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 4 | 5 | 0.165 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.033 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.066 | Gathers | |
| | Other Chironomidae | 41 | 6 | 2.033 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 36 | 6 | 1.785 | Filters | Blackfly |
| | Ceratopogonidae | 3 | 6 | 0.149 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 18 | 8 | 1.190 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 10 | |
| **FBI** | 6.372 | |
| **Scraper/Filters** | 0.000 | 0/37 |
| **EPT/Chironomidae** | 0.405 | |
| **% Contribution of Dominant Family** | 0.336 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.060 | |
| Total Number Collected | | 122 |

UN1 5/4/2000

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 3 |
| Macrophytes | 2 | Fish | 0 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | 1 | 8 | 0.053 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 2 | 6 | 0.080 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 2 | 5 | 0.067 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | 1 | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.107 | Gathers | |
| | Other Chironomidae | 12 | 6 | 0.480 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 48 | 6 | 1.920 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 77 | 8 | 4.107 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 6 | 6 | 0.240 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 10 | |
| **FBI** | 7.053 | |
| **Scraper/Filters** | 0.063 | |
| **EPT/Chironomidae** | 0.000 | 0/14 |
| **% Contribution of Dominant Family** | 0.503 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.735 | |
| Total Number Collected | | 153 |

SF3 5/7/2000

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 3 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 3 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 37 | | 0.000 | | |
| Gastropoda | Physa | 1 | 8 | 0.080 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 15 | 7 | 1.050 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 2 | 9 | 0.180 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.080 | Gathers | |
| | Other Chironomidae | 17 | 6 | 1.020 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | 1 | 6 | 0.060 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 63 | 8 | 5.040 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 9 | |
| **FBI** | 7.510 | |
| **Scraper/Filters** | #DIV/0! | 1/0 |
| **EPT/Chironomidae** | 0.833 | |
| **% Contribution of Dominant Family** | 0.457 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.306 | |
| Total Number Collected | 138 | |

WD1 5/4/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 1 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 11 | | 0.000 | | |
| Gastropoda | Physa | 7 | 8 | 0.800 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 2 | 6 | 0.171 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 3 | 7 | 0.300 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.043 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.114 | Gathers | |
| | Other Chironomidae | 38 | 6 | 3.257 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 1 | 6 | 0.086 | Filters | Blackfly |
| | Ceratopogonidae | 2 | 6 | 0.171 | Gathers | Bitingmidge |
| Ostracoda | | 17 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 13 | 8 | 1.486 | Shredders | Pillbug |
| Amphipod | | 1 | 4 | 0.057 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.086 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 16 |
| **FBI** | 6.571 |
| **Scraper/Filters** | 9.000 |
| **EPT/Chironomidae** | 0.077 |
| **% Contribution of Dominant Family** | 0.376 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.020 |
| Total Number Collected | 101 |

WF1

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 3 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 1 | 8 | 0.069 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 12 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 1 | 7 | 0.060 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.078 | Predators | |
| | Calopterygidae | 4 | 5 | 0.172 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 13 | 8 | 0.897 | Gathers | |
| | Other Chironomidae | 69 | 6 | 3.569 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 21 | 6 | 1.086 | Filters | Blackfly |
| | Ceratopogonidae | 3 | 6 | 0.155 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.069 | Shredders | Pillbug |
| Amphipod | | 2 | 4 | 0.069 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 6.224 | |
| **Scraper/Filters** | 0.030 | |
| **EPT/Chironomidae** | 0.012 | |
| **% Contribution of Dominant Family** | 0.523 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.020 | |
| Total Number Collected | | 132 |

WF2 5/5/2000

| | | | |
|---|---|---|---|
| Periphyton | 0 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 14 | | 0.000 | | |
| Gastropoda | Physa | 24 | 8 | 1.920 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 1 | 6 | 0.060 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 13 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.090 | Predators | |
| | Calopterygidae | 4 | 5 | 0.200 | Predators | Stiffantaena |
| Plecoptera | Perlidae | | 1 | 0.000 | Predators | |
| Trichoptera | Hydropsychidae | 2 | 4 | 0.080 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.240 | Gathers | |
| | Other Chironomidae | 49 | 6 | 2.940 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 14 | 6 | 0.840 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 1 | 4 | 0.040 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.060 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 14 |
| **FBI** | 6.470 |
| **Scraper/Filters** | 0.862 |
| **EPT/Chironomidae** | 0.038 |
| **% Contribution of Dominant Family** | 0.377 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.020 |
| Total Number Collected | 130 |

WATER QUALITY RESULTS FROM AUGUST 1999

| Site | Water body | Date | Time | Temp (C) | Conductivity (umhos) | pH | DO (mg/L) | % DO Saturation | Ammonia N (mg/L) | Total Kjeldahl N (mg/L) | Nitrate N (mg/L) | Phosphorus (mg/L) | BOD (mg/L) | Suspended solids (mg/L) | E. coli (per 100 mL) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC1 | Pigeon Creek | 08/06/1999 | 15:40 | 31 | 889 | 8.9 | 5.53 | 74 | 0.68 | 1.0 | 0.68 | 0.41 | <2.8 | 9 | 12 |
| PC2 | Pigeon Creek | 08/07/1999 | 8:30 | 27.6 | 1980 | 8.6 | 5.15 | 65 | 0.33 | 1.8 | 0.41 | 0.66 | <2.1 | 25 | 36 |
| PC3 | Pigeon Creek | 08/07/1999 | 7:45 | 25.4 | 2117 | 8.5 | 4.08 | 50 | 0 | 1.0 | <0.05 | 0.68 | <2.1 | 13 | 92 |
| PC4 | Pigeon Creek | 08/07/1999 | 9:15 | 28.3 | 2144 | 8.7 | 4.89 | 63 | 0.95 | 1.1 | <0.05 | 0.67 | <2.1 | 13 | 70 |
| PC5 | Pigeon Creek | 08/07/1999 | 9:45 | 27.8 | 2153 | 8.5 | 5.08 | 65 | 0.15 | 1.4 | <0.05 | 0.68 | <2.1 | 14 | 60 |
| PC6 | Pigeon Creek | 08/09/1999 | 8:45 | 24.9 | 1599 | 8.5 | 1.41 | 17 | 2.88 | 2.0 | 0.68 | 0.73 | 3.1 | 13 | 24000 |
| PC7 | Pigeon Creek | 08/09/1999 | 10:45 | 24.9 | 1776 | 8.44 | 2.46 | 30 | 0.38 | <1.0 | 0.34 | 0.7 | <3.0 | 36 | 16000 |
| PC8 | Pigeon Creek | 08/09/1999 | 14:30 | 25.6 | 2136 | 8.49 | 3.02 | 37 | 2.27 | 2.1 | 0.49 | 0.78 | <3.0 | 68 | 1000 |
| PC8 dup | | | | | | | | | 0.44 | 2.1 | 0.53 | 0.78 | <3.0 | 63 | 300 |
| PC9 | Pigeon Creek | 08/10/1999 | 10:15 | 27.6 | 1641 | 8.56 | 4.51 | 57 | 0.41 | 1.7 | 1.40 | 0.98 | <2.8 | 72 | 210 |
| PC11 | Pigeon Creek | 08/11/1999 | 11:30 | 26 | 1900 | | 5.3 | 65 | 1.01 | <1.0 | 0.68 | 0.44 | <2.8 | 34 | 180 |
| PC12 | Pigeon Creek | 08/12/1999 | 16:00 | 29.5 | 1500 | 8.37 | 7.4 | 97 | 0.67 | 2.5 | 0.54 | 0.16 | <2.8 | 23 | 295 |
| PC12 dup | | | | | | | | | 0.54 | 1.1 | 0.8 | 0.19 | <2.8 | 26 | 300 |
| PC13 | Pigeon Creek | 08/13/1999 | 11:00 | 28 | 1250 | | 6.8 | 87 | 1.37 | <1.0 | 0.65 | 0.21 | <5.0 | 35 | 420 |
| PC14 | Pigeon Creek | 08/15/1999 | 13:05 | 28 | 590 | 8.66 | 16 | 204 | 0.73 | <1.0 | 1.60 | 0.48 | <3.0 | 20 | 8 |
| PC15 | Pigeon Creek | 08/05/1999 | 16:30 | 21.5 | 436 | 8.78 | 5.9 | 67 | 0.45 | 2.8 | 1.60 | 0.47 | <2.8 | 8 | 0 |
| PC16 | Pigeon Creek | 08/05/1999 | 11:15 | 27.5 | 720 | 7.90 | 4.99 | 63 | 2.75 | 2.8 | <0.05 | 0.4 | <2.8 | 12 | 0 |
| LC1 | Locust Creek | 08/08/1999 | 13:00 | 23.6 | 412 | 9.02 | 3.01 | 35 | 0.55 | 2.0 | <0.05 | 0.59 | <3.0 | 27 | 880 |
| LC2 | Locust Creek | 08/10/1999 | 8:00 | 23.7 | 394 | 8.51 | 2.77 | 33 | 1.14 | 3.2 | <0.05 | 0.66 | <5.0 | 140 | 610 |
| LP1 | Little Pigeon Creek | 08/08/1999 | 11:15 | 24.1 | 201 | 8.82 | 3.38 | 40 | 0.34 | 2.1 | 1.20 | 0.6 | 4.3 | 51 | 1100 |
| LP2 | Little Pigeon Creek | 08/08/1999 | 8:30 | 23.5 | 327 | 8.43 | 1.57 | 18 | 0.61 | 2.4 | <0.05 | 0.59 | <3.0 | 9 | 320 |
| BC1 | Bluegrass Creek | 08/09/1999 | 16:15 | 24.2 | 1946 | 8.56 | 4.87 | 58 | 1.92 | <1.0 | <0.05 | 0.56 | <3.0 | 5 | 3500 |
| BC2 | Bluegrass Creek | 08/10/1999 | 9:30 | 33.9 | 2191 | 9.35 | 6.34 | 83 | 1.15 | 1.4 | <0.05 | 0.55 | <3.0 | 19 | 540 |
| BC3 | Bluegrass Creek | 08/11/1999 | 8:30 | 25.9 | 478 | 8.59 | 3.63 | 45 | 1.6 | <1.0 | <0.05 | 0.29 | <2.8 | 51 | 27 |
| WD1 | Weinsheimer Ditch | 08/12/1999 | 8:30 | 25.5 | 400 | 7.63 | 2.8 | 34 | 1.55 | <1.0 | <0.05 | 0.12 | 3.7 | 69 | 200 |
| SD1 | Stollberg Ditch | 08/13/1999 | 8:35 | 25 | 1130 | | 2.1 | 25 | 1.13 | 4.6 | 5.40 | 2.9 | 7.1 | 70 | 70 |
| UN1 | Unnamed Tributary | 08/12/1999 | 12:05 | 28 | 1120 | 8.00 | 6.5 | 83 | 0.96 | 1.1 | <0.05 | 0.08 | <2.8 | 61 | 43 |
| SC1 | Squaw Creek | 08/11/1999 | 15:30 | 25 | 3800 | | 7.7 | 93 | 1.04 | 1.8 | <0.05 | 0.3 | <2.8 | 8 | 67 |
| BG1 | Big Creek | 08/14/1999 | 8:30 | 28.5 | 3225 | 8.26 | 5.6 | 72 | 0.36 | <1.0 | <0.05 | 0.05 | <2.8 | 11 | 98 |
| BG2 | Big Creek | 08/13/1999 | 14:45 | 27.5 | 3200 | | 7 | 89 | 0.26 | <1.0 | <0.05 | 0.02 | <5.0 | 60 | 10 |
| SF1 | Smith Fork | 08/14/1999 | 16:00 | 25 | 1400 | | 11.3 | 137 | 0.49 | 1.3 | <0.05 | 0.07 | <2.8 | 5 | 110 |
| SF2 | Smith Fork | 08/14/1999 | 13:45 | 29 | 1780 | 8.60 | 9.8 | 127 | 0.22 | <1.0 | <0.05 | 0.07 | <2.8 | 10 | 25 |
| SF3 | Smith Fork | 08/14/1999 | 10:10 | 28 | 2000 | 8.33 | 7.4 | 95 | 0.35 | <1.0 | <0.05 | 0.09 | <2.8 | 2 | 54 |
| WF1 | West Fork | 08/15/1999 | 9:45 | 24 | 830 | 8.81 | 13.5 | 160 | 0.44 | <1.0 | 2.40 | 1.4 | <3.0 | 24 | 230 |
| WF2 | West Fork | 08/15/1999 | 12:15 | 28 | 960 | 9.14 | 0 | 256 | 0.56 | <1.0 | 6.70 | 0.6 | <3.0 | 20 | 540 |
| WF3 | West Fork | 08/15/1999 | 8:40 | 17 | 700 | 8.12 | 6.7 | 69 | 0.42 | 1.4 | <0.05 | 0.06 | <3.0 | 22 | 270 |
| HC1 | Hurricane Creek | 08/15/1999 | 14:10 | 30 | 1060 | 8.73 | 15.2 | 201 | 0.37 | <1.0 | 3.0 | 7.2 | <3.0 | 14 | 39 |
| HC1 dup | | | | | | | | | 0.28 | 1.8 | 3.1 | 6.9 | <3.0 | 38 | 340 |
| SA1 | Sand Creek | 08/06/1999 | 11:30 | 26.6 | 488 | 8.75 | 5.84 | 66 | 0.56 | <1.0 | <0.05 | 0.43 | <2.8 | 10 | 5 |

# DIAGNOSTIC STUDY OF PIGEON CREEK WATERSHED

Harza Engineering, Inc.

August 1999 Data Sheets:

Qualitative Habitat Evaluation Index

Rapid Bioassessment Protocol II for Macroinvertebrates

Flow measurements, on-site tests, physical description

SAI
8/6/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

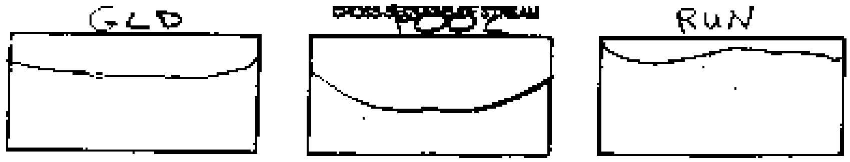
SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 95 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 19 & 20

STREAM MEASUREMENTS: AVERAGE WIDTH: ______ AVERAGE DEPTH: ______ MAX DEPTH 1.8'

| LENGTH | WIDTH | DEPTHS: | 3 | 4 | 5 | 6 | 7 | | | | POOL-GLD-RIF-RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 6 | 3" | 4" | 5" | 6" | 3" | | | | | GLD |
| 180 | 6 | 6" | 7" | 8" | 7" | 15" | 6" | | | | POOL |
| 8 | 5 | 3 | 2 | 1 | 1 | 3 | | | | | RUN |
| 28 | 3 | → MAX | | 1.8 ft | | | | | | | POOL |
| 20 | 6 | | | | | | | | | | GLD |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

GLD CROSS-SECTION OF STREAM POOL RUN



DRAWING OF STREAM

DT- 80699
TMP 26.43
DS .0317
DO. 5.84
pH 8.75

TM, 1114
SPC 485.00
DO 72.9
Dep .259
ORP 40.6

Flow is very slight – Flow Readings Not TAKEN

photos 19+20
End looking US = 20
End looking DS = 19

HCi
8/15/99
Dp 8/15

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not, ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 85 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 24, 25

STREAM MEASUREMENTS: AVERAGE WIDTH: 8 AVERAGE DEPTH: .5 MAX DEPTH: 1.2

| LENGTH | WIDTH | DEPTHS @ 2 | 4 | 6 | 8 | 10 | | | | | POOL/GLIDE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 235 | 6 | .6 | 1.2 | .8 | | | | | | | POOL |
| 20 | 10 | .4 | .6 | .5 | .3 | .3 | | | | | GLD |
| 40 | 8 | .4 | .6 | 1.0 | 1.0 | | | | | | POOL |
| 72 | 10 | | | | | | | | | | GLD |
| 30 | 10 | | | | | | | | | | POOL |
| 30 | 8 | | | | | | | | | | GLD |
| 10 | 8 | .1 | .1 | .1 | .1 | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

T = 30°C
= 15.2 mg/L (supersaturated)
= 1,060 μmhos

to 25 DS END looking US
to 24

| Dist from RWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| RWE | — | — |
| .5 | .6 | -.01 |
| 1.0 | .6 | .00 |
| 1.5 | .6 | -.01 |
| 2.0 | .5 | .04 |
| 2.5 | .5 | .06 |
| 3.0 | .5 | .07 |
| 3.5 | .5 | .12 |
| 4.0 | .5 | .14 |
| 4.5 | .5 | .19 |
| 5.0 | .5 | .14 |
| 5.5 | .5 | .14 |
| | .5 | .06 |
| 6.0 | .4 | -.02 |
| 6.5 | .2 | -.02 |
| 7.0 | | |
| 7.5 | .1 | — |
| 8.0 | .1 | — |

WF3 Y
8/15/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 95% GRADIENT: O-LOW O-MODERATE O-HIGH

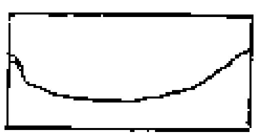
PHOTOS: Finishing Camera 3 [illegible] getting wet

STREAM MEASUREMENTS: AVERAGE WIDTH: ______ AVERAGE DEPTH: ______ MAX. DEPTH ______

| LENGTH | WIDTH | DEPTHS @ 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300' | 17' | 1.4 | 1.6 | 1.6 | 1.8 | 1.6 | 1.4 | 1.4 | 1.2 | 1.2 | POOL |
| 15 | 10 | .6 | .7 | .7 | .8 | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

+ very little flow

CROSS-SECTIONS OF STREAM



DRAWING OF STREAM

= 6.70 mg/L
T = 27°C
= 700 μmhos

14, 12, 10, 8, 6 = DS END looking US

13, 11, 9, 7, 5 = DS END looking DS

| (ft) Dist from LWE | (ft) Depth | (ft/sec) Velocity |
|---|---|---|
| LWE | – | – |
| .5 | .4 | – |
| 1.0 | .6 | .06 |
| 1.5 | 1.0 | .06 |
| 2.0 | 1.3 | .10 |
| 2.5 | 1.4 | .08 |
| 3.0 | 1.5 | .08 |
| 3.5 | 1.6 | .07 |
| 4.0 | 1.5 | .10 |
| 4.5 | 1.4 | .09 |
| 5.0 | 1.3 | .07 |
| 5.5 | 1.3 | .10 |
| 6.0 | 1.3 | .08 |
| 6.5 | 1.3 | .08 |
| 7.0 | 1.4 | .04 |
| 8.0 | 1.1 | .09 |
| 9.0 | .8 | .03 |
| 10.0 | .5 | .01 |

WFQ
8/15/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not:
Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)
AESTHETIC RATING (1-10)

CANOPY (% OPEN): 85 GRADIENT: ~~LOW~~ MODERATE HIGH PHOTOS: 26 & 27 Camera

STREAM MEASUREMENTS: AVERAGE WIDTH: 15 AVERAGE DEPTH: .8 MAX DEPTH: 1.9

| LENGTH | WIDTH | DEPTHS @ 3 | 6 | 9 | 12 | 15 | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 15 | 15 | .3 | .1 | .2 | .2 | .1 | | | | | RIF |
| 165 | 15 | .8 | 1.5 | 1.7 | .7 | .5 | | | | | POOL |
| 140 | 15 | .1 | .2 | .5 | .4 | .3 | | | | | RUN |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

• 28°C
FF Scale (>20mg/L)
960 µmhos

17 – DS END looking US
26 – DS END looking DS

| Dist from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| LWE | – | – |
| 1.0 | .3 | .04 |
| 2.0 | .7 | .08 |
| 3.0 | .8 | .13 |
| 4.0 | .6 | .16 |
| 5.0 | .7 | .18 |
| 6.0 | 1.1 | .20 |
| 7.0 | 1.2 | .26 |
| 8.0 | 1.1 | .20 |
| 9.0 | 1.0 | .15 |
| 10.0 | .7 | .16 |
| 11.0 | .5 | .08 |
| 12.0 | .3 | .00 |
| 13.0 | RWE | |

WF1
8/16/79



Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ________

Additional Comments/Pollution Impacts: ________

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ___ AESTHETIC RATING (1-10) ___

CANOPY (% OPEN) 90 GRADIENT: X LOW ☐ MODERATE ☐ HIGH PHOTOS: 22, 23

STREAM MEASUREMENTS: AVERAGE WIDTH 12 AVERAGE DEPTH .6 MAX. DEPTH 1.3

| LENGTH | WIDTH | DEPTHS @ 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 30 | 10 | .2 | .1 | .1 | .2 | .1 | | | | | RIF |
| 205 | 12 | .2 | .2 | .3 | .3 | .4 | .2 | | | | RUN |
| 15 | 8 | .1 | .1 | .1 | .1 | | | | | | RIF |
| 25 | 10 | .2 | .3 | .3 | .2 | .2 | | | | | RUN |
| 60 | 20 | 1.0 | 1.1 | 1.0 | .7 | .6 | .6 | .5 | .5 | .5 | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

: 24°C
: 13.5 mg/L
= 830 μmhos

.23 DS END looking US
.22 DS END looking DS

| Dist from RWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| RWE | — | — |
| .5 | .2 | .00 |
| 1.0 | .3 | .00 |
| 1.5 | .3 | .12 |
| 2.0 | .4 | .21 |
| 2.5 | .4 | .39 |
| 3.0 | .4 | .57 |
| 3.5 | .4 | .75 |
| 4.0 | .4 | .79 |
| 4.5 | .4 | .74 |
| 5.0 | .4 | .72 |
| 5.5 | .3 | .71 |
| 6.0 | .3 | .65 |
| 6.5 | .2 | .48 |
| 7.0 | .2 | .38 |
| 7.5 | .2 | .23 |
| 8.0 | .1 | — |
| 8.5 | .1 | — |

SF3
8/11/94

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ✓ If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ______ AESTHETIC RATING (1-10) ______

CANOPY (%OPEN) 30 GRADIENT: ☒-LOW ☐-MODERATE ☐-HIGH PHOTOS: 18, 19

STREAM MEASUREMENTS: AVERAGE WIDTH: 12 AVERAGE DEPTH: .7 MAX DEPTH 2.1

| LENGTH | WIDTH | DEPTHS @ 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 25 | 4 | .2 | .2 | | | | | | | | | RIF |
| 85 | 15 | .4 | .4 | .5 | .5 | .4 | 3 | .3 | .2 | | | GLD |
| 40 | 12 | .3 | 0.8 | 1.2 | 2.0 | 1.8 | 1.6 | | | | | POOL |
| 90 | 20 | .1 | .2 | .3 | .3 | .5 | .5 | .4 | .4 | .2 | | GLD |
| 60 | 10 | .5 | 1.6 | 2.1 | 1.5 | .5 | | | | | | POOL |
| 50 | 6 | .2 | .4 | .4 | | | | | | | | GLD |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| LWE | — | — |
| .5 | .1 | — |
| 1.0 | .1 | — |
| 1.5 | .3 | .23 |
| 2.0 | .4 | .32 |
| 2.5 | .4 | .36 |
| 3.0 | .6 | .34 |
| 3.5 | .6 | .36 |
| 4.0 | .5 | .40 |
| 4.5 | .4 | .36 |
| 5.0 | .3 | .32 |
| 5.5 | .2 | .31 |
| 6.0 | .1 | — |
| 6.5 | RWE | |

Conduct 2,000 umhos
Temp - 28°C
DO - 7.10 mg/L

photo 19 DS END looking US
photo 18 DS END looking DS

SF2
8/14/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not, ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 65 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 17 16

STREAM MEASUREMENTS: AVERAGE WIDTH 22 AVERAGE DEPTH .5 MAX DEPTH 1.5

| LENGTH | WIDTH | DEPTHS 5 | 10 | 15 | 20 | 25 | 30 | | | | POOL-GLD-RIF-RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 22 | .9 | 1.2 | 1.4 | 1.2 | 1.3 | | | | | POOL |
| 9 | 2 | .2 | .2 | | | | | | | | RUN |
| 145 | 25 | 1.2 | .9 | .9 | .5 | .2 | | | | | POOL |
| 120 | 28 | .5 | .6 | .6 | .8 | .7 | .4 | | | | GLD |
| 24 | 5 | .2 | .3 | | | | | | | | RUN |
| 9 | 5 | .1 | .2 | | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Distance from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| LWE | — | — |
| .4 | .1 | — |
| .8 | .2 | .33 |
| 1.2 | .2 | .36 |
| 1.6 | .3 | .47 |
| 2.0 | .3 | .49 |
| 2.4 | .3 | .57 |
| 2.8 | .3 | .56 |
| 3.2 | .3 | .54 |
| 3.6 | .3 | .60 |
| 4.0 | .3 | .47 |
| 4.4 | .2 | .33 |
| 4.8 | .1 | — |
| 5.0 | RWE | |

=29°C
1.8 mg/L
1,780 µmhos

Photo
17 - upstream looking upstream
16 - upstream looking downstream

SF1
8/14/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 10 GRADIENT: ☒LOW ☐MODERATE ☐HIGH PHOTOS: 14 + 15

STREAM MEASUREMENTS: AVERAGE WIDTH 25 AVERAGE DEPTH .6 MAX DEPTH 1.5

| LENGTH | WIDTH | DEPTHS: 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | POOL-GLD-RIF-RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 90 | 12 | .1 | .2 | .3 | .1 | | | | | | RUN |
| 50 | 32 | .4 | .5 | .6 | .4 | .3 | .3 | .3 | .3 | .3 | GLD |
| 120 | 27 | .1 | .3 | .8 | 1.0 | 1.2 | 1.1 | 1.3 | 1.0 | .8 | POOL |
| 85 | 25 | .3 | .3 | .4 | .5 | .5 | .3 | .2 | .5 | .5 | GLD |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from RWE | Depth | ft/sec Velocity |
|---|---|---|
| RWE | — | — |
| 1 | .1 | — |
| 2 | .1 | — |
| 3 | .1 | — |
| 4 | .1 | — |
| 5 | .2 | .05 |
| 5.5 | .3 | .10 |
| 6.0 | .3 | .09 |
| 7.0 | .2 | .16 |
| 8.0 | .2 | .16 |
| 9.0 | .3 | .19 |
| 10.0 | .4 | .18 |
| 11.0 | .4 | .19 |
| 12.0 | .4 | .18 |
| 13.0 | .2 | .09 |
| 14.0 | .1 | — |
| 15.0 | LWE | |

°C = 25°C
11.30 mg/L
1,400 µmhos

15 DS END looking US
14 DS END looking DS

362
8/15/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ____ AESTHETIC RATING (1-10) ____

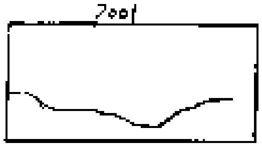
CANOPY (%OPEN) [illegible] GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 22 & 23

STREAM MEASUREMENTS: AVERAGE WIDTH ____ AVERAGE DEPTH ____ MAX DEPTH ____

| LENGTH | WIDTH | DEPTHS @ | 6' | 9' | 12' | 15' | 18' | 21' | 24' | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 150' | 25' | .8 | 1.1 | 1.1 | 1.1 | 1.2 | 1.3 | 1.6 | 2.1 | 2.6 | Pool |
| 50' | 25 | .6 | .6 | .5 | .4 | .5 | .2 | .3 | .3 | .4 | Glide |
| 270 | | | | | | | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

Pool



Glide

DRAWING OF STREAM

Flow - very slight but heading North

Photo
23 → upstream, taking picture of downstream
22 → same spot taking picture of upstream

d 3200 umh
p 27.5 °C
) 7.0 mg/L

8 G/

8/14/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 80 GRADIENT: ~~☐~~ LOW ☐ MODERATE ☐ HIGH PHOTOS: 20, 21 Camera 3

STREAM MEASUREMENTS: AVERAGE WIDTH: 15 AVERAGE DEPTH: .8 MAX DEPTH: 2.0

| LENGTH | WIDTH | DEPTHS 3 | 6 | 9 | 12 | 15 | 18 | 21 | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 88 | 20 | .7 | 1.0 | 1.5 | 2.0 | 1.7 | 1.1 | .5 | | | | POOL |
| 37 | 10 | .3 | .5 | .4 | | | | | | | | RUN |
| 7 | 10 | .1 | .2 | .2 | | | | | | | | RIF |
| 20 | 6 | .6 | .8 | | | | | | | | | RUN |
| 28 | 10 | .5 | 1.0 | .8 | | | | | | | | POOL |
| 30 | 8 | .3 | .6 | .4 | | | | | | | | RUN |
| 100 | 20 | .5 | .8 | 1.8 | 2.0 | 1.6 | 1.1 | .5 | | | | POOL |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| LWE | — | – |
| .5 | .2 | .14 |
| 1.0 | .3 | .01 |
| 1.5 | .5 | .01 |
| 2.0 | .5 | –.03 |
| 2.5 | .5 | .13 |
| 3.0 | .5 | .94 |
| 3.5 | .3 | .89 |
| 4.0 | .3 | .94 |
| 4.5 | .2 | .54 |
| 5.0 | .2 | .47 |
| 5.5 | .3 | .46 |
| 6.0 | .2 | .47 |
| 6.5 | .1 | — |
| 7.0 | RWE | — |

onductiv – 3225 umhos

emp – 28.5 °C

DO – 5.6 mg/L

oto 21 DS END looking US

oto 20 DS END looking DS

3C1
8/11/90

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (% OPEN) ____ GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 9, 10

STREAM MEASUREMENTS: AVERAGE WIDTH: 20 AVERAGE DEPTH: 0.8 MAX DEPTH 2'

| LENGTH | WIDTH | DEPTHS 5 | 10 | 15 | 20. | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 20 | 0.6 | 1.0 | 2.0 | 1.5 | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

10 - DS END looking US
9 - DS END looking DS
8 - INDIANA BANANA

Temp - 25°C
DO - 7.70 mg/L
Cond - 3,800 µmhos

| Dist. from LWE (ft) | Depth (ft) | Velocity ft/sec |
|---|---|---|
| 1.0 | 0.4 | 0 |
| 2.0 | 1.0 | 0 |
| 3.0 | 0.7 | 0 |
| 4.0 | 0.9 | -.01 |
| 5.0 | 1.0 | .01 |
| 6.0 | 1.1 | .06 |
| 7.0 | 1.3 | .06 |
| 8.0 | 1.3 | .06 |
| 9.0 | 1.3 | .10 |
| 10.0 | 1.4 | 0.13 |
| 11.0 | 1.4 | 0.13 |
| 12.0 | 1.5 | 0.16 |
| 13.0 | 1.6 | 0.15 |
| 14.0 | 1.8 | 0.09 |

| Dist LWE | Depth | Vel |
|---|---|---|
| 16.0 | 1.7 | 0.11 |
| 17.0 | 1.5 | 0.16 |
| 18.0 | 1.2 | 0.10 |
| 19.0 | 0.6 | 0.08 |
| RWE-20.0 | – | — |

8/12/95

UWI

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area

Is Reach Representative of Stream? (Y/N) ✓ If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

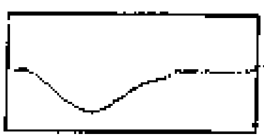
AESTHETIC RATING (1-10)

CANOPY (%OPEN) ______ GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 5 + 4

STREAM MEASUREMENTS: AVERAGE WIDTH ______ AVERAGE DEPTH: ______ MAX DEPTH ______

| LENGTH | WIDTH | DEPTHS | | | | | | | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200' | 3' | 3" | 4" | 5" | | | | | | | | GID |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM



DRAWING OF STREAM

25°

120 umhos

0.5 mg/L

Photo

5 – downstream looking upstream

4 – downstream looking downstream

SD 1
8/13/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:
Additional Comments/Pollution Impacts:
Appears to have a lot of flocculated solids drifting in the water column

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)
AESTHETIC RATING (1-10)

CANOPY (%OPEN) 5 GRADIENT: ☒-LOW ☐-MODERATE ☐-HIGH PHOTOS: 27 + 26 - Camera 3

STREAM MEASUREMENTS: AVERAGE WIDTH: 12' AVERAGE DEPTH: .2' MAX DEPTH .6'

| LENGTH | WIDTH | DEPTHS@ 3 | 6 | 9 | 12 | 15 | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | 15 | .2 | .2 | .2 | .1 | .1 | | | | | RUN |
| 50 | 10 | .2 | .1 | .1 | | | | | | | RIF |
| 100 | 6 | .4 | .2 | | | | | | | | RUN |
| 150 | 15 | .3 | .1 | .2 | .2 | .1 | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

3/49
.1
00 µmhos
.3 mg/L
25°C

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

d = 1130 µmhos
? = 2.10 mg/L
Temp = 25°C

27 – US END looking US
26 – US END looking DS

| Dist from LWE (m) | Depth (m) | Velocity (ft/sec) |
|---|---|---|
| LWE | — | — |
| 1 | .1 | — |
| 2 | .1 | — |
| ~~2 2.5~~ | ~~.6~~ | ~~.12~~ |
| 3 | .6 | .12 |
| 4 | .5 | .26 |
| 5 | .5 | .42 |
| 6 | .4 | .24 |
| 7 | .4 | .34 |
| 8 | .3 | .35 |
| 9 | .2 | .22 |
| 10 | .1 | — |
| 11 | .1 | — |
| 12 | RWE | — |

WDI 8/2/55

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 85  GRADIENT: X LOW  ☐ MODERATE  ☐ HIGH  PHOTOS: 6+7

STREAM MEASUREMENTS: AVERAGE WIDTH: 20  AVERAGE DEPTH: 0.[illegible]'  MAX DEPTH 2'

| LENGTH | WIDTH | DEPTHS 5 | 10 | 15 | 20 | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 20 | .6 | 1.5 | 1.1 | .6 | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

Temp 25.5

Conduct – 400.0

DO – 2.80

No Flow

photo 7 DS END looking US
photo 6 DS END looking DS

8/11/99
3C3

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN): 95 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 14 & 15

STREAM MEASUREMENTS: AVERAGE WIDTH 20 AVERAGE DEPTH .3 MAX DEPTH 2'

DEPTHS: 5 10 15 20 25

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 140 | 25 | 1.1 | 1.6 | 2.0 | 1.1 | 0.6 | | | | | POOL |
| 70 | 20 | 0.8 | 0.6 | 0.5 | 0.2 | | | | | | GLD |
| 38 | 20 | .05 | .1 | .2 | .3 | | | | | | RIF |
| 100 | 15 | .8 | .5 | .2 | | | | | | | GLD |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

DT – 8:155
TMP 25.90
DS .34
D 3.63
pH 8.59

TM .75425
SpC 478.0
DO% 44.5
DEP .233
ORP 81.1

No flow

photo 15 DS END looking US
photo 14

BC 2 3/10/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-20) ☐

CANOPY (%OPEN) 15 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 18, 19

STREAM MEASUREMENTS: AVERAGE WIDTH: 6 AVERAGE DEPTH: .5 MAX DEPTH: 1.7

| LENGTH | WIDTH | DEPTHS: | 2 | 3 | 4 | 5 | 6 | 7 | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 7 | .3 | .6 | 1.4 | 1.2 | .8 | .4 | .4 | | | 700L |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| (ft) Dist from RWE | (ft) Depth | (ft/sec) Velocity |
|---|---|---|
| RWE | 0 | — |
| .5 | .2 | .05 |
| 1.0 | .9 | .11 |
| 1.5 | 1.2 | .21 |
| 2.0 | 1.5 | .21 |
| 2.5 | 1.5 | .18 |
| 3.0 | 1.7 | .17 |
| 3.5 | 1.5 | .15 |
| 4.0 | 1.5 | .14 |
| 4.5 | 1.5 | .12 |
| 5.0 | 1.0 | .18 |
| 5.5 | 0.8 | .16 |
| 6.0 | 0.7 | .15 |
| 6.5 | 0.4 | .13 |
| 7.0 | 0.3 | .08 |
| 7.5 | LWE | |

1099 TM 144809
33.9 SpC 2191.0
.429 %DO 90.2
6.34 DEP .0413
7.35 ORP -14.7

photo 19 DS END looking US
photo 18 DS END looking DS

BCI 8/4/95

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not, ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 5 GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 22+23

STREAM MEASUREMENTS: AVERAGE WIDTH: 10' AVERAGE DEPTH: 7" MAX DEPTH: 2.8'

| LENGTH | WIDTH | DEPTHS | 10 | 15 | 20 | 25 | 30 | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 50 | 30 | 3" | 5" | 8" | 6" | 3" | 2" | | | | GLD |
| 35 | 20 | 4" | 8" | 14" | 3" | | | | | | POOL |
| 105 | 25 | 4" | 6" | 7" | 7" | 3" | | | | | GLD |
| 160 | 15 | 2.8' | 1.5' | .3' | | | | | | | POOL |
| 30 | 20 | 3" | 5" | 4" | 2" | | | | | | RUN |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

T B0599
Temp 24.17
DS 1.266
DO 4.87
pH 8.56

TM 152425
SPC 1946.0
DO% 58.0
DEP .253
ORP 61.3

Photo 23 DS END looking US
Photo 22 DS END looking DS

| Dist from RWE (ft) | Depth (ft) | Vel |
|---|---|---|
| RWE | — | |
| 1 | 1.7 | 0.06 |
| 2 | 2.4 | 0.03 |
| 3 | 2.8 | 0.02 |
| 4 | 3.0 | 0.02 |
| 5 | 2.8 | 0.02 |
| 6 | 2.1 | 0.04 |
| 7 | 1.8 | 0.07 |
| 8 | 1.7 | 0.04 |
| 9 | 1.5 | 0.06 |
| 10 | 1.5 | 0.03 |
| 11 | 1.5 | 0.06 |
| 12 | 1.4 | 0.07 |
| 13 | 1.2 | 0.08 |
| 14 | 1.0 | 0.09 |

| Dist from | Depth | Velocity |
|---|---|---|
| 15 | 1.0 | .07 |
| 16 | 0.8 | .05 |
| 17 | 0.6 | — |
| 18 | 0.2 | -0.05 |
| 19 | LWE | — |

LP2
8/8/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

No flow

Is Reach Representative of Stream? (Y/N) ____ If Not: ____

Additional Comments/Pollution Impacts: Riffle [illegible] dry

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10): ____ AESTHETIC RATING (1-10): ____

CANOPY (% OPEN): 5 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 4 & 3

STREAM MEASUREMENTS: AVERAGE WIDTH: 20 AVERAGE DEPTH: .5 MAX. DEPTH: 1.7

| LENGTH | WIDTH | DEPTHS (ft) | | | | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 800' | 20' | .5 | 1 | 2 | 1 | .5 | | | | | Pool |
| 40' | 15' | .1 | .2 | .1 | .2 | | | | | | Glide |
| 100' | 20' | .5 | .2 | 1 | 1 | .5 | | | | | Pool |
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | | | Riffle |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

0899 TM 123442
13.48 SpC 327.00
0.215 DO% 18.3
1.57 DEP 0.428
8.43 ORP 85.1

No flow

Photo
5 ft. downstream looking upstream
4.5 downstream looking downstream

[illegible]
8/6/97

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) N If Not, ______

Additional Comments/Pollution Impacts: – Stream is a ditch, [illegible] / [illegible] only riffle

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ______ AESTHETIC RATING (1-10) ______

CANOPY (% OPEN) 10  GRADIENT: O-LOW O-MODERATE O-HIGH  PHOTOS: 6 [illegible]

STREAM MEASUREMENTS: AVERAGE WIDTH ______ AVERAGE DEPTH ______ MAX. DEPTH ______

| LENGTH | WIDTH | DEPTHS 10 | 15 | 20 | 25 | 30 | 35 | 40 | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 25' | 10' | .2 | .1 | .2 | .3 | .2 | | | | | R:F |
| 300' | 40' | .5 | 1.5 | 3.5 | 4 | 4 | 2 | 1.5 | 1 | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

0899 TM 100045
24.11 SpC 201.00
.131 DO% 39.9
.38 DEP 0.758
3.82 ORP 74.8

Photo
– downstream end looking upstream
– downstream end looking downstream

| Dist from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| LWE | — | — |
| 1 | .7 | .02 |
| 3 | 1.3 | .04 |
| 5 | 1.5 | .04 |
| 7 | 1.6 | — |
| 9 | 1.8 | .03 |
| 11 | 1.9 | .07 |
| 13 | 2.1 | .15 |
| 15 | 1.4 | .27 |
| 17 | 1.1 | .40 |
| 19 | 1.2 | .32 |
| 21 | 1.5 | — |
| 23 | 1.0 | .04 |
| 25 | RWE | |

.80 .46 .17

8/16/91

IC 7

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Yes/No) ✓ If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10): ______ AESTHETIC RATING (1-10): ______

CANOPY (%OPEN) 5%  GRADIENT: ~~0~~-LOW 0-MODERATE 0-HIGH  PHOTOS: 21/20

STREAM MEASUREMENTS: AVERAGE WIDTH: ______ AVERAGE DEPTH: ______ MAX. DEPTH ______

| LENGTH | WIDTH | DEPTHS: 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 150 | 15' | .2 | 1.1 | 1.2 | 1.0 | 1.0 | .6 | .3 | .1 | | POOL |
| 5 | 1' | 1" | | | | | | | | | RUN |
| 42 | 5' | 2" | 4' | 2" | | | | | | | GLD |
| 7 | 8" | ½" | | | | | | | | | RUN |
| 52 | 7' | 4" | 10" | 4" | | | | | | | GLD |
| 15 | 1' | ½" | | | | | | | | | RUN |
| 100 | 10 | .5 | .8 | .8 | .5 | | | | | | GLD |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

DT 81091
TEMP 23.69
TDS .256
DO 2.77
pH 8.51

TM 111318
SpC 394.00
DO% 32.0
Dep .280
ORP -11.4

photo 450 of DS END
21 upstream photo looking upstream
20 150 upstream photo looking downstream

No velocity taken, slight [illegible] [illegible]

LCI
8/?/97

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) 40 GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 8-7 — Camera C

STREAM MEASUREMENTS: AVERAGE WIDTH 25 AVERAGE DEPTH 1' MAX. DEPTH 6'

| LENGTH | WIDTH | DEPTHS 10 | 15 | 20 | 25 | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 200 | 25 | .5 | 1.0 | 1.0 | 1.0 | | | | | | | POOL |
| 40 | 25 | .3 | .2 | .1 | .4 | | | | | | | RUN |
| 100 | 15 | 1.5 | 6.0 | 2.0 | | | | | | | | POOL |
| | | | | | | | | | | | | |
| | | RIFFLES | SAMPLED | | WERE | ≈ 500 ft further up | | | | | | |
| | | [illegible] | [illegible] | [illegible] | | | | | | | | |
| 15 | 3 | 1" | 3" | 1" | | | | | | | | RIF |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

T 80499
Tmp 23.58
DS .268
DO 3.01
pH 9.02

TM 74526
SpC 412
DO% 35.4
DEP .634
ORP

foto 8 9 DS END looking US
foto 7 6 DS END looking DS

DRAWING OF STREAM

| Dist From LWE (ft) | (ft) Depth | (ft/sec) Vel |
|---|---|---|
| LWE | — | — |
| 1 | .4 | — |
| 3 | .5 | .03 |
| 5 | .8 | .16 |
| 7 | .8 | .22 |
| 9 | .9 | .16 |
| 11 | 1.0 | .13 |
| 13 | 1.0 | .08 |
| 15 | 1.0 | .08 |
| 17 | 1.0 | .14 |
| 19 | 0.9 | .11 |
| 21 | .7 | .08 |
| 23 | .7 | .04 |
| 24 | .7 | — |
| 25 — | RWE | — |

PC-16
8/5/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

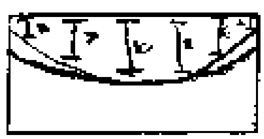
AESTHETIC RATING (1-10)

CANOPY (%OPEN): 95 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 26 – 27

STREAM MEASUREMENTS: AVERAGE WIDTH: 16' AVERAGE DEPTH: 7" MAX DEPTH: 10"

| LENGTH | WIDTH | DEPTHS@ 0 | | 4 | | 8 | | 12 | | 16 | POOL GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 500' | 16' | 2" | 8" | 8" | 10" | 10" | 7" | 6" | 2" | | GLD |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM



DT -80599
TEMP -22.47
TDS -.466
DO 4.99
pH 7.90

TM 103213
SpC 720.00
DO% 60.3%
DEP .199
ORP 121.9

DRAWING OF STREAM

Distance from LWE

V velocity ft/sec

| Left Water Edge (ft) | D (ft) | cf |
|---|---|---|
| 0.2' | .2' | -0.08 |
| .4 | .2' | -0.4 |
| .6 | .2' | -0.12 |
| .8 | .2' | 0.09 |
| 1.0' | .2' | 0.14 |
| 1.2' | .2' | 0.05 |
| 1.4' | .3' | 0.73 |
| 1.6' | .3' | 0.39 |
| 1.8 | .2' | 0.35 |
| CWE | 0 | 0 |

PC-15 X
9/6/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

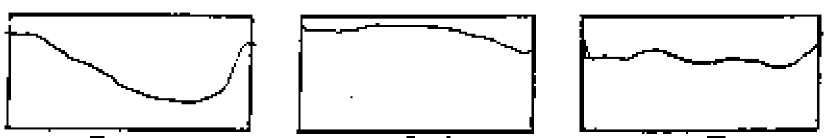
SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 95% GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 22 + 21

STREAM MEASUREMENTS: AVERAGE WIDTH: 8' AVERAGE DEPTH: 5" MAX DEPTH 16

| LENGTH | WIDTH | DEPTHS: 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 315 | 8' | 6" | 3" | 3" | 5" | 2" | 8" | 10" | | | RUN |
| 12 | 8 | 3" | 5" | 3" | 2" | 3" | 2" | 4" | | | RIF |
| 10 | 6 | | | | | | | | | | RUN |
| 12 | 8 | 3" | 4" | 10" | 16" | 17" | 9" | 3" | | | POOL |
| 15 | 8 | | | | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM



Pool Riffle Run

DRAWING OF STREAM

DT 80699 TM 80916
TMP 21.54 SpC 436.00
TDS 0.284 DO% 57.5
DO ~~5.09~~ 5.90 DEP 0.307
pH 8.78 ORP 84.0

to 21+22

End looking US = ~~22~~ 23
End looking DS = ~~21~~ 22

| Dist from LWE (ft) | Velocity (ft/sec) | Depth (ft) |
|---|---|---|
| LWE | — | 0 |
| 0.2 | 0.04 | 0.2 |
| 0.4 | 0.24 | 0.5 |
| 0.6 | 0.44 | 0.6 |
| 0.8 | 1.15 | 0.6 |
| 1.0 | 1.33 | 0.7 |
| 1.2 | 1.08 | 0.6 |
| 1.4 | 1.15 | 0.6 |
| 1.6 | 1.13 | 0.6 |
| 1.8 | 1.38 | 0.7 |
| 2.0 | 1.48 | 0.7 |
| 2.2 | 1.56 | 0.6 |
| 2.4 | 1.65 | 0.6 |
| 2.6 | 1.44 | 0.6 |
| 2.8 | 1.33 | 0.5 |
| 3.0 | 0.94 | 0.5 |

| Dist from LWE | Vel. | Depth |
|---|---|---|
| 3.2 | 0.78 | 0.5 |
| 3.4 | 0.33 | 0.5 |
| 3.6 | 0.03 | 0.4 |
| 3.8 | 0.02 | 0.4 |
| 4.0 | RWE | — |

X

8/15/99 i-CH

Figure V-4-6 Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 95 GRADIENT: ☒ LOW ○ MODERATE ○ HIGH PHOTOS: 20, 21

STREAM MEASUREMENTS: AVERAGE WIDTH 12 AVERAGE DEPTH .5 MAX DEPTH 1.2

| LENGTH | WIDTH | DEPTHS@ 2 | 4 | 6 | 8 | 10 | 12 | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 20 | 10 | .3 | .6 | .7 | .5 | .3 | | | | | RUN |
| 170 | 13 | .7 | 1.0 | 1.1 | .9 | .8 | .7 | | | | GLD |
| 35 | 15 | .2 | .3 | .6 | .3 | .2 | .3 | | | | RUN |
| 140 | 8 | .6 | .1 | .3 | .1 | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from LWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| RWE | | |
| .5 | .8 | .12 |
| 1.0 | .8 | .21 |
| 1.5 | .8 | .53 |
| 2.0 | .8 | .77 |
| 2.5 | .7 | .94 |
| 3.0 | .7 | .88 |
| 3.5 | .7 | .73 |
| 4.0 | .6 | .66 |
| 4.5 | .6 | .55 |
| 5.0 | .5 | .68 |
| 5.5 | .4 | .64 |
| 6.0 | .3 | .31 |
| 6.5 | .3 | — |
| 7.0 | .1 | — |
| 7.5 | LWE | — |

tivity - 590 umhos

? 28°C

16 mg/L

21 DS END looking US

20 DS END looking DS

PC-15 Y1
9/6/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

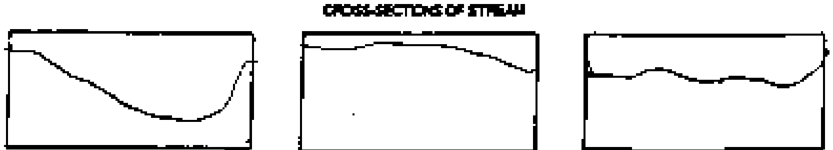
SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 95% GRADIENT: X LOW O-MODERATE O-HIGH PHOTOS: 22 & 21

STREAM MEASUREMENTS: AVERAGE WIDTH: 8' AVERAGE DEPTH: 5" MAX DEPTH 16

| LENGTH | WIDTH | DEPTHS | 3 | 4 | 5 | 6 | 7 | 8 | | | POOL/GL/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 35' | 8' | 6" | 3" | 5" | 1" | 2" | 8" | 10" | | | RUN |
| 12 | 8 | 3" | 3" | 3" | 2" | 3" | 2" | 4" | | | RIF |
| 10 | 6 | | | | | | | | | | RUN |
| 12 | 8 | 5" | 9" | 10" | 16" | 17" | 9" | 3" | | | POOL |
| 15 | 8 | | | | | | | | | | RIF |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM



Pool Riffle Run

DRAWING OF STREAM

DT 80699 TM 80916
TMP 21.54 SpC 436.00
TDS 0.284 DO% 57.5
DO ~~5.09~~ 5.90 DEP 0.307
pH 8.78 ORP 84.0

to 21+22

End looking US = ~~22~~ 23
End looking DS = 21-22

| Dist from LWE (ft) | Velocity (ft/sec) | Depth (ft) |
|---|---|---|
| LWE | — | 0 |
| 0.2 | 0.04 | 0.2 |
| 0.4 | 0.24 | 0.5 |
| 0.6 | 0.44 | 0.6 |
| 0.8 | 1.15 | 0.6 |
| 1.0 | 1.33 | 0.7 |
| 1.2 | 1.08 | 0.6 |
| 1.4 | 1.15 | 0.6 |
| 1.6 | 1.13 | 0.6 |
| 1.8 | 1.38 | 0.7 |
| 2.0 | 1.48 | 0.7 |
| 2.2 | 1.56 | 0.6 |
| 2.4 | 1.65 | 0.6 |
| 2.6 | 1.44 | 0.5 |
| 2.8 | 1.33 | 0.5 |
| 3.0 | 0.94 | 0.5 |

| Dist from LWE | Vel. | Depth |
|---|---|---|
| 3.2 | 0.78 | 0.5 |
| 3.4 | 0.33 | 0.5 |
| 3.6 | 0.03 | 0.4 |
| 3.8 | 0.02 | 0.4 |
| 4.0 | RWE | — |

PC12 8/1/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 40 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 2+3

STREAM MEASUREMENTS: AVERAGE WIDTH: 20 AVERAGE DEPTH: 1.0' MAX DEPTH 2.5'

| LENGTH | WIDTH | DEPTHS (5) | (10) | (15) | (20) | | | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | 20 | .1 | .2 | .4 | .8 | | | | | | RIF |
| 120 | 20 | .4 | .6 | .4 | .5 | | | | | | RUN |
| 150 | 20 | 2.0 | 2.2 | 1.8 | 1.2 | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from RWE (ft) | Depth (ft) | Velocity (ft/sec) |
|---|---|---|
| RWE | – | – |
| 1 | .4 | 0.02 |
| 3 | 1.1 | ~~0.06~~ |
| 5 | 1.7 | 0.13 |
| 7 | 1.8 | 0.14 |
| 9 | 1.8 | 0.18 |
| 11 | 2.0 | 0.16 |
| 13 | 2.1 | 0.13 |
| 15 | 2.2 | 0.20 |
| 17 | 2.3 | 0.18 |
| 19 | 2.2 | 0.11 |
| 21 | 1.5 | 0.04 |
| 23 | 0.8 | – |
| 24 | LWE | |

temp 29.5°C

cond 1500 umhos

DO 7.4 mg/L

Photo 3 DS END looking US

Photo 2 DS END looking DS

Photo 1 – Concretion formations in hardpan

PC 11
9/11/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If not: ______

Additional Comments/Pollution Impacts: ______

Down stream of bridge, no riffle/run US of bridge

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ______ AESTHETIC RATING (1-10) ______

CANOPY (%OPEN): 15 GRADIENT: O-LOW O-MODERATE O-HIGH PHOTOS: 12 + 13

STREAM MEASUREMENTS: AVERAGE WIDTH: 20 AVERAGE DEPTH: .4 MAX DEPTH: 1.1

= 1900 µmhos
= 5.3 mg/l
= 26°C

| LENGTH | WIDTH | DEPTHS 5 | 10 | 15 | 20 | 25 | 30 | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 30 | 1.0 | .6 | .4 | .3 | .4 | .3 | | | | | RUN |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

| Dist from LWE (ft) | (ft) Depth | (ft/sec) Velocity |
|---|---|---|
| LWE | — | — |
| 1 | 0.9 | .63 |
| 3 | 0.8 | .81 |
| 5 | 0.6 | .75 |
| 7 | 0.4 | .98 |
| 9 | 0.5 | .96 |
| 11 | 0.5 | 1.23 |
| 13 | 0.5 | 1.27 |
| 15 | 0.4 | 1.03 |
| 17 | 0.5 | 1.10 |
| 19 | 0.3 | 0.76 |
| 21 | 0.4 | 1.08 |
| 23 | 0.5 | 0.65 |
| 25 | 0.3 | 0.56 |
| 26 | RWE | |

Photo 11 - garbage at bridge

Photo 13 DS END looking US

Photo 12 DS END looking DS

PC9
8/10A

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) ______ GRADIENT: ○-LOW ○-MODERATE ○-HIGH PHOTOS: 16 17

STREAM MEASUREMENTS: AVERAGE WIDTH 20 AVERAGE DEPTH 3 MAX. DEPTH 5+

| LENGTH | WIDTH | DEPTHS 10 | 15 | 20 | 25 | 30 | 35 | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 30' | 35 | 2' | 3 | 4 | 5+ | | | | | | | Pool |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

DT - 81099
TMP - 27.57
TDS 1.067
DO 4.51
pH 8.56

TM 16531
SpC 1641.6
DO 57.5
DEP .257
ORP 33.6

photo 17 - DS END looking US
photo 16 - DS END looking DS

PC 5

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

5/9/95

Is Reach Representative of Stream? (Y/N) Y If Not, ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10)

AESTHETIC RATING (1-10)

CANOPY (%OPEN) 25 GRADIENT: X-LOW O-MODERATE O-HIGH PHOTOS: 24, 25

STREAM MEASUREMENTS: AVERAGE WIDTH 40 AVERAGE DEPTH 2' MAX DEPTH 6'

| LENGTH | WIDTH | DEPTHS 10 | 20 | 30 | 40 | 50 | | | | | | POOL/GLIDE/RIFFLE/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 390 | 45' | 1.5' | 3.5' | 5.5' | 5.5 | 2.5 | | | | | | POOL |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

10595 TM 13.4557

24.57 SpC 2131

1.391 DO% 34.5

1.02 DEP .325

1.49 ORP 60.4

No flow Reading too deep

photo 24 DS END looking US
photo 25 DS END looking DS

PC7
6-4-95

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 30 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 27+26 2nd Cam

STREAM MEASUREMENTS: AVERAGE WIDTH: 50 AVERAGE DEPTH: 3' MAX DEPTH 6'

| LENGTH | WIDTH | DEPTHS @ 10 | 20 | 30 | 40 | 50 | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 50 | 1' | 3' | 6' | 3' | 1' | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

Dist from LINE (ft) Depth (ft) Velocity (ft/sec)

Too Deep No Velocity Readings

| | | | |
|---|---|---|---|
| T | 80409 | TM | 10:2204 |
| ?? | 29.92 | SpC | 1776.0 |
| ?? | 1.154 | DO | 2.92 |
| D | 2.46 | DO% | .532 |
| ( | 8.44 | ORP | 4.2 |

2nd Camera
photo 27 DS END looking US
photo 26 DS END looking DS

RCG
9/9/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not:

Additional Comments/Pollution Impacts:

Included bridge for macroinvert sampling

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) AESTHETIC RATING (1-10)

CANOPY (% OPEN) 10 GRADIENT: ~~0-LOW~~ 0-MODERATE 0-HIGH PHOTOS: 1st 2 [illegible] 1st G[illegible]

STREAM MEASUREMENTS: AVERAGE WIDTH 50 AVERAGE DEPTH: MAX DEPTH

DEPTHS 20 30 40. 50

| LENGTH | WIDTH | DEPTHS | | | | | | | | | | POOL/GLD/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 300 | 50 | 1.0 | 2.5 | >5 | ? | 1.0 | | | | | | Pool |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

0999 TM 72850
2492 SpC 1599.0
1.036 DO% 16.0
1.41 DEP 2.112
8.45 ORP 99.4

Velocities not taken too deep (>5')

picture 2 – upstream looking upstream
picture 1 upstream looking downstream

X



8/7/99
PC5

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 25% GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: (E ft/ 2)

STREAM MEASUREMENTS: AVERAGE WIDTH 50 AVERAGE DEPTH .7' MAX DEPTH 1.5'

| LENGTH | WIDTH | DEPTHS D 10 | 20 | 30 | 40 | 50 | 60 | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 160 | 55 | .5 | 1.0 | .5 | .5 | .6 | .2 | | | | RUN |
| 79 | 45 | .1 | .2 | .2 | .1 | | | | | | RIF |
| 61 | 50 | .2 | .3 | .4 | .3 | .1 | | | | | RUN |
| 100 | 55 | .3 | .5 | 1.[illegible] | 1.[illegible] | 0.7 | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

DT 80799
TMP 27.81
TDS 1.397
DO 5.08
pH 8.53

TM 144020
SPC 2153.0
DO% 65.0
DEP .171
ORP 487

12 ⇒ looking US from ' from DS END

11 ⇒ looking DS from ' from DS END

| Dist from LWE (ft) | Depth (ft) | ft/sec Velocity |
|---|---|---|
| LWE | - | - |
| 2 | .1 | 0 |
| 4 | .1 | 0 |
| 5 | .2 | 0.13 |
| 6 | .4 | 0.11 |
| 8 | .4 | 0.17 |
| 10 | .6 | 0.26 |
| 12 | .6 | 0.34 |
| 14 | .9 | 0.54 |
| 16 | 1.0 | 0.64 |
| 18 | .9 | 0.70 |
| 20 | 1.0 | 0.70 |
| 22 | 0.6 | 0.50 |
| 24 | 0.7 | — |
| 26 | 0.8 | 0.10 |
| 28 | 0.7 | 0.28 |
| 30 | 0.5 | 0.28 |
| 32 | 0.4 | 0.34 |

| Dist from LWE | Depth | Velocity |
|---|---|---|
| 36 | 0.4 | 0.32 |
| 38 | 0.4 | 0.54 |
| 40 | 0.5 | 0.54 |
| 42 | 0.6 | 0.34 |
| 44 | 0.6 | 0.46 |
| 46 | 0.7 | 0.16 |
| 48 | 0.6 | 0.39 |
| 50 | 0.6 | 0.23 |
| 52 | 0.7 | 0.31 |
| 54 | 0.7 | 0.31 |
| 56 | 0.7 | 0.16 |
| 58 | 0.4 | 0.0[illegible] |
| 60 | 0.2 | — |
| 62 | RWE | — |

PCY
8/7/99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

(Logan [illegible])

Is Reach Representative of Stream? (Y/N) ✓ If Not: ____

Additional Comments/Pollution Impacts: ____

| | GEAR | DISTANC | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 55 GRADIENT: ☒ LOW ☐ MODERATE ☐ HIGH PHOTOS: 9+10

STREAM MEASUREMENTS: AVERAGE WIDTH: [illegible] AVERAGE DEPTH: [illegible] MAX. DEPTH: 1 [illegible]

| LENGTH | WIDTH | DEPTHS 20 | 30 | 40 | 50 | 60 | | | | | POOL/GLIDE/RIF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | [illegible] | | | | | [illegible] |
| 64 | 25 | 2" | 4" | | | | | | | | RIF |
| 55 | 35 | 4" | 2" | 4" | | | | | | | RUN |
| 106 | 30 | 3" | 3" | 2" | | | | | | | [illegible] |
| | | | | | | | | | | | [illegible] |
| | | | | | | | | | | | [illegible] |
| | | | | | | | | | | | [illegible] |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

[illegible]

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

T 80799
P 2827
S 1.394
4.84
6.65

TM 16.28 31
SPC 244.0
DO% 629
DEP .225
ORP 57.3

oto 10 – DS END Looking US
oto 9 – DS END Looking DS

| Dist from LWE | (ft) Depth | ft/sec Velocity |
|---|---|---|
| LWE | – | – |
| 2 | .5 | 0.38 |
| 4 | .6 | 0.44 |
| 6 | .7 | 0.43 |
| 8 | .7 | 0.45 |
| 10 | .7 | 0.45 |
| 12 | .7 | 0.52 |
| 14 | .7 | 0.60 |
| 16 | .7 | 0.50 |
| 18 | .7 | 0.45 |
| 20 | .7 | 0.44 |
| 22 | .6 | 0.20 |
| 24 | .7 | 0.52 |
| 26 | .7 | 0.60 |
| 28 | .7 | 0.37 |
| 31 | .7 | 0.48 |
| 34 | .7 | 0.34 |
| 37 | .6 | 0.28 |

| Dist | Run | [illegible] |
|---|---|---|
| 40 | [illegible] | [illegible] |
| 43 | [illegible] | [illegible] |
| 46 | .4 | [illegible] |
| 40 | [illegible] | [illegible] |
| 52 | [illegible] | |
| 56 | RUN | |

X

PC 3

8-7-99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y   If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐   AESTHETIC RATING (1-10) ☐

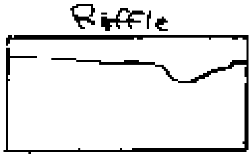
CANOPY (%OPEN): 60   GRADIENT: X LOW  O-MODERATE  O-HIGH   PHOTOS: 16 + 15

STREAM MEASUREMENTS: AVERAGE WIDTH: 30   AVERAGE DEPTH: 1.0   MAX DEPTH: 2.0

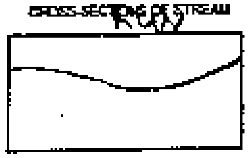
| LENGTH | WIDTH 0 | DEPTH 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 60 | 20 | .5' | .8' | 1.5' | | | | | | | RUN |
| 15 | 30 | .5' | .6' | .7' | .6' | .4' | .3' | | | | RIFF |
| 62 | 25 | .5' | 1.0 | 2.0 | 1.0 | | | | | | RUN |
| 12 | 10 | (.2) | (.3) | (.5) | (.3) | (.4) | | | | | RIFF |
| 70 | 40 | .5' | 1.0' | 2.0' | 2.0 | 1.5' | 1.0' | .5' | .2' | | RUN |
| 100 | 40 | | | | | | | | | | POOL |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

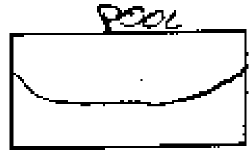
Riffle



RUN



POOL



(-) DRAWING OF STREAM (-)

| Dist from LWE | Vel | Depth |
|---|---|---|
| 0 | | |
| 2 | 0.14 | .6 |
| 4 | 0.14 | .7 |
| 6 | 0.16 | .8 |
| 8 | 0.16 | 1.6 |
| 10 | 0.20 | 1.9 |
| 12 | 0.16 | 2.1 |
| 14 | 0.17 | 2.1 |
| 16 | 0.17 | 2.3 |
| 18 | 0.18 | 2.2 |
| 20 | 0.17 | 2.0 |
| 22 | 0.15 | 2.0 |
| 25 | 0.17 | 1.9 |
| 28 | 0.14 | 1.8 |
| 31 | 0.13 | 1.7 |
| 34 | 0.08 | 0.8 |
| 37 | 0.06 | 0.5 |
| 40 | [illegible] | 0.4 |

| Dist from LWE | Vel | Depth |
|---|---|---|
| 43 | 0.03 | 0.4 |
| 46 | — | 0.1 |
| 47 RWE | — | — |

38799

#2535

1.376

4.08

8.52

TM 9 3545

SpC .211780

ODP .342

ORP 64.6

Photo ~~16~~ 17: 50' upstream of DS END looking DS

Photo ~~15~~ 16: 50' upstream of DS END looking US

ΣC2



8-7-99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) ✓ If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐  AESTHETIC RATING (1-10) ☐

CANOPY (% OPEN) 10%  GRADIENT: ◯-LOW ◯-MODERATE ◯-HIGH  PHOTOS: 14-15

STREAM MEASUREMENTS: AVERAGE WIDTH: ______ AVERAGE DEPTH: ______ MAX. DEPTH ______

| LENGTH | WIDTH | DEPTHS | 2 | 3 | 4 | - | | | | | POOL-GLD-RIF-RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300' | 50' | 1 | 1 | 2 | 4 | 24 | | | | | Pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

T 80799
MO 27.64
DS 6286
O 5.15
H 8.50

TM 11.9165
SpC 1980
DO% 65.8
DEP .729
Ohp 72.3

Photos
15 14 → upstream end looking upstream
14 15 → upstream end looking downstream

| | | | |
|---|---|---|---|
| Procedure No. | WQPA-SWS-3 | Date Issued | 9-30-89 |
| Revision No. | 8 | Date Effective | 9-30-89 |

RC1
8-6-99

Figure V-4-6. Reverse side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record additional information about the sampling site and adjacent area.

Is Reach Representative of Stream? (Y/N) Y If Not: ______

Additional Comments/Pollution Impacts: ______

| | GEAR | DISTANCE | WATER CLARITY | WATER STAGE |
|---|---|---|---|---|
| FIRST PASS | | | | |
| SECOND PASS | | | | |
| THIRD PASS | | | | |

SUBJECTIVE RATING (1-10) ☐ AESTHETIC RATING (1-10) ☐

CANOPY (%OPEN) 60% GRADIENT: (0-LOW) 0-MODERATE 0-HIGH PHOTOS: [illegible] – 100ft [illegible]

STREAM MEASUREMENTS: AVERAGE WIDTH 80' (Large [illegible]) AVERAGE DEPTH ______ MAX DEPTH ______

| LENGTH | WIDTH | DEPTHS | | | | | | | | | POOL/GLIDE/RIFF/RUN |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 300' | | | | | | | | | | | pool |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |
| | | | | | | | | | | | |

CROSS-SECTIONS OF STREAM

DRAWING OF STREAM

T B0699 TN 154930
SpC 989.00
D 30.74 DO% 67.3
.0578 Dep. 221
5.53 ORP. 51.6
8.87

Too deep to do transect – mean 5' [illegible] from 4' [illegible] above

Photo –
~~#~~ 100ft upstream from down st End – looking US (opposite order
#6 100ft upstream from DS END – looking DS from usual)

SA1
8/6/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda |||| - phys (4)
| - limpet (1)

Bivalvia

Ephemeroptera || - Caenidae (2)

Other Annelida || (2)

Anisoptera

Zygoptera | - Coenagrionidae (1)

Plecoptera

Trichoptera ||| - Hydropsychidae (4)

Coleoptera ~~||||~~ ~~||||~~ ~~||||~~ |||
Dryopidae - (16)
Elmidae - (2)

Diptera ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~
~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~
~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~
|
Bloodred - (36)
Other - (60)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2

Total Org. = Sample 42

Observations

HC1
8/15/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda Physa - HHT HHT HHT HHT HHT HHT HHT ||| (34)

Anisoptera long body - || - Aeshnidae (2) Libellulidae - |

Riffle Beetle - HHT ||| (8)

Coleoptera predacious - |||| (21) Dytiscidae - HHT HHT HHT || crawling - HHT |||| (9)

Zygoptera Coenagrionidae - HHT || (7)

Bivalvia

Plecoptera

Diptera Bloodred - | (1) other - HHT HHT HHT HHT HHT HHT HHT (34) Culicidae - | (1)

Ephemeroptera other Baetid - || (2)

Trichoptera Hydropsychid - || (2)

Other Daphnia - ||| (3) X

RIFFLE SAMPLE ___

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Observations | Total Org. in Sample 90

## Rapid Bioassessment Protocol II

WF3
8/15/94

Biosurvey Field Data Sheet

used bridge abutment riprap

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta | 1

Anisoptera

Gastropoda

Physa [illegible] 2

Calopteryx | 1

Zygoptera

Bivalvia | 1

Coenagrion [illegible] 40

Plecoptera

Coleoptera [illegible] 3

[illegible] 21

[illegible] 2

Diptera

[illegible] 5

Other [illegible] 20

Ephemeroptera

[illegible] | 1

Trichoptera

Other [illegible] 5 [illegible] | [illegible] 2 [illegible] | [illegible] 1 [illegible] 1

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

WF2
8/15/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 (circled) | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 (circled) | 4 |
| Macrophytes | 0 | 1 (circled) | 2 | 3 | 4 |
| Slimes | 0 (circled) | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 (circled) | 3 | 4 |
| Fish | 0 | 1 | 2 (circled) | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Approximate Abundance

Oligochaeta | 1

Gastropoda physa - |||| 4
limpet - | 1 Ancylidae 5

Bivalvia - ||| 3

Ephemeroptera Caenid - || 2

Anisoptera

Zygoptera Coenagrionidae - ~~||||~~ ||
Calopterygidae - | 1

Plecoptera

Trichoptera Hydropsychid - ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ||| 43

Predacious - |

Coleoptera Riffle B - ~~||||~~ | 6

Crawling - ~~||||~~ 5

Dytiscid - || 2

Diptera Blackfly d

other - ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ||| 46

Other Planaria - ||| 3 Horsehair - | 1

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0 | Total Org. in Sample 60

Observations

WF 1
8/16/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta – | 1

Gastropoda Lymnaeidae righthand – | 1

Physa – |||| 4

Bivalvia – HHT HHT 11

Ephemeroptera Caenid – HHT HHT ||

47

Beetle – ||| 3

Anisoptera Lonely – | – Gerdulidae 1

Zygoptera coenagrionidae – HHT |||

calopterygidae – HHT HHT ||

9

Plecoptera 1

Trichoptera Hydropsychidae – HHT HHT HHT

22

Coleoptera predacious – || 3

Riffle – || 2

crawling – || 2

Dytiscid – |

Diptera Bloodred – | 1

others – HHT HHT HHT HHT HHT HHT | 3

Simulidae – 1 yes

1

Other Planaria – ||| 3 Horsehair – || Nematomorpha 2

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Observations | Total Org. in Sample 60

SF 3
8/14/91

## Rapid Bioassessment Protocol II

### Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta | Anisoptera (1) | riffle [illegible] / (1) |
| Gastropoda | [illegible] 1 - Cordulidae | Coleoptera |
| physa (5) | | [illegible] Haliplidae (10) |
| large left handed snail | Zygoptera (15) | dytiscids II (5) |
| Bivalvia | Calopterygidae [illegible] | Diptera |
| | Plecoptera | [illegible] (5) |
| Ephemeroptera | Philopotamidae | other (19) |
| Caenidae (15) | 4 - Polycentropodidae | [illegible] II - Tipulidae (2) |
| Baetidae I (1) | Trichoptera Other (6) | |
| | Hydras (40) | |

Other Isopoda (6) [illegible] (3) Water strider 1 [illegible] (1)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders 20 | Total Org. in Sample 60 |

Observations

SF2
8/14/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda Physa - HHT HHT HHT IIII (19)

Anisoptera Aeshnidae (2)
Ipnalen - II
Long body - I Cordulegast[illegible]

Zygoptera Coenagrionidae HHT HHT HHT HHT III (23)
Calopterygidae - II (2)

Bivalvia

Plecoptera

Coleoptera Dytiscidae - II (2)
Elmidae - HHT II (7)
Omenti[illegible] - HHT HHT HHT II (17)
~~[illegible] body [illegible] - II~~

Diptera Blephar[illegible] - HHT III (8)
other - HHT HHT HHT HHT HHT I (26)

Ephemeroptera Caenidae - HHT HHT I (11)
Baetidae - II (2)

Trichoptera

Other Megaloptera - IIII (4)
Water penny - I (1)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

SF 1
8/14/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST — List Families Present/Indicate Abundance

Oligochaeta

Gastropoda Physa - ~~HHT~~ ~~HHT~~ ~~HHT~~ 1 (16)
Limpet - 1 (1)

Bivalves - ~~HHT~~ ~~HHT~~ 1111 (14)

Ephemeroptera Caridae - ~~HHT~~ ~~HHT~~ (10)

Anisoptera long body - 1 Aeshnidae (1)
wide teeling - 11 - Cordulii (2)

Zygoptera Coenagrionid - 111 (3)

Plecoptera

Trichoptera Hydropsychid - ~~HHT~~ ~~HHT~~ ~~HHT~~ ~~HHT~~ ~~HHT~~ (25)

~~Gyr Swimmer - 1~~
Dytiscid - ~~HHT~~ ~~HHT~~ 1 (11)

Coleoptera Riffle beetle - ~~HHT~~ ~~HHT~~ 111 (13)
4-eyed - 1

Diptera Bloodworm 11 (2)
other - ~~HHT~~ ~~HHT~~ ~~HHT~~ ~~HHT~~ 1 (21)
Culicid - 1 (1)
Tabanidae - 111 (3)
Tipulidae - 11 (2)

Other Megaloptera - 111 (3) Annelid - 11 (2)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

X

BG#
6/13/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Relative Abundance

Oligochaete || 2

Anisoptera - 1 Aeshnidae 1

Gastropoda
Physidae 1

Coleoptera
elmidae 25
dytiscid ||| 3

Zygoptera Coen. 25
Calopt. - ||| 4

Bivalvia 23

Diptera
Tipul. - 1 Heleidae 1
Red midges 6
Other 13

Plecoptera

Ephemeroptera
Caenidae 10

Trichoptera Hydropsychidae - 1 2

Other Leech 1 Decapoda 1
Pseudoletter... - ||| 3

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

X

BG 1

8/14/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda Physa - III (3).

Bivalvia (13)

Ephemeroptera Caenidae - (5)

Other megalopt III (3).

Anisoptera longleg - 1 - Cordulidae (1)

Zygoptera calopterygidae - 1 (1)

Coenagrion (19)

Plecoptera

Trichoptera Hydropsychidae - III (3)

Organic - 1 - Leptoceridae (1)

Coleoptera

Elmidae (55)

Crawling - (11). Haliplidae

Diptera Blood red - II (2)

Blac... (37)

Culicidae - II (2)

**RIFFLE SAMPLE**

**FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders

Total Org. in Sample 60

Observations

SC1
8/11/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | | | | |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Anisoptera

Gastropoda

Coleoptera Riffle beetle - 7 ; crawling 1

Zygoptera Coenagrionidae - 14 ; Calopteridae - 1

Bivalvia - 33

Diptera Bloodred - 2 ; other - 18 ; Hairy - 1

Plecoptera

Ephemeroptera

Caenidae - 4

Trichoptera Hydropsychidae - 28

Other Isopoda - 3 ; Decapoda - 1 ; Megaloptera - 6

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 3

Observations | Total Org. In Sample 60

X

W01
8/12/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Anisoptera — || — [illegible] (2)

Gastropoda

~~Physid~~ HHT | (6)

Coleoptera

Zygoptera

Elmids HHT HHT HHT ||| (23)

[illegible] HHT HHT HHT || (27)

Bivalve ||| (3)

Diptera

Plecoptera

Blood — |||| (4)

Other HHT HHT (10)

Ephemeroptera Baetidae — ||| (4)

[illegible] HHT HHT HHT HHT HHT HHT HHT HHT || Trichoptera

HHT |||| (44)

(4!)

Other Leeches HHT HHT ||| (13) Amphipoda — |||| Water boatmen - HHT HHT || (12)

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2

Observations

Total Org. in Sample 60

X

BC3
8/11/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda physa - (11) Tanbora - 1 Planorbidae

Anisoptera → Aeshnidae (22)

Coleoptera Dytiscidae - 11 (2) Crawling (4)

Bivalvia (9)

Zygoptera Coenagrionidae (14)

Plecoptera

Diptera bladed (6) other (22) longhaired - 1111

Ephemeroptera Baetidae - 1111 (4) Scraper Heptageniidae - (6) Corixidae (25)

Trichoptera

Other Isopoda - 1 (1) Daphnia (8) Seed Shrimp (6) Amphipoda - 11 (2)

**RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** Indicate No. of Individuals Representing Group

Shredders 3 | Total Org. in Sample 60

Observations

BC 2
8/10/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | **1** | 2 | 3 | 4 |
| Filamentous Algae | 0 | **1** | 2 | 3 | 4 |
| Macrophytes | **0** | 1 | 2 | 3 | 4 |
| Slimes | **0** | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | **2** | 3 | 4 |
| Fish | 0 | 1 | **2** | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Corduligastridae - 1

Anisoptera 1 - long legs (1)

Aeshnidae - 1

Gastropoda limpet - (5)

physa - (16)

Planorbid - (2)

Coleoptera Dytiscidae - (4)

Riffle - 1

Zygoptera Coenagrionidae - (8)

Bivalvia - (21)

Diptera Blacked - (13)

other - (7)

Plecoptera

Ephemeroptera

swimmer 1 (1)

pointed tail - 1

Trichoptera Hydropsychidae - 1 (1)

Other Decapoda - 1 (1) Isopoda - 1 (1)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders

Total Org. in Sample 60

Observations

BC 1
8/9/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta ||| 3

Gastropoda – ~~||||~~ |||
Physa – 8

Bivalvia ~~||||~~ ~~||||~~ 10

Ephemeroptera

Corixidae 2

Anisoptera

Zygoptera ~~||||~~ ||
Coenagrionidae 7

Plecoptera

Hydropsychidae – 40

Trichoptera – ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~

Dytiscidae – 9
Elmidae – 4

Coleoptera – ~~||||~~ ~~||||~~ |||

Diptera – ~~||||~~ ~~||||~~ ~~||||~~ ~~||||~~ |||
Bloodred – 17
other – 7

Other Hemipteran – || Megalopteran – ~~||||~~ ||| 8

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0 | Total Org. in Sample 60

Observations

BC 1
8/9/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

### RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

### MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta (3)

Gastropoda –
Physidae – (8) ✓

Bivalvia (10)

Ephemeroptera

Corixidae (9)

Anisoptera

Zygoptera
Coenagrionidae (7)

Plecoptera

Hydropsychidae – (40) ✓

Trichoptera –

Dytiscidae – (9)
Elmidae – (4)

Coleoptera –

Diptera –
Chironomidae – (17)
Other – (7)

Other Hemiptera – 11 Megaloptera – (8)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

X

LP2
8/8/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta – || 2

Gastropoda

Bivalvia

Anisoptera

Zygoptera

Plecoptera

Coleoptera – ||| – Elmidae 4, – dytiscidae – 1, – Gyrinidae 2

Diptera – 37

Chironomidae – 23

other – 15

Baetidae – 36

Ephemeroptera – 

Simulidae – 27

Trichoptera – ||| – Hydropsychidae – 2

Other Hemiptera – 6, Isopoda – ||| 4 Amphipoda – | 1 Daphnia Small Shrimp

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 6

Observations | Total Org. in Sample 60

Walked up to Bulkhead structure on the West Bank with green Pipe in close proximity – purpose unknown

# Rapid Bioassessment Protocol II

LP1

Biosurvey Field Data Sheet

8/8/99

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta 3 | | |
| | Anisoptera | |
| Gastropoda 11 Physa | | Coleoptera – Dryopidae 5 |
| | Zygoptera | |
| Bivalvia 65 | | Diptera |
| | Plecoptera | |
| Ephemeroptera Caenidae 18 Baetidae 1 | | Blood red – 13 other – 7 Culicidae – 6 |
| | Trichoptera 2 – Hydropsychidae | |

Other amphipoda Gammaridae 4 isopods 2 Riffle sample 15

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders 3 | Total Org. in Sample 68 |

Observations

Sample taken in broken concrete, and not indicative of stream, only riffle available

X

LC 2
8/10/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta (19)

Araneae 1 - Arachnidae (1)

Gastropoda
Physidae 1 (2)
Planorbidae (20)

Bivalvia (8)

Zygoptera
Coenagrionidae 1 (1)

Plecoptera

Coleoptera
[illegible] (20)
dytiscidae (25)

Diptera
Blood red
other (8)
Tipulidae - 1 (1)

Ephemeroptera
Hept - 1 - [illegible] (1)

Trichoptera
[illegible] tail - (1)

Other Amphipoda (5), [illegible], Nepidae (5), [illegible] - 1, [illegible] (2)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (9) (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 20

Observations | Total Org. in Sample 60

X

LC1
8/18/95

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta (14)

Gastropoda - Physa (13)

Anisoptera

Coleoptera - Dryopidae (15) - Elmidae (1)

Zygoptera - Coenagrionidae (7)

Bivalvia (13)

Diptera - Bloodred (10) - other (6)

Plecoptera

Ephemeroptera

Trichoptera - Hydropsychidae (19)

Other (2) Leech, Bootiera, [illegible] Corixidae (5), [illegible] Isopoda (3)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS Indicate No. of Individuals Representing Group

Shredders 2

Observations | Total Org. in Sample 60

PC-16
8/5/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

madtom
mosquito fish
Blue gill
Large mouth bass
(spotted or redeye)

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta I (1) | Anisoptera |||| I Aeshnidae (6) | |
| Physa (51) Gastropoda |||| |||| |||| |||| |||| |||| |||| |||| |||| |||| |||| | | Coleoptera |||| |||| { Dryopidae - |||| || (9) ; Elmidae - ||| (3) |
| Limpet (5) | Zygoptera |||| |||| |||| | Calopterygidae - (3) ; Coenagrionidae - (14) | |
| Bivalvia | Plecoptera | Diptera |
| Ephemeroptera II - Baetidae (2) | | |
| | Trichoptera I - Hydropsychidae (1) | |
| Other I (Hemiptera) Belostomatidae (1) | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders 1 | Total Org. In Sample 61 |

Observations

X

PC15
8-6

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

## RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

## MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta | (1)

Anisoptera

Gastropoda — physa (1)

Coleoptera — Dryopidae - 11 (2); Elmidae - 1 (1); Dyt. - 11 (2)

Zygoptera — Calopterygidae - (5); Coenagrionidae - (5)

Bivalvia — (44)

Diptera — Blood-Red - 11 (2); Other - 11 (2)

Plecoptera

Ephemeroptera — Baetidae (20); Caenidae (12)

Trichoptera — Hydropsychidae (30)

Other — (annelid leech) (2); Nepidae - (1)

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2 | Total Org. in Sample 60

Observations

PC 14
8/16/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

| | | |
|---|---|---|
| Oligochaeta | Anisoptera long body - 1 - Aeshnidae (1) | |
| Gastropoda physa - IIII (4) | | Coleoptera crawling - IIII (4) |
| | Zygoptera | Riffle - II (2) |
| Bivalvia - ~~HH HH HH HH I~~ (21) | | Diptera Bloodred - I (1) |
| | Plecoptera | other - ~~HH HH HH HH HH~~ II (27) |
| ~~HH HH HH HH~~ (46) | | |
| Ephemeroptera Small ~~HH HH~~ | | |
| Baetid - ~~HH HH HH HH~~ (24) | Trichoptera Hydropsychid - III (3) | |
| Heptageniidae - III (3) | | |
| Other Planaria - II (2) | | |

RIFFLE SAMPLE

FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders | Total Org. in Sample 60 |

Observations

PC13
9/13/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST** List Relative Presence/Relative Abundance

| | | |
|---|---|---|
| Oligochaeta | | |
| | Anisoptera | Gyrinidae (1) |
| Gastropoda Physa - ||| (3) | | Coleoptera Riffle - HHT HHT | (11) |
| | | Dytiscidae - ||| (3) |
| | Zygoptera Coenagrionidae - || (2) | Leyed - | Haliplidae (1) |
| Bivalvia - HHT |||| (9) | | Diptera Bladed - |||| (4) |
| | Plecoptera | Other - HHT HHT HHT HHT ||| |
| Ephemeroptera (18) | | Hairy - |
| Caenidae - HHT HHT HHT ||| | Trichoptera - HHT HHT HHT HHT HHT HHT HHT HHT ||| (43) | Haliplidae |
| Baetidae - ||| (3) | | |
| Other Megaloptera - || (2) | | |

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Scrapers | Filtering Collectors |

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

| | |
|---|---|
| Shredders 0 | Total Org. in Sample 60 |

Observations

PC12
8/12/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Anisoptera

Gastropoda

37

Coleoptera Riffle beetle - 37

Zygoptera Coenagrionidae - 1

Dytiscidae - 1

Bivalvia 5

Diptera ~~Chironomidae~~

Plecoptera

other - 11

Ephemeroptera 17 - Caenidae

Trichoptera - 70 Hydropsychidae

Other Megaloptera - 1

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

PC 11
8/11/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Anisoptera

Gastropoda physa - II (2)

Coleoptera Riffle beetle - HHT HHT HHT II (1?

Zygoptera

Bivalvia

Diptera Blood red - HHT HHT I (11)
other - IIII (4)

Plecoptera

Ephemeroptera Baetidae - III (4)
Caenidae - HHT HHT HHT I (16)
Scrapers Hept - HHT I (6)

other type → Polycentropodidae (1)

Trichoptera Hydropsychidae (25)

organic hose - III

Leptoceridae (5)

Other

Megaloptera - III (3)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2

Total Org. in Sample 60

Observations

X

# Rapid Bioassessment Protocol II

Biosurvey Field Data Sheet

2C9

8/10/99

## RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

## MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda

Anisoptera

Coleoptera 29

Elmidae [illegible]

Zygoptera

Bivalvia

Coenagrionidae [illegible] 11

Diptera

Dytiscidae 9

Plecoptera

Chironomidae 21

Tipulidae 10

Ephemeroptera

Caenidae 5

Baetidae 1

Trichoptera [illegible]

Hydropsychidae 1

Other [illegible] 9, [illegible] 7, [illegible] 1, $H_2O$ Strider 1, $H_2O$ [illegible] 1, Megaloptera 1

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS 17 (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 5

Observations

Total Org. in Sample 60

PC 8
8/9/99

Rapid Bioassessment Protocol II

Water Duplicate Samp[le]
DUP89 taken He[re]

Biosurvey Field Data Sheet

Biota sampling included bridge abutment

RELATIVE ABUNDANCE OF AQUATIC BIOTA

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

MACROBENTHOS QUALITATIVE SAMPLE LIST

List Families Present/Indicate Abundance

Oligochaeta (2)

[illegible] - (4)
[illegible] - (6)
[illegible] - (17)

Anisoptera

Gastropoda

Coleoptera

Zygoptera

Bivalvia

Diptera

Plecoptera

Ephemeroptera
[illegible] (9)
6

[illegible] (5)
[illegible] (26)

Trichoptera

Other Hemipteran - (2) Isopoda - (6) Daphnia - (2) Megaloptera - [illegible]

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 4

Observations

Total Org. in Sample 60

X

X

OC 17
3/9/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta 6

Gastropoda

Anisoptera

Coleoptera

Elmidae 13

Bivalvia

Zygoptera

Plecoptera

Diptera

Ephemeroptera

Trichoptera 13

Other Annelid

**RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders

Observations

Total Org. in Sample 60

X

PCG
8/9/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

Included bridge abutment area for biotic sampling

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta 3

Anisoptera - Aeshnidae - 2

Gastropoda - Limpets
Ancylidae 6

Coleoptera - Elmidae - 13
dytiscid - 9
crawling 2

Zygoptera - Coenagrionidae - 9

Bivalvia 2

Diptera -
Blood red - 5
other - 31

Plecoptera

Ephemeroptera -
Caenidae - 6

Trichoptera

Scraping - Heptageniidae - 5

Other Isopoda - 31

Seed Shrimp 12

Nematode 2

Leeches 3

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2 | Total Org. in Sample 60

Observations

PC6
8/9/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

Included bridge abutment area for biotic sampling

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 (circled) | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 (circled) | 3 | 4 |
| Macrophytes | 0 (circled) | 1 | 2 | 3 | 4 |
| Slimes | 0 (circled) | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 (circled) | 3 | 4 |
| Fish | 0 | 1 (circled) | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST** List Families Present/Indicate Abundance

Oligochaeta 3

Gastropoda – Limpets
Ancylidae 6

Bivalvia 2

Ephemeroptera –
Coenidae – 6
Scraping – Heptageniidae – 3

Anisoptera – Aeschnidae – 2

Zygoptera –
Coenagrionidae – 9

Plecoptera

Trichoptera

Coleoptera – | Elmidae – 13
crawling 2
dyticid – 9

Diptera –
Blood red – 5
other – 31

Other Isopoda – 31
Seed Shrimp daphnia 12
Hemipteran Boatman 2
Leeches 3

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 12

Total Org. in Sample 60

Observations

X

PC 5
8/17/95

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed  1 = Rare  2 = Common  3 = Abundant  4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Gastropoda

Bivalvia

Ephemeroptera – 11
Caenidae – [illegible]
Baetidae – [illegible]
Scrapers – 1 (1)

Anisoptera

Zygoptera – 1 (1) Coenagrionidae

Plecoptera

Trichoptera – [illegible]

Coleoptera – 14
Elmidae – [illegible]
Dryopidae – [illegible]

Diptera – 6
[illegible] – (5)
other – (1)

Other – Decapoda – 1 (1) Hemiptera – 1 (1) Annelida – 1 (1) Megaloptera – 1 (1)

**RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

**CPOM SAMPLE FUNCTIONAL FEEDING GROUPS** (Indicate No. of Individuals Representing Group)

Shredders 0 | Total Org. in Sample 60

Observations

PC4
8/7/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | 0 | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

Circled: Periphyton 2; Filamentous Algae 2; Macrophytes 1; Slimes 0; Macroinvertebrates 3; Fish 2

0 = Absent/Not Observed   1 = Rare   2 = Common   3 = Abundant   4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Indicate Abundance

Oligochaeta

Anisoptera – 1 – Aeshnidae (1)

Gastropoda

Coleoptera – HHT HHT II
Drypidae – (12) –

Zygoptera

Bivalvia

Diptera – HHT
Blood red (3) –
other – (0) –

Plecoptera

All Baetidae
Ephemeroptera – HHT HHT HHT HHT HHT II (27)

All Hydropsychidae
Trichoptera – HHT HHT HHT HHT HHT HHT II (32)
HHT HHT HHT HHT HHT HHT HHT

Other Annelida – 1 (1)

RIFFLE SAMPLE
FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 0

Total Org. in Sample 60

Observations

PC 3
8/7/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Approximate Abundance

Oligochaeta 1

Anisoptera

Gastropoda 1 - limpet 1

Coleoptera
Dryopidae - 15
Elmidae - 6
Zygoptera

Bivalvia 12

Diptera
Plecoptera
Bloodred - 5
Ephemeroptera - Caenidae 4 Baetidae 1
other - 9
Trichoptera Small Hydropsychidae 40
Culicidae - 2

Other Isopoda - 6 Annelid - 2 Megaloptera - 1

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers | Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 3 | Total Org. in Sample 60

Observations

PC 2
8/7/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 | Slimes | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 | Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 | Fish | 0 | 1 | 2 | 3 | 4 |

Algae scum on surface

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST**

List Families Present/Relative Abundance

Oligochaeta 2

Anisoptera Aeshnidae (1)

Gastropoda

Coleoptera
Elmidae 7
Dryopidae 12

Zygoptera Coenagrionidae 2

Bivalvia 3

Diptera
Blood red 20
other 5
Culicidae 6

Plecoptera

Ephemeroptera

Trichoptera Hydropsychidae 3

Other Annelid 1 daphnia 15 Amphipod 3 Hemipt Dytiscus - Corix. 5

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 2

Total Org. in Sample 570

Observations

PC 1.
8/6/99

# Rapid Bioassessment Protocol II

## Biosurvey Field Data Sheet

**RELATIVE ABUNDANCE OF AQUATIC BIOTA**

| | | | | | |
|---|---|---|---|---|---|
| Periphyton | 0 | 1 | 2 | 3 | 4 |
| Filamentous Algae | 0 | 1 | 2 | 3 | 4 |
| Macrophytes | 0 | 1 | 2 | 3 | 4 |
| Slimes | 0 | 1 | 2 | 3 | 4 |
| Macroinvertebrates | 0 | 1 | 2 | 3 | 4 |
| Fish | 0 | 1 | 2 | 3 | 4 |

0 = Absent/Not Observed 1 = Rare 2 = Common 3 = Abundant 4 = Dominant

**MACROBENTHOS QUALITATIVE SAMPLE LIST** List Families Present/Indicate Abundance

Oligochaeta — || (2)

Gastropoda — |||| |||| || - physa (12)

Bivalvia

Ephemeroptera — |||| - Caenidae (5)

Anisoptera — || Aeshnidae (2)

Zygoptera — |||| |||| |||| | |||| |||| |||| ||| - Coenagrionidae (33)

Plecoptera

Trichoptera
Coenagrionidae (25)

Coleoptera — |||| |||| Elmidae — 4 (4) Dryopidae — 6 (6)

Diptera — |||| |||| |||
Blood red — (3) (3)
other — (5) (5)
Culicidae — (5) (5)

Other Hemiptera — |||| |||| |||| |||| |||| |||| Corixidae (?) Arachnida? — |||| |||| |||| |||| Ostracoda (20) Seed Shrimp

RIFFLE SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Scrapers

Filtering Collectors

CPOM SAMPLE FUNCTIONAL FEEDING GROUPS (Indicate No. of Individuals Representing Group)

Shredders 4

Total Org. in Sample 60

Observations

woody debris & roots only thing availible

SA I
8/6/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI)

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 37

Stream Sand Creek RM ___ Date 8/6/99 River Code ___

Location SA I Crew ___

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 2

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS[10] / GRAVEL [7] X
- BOULDER [9] / SAND [6] X
- COBBLE [8] / BEDROCK[5]
- HARDPAN [4] / DETRITUS[3]
- MUCK [2] / ARTIFIC.[0]

TOTAL NUMBER OF SUBSTRATE TYPES: >= 4 [2] X <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

Substrate Origin (Check all): LIMESTONE [1] RIPRAP [0] TILLS [1] X HARDPAN [0] SANDSTONE [0] SHALE [-1] COAL FINES [-2]

Silt Cover (Check One): SILT HEAVY [-2] X SILT MODERATE [-1] SILT NORMAL [0] SILT FREE [1]

Extent Of Embeddedness (Check One): EXTENSIVE [-2] X MODERATE [-1] LOW [0] NONE [1]

COMMENTS ___

2] INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- X OVERHANGING VEGETATION [1]
- X SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- X AQUATIC MACROPHYTES [1]
- X LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]
- MODERATE 25-75% [7]
- X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS ___

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 6

SINUOSITY: HIGH [4] MODERATE [3] LOW [2] X NONE [1]

DEVELOPMENT: EXCELLENT [7] GOOD [5] FAIR [3] X POOR [1]

CHANNELIZATION: NONE [6] RECOVERED [4] X RECOVERING [3] RECENT OR NO RECOVERY [1]

STABILITY: HIGH [3] MODERATE [2] X LOW [1]

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

COMMENTS ___

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank): WIDE > 50m [4]; MODERATE 10-50 [3]; NARROW 5-10m [2]; X VERY NARROW 1-5m [1]; NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank): FOREST, SWAMP [3]; X OPEN PASTURE/ ROWCROP [0]; RESID., PARK, NEW FIELD [1]; FENCED PASTURE [1]

L R (Per Bank): URBAN OR INDUSTRIAL [0]; SHRUB OR OLD FIELD [2]; CONSERV. TILLAGE [1]; MINING/CONSTRUCTION [0]

BANK EROSION: NONE OR LITTLE [3]; X MODERATE [2]; HEAVY OR SEVERE [1]

COMMENTS ___

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 2

MAX. DEPTH (Check 1): > 1m [6]; 0.7-1m [4]; X 0.4-0.7m [2]; < 0.4m [1]; < 0.2m [Pool = 0]

MORPHOLOGY (Check 1): POOL WIDTH > RIFFLE WIDTH [2]; X POOL WIDTH = RIFFLE WIDTH [1]; POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply): TORRENTIAL [-1]; FAST [1]; MODERATE [1]; SLOW [1]; EDDIES [1]; X INTERSTITIAL [-1]; INTERMITTENT [-2]

NO POOL [0]

COMMENTS ___

RIFFLE: 0

RIFFLE/RUN DEPTH: GENERALLY > 10 cm, MAX > 50 [4]; GENERALLY > 10 cm, MAX < 50 [3]; GENERALLY 5-10 cm [1]; GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2]; MOD. STABLE (e.g., Pea Gravel) [1]; UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS: EXTENSIVE [-1]; MODERATE [0]; LOW [1]; NONE [2]; X NO RIFFLE [0]

0
IF

COMMENTS ___ GRADIENT: 2

6] Gradient (feet/mile): .66 %POOL: 97 %RIFFLE: ___ %RUN: 3

HC 1
8/15/(?)

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: 44

Stream: Hurricane Creek RM ____ Date 8/15/89 River Code ____
Location: HC 1 Crew: [illegible]

1] SUBSTRATE (Check ONE (Two) Substrate TYPE BOXES; Check all types present):

SUBSTRATE SCORE: 14 14

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| ☐☐-BLDER/SLABS[10] | | | ☐X-GRAVEL [7] | X | X | Substrate Origin (Check all) |
| ☐☐-BOULDER [9] | | | ☐X-SAND [6] | X | X | ☐-LIMESTONE [1] ☐-RIP/RAP [0] |
| ☐☐-COBBLE [8] | | | ☐☐-BEDROCK[5] | | | X-TILLS [1] ☐-HARDPAN [0] ☐-SANDSTONE [0] ☐-SHALE [-1] ☐-COAL FINES [-2] |
| ☐☐-HARDPAN [4] | X | | ☐☐-DETRITUS[3] | | | |
| ☐☐-MUCK [2] | | | ☐☐-ARTIFIC.[0] | | | |

Silt Cover (Check One): ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] X-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddedness (Check One): ☐-EXTENSIVE [-2] ☐-MODERATE [-1] X-LOW [0] ☐-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] X-<= 4 [0]

NOTE: (Ignore sludge that originates from point sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER

COVER SCORE: 5

TYPE (Check All That Apply)

☐-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1]
☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

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

CHANNEL: 8

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SHADING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | X-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| X-LOW [2] | ☐-FAIR [3] | X-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | X-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

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

RIPARIAN: 6

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | ☐☐-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | XX-OPEN PASTURE/ ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | XX-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐☐-HEAVY OR SEVERE [1] |
| XX-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 5 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/GLIDE/RIFFLE - CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐- > 1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| ☐- 0.7-1m [4] | ☐-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| X-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] |
| ☐- < 0.4m [1] | | X-SLOW [1] | |
| ☐- < 0.2m [Pool = 0] | | | |

☐-NO POOL [0]

COMMENTS: ____

RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g. Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g. Pea Gravel) [1] | ☐-LOW [1] | X-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | |
| X-GENERALLY < 5 cm [Riffle = 0] | | | |

☐-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 4

6] Gradient (feet/mile): 1.833 %POOL: 40 %RIFFLE: ____ %RUN: 2

LWF3 6/11/95

Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 40

Stream West Fork of Cigars RM ___ Date ___ River Code ___
Location WF3 Crew ___

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY — SUBSTRATE SCORE: 11

- ☐☐-BLDER/SLABS[10] — ☒☐-GRAVEL[7] X X — Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER[9] — ☐☐-SAND[6] X X — ☐-LIMESTONE[1] ☐-RIPRAP[0] ☐-SILT HEAVY[-2] ☒-SILT MODERATE[-1]
- ☐☐-COBBLE[8] — ☐☐-BEDROCK[5] — ☒-TILLS[1] ☒-HARDPAN[0] ☐-SILT NORMAL[0] ☐-SILT FREE[1]
- ☒☐-HARDPAN[4] X — ☐☐-DETRITUS[3] X X — ☐-SANDSTONE[0] — Extent Of Embeddedness (Check One)
- ☐☐-MUCK[2] — ☐☐-ARTIFIC[0] — ☐-SHALE[-1] — ☐-EXTENSIVE[-1] ☐☐-MODERATE[-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☒ >4 [2] ☒ <=4 [0] ☐-COAL FINES[-2] — ☒-LOW[0] ☐-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

2) INSTREAM COVER — COVER SCORE: 6

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐-UNDERCUT BANKS[1] — ☒-DEEP POOLS[2] — ☐-OXBOWS[1] — ☐-EXTENSIVE >75%[11]
- ☒-OVERHANGING VEGETATION[1] — ☐-ROOTWADS[1] — ☒-AQUATIC MACROPHYTES[1] — ☐-MODERATE 25-75%[7]
- ☐-SHALLOWS (IN SLOW WATER)[1] — ☐-BOULDERS[1] — ☒-LOGS OR WOODY DEBRIS[1] — ☒-SPARSE 5-25%[3]
- ☐-NEARLY ABSENT <5%[1]

COMMENTS ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 4

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH[4] | ☐-EXCELLENT[7] | ☐-NONE[6] | ☐-HIGH[3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE[3] | ☐-GOOD[5] | ☐-RECOVERED[4] | ☐-MODERATE[2] | ☐-RELOCATION | ☐-ISLANDS |
| ☐-LOW[2] | ☐-FAIR[3] | ☐-RECOVERING[3] | ☒-LOW[1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☒-NONE[1] | ☒-POOR[1] | ☒-RECENT OR NO RECOVERY[1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 4
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOODPLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE >50m[4] | ☐☐-FOREST, SWAMP[3] | ☐☐-URBAN OR INDUSTRIAL[0] | ☐☐-NONE OR LITTLE[3] |
| ☐☐-MODERATE 10-50[3] | ☒☒-OPEN PASTURE/ROWCROP[0] | ☐☐-SHRUB OR OLD FIELD[2] | ☒☒-MODERATE[2] |
| ☐☐-NARROW 5-10m[2] | ☐☐-RESID.,PARK,NEW FIELD[1] | ☐☐-CONSERV. TILLAGE[1] | ☐☐-HEAVY OR SEVERE[1] |
| ☐☐-VERY NARROW 1-5m[1] | ☐☐-FENCED PASTURE[1] | ☐☐-MINING/CONSTRUCTION[0] | |
| ☒☒-NONE[0] | | | |

COMMENTS ___

5.) POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 7

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐->1m[6] | ☒-POOL WIDTH > RIFFLE WIDTH[2] | ☐-TORRENTIAL[-1] | ☐-EDDIES[1] |
| ☒-0.7-1m[4] | ☐-POOL WIDTH = RIFFLE WIDTH[1] | ☐-FAST[1] | ☐-INTERSTITIAL[-1] |
| ☐-0.4-0.7m[2] | ☐-POOL WIDTH < RIFFLE W.[0] | ☐-MODERATE[1] | ☐-INTERMITTENT[-2] |
| ☐-<0.4m[1] | | ☒-SLOW[1] | ☐-NO POOL[0] |
| ☐-<0.2m (Pool = 0) | | | |

COMMENTS ___

RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY >10 cm, MAX>50[4] | ☐-STABLE (e.g.,Cobble, Boulder)[2] | ☐-EXTENSIVE[-1] | ☐-MODERATE[0] |
| ☐-GENERALLY >10 cm, MAX<50[3] | ☐-MOD. STABLE (e.g.,Pea Gravel)[1] | ☒-LOW[1] | ☐-NONE[2] |
| ☒-GENERALLY 5-10 cm[1] | ☒-UNSTABLE (Gravel,Sand)[0] | | ☐-NO RIFFLE[0] |
| ☐-GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ___ GRADIENT: 4

6] Gradient (feet/mile): 2.00 %POOL: 95 %RIFFLE: ___ %RUN: 5

WF2
8/15/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 46
Stream West Fork RM ____ Date 8/15/99 River Code ____
Location WF2 Crew EJS / CWS

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: 12

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY
- O O-BLDER/SLABS [10] ____ ____ / X O-GRAVEL [7] ____ X / Substrate Origin (Check all) / Silt Cover (Check One)
- O O-BOULDER [9] ____ ____ / O O-SAND [6] ____ ____ / O-LIMESTONE [1] O-RIPRAP [0] / O-SILT HEAVY [-2] O-SILT MODERATE [-1]
- O O-COBBLE [8] X X / O O-BEDROCK [5] ____ ____ / X TILLS [1] X HARDPAN [0] / X SILT NORMAL [0] O-SILT FREE [1]
- O X HARDPAN [4] X X / O O-DETRITUS [3] ____ ____ / O-SANDSTONE [0] / Extent Of Embeddedness (Check One)
- O O-MUCK [2] ____ ____ / O O-ARTIFIC. [0] ____ X / O-SHALE [-1] / O-EXTENSIVE [-2] O-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: X >4 [2] X <=4 [0] O-COAL FINES [-2] X LOW [0] O-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply) / AMOUNT (Check ONLY One or check 2 and AVERAGE)
- O-UNDERCUT BANKS [1] / X DEEP POOLS [2] / O-OXBOWS [1] / O - EXTENSIVE > 75% [11]
- X OVERHANGING VEGETATION [1] / O-ROOTWADS [1] / X AQUATIC MACROPHYTES [1] / O - MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1] / O-BOULDERS [1] / X LOGS OR WOODY DEBRIS [1] / X SPARSE 5-25% [3]
- O - NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | O - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X LOW [2] | O - FAIR [3] | X RECOVERING [3] | X LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | X POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE >50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | X X OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X X MODERATE [2] |
| O O-NARROW 5-10m [2] | O O- RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O >1m [6] | | | |
| X 0.7-1m [4] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| O 0.4-0.7m [2] | X POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O <0.4m [1] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] |
| O-<0.2m [Pool = 0] | | X SLOW [1] | |

O NO POOL [0]

COMMENTS ____

RIFFLE: 4

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY >10 cm, MAX.>50 [4] | X STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O - GENERALLY >10 cm, MAX.<50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X LOW [1] | O-NONE [2] |
| X GENERALLY 5-10 cm [1] | O-UNSTABLE (Gravel, Sand) [0] | | |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

→ bridge abutment riprap

O NO RIFFLE [0]

COMMENTS ____ GRADIENT: 2

5) Gradient (feet/mile): 1.096 %POOL: 52 %RIFFLE: 5 %RUN: 43

EPA 4520

WF1
8/16/c

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI)

## Ohio EPA Site Description Sheet - Fish

**QHEI SCORE:** 41

Stream West Fork of Pigeon RM ____ Date 8/16/99 River Code ____
Location WF1 Crew EB KWB

**1) SUBSTRATE** (Check ONLY Two Substrate TYPE BOXES; Check all types present):

**SUBSTRATE SCORE:** 14

TYPE POOL RIFFLE
- ☐ ☐-BLDER/SLABS [10]
- ☐ ☐-BOULDER [9]
- ☐ ☐-COBBLE [8]
- ☐ ☐-HARDPAN [4]
- ☐ ☐-MUCK [2]

POOL RIFFLE
- ☐ X GRAVEL [7] X X
- ☐ X SAND [6] X X
- ☐ ☐-BEDROCK [5]
- ☐ ☐-DETRITUS [3]
- ☐ ☐-ARTIFIC [0]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] X-<= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE QUALITY
Substrate Origin (Check all)
- ☐-LIMESTONE [1] ☐-RIPRAP [0]
- X TILLS [1] ☐-HARDPAN [0]
- X SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]

Silt Cover (Check One)
- ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- X SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddedness (Check One)
- ☐-EXTENSIVE [-2] ☐-MODERATE [-1]
- X-LOW [0] ☐-NONE [1]

COMMENTS ____

**2) INSTREAM COVER**

**COVER SCORE:** 9

TYPE (Check All That Apply)
- ☐-UNDERCUT BANKS [1]
- X OVERHANGING VEGETATION [1]
- X SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]
- ☐-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- X AQUATIC MACROPHYTES [1]
- X LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

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

**CHANNEL:** 4

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☐ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | ☐ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☐ - LOW [2] | ☐ - FAIR [3] | ☐ - RECOVERING [3] | X LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| X NONE [1] | X POOR [1] | X RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

**4) RIPARIAN ZONE AND BANK EROSION** - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

**RIPARIAN:** 6

RIPARIAN WIDTH
L R (Per Bank)
- ☐ ☐-WIDE > 50m [4]
- ☐ ☐-MODERATE 10-50 [3]
- ☐ ☐-NARROW 5-10m [2]
- X-VERY NARROW 1-5m [1]
- ☐ ☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
- ☐ ☐-FOREST, SWAMP [3]
- X OPEN PASTURE/ ROWCROP [0]
- ☐ ☐-RESID.,PARK,NEW FIELD [1]
- ☐ ☐-FENCED PASTURE [1]

L R (Per Bank)
- ☐ ☐-URBAN OR INDUSTRIAL [0]
- ☐ ☐-SHRUB OR OLD FIELD [2]
- ☐ ☐-CONSERV. TILLAGE [1]
- ☐ ☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ☐ ☐-NONE OR LITTLE [3]
- X MODERATE [2]
- ☐ ☐-HEAVY OR SEVERE [1]

COMMENTS: ____

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

**POOL:** 4

MAX. DEPTH (Check 1)
- ☐->1m [6]
- ☐-0.7-1m [4]
- ☐-0.4-0.7m [2]
- X <0.4m [1]
- ☐-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- X POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- ☐-TORRENTIAL [-1]
- ☐-FAST [1]
- ☐-MODERATE [1]
- X SLOW [1]
- ☐-EDDIES [1]
- ☐-INTERSTITIAL [-1]
- ☐-INTERMITTENT [-2]

☐-NO POOL [0]

COMMENTS: ____

**RIFFLE:** 2

RIFFLE/RUN DEPTH
- ☐ - GENERALLY >10 cm MAX > 50 [4]
- ☐ - GENERALLY >10 cm, MAX < 50 [3]
- X GENERALLY 5-10 cm [1]
- ☐ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g., Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g., Pea Gravel) [1]
- X UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1] ☐-MODERATE [0]
- X LOW [1] ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS ____

**GRADIENT:** 2

6) Gradient (feet/mile): 1.045 %POOL: 47 %RIFFLE: 38 %RUN: 15

SF3
9/14/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [ ] 61

Stream Smith Fork RM ____ Date 8/14/99 River Code ____

Location ____ Crew ESD Lewis

1) SUBSTRATE (Check ONE (Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: [ ] 12

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| O-O-BLDER /SLABS [10] | | | O-O-GRAVEL [7] | X | | Substrate Origin (Check all) |
| O-O-BOULDER [9] | | | O-O-SAND [6] | X | | O-LIMESTONE [1] O-RIP/RAP [0] |
| O-O-COBBLE [8] | X | X | O-O-BEDROCK [5] | | | X-TILLS [1] X-HARDPAN [0] |
| X-O-HARDPAN [4] | X | X | O-O-DETRITUS [3] | | | O-SANDSTONE [0] |
| O-O-MUCK [2] | | | O-O-ARTIFIC [0] | | | O-SHALE [-1] |

Silt Cover (Check One): O-SILT HEAVY [-2] O-SILT MODERATE [-1] X-SILT NORMAL [0] O-SILT FREE [1]

Extent Of Embeddedness (Check One): O—EXTENSIVE [-2] O—MODERATE [-1] X—LOW [0] O—NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] X <= 4 [0] O-COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: [13]

TYPE (Check All That Apply)

O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1]
O-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1]
O-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [11]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| X - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | X - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | X - FAIR [3] | X - RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | O - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [10]

"River Right Looking Downstream"

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | X O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O X-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| X O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| O X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [9]

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| X- > 1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| O- 0.7-1m [4] | O-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O- 0.4-0.7m [2] | O-POOL WIDTH < RIFFLE W. [0] | O-MODERATE [1] | O-INTERMITTENT [-2] |
| O- < 0.4m [1] | | X-SLOW [1] | |
| O— < 0.2m [Pool = 0] | | | |

[O-NO POOL [0]]

COMMENTS ____

RIFFLE: [2]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X-LOW. [1] | O-NONE [2] |
| X - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | |
| O - GENERALLY < 5 cm [Riffle = 0] | | | |

[O-NO RIFFLE [0]]

COMMENTS ____ GRADIENT: [4]

6) Gradient (feet/mile): 1.612 %POOL: 93 %RIFFLE: 7 %RUN: ____

EPA 4520

SF:
8/14/



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: ~~[illegible]~~ 49

Stream: Smith Fork RM: ____ Date: 8/14/ River Code: ____

Location: SF2 Crew: [illegible]

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: ~~[illegible]~~ 11

- BLDER /SLABS [10] ____ ____ GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
- BOULDER [9] ____ ____ SAND [6] X X LIMESTONE [1] RIP/RAP [0] SILT HEAVY [-2] X SILT MODERATE [-1]
- COBBLE [8] X X BEDROCK [5] ____ X TILLS [1] X HARDPAN [0] SILT NORMAL [0] SILT FREE [1]
- X HARDPAN [4] ____ X DETRITUS [3] ____ SANDSTONE [0] Extent Of Embeddedness (Check One)
- MUCK [2] ____ ____ ARTIFIC. [0] ____ SHALE [-1] EXTENSIVE [-2] MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] X <= 4 [0] COAL FINES [-2] X LOW [0] NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

COVER SCORE: 10

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- UNDERCUT BANKS [1] X DEEP POOLS [2] OXBOWS [1] EXTENSIVE > 75% [11]
- X OVERHANGING VEGETATION [1] X ROOTWADS [1] X AQUATIC MACROPHYTES [1] MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1] BOULDERS [1] X LOGS OR WOODY DEBRIS [1] X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | X MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| WIDE > 50m [4] | FOREST, SWAMP [3] | URBAN OR INDUSTRIAL [0] | NONE OR LITTLE [3] |
| MODERATE 10-50 [3] | X OPEN PASTURE/ ROWCROP [0] | SHRUB OR OLD FIELD [2] | X MODERATE [2] |
| NARROW 5-10m [2] | RESID., PARK, NEW FIELD [1] | CONSERV. TILLAGE [1] | HEAVY OR SEVERE [1] |
| X VERY NARROW 1-5m [1] | FENCED PASTURE [1] | MINING/CONSTRUCTION [0] | |
| NONE [0] | | | |

COMMENTS: ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 7

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| > 1m [6] | X POOL WIDTH > RIFFLE WIDTH [2] | TORRENTIAL [-1] | EDDIES [1] | NO POOL [0] |
| X 0.7-1m [4] | POOL WIDTH = RIFFLE WIDTH [1] | FAST [1] | INTERSTITIAL [-1] | |
| 0.4-0.7m [2] | POOL WIDTH < RIFFLE W. [0] | MODERATE [1] | INTERMITTENT [-2] | |
| < 0.4m [1] | | X SLOW [1] | | |
| < 0.2m [Pool = 0] | | | | |

COMMENTS: ____

RIFFLE: 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| GENERALLY > 10cm, MAX. > 50 [4] | STABLE (e.g., Cobble, Boulder) [2] | EXTENSIVE [-1] | MODERATE [0] |
| GENERALLY > 10 cm, MAX. < 50 [3] | MOD. STABLE (e.g., Pea Gravel) [1] | X LOW [1] | NONE [2] |
| GENERALLY 5-10 cm [1] | X UNSTABLE (Gravel, Sand) [0] | | NO RIFFLE [0] |
| X GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): 1.913 %POOL: 89 %RIFFLE: 2 %RUN: 9

SF
8/14

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: [50] 46

Stream: Smith Fork  RM: ____ Date: 9/14/89  River Code: ____
Location: SF1  Crew: EB/EWB

**1) SUBSTRATE** (Check ONLY Two Substrate TYPE BOXES; Check all types present)

SUBSTRATE SCORE: [13] 11

TYPE — POOL RIFFLE
- ☐☐-BLDER/SLABS[10] ____ ____
- ☐☐-BOULDER[9] ____ ____
- ☐☐-COBBLE[8] X X
- ☐☒-HARDPAN[4] X X
- ☐☐-MUCK[2] ____ ____

POOL RIFFLE
- ☐☒-GRAVEL[7] X X
- ☐☐-SAND[6] X X
- ☐☐-BEDROCK[5] ____ ____
- ☐☐-DETRITUS[3] ____ ____
- ☐☐-ARTIFIC[0] ____ ____

TOTAL NUMBER OF SUBSTRATE TYPES: ☒ ≥4 [2] ☒ ≤4 [0]

SUBSTRATE QUALITY
Substrate Origin (Check all)
- ☐-LIMESTONE [1]
- ☒-TILLS [1]
- ☐-SANDSTONE [0]
- ☐-SHALE [-1]
- ☐-COAL FINES [-2]
- ☐-RIPRAP [0]
- ☒-HARDPAN [0]

Silt Cover (Check One)
- ☐-SILT HEAVY [-2] ☒-SILT MODERATE [-1]
- ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddedness (Check One)
- ☐—EXTENSIVE [-2] ☐—MODERATE [-1]
- ☒—LOW [0] ☐—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

**2) INSTREAM COVER**

COVER SCORE: [7]

TYPE (Check All That Apply)
- ☐-UNDERCUT BANKS [1]
- ☐-OVERHANGING VEGETATION [1]
- ☒-SHALLOWS (IN SLOW WATER) [1]
- ☒-DEEP POOLS [2]
- ☐-ROOTWADS [1]
- ☐-BOULDERS [1]
- ☐-OXBOWS [1]
- ☐-AQUATIC MACROPHYTES [1]
- ☒-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

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

CHANNEL: [4]

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☒-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☒-LOW [2] | ☐-FAIR [3] | ☒-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☒-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

**4) RIPARIAN ZONE AND BANK EROSION** - (check ONE box per bank or check 2 and AVERAGE per bank)
"River Right Looking Downstream"

RIPARIAN: [12]

RIPARIAN WIDTH
L R (Per Bank)
- ☐☐-WIDE > 50m [4]
- ☐☐-MODERATE 10-50 [3]
- ☐☐-NARROW 5-10m [2]
- ☒☒-VERY NARROW 1-5m [1]
- ☐☐-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
- ☒☒-FOREST, SWAMP [3]
- ☐☐-OPEN PASTURE/ROWCROP [0]
- ☐☐-RESID.,PARK,NEW FIELD [1]
- ☐☐-FENCED PASTURE [1]

L R (Per Bank)
- ☐☐-URBAN OR INDUSTRIAL [0]
- ☐☐-SHRUB OR OLD FIELD [2]
- ☐☐-CONSERV. TILLAGE [1]
- ☐☐-MINING/CONSTRUCTION [0]

BANK EROSION
- ☐☐-NONE OR LITTLE [3]
- ☒☒-MODERATE [2]
- ☐☐-HEAVY OR SEVERE [1]

COMMENTS: ____

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

POOL: [5]

MAX. DEPTH (Check 1)
- ☐- >1m [6]
- ☐- 0.7-1m [4]
- ☒- 0.4-0.7m [2]
- ☐- ≤0.4m [1]
- ☐- <0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- ☒-POOL WIDTH > RIFFLE WIDTH [2]
- ☐-POOL WIDTH = RIFFLE WIDTH [1]
- ☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- ☐-TORRENTIAL [-1]
- ☐-FAST [1]
- ☐-MODERATE [1]
- ☒-SLOW [1]
- ☐-EDDIES [1]
- ☐-INTERSTITIAL [-1]
- ☐-INTERMITTENT [-2]

☐-NO POOL [0]

COMMENTS: ____

RIFFLE: [1]

RIFFLE/RUN DEPTH
- ☐-GENERALLY >10 cm, MAX > 50 [4]
- ☐-GENERALLY >10 cm, MAX < 50 [3]
- ☐-GENERALLY 5-10 cm [1]
- ☒-GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- ☐-STABLE (e.g., Cobble, Boulder) [2]
- ☐-MOD. STABLE (e.g., Pea Gravel) [1]
- ☒-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- ☐-EXTENSIVE [-1]
- ☐-MODERATE [0]
- ☒-LOW [1]
- ☐-NONE [2]

☐-NO RIFFLE [0]

COMMENTS ____

GRADIENT: [4]

6) Gradient (feet/mile): 1.100  %POOL: 74  %RIFFLE: ____  %RUN: 26

Glide

EPA 4520

B62

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [ ] 56

Stream Big Creek RM ___ Date 8/3/99 River Code ___
Location BC2 Crew GJB/CWB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE:** [ ] 13

☐ ☐-BLDER /SLABS [10] ___ ___ ☒ ☐-GRAVEL [7] ___ ___ Substrate Origin (Check all) Silt Cover (Check One)
☐ ☐-BOULDER [9] X ___ ☒ ☐-SAND [6] ___ ___ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐ ☐-COBBLE [8] X ___ ☐ ☐-BEDROCK [5] ___ ___ ☐-TILLS [1] ☒-HARDPAN [0] ☒ - SILT NORMAL [0] ☐ - SILT FREE [1]
☐ ☐-HARDPAN [4] X ___ ☐ ☐-DETRITUS [3] X ___ ☒-SANDSTONE [0] Extent Of Embeddedness (Check One)
☐ ☐-MUCK [2] ___ ___ ☐ ☐-ARTIFIC [0] ___ ___ ☐-SHALE [-1] ☐—EXTENSIVE [-2] ☐—MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ☐ > 4 [2] ☒ — ≤ 4 [0] ☐-COAL FINES [-2] ☒—LOW [0] ☐—NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ___

**COVER SCORE:** [ ] 14

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

☐ -UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐ -OXBOWS [1] ☐ - EXTENSIVE > 75% [11]
☒ -OVERHANGING VEGETATION [1] ☒-ROOTWADS [1] ☐ -AQUATIC MACROPHYTES [1] ☒ - MODERATE 25-75% [7]
☒ -SHALLOWS (IN SLOW WATER) [1] ☒-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1] ☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ___

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** [13]

SINUOSITY / DEVELOPMENT / CHANNELIZATION / STABILITY / MODIFICATIONS/OTHER

☐ - HIGH [4] ☐ - EXCELLENT [7] ☐ - NONE [6] ☐ - HIGH [3] ☐ - SNAGGING ☐ - IMPOUND.
☐ - MODERATE [3] ☒ - GOOD [5] ☒ - RECOVERED [4] ☒ - MODERATE [2] ☐ - RELOCATION ☐ - ISLANDS
☒ - LOW [2] ☐ - FAIR [3] ☐ - RECOVERING [3] ☐ - LOW [1] ☐ - CANOPY REMOVAL ☒ - LEVEED
☐ - NONE [1] ☐ - POOR [1] ☐ - RECENT OR NO RECOVERY [1] ☐ - DREDGING ☐ - BANK SHAPING
☐ - ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ___

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** [6] 6

"River Right Looking Downstream"

RIPARIAN WIDTH / EROSION/RUNOFF - FLOOD PLAIN QUALITY / BANK EROSION

L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)
☐ ☐-WIDE > 50m [4] ☐☐-FOREST, SWAMP [3] ☐☐-URBAN OR INDUSTRIAL [0] ☐ ☐-NONE OR LITTLE [3]
☐ ☐-MODERATE 10-50 [3] ☒☒-OPEN PASTURE/ ROWCROP [0] ☐☐-SHRUB OR OLD FIELD [2] ☒ ☒-MODERATE [2]
☐ ☐-NARROW 5-10m [2] ☐☐- RESID.,PARK,NEW FIELD [1] ☐☐-CONSERV. TILLAGE [1] ☐ ☐-HEAVY OR SEVERE [1]
☒☒-VERY NARROW 1-5m [1] ☐☐-FENCED PASTURE [1] ☐☐-MINING/CONSTRUCTION [0]
☐☐-NONE [0]

COMMENTS: ___

5] POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** [6]

MAX. DEPTH (Check 1) / MORPHOLOGY (Check 1) / POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

☒ > 1m [6] ☐ - POOL WIDTH > RIFFLE WIDTH [2] ☐ - TORRENTIAL [-1] ☐ - EDDIES [1]
☐ 0.7-1m [4] ☒ - POOL WIDTH = RIFFLE WIDTH [1] ☐ - FAST [1] ☒ - INTERSTITIAL [-1] ☐ NO POOL [0]
☐ 0.4-0.7m [2] ☐ - POOL WIDTH < RIFFLE W. [0] ☐ - MODERATE [1] ☐ - INTERMITTENT [-2]
☐ < 0.4m [1] ☐ - SLOW [1]
☐ — < 0.2m [Pool = 0]

COMMENTS: ___

**RIFFLE:** [0]

RIFFLE/RUN DEPTH / RIFFLE/RUN SUBSTRATE / RIFFLE/RUN EMBEDDEDNESS

☐ - GENERALLY > 10 cm, MAX > 50 [4] ☐-STABLE (e.g.,Cobble, Boulder) [2] ☐-EXTENSIVE [-1] ☐-MODERATE [0]
☐ - GENERALLY > 10 cm, MAX < 50 [3] ☐-MOD. STABLE (e.g.,Pea Gravel) [1] ☐-LOW [1] ☐-NONE [2]
☐ - GENERALLY 5-10 cm [1] ☐-UNSTABLE (Gravel, Sand) [0] ☒ NO RIFFLE [0]
☐ - GENERALLY < 5 cm [Riffle = 0]

COMMENTS ___ **GRADIENT:** [4]

6] Gradient (feet/mile): 1.2-00 %POOL: 100 %RIFFLE: ___ %RUN: ___

EPA 4520

glide

BG / 8/14/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 45

Stream: Big Creek Date: 8/14/99 River Code:
Location: BG1 Crew:

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE / POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY — SUBSTRATE SCORE: 12

- BLDER/SLABS[10]
- BOULDER[9]
- COBBLE[8] — X X
- HARDPAN[4] — X
- MUCK [2]
- GRAVEL[7] — X X
- SAND[6] — X X
- BEDROCK[5]
- DETRITUS[3]
- ARTIFIC[0]

Substrate Origin (Check all): LIMESTONE [1], RIPRAP [0], TILLS [1], HARDPAN [0] X, SANDSTONE [0], SHALE [-1], COAL FINES [-2]

Silt Cover (Check One): SILT HEAVY [-2], SILT MODERATE [-1], SILT NORMAL [0] X, SILT FREE [1]

Extent Of Embeddedness (Check One): EXTENSIVE [-2], MODERATE [-1], LOW [0] X, NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: >4 [2] <=4 [0] X

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS:

2] INSTREAM COVER — COVER SCORE: 9

TYPE (Check All That Apply): UNDERCUT BANKS [1]; OVERHANGING VEGETATION [1]; SHALLOWS (IN SLOW WATER) [1] X; DEEP POOLS [2] X; ROOTWADS [1]; BOULDERS [1]; OXBOWS [1]; AQUATIC MACROPHYTES [1] X; LOGS OR WOODY DEBRIS [1] X

AMOUNT (Check ONLY One or check 2 and AVERAGE): EXTENSIVE > 75% [11]; MODERATE 25-75% [7]; SPARSE 5-25% [3] X; NEARLY ABSENT < 5% [1]

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 8

SINUOSITY: HIGH [4]; MODERATE [3]; LOW [2] X; NONE [1] X

DEVELOPMENT: EXCELLENT [7]; GOOD [5]; FAIR [3]; POOR [1] X

CHANNELIZATION: NONE [6]; RECOVERED [4]; RECOVERING [3] X; RECENT OR NO RECOVERY [1]

STABILITY: HIGH [3]; MODERATE [2] X; LOW [1]

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

COMMENTS:

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 6

*River Right Looking Downstream*

RIPARIAN WIDTH (L R Per Bank): WIDE > 50m [4]; MODERATE 10-50 [3]; NARROW 5-10m [2]; VERY NARROW 1-5m [1] X X; NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY (L R Most Predominant Per Bank): FOREST, SWAMP [3]; OPEN PASTURE/ ROWCROP [0] X; RESID., PARK, NEW FIELD [1]; FENCED PASTURE [1]; URBAN OR INDUSTRIAL [0]; SHRUB OR OLD FIELD [2]; CONSERV. TILLAGE [1]; MINING/CONSTRUCTION [0]

BANK EROSION: NONE OR LITTLE [3]; MODERATE [2] X; HEAVY OR SEVERE [1]

COMMENTS:

5] POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 5

MAX. DEPTH (Check 1): > 1m [6]; 0.7-1m [4]; 0.4-0.7m [2] X; < 0.4m [1]; < 0.2m [Pool = 0]

MORPHOLOGY (Check 1): POOL WIDTH > RIFFLE WIDTH [2] X; POOL WIDTH = RIFFLE WIDTH [1]; POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply): TORRENTIAL [-1]; FAST [1]; MODERATE [1]; SLOW [1] X; EDDIES [1]; INTERSTITIAL [-1]; INTERMITTENT [-2]

NO POOL [0]

COMMENTS:

RIFFLE: 2

RIFFLE/RUN DEPTH: GENERALLY > 10 cm, MAX > 50 [4]; GENERALLY > 10 cm, MAX < 50 [3]; GENERALLY 5-10 cm [1] X; GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE: STABLE (e.g., Cobble, Boulder) [2]; MOD. STABLE (e.g., Pea Gravel) [1]; UNSTABLE (Gravel, Sand) [0] X

RIFFLE/RUN EMBEDDEDNESS: EXTENSIVE [-1]; MODERATE [0]; LOW [1] X; NONE [2]

NO RIFFLE [0]

COMMENTS — GRADIENT: 4

6] Gradient (feet/mile): 1.630 %POOL: 30 %RIFFLE: 2 %RUN: 18

3/11/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 57

Stream Sugar Creek RM ____ Date 3/11/99 River Code ____
Location SC1 Crew ____

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: 15

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS[10] / GRAVEL [7] X / Substrate Origin (Check all) / Silt Cover (Check One)
- BOULDER [9] / SAND [6] X / LIMESTONE [1] / RIP/RAP [0] / SILT HEAVY [-2] / SILT MODERATE [-1]
- COBBLE [8] / BEDROCK[5] / TILLS [1] / X HARDPAN [0] / SILT NORMAL [0] / SILT FREE [1]
- HARDPAN [4] X / DETRITUS[3] / SANDSTONE [0] / Extent Of Embeddedness (Check One)
- MUCK [2] X / ARTIFIC.[0] X / SHALE [-1] / EXTENSIVE [-2] / MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] / <= 4 [0] / COAL FINES [-2] / X LOW [0] / NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER COVER SCORE: 10

TYPE (Check All That Apply) / AMOUNT (Check ONLY One or check 2 and AVERAGE)

- UNDERCUT BANKS [1] / X DEEP POOLS [2] / OXBOWS [1] / EXTENSIVE > 75% [11]
- X OVERHANGING VEGETATION [1] / X ROOTWADS [1] / X AQUATIC MACROPHYTES [1] / MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1] / BOULDERS [1] / X LOGS OR WOODY DEBRIS [1] / X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | X MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 5 1.5

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank) / EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank) / BANK EROSION

- WIDE > 50m [4] / FOREST, SWAMP [3] / URBAN OR INDUSTRIAL [0] / NONE OR LITTLE [3]
- MODERATE 10-50 [3] / X OPEN PASTURE/ ROWCROP [0] / SHRUB OR OLD FIELD [2] / X MODERATE [2]
- NARROW 5-10m [2] / RESID.,PARK,NEW FIELD [1] / CONSERV. TILLAGE [1] / HEAVY OR SEVERE [1]
- X VERY NARROW 1-5m [1] / FENCED PASTURE [1] / MINING/CONSTRUCTION [0]
- NONE [0]

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

MAX. DEPTH (Check 1) / MORPHOLOGY (Check 1) / POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- > 1m [6] / POOL WIDTH > RIFFLE WIDTH [2] / TORRENTIAL [-1] / EDDIES [1]
- X 0.7-1m [4] / X POOL WIDTH = RIFFLE WIDTH [1] / FAST [1] / INTERSTITIAL [-1] / NO POOL [0]
- 0.4-0.7m [2] / POOL WIDTH < RIFFLE W. [0] / MODERATE [1] / INTERMITTENT [-2]
- < 0.4m [1] / X SLOW [1]
- < 0.2m (Pool = 0)

COMMENTS: ____

RIFFLE: 0

RIFFLE/RUN DEPTH / RIFFLE/RUN SUBSTRATE / RIFFLE/RUN EMBEDDEDNESS

- GENERALLY > 10 cm, MAX > 50 [4] / STABLE (e.g.,Cobble, Boulder) [2] / EXTENSIVE [-1] / MODERATE [0]
- GENERALLY > 10 cm, MAX < 50 [3] / MOD. STABLE (e.g.,Pea Gravel) [1] / LOW [1] / NONE [2]
- GENERALLY 5-10 cm [1] / UNSTABLE (Gravel,Sand) [0] / X NO RIFFLE [0]
- GENERALLY < 5 cm [Riffle = 0]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): 1.158 %POOL: 100 %RIFFLE: ____ %RUN: ____

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 32

Stream: Un. Named trib. RM ___ Date 8/12 River Code ___
Location ___ Crew: ___

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 5

TYPE POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY

- O-BLDER/SLABS[10] — O-GRAVEL[7] ✓ — Substrate Origin (Check all) — Silt Cover (Check One)
- O-BOULDER[9] — O-SAND[6] — O-LIMESTONE[1] O-RIPRAP[0] — O-SILT HEAVY[-2] X SILT MODERATE[-1]
- O-COBBLE[8] — O-BEDROCK[5] — TILLS[1] — O-HARDPAN[0] — O-SILT NORMAL[0] — O-SILT FREE[1]
- O-HARDPAN[4] — O-DETRITUS[3] — O-SANDSTONE[0] — Extent Of Embeddedness (Check One)
- X O-MUCK[2] ✓ — O-ARTIFIC.[0] — O-SHALE[-1] — O-EXTENSIVE[-2] X MODERATE[-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: O->4[2] X <=4[0] O-COAL FINES[-2] — O-LOW[0] O-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

2) INSTREAM COVER — COVER SCORE: 2

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- O-UNDERCUT BANKS[1] — O-DEEP POOLS[2] — O-OXBOWS[1] — O-EXTENSIVE >75%[11]
- O-OVERHANGING VEGETATION[1] — O-ROOTWADS[1] — O-AQUATIC MACROPHYTES[1] — O-MODERATE 25-75%[7]
- O-SHALLOWS (IN SLOW WATER)[1] — O-BOULDERS[1] — X LOGS OR WOODY DEBRIS[1] — O-SPARSE 5-25%[3]
- X NEARLY ABSENT <5%[1]

COMMENTS: ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 6

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH[4] | O-EXCELLENT[7] | O-NONE[6] | O-HIGH[3] | O-SNAGGING | O-IMPOUND. |
| O-MODERATE[3] | O-GOOD[5] | O-RECOVERED[4] | X MODERATE[2] | O-RELOCATION | O-ISLANDS |
| X LOW[2] | X FAIR[3] | X RECOVERING[3] | O-LOW[1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE[1] | O-POOR[1] | O-RECENT OR NO RECOVERY[1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 9
"River Right Looking Downstream"

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O-WIDE>50m[4] | X FOREST, SWAMP[3] | O-URBAN OR INDUSTRIAL[0] | O-NONE OR LITTLE[3] |
| O-MODERATE 10-50[3] | X OPEN PASTURE/ROWCROP[0] | O-SHRUB OR OLD FIELD[2] | X X MODERATE[2] |
| O-NARROW 5-10m[2] | O-RESID.,PARK,NEW FIELD[1] | O-CONSERV. TILLAGE[1] | O-HEAVY OR SEVERE[1] |
| X X VERY NARROW 1-5m[1] | O-FENCED PASTURE[1] | O-MINING/CONSTRUCTION[0] | |
| O-NONE[0] | | | |

COMMENTS ___

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 1

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O->1m[6] | | | |
| O-0.7-1m[4] | O-POOL WIDTH > RIFFLE WIDTH[2] | O-TORRENTIAL[-1] | O-EDDIES[1] |
| O-0.4-0.7m[2] | X POOL WIDTH = RIFFLE WIDTH[1] | O-FAST[1] | X INTERSTITIAL[-1] |
| X <0.4m[1] | O-POOL WIDTH < RIFFLE W.[0] | O-MODERATE[1] | O-INTERMITTENT[-2] |
| O-0.2=(Pool=0) | | O-SLOW[1] | |

O-NO POOL[0]

COMMENTS ___

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O-GENERALLY >10 cm,MAX>50[4] | O-STABLE (e.g.,Cobble, Boulder)[2] | O-EXTENSIVE[-1] | O-MODERATE[0] |
| O-GENERALLY >10 cm,MAX<50[3] | O-MOD. STABLE (e.g.,Pea Gravel)[1] | O-LOW[1] | O-NONE[2] |
| O-GENERALLY 5-10 cm[1] | O-UNSTABLE (Gravel,Sand)[0] | | X NO RIFFLE[0] |
| O-GENERALLY <5 cm (Riffle=0) | | | |

COMMENTS ___ GRADIENT: 2

6) Gradient (feet/mile): ___ %POOL: 100 %RIFFLE: ___ %RUN: ___

EPA 4520

SD1
8/13/



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 45

Stream Schellberg Ditch RM ___ Date 8/13/__ River Code ___
Location SD1 ___ Crew ___

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY — SUBSTRATE SCORE: 12

- □□-BLDER/SLABS[10] / □□-GRAVEL [7] / X Substrate Origin (Check all) / Silt Cover (Check One)
- □□-BOULDER [9] / □X-SAND [6] / X □-LIMESTONE [1] □-RIP/RAP [0] □-SILT HEAVY [-2] X-SILT MODERATE [-1]
- □□-COBBLE [8] X □□-BEDROCK[5] / X-TILLS [1] □-HARDPAN [0] □-SILT NORMAL [0] □-SILT FREE [1]
- □□-HARDPAN [4] / □□-DETRITUS[3] / X-SANDSTONE [0] / Extent Of Embeddedness (Check One)
- □□-MUCK [2] / □□-ARTIFIC.[0] / □-SHALE [-1] / □-EXTENSIVE [-2] X-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: □- > 4 [2] X- <= 4 [0] □-COAL FINES [-2] □-LOW[0] □-NONE[1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

2] INSTREAM COVER — COVER SCORE: 6

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-UNDERCUT BANKS [1] / □-DEEP POOLS [2] / □-OXBOWS [1] / □-EXTENSIVE > 75% [11]
- □-OVERHANGING VEGETATION [1] / X-ROOTWADS [1] / □-AQUATIC MACROPHYTES [1] / □-MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1] / □-BOULDERS [1] / X-LOGS OR WOODY DEBRIS [1] / X-SPARSE 5-25% [3]
- □-NEARLY ABSENT < 5% [1]

COMMENTS: ___

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) — CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING | □-IMPOUND. |
| □-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | X-MODERATE [2] | □-RELOCATION | □-ISLANDS |
| X-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL | □-LEVEED |
| □-NONE [1] | □-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING | □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) — RIPARIAN: 12

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| □□-WIDE > 50m [4] | X-FOREST, SWAMP [3] | □□-URBAN OR INDUSTRIAL [0] | □ □-NONE OR LITTLE [3] |
| □□-MODERATE 10-50 [3] | □□-OPEN PASTURE/ ROWCROP [0] | □□-SHRUB OR OLD FIELD [2] | X-MODERATE [2] |
| □□-NARROW 5-10m [2] | □□-RESID.,PARK,NEW FIELD [1] | □□-CONSERV. TILLAGE [1] | □ □-HEAVY OR SEVERE [1] |
| X-VERY NARROW 1-5m [1] | □□-FENCED PASTURE [1] | □□-MINING/CONSTRUCTION [0] | |
| □□-NONE [0] | | | |

COMMENTS: ___

POOL/GLIDE AND RIFFLE/RUN QUALITY — POOL: 0

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/GLIDE/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| □- > 1m [6] | □-POOL WIDTH > RIFFLE WIDTH [2] | □-TORRENTIAL [-1] | □-EDDIES [1] |
| □- 0.7-1m [4] | □-POOL WIDTH = RIFFLE WIDTH [1] | □-FAST [1] | □-INTERSTITIAL [-1] |
| □- 0.4-0.7m [2] | □-POOL WIDTH < RIFFLE W. [0] | □-MODERATE [1] | □-INTERMITTENT [-2] |
| □- < 0.4m [1] | | □-SLOW [1] | |
| □- < 0.2m [Pool = 0] | | | |

X-NO POOL [0]

COMMENTS: ___

RIFFLE: 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| □-GENERALLY > 10 cm, MAX > 50 [4] | □-STABLE (e.g., Cobble, Boulder) [2] | □-EXTENSIVE [-1] X-MODERATE [0] |
| □-GENERALLY > 10 cm, MAX < 50 [3] | □-MOD. STABLE (e.g., Pea Gravel) [1] | □-LOW [1] □-NONE [2] |
| X-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | □-NO RIFFLE [0] |
| □-GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ___ GRADIENT: 4

5] Gradient (feet/mile): .0002 %POOL: 0 %RIFFLE: 14 %RUN: 86

WD 1
8/12/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**

Stream Winnesenheimer Ditch RM ____ Date 8/12/99 QHEI SCORE: [31] 31 River Code ____
Location WD1 Crew CWB/ESB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE — POOL RIFFLE — POOL RIFFLE — SUBSTRATE QUALITY — SUBSTRATE SCORE: [1]

- ☐☐-BLDER/SLABS[10] ___ ___ ☐☐-GRAVEL [7] ___ ___ Substrate Origin (Check all) — Silt Cover (Check One)
- ☐☐-BOULDER [9] ___ ___ ☐☐-SAND [6] ___ ___ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☐-SILT HEAVY [-2] X-SILT MODERATE [-1]
- ☐☐-COBBLE [8] ___ ___ ☐☐-BEDROCK [5] ___ ___ X-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐☐-HARDPAN [4] ___ ___ ☐☐-DETRITUS [3] ___ ___ ☐-SANDSTONE [0] — Extent Of Embeddedness (Check One)
- X-MUCK [2] X ___ ☐X-ARTIFIC [0] X ___ ☐-SHALE [-1] ☐-EXTENSIVE [-2] X-MODERATE [-1]
- TOTAL NUMBER OF SUBSTRATE TYPES: ☐> 4 [2] X<= 4 [0] ☐-COAL FINES [-2] ☐-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: [5] 5

2] INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐-UNDERCUT BANKS [1] X-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
- ☐-OVERHANGING VEGETATION [1] ☐-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]
- X-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] ☐-SPARSE 5-25% [3]
- X-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [9] 9

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| X-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | X-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☐-LOW [2] | ☐-FAIR [3] | X-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | X-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [12]
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | XX-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☐☐-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | XX-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐-HEAVY OR SEVERE [1] |
| XX-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [2] 2

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| ☐->1m [6] | | | | |
| ☐-0.7-1m [4] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] | |
| X-0.4-0.7m [2] | X-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | X-INTERSTITIAL [-1] | ☐-NO POOL [0] |
| ☐-≤0.4m [1] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] | |
| ☐-<0.2m [Pool = 0] | | ☐-SLOW [1] | | |

COMMENTS: ____

RIFFLE: [0]

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY >10 cm, MAX>50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY >10 cm, MAX<50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | ☐-UNSTABLE (Gravel, Sand) [0] | | X-NO RIFFLE [0] |
| ☐-GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ____ GRADIENT: [2]

6] Gradient (feet/mile): 1.625 %POOL: 100 %RIFFLE: ____ %RUN: ____

BC3
8/11/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**  QHEI SCORE: 48

Stream: Blacklick Creek  RM: ____ Date: 8/11/99  River Code: ____

Location: BC3  Crew: LUB/EJB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 13

TYPE — POOL RIFFLE

- BLDER/SLABS [10] ____ ____
- BOULDER [9] X ____
- COBBLE [8] X ____
- HARDPAN [4] ____ ____
- MUCK [2] ____ ____
- GRAVEL [7] X X
- SAND [6] X X
- BEDROCK [5] ____ ____
- DETRITUS [3] ____ ____
- ARTIFIC. [0] X ____

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE QUALITY — Substrate Origin (Check all): LIMESTONE [1]; RIPRAP [0]; TILLS [1]; HARDPAN [0]; SANDSTONE [0]; SHALE [-1]; COAL FINES [-2]

Silt Cover (Check One): SILT HEAVY [-2]; SILT MODERATE [-1]; SILT NORMAL [0]; SILT FREE [1]

Extent Of Embeddedness (Check One): EXTENSIVE [-2]; MODERATE [-1]; LOW [0]; NONE [1]

COMMENTS ____

2) INSTREAM COVER  COVER SCORE: 9

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE)  CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| LOW [2] | FAIR [3] | RECOVERING [3] | LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)  RIPARIAN: 6

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| WIDE > 50m [4] | FOREST, SWAMP [3] | URBAN OR INDUSTRIAL [0] | NONE OR LITTLE [3] |
| MODERATE 10-50 [3] | OPEN PASTURE/ROWCROP [0] | SHRUB OR OLD FIELD [2] | MODERATE [2] |
| NARROW 5-10m [2] | RESID., PARK, NEW FIELD [1] | CONSERV. TILLAGE [1] | HEAVY OR SEVERE [1] |
| VERY NARROW 1-5m [1] | FENCED PASTURE [1] | MINING/CONSTRUCTION [0] | |
| NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY  POOL: 5

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| > 1m [6] | POOL WIDTH > RIFFLE WIDTH [2] | TORRENTIAL [-1] | EDDIES [1] |
| 0.7-1m [4] | POOL WIDTH = RIFFLE WIDTH [1] | FAST [1] | INTERSTITIAL [-1] |
| 0.4-0.7m [2] | POOL WIDTH < RIFFLE W. [0] | MODERATE [1] | INTERMITTENT [-2] |
| < 0.4m [1] | | SLOW [1] | |
| < 0.2m (Pool = 0) | | | |

NO POOL [0]

COMMENTS ____

RIFFLE: 1

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| GENERALLY > 10 cm, MAX > 50 [4] | STABLE (e.g., Cobble, Boulder) [2] | EXTENSIVE [-1] | MODERATE [0] |
| GENERALLY > 10 cm, MAX < 50 [3] | MOD. STABLE (e.g., Pea Gravel) [1] | LOW [1] | NONE [2] |
| GENERALLY 5-10 cm [1] | UNSTABLE (Gravel, Sand) [0] | | |
| GENERALLY < 5 cm (Riffle = 0) | | | |

NO RIFFLE [0]

COMMENTS ____  GRADIENT: 4

6) Gradient (feet/mile): 1.794  %POOL: 87  %RIFFLE: ____  %RUN: 11

Glide

EPA 4520

3C 2
5/10/95

Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 43 45 41

Stream ______ RM ______ Date 5/10/95 River Code ______
Location ______ Crew ______

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present) SUBSTRATE SCORE: 15 14 7

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY

- ☐ ☐-BLDER /SLABS [10] ___ ___ ☐ ☒-GRAVEL [7] X ___ Substrate Origin (Check all) Silt Cover (Check One)
- ☐ ☐-BOULDER [9] ___ ___ ☐ ☒-SAND [6] X ___ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☒-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
- ☐ ☐-COBBLE [8] ___ ___ ☐ ☐-BEDROCK [5] ___ ___ ☒-TILLS [1] ☐-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
- ☐ ☐-HARDPAN [4] ___ ___ ☐ ☐-DETRITUS [3] ___ ___ ☒-SANDSTONE [0] Extent Of Embeddedness (Check One)
- ☐ ☐-MUCK [2] ___ ___ ☐ ☐-ARTIFIC [0] ___ ___ ☐-SHALE [-1] ☐-EXTENSIVE [-2] ☒-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐->4 [2] ☒-<=4 [0] ☐-COAL FINES [-2] ☐-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

COVER SCORE: 9

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☒-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
- ☒-OVERHANGING VEGETATION [1] ☒-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]
- ☐-SHALLOWS (IN SLOW WATER) [1] ☒-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1] ☒-SPARSE 5-25% [3]
- ☐-NEARLY ABSENT < 5% [1]

COMMENTS: ______

CHANNEL: 11

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

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☒-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☒-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☐-LOW [2] | ☒-FAIR [3] | ☒-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ______

RIPARIAN: 6

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

"River Right Looking Downstream"

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐ ☐-WIDE > 50m [4] | ☐ ☐-FOREST, SWAMP [3] | ☐ ☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐ ☐-MODERATE 10-50 [3] | ☒ ☒-OPEN PASTURE/ ROWCROP [0] | ☐ ☐-SHRUB OR OLD FIELD [2] | ☒ ☒-MODERATE [2] |
| ☐ ☐-NARROW 5-10m [2] | ☒ ☒-RESID., PARK, NEW FIELD [1] | ☐ ☐-CONSERV. TILLAGE [1] | ☐ ☐-HEAVY OR SEVERE [1] |
| ☒ ☒-VERY NARROW 1-5m [1] | ☐ ☐-FENCED PASTURE [1] | ☐ ☐-MINING/CONSTRUCTION [0] | |
| ☐ ☐-NONE [0] | | | |

COMMENTS: ______

POOL: 6

POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐->1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| ☒-0.7-1m [4] | ☒-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] |
| ☐-<0.4m [1] | | ☒-SLOW [1] | |
| ☐-<0.2m [Pool = 0] | | | |

☐-NO POOL [0]

COMMENTS ______

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY >10 cm, MAX>50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY >10 cm, MAX<50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | ☐-UNSTABLE (Gravel, Sand) [0] | | ☒-NO RIFFLE [0] |
| ☐-GENERALLY < 5 cm [Riffle = 0] | | | |

COMMENTS ______ GRADIENT: 2

6] Gradient (feet/mile): 7.38 %POOL: 100 %RIFFLE: ______ %RUN: ______

EPA 4520

BC1
8/9/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 56 57

Stream Blue Grass Creek RM ___ Date 8/9/99 River Code ___
Location BC1 Crew CWB/EJB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present); SUBSTRATE SCORE: 9

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|
| □ □-BLDER/SLABS[10] | ___ | □ □-GRAVEL [7] | ___ ___ | Substrate Origin (Check all) / Silt Cover (Check One) |
| □ □-BOULDER [9] | ___ | X □-SAND [6] | X ___ | □-LIMESTONE [1] □-RIPRAP [0] □-SILT HEAVY [-2] X-SILT MODERATE [-1] |
| □ □-COBBLE [8] | ___ | □ □-BEDROCK[5] | ___ | X-TILLS [1] □-HARDPAN [0] □-SILT NORMAL [0] □-SILT FREE [1] |
| □ □-HARDPAN [4] | ___ | □ □-DETRITUS[3] | ___ | X-SANDSTONE [0] Extent Of Embeddedness (Check One) |
| □ □-MUCK [2] | ___ | □ □-ARTIFIC.[0] | ___ | □-SHALE [-1] □-EXTENSIVE [-2] X-MODERATE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: □- 4 [2] □- <= 4 [0] X-COAL FINES [-2] □-LOW [0] □-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ___

2) INSTREAM COVER COVER SCORE: 8

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

□-UNDERCUT BANKS [1] X-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]
□-OVERHANGING VEGETATION [1] X-ROOTWADS [1] □-AQUATIC MACROPHYTES [1] □-MODERATE 25-75% [7]
X-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X-SPARSE 5-25% [3]
□-NEARLY ABSENT < 5% [1]

COMMENTS: ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 14 -11

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER |
|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING □-IMPOUND. |
| X-MODERATE [3] | X-GOOD [5] | X-RECOVERED [4] | X-MODERATE [2] | □-RELOCATION □-ISLANDS |
| □-LOW [2] | □-FAIR [3] | □-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL □-LEVEED |
| □-NONE [1] | □-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank) | | BANK EROSION L R (Per Bank) |
|---|---|---|---|
| □ □-WIDE > 50m [4] | X X-FOREST, SWAMP [3] | □ □-URBAN OR INDUSTRIAL [0] | □ □-NONE OR LITTLE [3] |
| □ □-MODERATE 10-50 [3] | □ □-OPEN PASTURE/ROWCROP [0] | □ □-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| □ □-NARROW 5-10m [2] | □ □-RESID.,PARK,NEW FIELD [1] | □ □-CONSERV. TILLAGE [1] | □ □-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | □ □-FENCED PASTURE [1] | □ □-MINING/CONSTRUCTION [0] | |
| □ □-NONE [0] | | | |

COMMENTS ___

5) POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) No Riffle | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| □->1m [6] | | | |
| X-0.7-1m [4] | □-POOL WIDTH > RIFFLE WIDTH [2] | □-TORRENTIAL [-1] | □-EDDIES [1] |
| □-0.4-0.7m [2] | X-POOL WIDTH = RIFFLE WIDTH [1] | □-FAST [1] | □-INTERSTITIAL [-1] |
| □-< 0.4m [1] | □-POOL WIDTH < RIFFLE W. [0] | □-MODERATE [1] | □-INTERMITTENT [-2] |
| □-<0.2m [Pool = 0] | | X-SLOW [1] | |

□-NO POOL [0]

COMMENTS ___

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| □-GENERALLY >10 cm,MAX>50 [4] | □-STABLE (e.g.,Cobble, Boulder) [2] | □-EXTENSIVE [-1] □-MODERATE [0] |
| □-GENERALLY >10 cm,MAX<50 [3] | □-MOD. STABLE (e.g.,Pea Gravel) [1] | □-LOW [1] □-NONE [2] |
| □-GENERALLY 5-10 cm [1] | □-UNSTABLE (Gravel, Sand) [0] | X-NO RIFFLE [0] |
| □-GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ___ GRADIENT: 4

6) Gradient (feet/mile): 1.492 %POOL: 92 glide %RIFFLE: 0 %RUN: 8



358

LP2
8/6/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 46

Stream Little Pigeon RM Date 8/6/99 River Code

Location LP2 Crew CW B, CS B

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: 9

| TYPE | POOL RIFFLE | POOL RIFFLE | SUBSTRATE QUALITY | |
|---|---|---|---|---|
| □□-BLDER/SLABS[10] | □□-GRAVEL [7] X X | Substrate Origin (Check all) | Silt Cover (Check One) |
| □□-BOULDER [9] | □X-SAND [6] X X | □-LIMESTONE [1] □-RIPRAP [0] | □-SILT HEAVY [-2] X-SILT MODERATE [-1] |
| □□-COBBLE [8] | □□-BEDROCK[5] | X-TILLS [1] X-HARDPAN [0] | □-SILT NORMAL [0] □-SILT FREE [1] |
| X□-HARDPAN [4] X | □□-DETRITUS[3] | □-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| □□-MUCK [2] | □□-ARTIFIC.[0] | □-SHALE [-1] | □-EXTENSIVE [-2] X-MODERATE [-1] |
| | | □-COAL FINES [-2] | □-LOW [0] □-NONE [1] |

pools & gravel sand but no water

TOTAL NUMBER OF SUBSTRATE TYPES: □> 4 [2] X<= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ______

2] INSTREAM COVER COVER SCORE: 9

TYPE (Check All That Apply)

- □-UNDERCUT BANKS [1]
- X-OVERHANGING VEGETATION [1]
- X-SHALLOWS (IN SLOW WATER) [1]
- X-DEEP POOLS [2]
- X-ROOTWADS [1]
- □-BOULDERS [1]
- □-OXBOWS [1]
- □-AQUATIC MACROPHYTES [1]
- X-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-EXTENSIVE > 75% [11]
- □-MODERATE 25-75% [7]
- X-SPARSE 5-25% [3]
- □-NEARLY ABSENT < 5% [1]

COMMENTS: ______

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING | □-IMPOUND. |
| □-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | X-MODERATE [2] | □-RELOCATION | □-ISLANDS |
| X-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL | □-LEVEED |
| □-NONE [1] | □-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING | □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ______

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| □□-WIDE > 50m [4] | □□-FOREST, SWAMP [3] | □□-URBAN OR INDUSTRIAL [0] | □□-NONE OR LITTLE [3] |
| □□-MODERATE 10-50 [3] | XX-OPEN PASTURE/ROWCROP [0] | □□-SHRUB OR OLD FIELD [2] | XX-MODERATE [2] |
| □□-NARROW 5-10m [2] | □□-RESID., PARK, NEW FIELD [1] | □□-CONSERV. TILLAGE [1] | □□-HEAVY OR SEVERE [1] |
| XX-VERY NARROW < 5m [1] | □□-FENCED PASTURE [1] | □□-MINING/CONSTRUCTION [0] | |
| □□-NONE [0] | | | |

COMMENTS: ______

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 4

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| □->1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | □-TORRENTIAL [-1] | □-EDDIES [1] |
| X-0.7-1m [4] | □-POOL WIDTH = RIFFLE WIDTH [1] | □-FAST [1] | □-INTERSTITIAL [-1] |
| □-0.4-0.7m [2] | □-POOL WIDTH < RIFFLE W. [0] | □-MODERATE [1] | X-INTERMITTENT [-2] |
| □-< 0.4m [1] | | □-SLOW [1] | |
| □-< 0.2m [Pool = 0] | | | |

No Flow

□ NO POOL [0]

COMMENTS: ______

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| □-GENERALLY > 10 cm MAX. > 50 [4] | □-STABLE (e.g., Cobble, Boulder) [2] | □-EXTENSIVE [-1] X-MODERATE [0] |
| □-GENERALLY > 10 cm MAX. < 50 [3] | □-MOD. STABLE (e.g., Pea Gravel) [1] | □-LOW [1] □-NONE [2] |
| □-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | X-NO RIFFLE [0] |
| X-GENERALLY < 5 cm (Riffle = 0) No Water | | |

COMMENTS ______ GRADIENT: 2

6] Gradient (feet/mile): 1.379 %POOL: 100 %RIFFLE: ______ %RUN: ______

Gr/d

LPI
8/6/99

Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 53 54 47

Stream Little Pigeon RM ____ Date 8/6/99 River Code ____
Location LPI Crew CWB/ESR

1] SUBSTRATE (Check ONE (Or Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE:** 14.5

O O-BLDER /SLABS[10] ___ ___ O O-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
O O-BOULDER [9] ___ X X O-SAND [6] X ___ O-LIMESTONE [1] O-RIPRAP [0] O-SILT HEAVY [-2] X-SILT MODERATE [-1]
O O-COBBLE [8] ___ X O O-BEDROCK[5] ___ ___ X-TILLS [1] X-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
X O-HARDPAN [4] X ___ O O-DETRITUS[3] ___ ___ O-SANDSTONE [0] Extent Of Embeddedness (Check One)
O O-MUCK [2] ___ ___ O O-ARTIFIC [0] X X O-SHALE [-1] O—EXTENSIVE [-2] X—MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: X->4 [2] O-<=4 [0] O-COAL FINES [-2] O—LOW [0] O—NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ______________________________

**COVER SCORE:** 8

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

O-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1] O - EXTENSIVE > 75% [11]
X-OVERHANGING VEGETATION [1] O-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]
O-SHALLOWS (IN SLOW WATER) [1] X-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3]
O - NEARLY ABSENT < 5% [1]
COMMENTS: ______________________________

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 8

SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER
O - HIGH [4] O - EXCELLENT [7] O - NONE [6] O - HIGH [3] O - SNAGGING O - IMPOUND.
O - MODERATE [3] O - GOOD [5] O - RECOVERED [4] X - MODERATE [2] O - RELOCATION O - ISLANDS
X - LOW [2] O - FAIR [3] X - RECOVERING [3] O - LOW [1] O - CANOPY REMOVAL O - LEVEED
O - NONE [1] X - POOR [1] O - RECENT OR NO RECOVERY [1] O - DREDGING O - BANK SHAPING
O - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS: ______________________________

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 5 - 10
"River Right Looking Downstream"

RIPARIAN WIDTH EROSION/RUNOFF - FLOOD PLAIN QUALITY BANK EROSION
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)
O O-WIDE >50m [4] O O-FOREST, SWAMP [3] X O-URBAN OR INDUSTRIAL [0] O O-NONE OR LITTLE [3]
O O-MODERATE 10-50 [3] O O-OPEN PASTURE/ ROWCROP [0] O O-SHRUB OR OLD FIELD [2] X X-MODERATE [2]
O O-NARROW 5-10m [2] O X RESID., PARK, NEW FIELD [1] O O-CONSERV. TILLAGE [1] O O-HEAVY OR SEVERE [1]
O O-VERY NARROW 1-5m [1] O O-FENCED PASTURE [1] O O-MINING/CONSTRUCTION [0]
X X-NONE [0]
COMMENTS: ______________________________

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 9

MAX. DEPTH (Check 1) MORPHOLOGY (Check 1) POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
X->1m [6] X-POOL WIDTH > RIFFLE WIDTH [2] O-TORRENTIAL [-1] O-EDDIES [1]
O-0.7-1m [4] O-POOL WIDTH = RIFFLE WIDTH [1] O-FAST [1] O-INTERSTITIAL [-1] O-NO POOL [0]
O-0.4-0.7m [2] O-POOL WIDTH < RIFFLE W. [0] X-MODERATE [1] O-INTERMITTENT [-2]
O-<0.4m [1] O-SLOW [1]
O-<0.2m [Pool = 0]
COMMENTS: ______________________________

**RIFFLE:** 3

RIFFLE/RUN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS
O - GENERALLY >10 cm MAX. > 50 [4] X-STABLE (e.g., Cobble, Boulder) [2] O-EXTENSIVE [-1] X-MODERATE [0]
O - GENERALLY >10 cm MAX. < 50 [3] O-MOD. STABLE (e.g., Pea Gravel) [1] O-LOW [1] O-NONE [2]
X - GENERALLY 5-10 cm [1] O-UNSTABLE (Gravel, Sand) [0] O-NO RIFFLE [0]
O - GENERALLY < 5 cm [Riffle = 0]
COMMENTS ______________________________ **GRADIENT:** 4

5] Gradient (feet/mile): 2.640 %POOL: 72 %RIFFLE: 8 %RUN: ____

EPA 4520

LC 2
2/10/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 40

Stream Locust Creek RM ____ Date 2/10/95 River Code ____
Location LC 2 Crew ____

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE:** 12

- □□-BLDER/SLABS[10] ____ ■□-GRAVEL [7] X ____ Substrate Origin (Check all) Silt Cover (Check One)
- □□-BOULDER [9] ____ ■□-SAND [6] X ____ □-LIMESTONE [1] □-RIP/RAP [0] □-SILT HEAVY [-2] ■-SILT MODERATE [-1]
- □□-COBBLE [8] ____ □□-BEDROCK[5] ____ ■-TILLS [1] □-HARDPAN [0] □-SILT NORMAL [0] □-SILT FREE [1]
- □□-HARDPAN [4] ____ □□-DETRITUS[3] ____ ■-SANDSTONE [0] Extent Of Embeddedness (Check One)
- □□-MUCK [2] ____ □□-ARTIFIC.[0] ____ □-SHALE [-1] □-EXTENSIVE [-2] ■-MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: □ > 4 [2] ■ <= 4 [0] □-COAL FINES [-2] □-LOW [0] □-NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

**COVER SCORE:** 9

2] INSTREAM COVER
TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

- □-UNDERCUT BANKS [1] ■-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]
- ■-OVERHANGING VEGETATION [1] ■-ROOTWADS [1] □-AQUATIC MACROPHYTES [1] □-MODERATE 25-75% [7]
- ■-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] ■-LOGS OR WOODY DEBRIS [1] ■-SPARSE 5-25% [3]
- □-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 11

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING | □-IMPOUND. |
| ■-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | ■-MODERATE [2] | □-RELOCATION | □-ISLANDS |
| □-LOW [2] | ■-FAIR [3] | ■-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL | □-LEVEED |
| □-NONE [1] | □-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING | □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION – (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 6
*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank) / EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank) / BANK EROSION

- □□-WIDE > 50m [4] □□-FOREST, SWAMP [3] □□-URBAN OR INDUSTRIAL [0] □□-NONE OR LITTLE [3]
- □□-MODERATE 10-50 [3] ■■-OPEN PASTURE/ROWCROP [0] □□-SHRUB OR OLD FIELD [2] ■■-MODERATE [2]
- □□-NARROW 5-10m [2] □□-RESID.,PARK,NEW FIELD [1] □□-CONSERV. TILLAGE [1] □□-HEAVY OR SEVERE [1]
- ■■-VERY NARROW 1-5m [1] □□-FENCED PASTURE [1] □□-MINING/CONSTRUCTION [0]
- □□-NONE [0]

COMMENTS ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 7

MAX. DEPTH (Check 1) / MORPHOLOGY (Check 1) / POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- □->1m [6] ■-POOL WIDTH > RIFFLE WIDTH [2] □-TORRENTIAL [-1] □-EDDIES [1]
- ■-0.7-1m [4] □-POOL WIDTH = RIFFLE WIDTH [1] □-FAST [1] □-INTERSTITIAL [-1] □-NO POOL [0]
- □-0.4-0.7m [2] □-POOL WIDTH < RIFFLE W. [0] □-MODERATE [1] □-INTERMITTENT [-2]
- □-< 0.4m [1] ■-SLOW [1]
- □-< 0.2m [Pool = 0]

COMMENTS ____

**RIFFLE:** 0

RIFFLE/RUN DEPTH / RIFFLE/RUN SUBSTRATE / RIFFLE/RUN EMBEDDEDNESS

- □-GENERALLY > 10 cm, MAX > 50 [4] □-STABLE (e.g., Cobble, Boulder) [2] □-EXTENSIVE [-1] ■-MODERATE [0]
- □-GENERALLY > 10 cm, MAX < 50 [3] □-MOD. STABLE (e.g., Pea Gravel) [1] □-LOW [1] □-NONE [2]
- □-GENERALLY 5-10 cm [1] ■-UNSTABLE (Gravel, Sand) [0] □-NO RIFFLE [0]
- ■-GENERALLY < 5 cm [Riffle = 0]

COMMENTS ____ **GRADIENT:** 4

6] Gradient (feet/mile): 2.49 %POOL: 93 %RIFFLE: ____ %RUN: 7

Rainsdo
Aug Pat
LC1
8/6/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** **QHEI SCORE: 53**

Stream LDCw3+ RM ____ Date 8/6/99 River Code ____
Location LC1 Crew ESK, CMB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

**SUBSTRATE SCORE: 14**

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE |
|---|---|---|---|---|---|
| O O-BLDER /SLABS[10] | | X | O O-GRAVEL [7] | X | X |
| O O-BOULDER [9] | X | | O O-SAND [6] | X | X |
| O O-COBBLE [8] | X | X | O O-BEDROCK[5] | | |
| X O-HARDPAN [4] | X | X | O O-DETRITUS[3] | | |
| O O-MUCK [2] | | X | O O-ARTIFIC[0] | | |

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] O- <= 4 [0]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

SUBSTRATE QUALITY
Substrate Origin (Check all): X O-LIMESTONE [1] O-RIP/RAP [0] X TILLS [1] X HARDPAN [0] O-SANDSTONE [0] O-SHALE [-1] O-COAL FINES [-2]
Silt Cover (Check One): O-SILT HEAVY [-2] X SILT MODERATE [-1] O - SILT NORMAL [0] O - SILT FREE [1]
Extent Of Embeddedness (Check One): O—EXTENSIVE [-2] X—MODERATE [-1] O—LOW [0] O—NONE [1]

COMMENTS ____

**COVER SCORE: 11**

2] INSTREAM COVER
TYPE (Check All That Apply)
O -UNDERCUT BANKS [1] X DEEP POOLS [2] O -OXBOWS [1]
X -OVERHANGING VEGETATION [1] X -ROOTWADS [1] X AQUATIC MACROPHYTES [1]
X -SHALLOWS (IN SLOW WATER) [1] X -BOULDERS [1] X LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

**CHANNEL: 11**

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

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| X MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | X - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | X - FAIR [3] | X - RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | O - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

**RIPARIAN: 6**

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank)
*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| O O-WIDE > 50m [4] | O O-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | X X OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X X MODERATE [2] |
| O O-NARROW 5-10m [2] | O O- RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS: ____

**POOL: 4**

POOL/GLIDE AND RIFFLE/RUN QUALITY

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| X > 1m [6] | X -POOL WIDTH > RIFFLE WIDTH [2] | O -TORRENTIAL [-1] | O -EDDIES [1] |
| O- 0.7-1m [4] | O -POOL WIDTH = RIFFLE WIDTH [1] | O -FAST [1] | O -INTERSTITIAL [-1] |
| O- 0.4-0.7m [2] | O -POOL WIDTH < RIFFLE W. [0] | O -MODERATE [1] | O -INTERMITTENT [-2] |
| O- < 0.4m [1] | | X SLOW [1] | |
| O— < 0.2m [Pool = 0] | | | |

[O-NO POOL [0]]

COMMENTS ____

**RIFFLE: 2**

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| O - GENERALLY > 10 cm, MAX > 50 [4] | O STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] | O-MODERATE [0] |
| O - GENERALLY > 10 cm, MAX < 50 [3] | X MOD. STABLE (e.g. Pea Gravel) [1] | X LOW [1] | O-NONE [2] |
| O - GENERALLY 5-10 cm [1] | O-UNSTABLE (Gravel, Sand) [0] | | |
| X GENERALLY < 5 cm [Riffle = 0] | | | |

[O-NO RIFFLE [0]]

COMMENTS ____

**GRADIENT: 2**

5] Gradient (feet/mile): ____ %POOL: 85 %RIFFLE: 4 %RUN: 11

PC16
8/5/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [43]

Stream: Pigeon Creek RM: ____ Date: 8/5/99 River Code: ____
Location: PC-16 Crew: ESR, CWB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: [14]

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER /SLABS [10] — GRAVEL [7] ✓ — Substrate Origin (Check all): LIMESTONE [1], RIP/RAP [0], TILLS [1], HARDPAN [0], SANDSTONE [0], SHALE [-1], COAL FINES [-2]
- BOULDER [9] ✓ — SAND [6] ✓
- COBBLE [8] ✓ — BEDROCK [5]
- HARDPAN [4] ✓ — DETRITUS [3] ✓
- MUCK [2] — ARTIFIC [0]

Silt Cover (Check One): SILT HEAVY [-2], SILT MODERATE [-1], SILT NORMAL [0], SILT FREE [1]
Extent Of Embeddedness (Check One): EXTENSIVE [-2], MODERATE [-1], LOW [0], NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] — <= 4 [0]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS: ____

2] INSTREAM COVER COVER SCORE: [7] 7

TYPE (Check All That Apply): UNDERCUT BANKS [1]; OVERHANGING VEGETATION [1]; SHALLOWS (IN SLOW WATER) [1]; DEEP POOLS [2]; ROOTWADS [1]; BOULDERS [1]; OXBOWS [1]; AQUATIC MACROPHYTES [1]; LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [8]

SINUOSITY: HIGH [4]; MODERATE [3]; LOW [2]; NONE [1]
DEVELOPMENT: EXCELLENT [7]; GOOD [5]; FAIR [3]; POOR [1]
CHANNELIZATION: NONE [6]; RECOVERED [4]; RECOVERING [3]; RECENT OR NO RECOVERY [1]
STABILITY: HIGH [3]; MODERATE [2]; LOW [1]
MODIFICATIONS/OTHER: SNAGGING; RELOCATION; CANOPY REMOVAL; DREDGING; IMPOUND.; ISLANDS; LEVEED; BANK SHAPING; ONE SIDE CHANNEL MODIFICATIONS

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [6]
*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank): WIDE > 50m [4]; MODERATE 10-50 [3]; NARROW 5-10m [2]; VERY NARROW 1-5m [1]; NONE [0]
EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank): FOREST, SWAMP [3]; OPEN PASTURE/ ROWCROP [0]; RESID., PARK, NEW FIELD [1]; FENCED PASTURE [1]
L R (Per Bank): URBAN OR INDUSTRIAL [0]; SHRUB OR OLD FIELD [2]; CONSERV. TILLAGE [1]; MINING/CONSTRUCTION [0]
BANK EROSION: NONE OR LITTLE [3]; MODERATE [2]; HEAVY OR SEVERE [1]

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [4]

MAX. DEPTH (Check 1): > 1m [6]; 0.7-1m [4]; 0.4-0.7m [2]; < 0.4m [1]; < 0.2m [Pool = 0]
MORPHOLOGY (Check 1): POOL WIDTH > RIFFLE WIDTH [2]; POOL WIDTH = RIFFLE WIDTH [1]; POOL WIDTH < RIFFLE W. [0]
POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply): TORRENTIAL [-1]; FAST [1]; MODERATE [1]; SLOW [1]; EDDIES [1]; INTERSTITIAL [-1]; INTERMITTENT [-2]
NO POOL [0]

COMMENTS: ____

RIFFLE: [0]

RIFFLE/RUN DEPTH: GENERALLY > 10 cm, MAX > 50 [4]; GENERALLY > 10 cm, MAX < 50 [3]; GENERALLY 5-10 cm [1]; GENERALLY < 5 cm [Riffle = 0]
RIFFLE/RUN SUBSTRATE: STABLE (e.g. Cobble, Boulder) [2]; MOD. STABLE (e.g. Pea Gravel) [1]; UNSTABLE (Gravel, Sand) [0]
RIFFLE/RUN EMBEDDEDNESS: EXTENSIVE [-1]; MODERATE [0]; LOW [1]; NONE [2]
NO RIFFLE [0]

FLE

COMMENTS: ____ GRADIENT: [4]

6] Gradient (feet/mile): 4 %POOL: 100 %RIFFLE: ____ %RUN: ____

EPA 4520

Cam#1 Photo 27 DS end looking US
Photo 26 DS end looking DS
DS end where Riprap shore ends
Photo 24 + 25 Mosquito Fish schooling Near Bluegill beds

PC-15
8/6/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 46

Stream: Pinece RM: ____ Date: 8/6/99 River Code: ____
Location: PC 15 Crew: E, R, C, L, R

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 15

□ □-BLDER /SLABS [10] ____ ____ X □-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
□ □-BOULDER [9] ____ ____ X □-SAND [6] X X □-LIMESTONE [1] □-RIP/RAP [0] □-SILT HEAVY [-2] □-SILT MODERATE [-1]
□ □-COBBLE [8] ____ ____ □ □-BEDROCK [5] ____ ____ X □-TILLS [1] □-HARDPAN [0] X-SILT NORMAL [0] □-SILT FREE [1]
□ □-HARDPAN [4] ____ ____ □ □-DETRITUS [3] X ____ X □-SANDSTONE [0] Extent Of Embeddedness (Check One)
□ □-MUCK [2] ____ ____ □ □-ARTIFIC [0] ____ ____ □-SHALE [-1] □-EXTENSIVE [-2] □-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: □-> 4 [2] X-<= 4 [0] □-COAL FINES [-2] □-LOW [0] X-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: 9

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

□-UNDERCUT BANKS [1] X-DEEP POOLS [2] □-OXBOWS [1] □-EXTENSIVE > 75% [11]
X-OVERHANGING VEGETATION [1] □-ROOTWADS [1] X-AQUATIC MACROPHYTES [1] □-MODERATE 25-75% [7]
X-SHALLOWS (IN SLOW WATER) [1] □-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X-SPARSE 5-25% [3]
□-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| □-HIGH [4] | □-EXCELLENT [7] | □-NONE [6] | □-HIGH [3] | □-SNAGGING | □-IMPOUND. |
| □-MODERATE [3] | □-GOOD [5] | □-RECOVERED [4] | X-MODERATE [2] | □-RELOCATION | □-ISLANDS |
| □-LOW [2] | □-FAIR [3] | X-RECOVERING [3] | □-LOW [1] | □-CANOPY REMOVAL | □-LEVEED |
| X-NONE [1] | X-POOR [1] | □-RECENT OR NO RECOVERY [1] | | □-DREDGING | □-BANK SHAPING |
| | | | | □-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)
□ □-WIDE > 50m [4]
□ □-MODERATE 10-50 [3]
□ □-NARROW 5-10m [2]
X X-VERY NARROW < 5m [1]
□ □-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)
□ □-FOREST, SWAMP [3] □ □-URBAN OR INDUSTRIAL [0]
X X-OPEN PASTURE/ ROWCROP [0] □ □-SHRUB OR OLD FIELD [2]
□ □-RESID., PARK, NEW FIELD [1] □ □-CONSERV. TILLAGE [1]
□ □-FENCED PASTURE [1] □ □-MINING/CONSTRUCTION [0]

BANK EROSION
□ □-NONE OR LITTLE [3]
X X-MODERATE [2]
□ □-HEAVY OR SEVERE [1]

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 4

MAX. DEPTH (Check 1)
□->1m [6]
□-0.7-1m [4]
X-0.4-0.7m [2]
□-<0.4m [1]
□-<0.2m [Pool = 0]

MORPHOLOGY (Check 1)
□-POOL WIDTH > RIFFLE WIDTH [2]
X-POOL WIDTH = RIFFLE WIDTH [1]
□-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
□-TORRENTIAL [-1] □-EDDIES [1]
□-FAST [1] □-INTERSTITIAL [-1]
□-MODERATE [1] □-INTERMITTENT [-2]
X-SLOW [1]

[□-NO POOL [0]]

COMMENTS: ____

RIFFLE: 3

RIFFLE/RUN DEPTH
□-GENERALLY > 10 cm, MAX > 50 [4]
□-GENERALLY > 10 cm, MAX < 50 [3]
X-GENERALLY 5-10 cm [1]
□-GENERALLY < 5 cm (Riffle = 0)

RIFFLE/RUN SUBSTRATE
□-STABLE (e.g., Cobble, Boulder) [2]
□-MOD. STABLE (e.g., Pea Gravel) [1]
X-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
□-EXTENSIVE [-1] □-MODERATE [0]
□-LOW [1] X-NONE [2]

[□-NO RIFFLE [0]]

COMMENTS ____ GRADIENT: 4

6) Gradient (feet/mile): 1.517 %POOL: 3 %RIFFLE: 7 %RUN: 90

EPA 4520

PC14
8/16/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 42

Stream Cr... Creek RM Date 8/16/99 River Code

Location PC14 Crew C.W. 8/4.38

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE: 13**

- BLDER/SLABS[10] — GRAVEL [7] — Substrate Origin (Check all) — Silt Cover (Check One)
- BOULDER [9] — SAND [6] — LIMESTONE [1] — RIP/RAP [0] — SILT HEAVY [-2] — SILT MODERATE [-1]
- COBBLE [8] — BEDROCK [5] — TILLS [1] — HARDPAN [0] — SILT NORMAL [0] — SILT FREE [1]
- HARDPAN [4] — DETRITUS [3] — SANDSTONE [0] — Extent Of Embeddedness (Check One)
- MUCK [2] — ARTIFIC [0] — SHALE [-1] — EXTENSIVE [-2] — MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] <= 4 [0] — COAL FINES [-2] — LOW [0] — NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS

**COVER SCORE: 8**

2] INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- UNDERCUT BANKS [1] — DEEP POOLS [2] — OXBOWS [1] — EXTENSIVE > 75% [11]
- OVERHANGING VEGETATION [1] — ROOTWADS [1] — AQUATIC MACROPHYTES [1] — MODERATE 25-75% [7]
- SHALLOWS (IN SLOW WATER) [1] — BOULDERS [1] — LOGS OR WOODY DEBRIS [1] — SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS:

**CHANNEL: 6**

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

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | MODERATE [2] | RELOCATION | ISLANDS |
| LOW [2] | FAIR [3] | RECOVERING [3] | LOW [1] | CANOPY REMOVAL | LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:

**RIPARIAN: 6**

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

*River Right Looking Downstream*

RIPARIAN WIDTH — EROSION/RUNOFF - FLOOD PLAIN QUALITY — BANK EROSION

L R (Per Bank) — L R (Most Predominant Per Bank) L R (Per Bank)

- WIDE > 50m [4] — FOREST, SWAMP [3] — URBAN OR INDUSTRIAL [0] — NONE OR LITTLE [3]
- MODERATE 10-50 [3] — OPEN PASTURE/ ROWCROP [0] — SHRUB OR OLD FIELD [2] — MODERATE [2]
- NARROW 5-10m [2] — RESID.,PARK,NEW FIELD [1] — CONSERV. TILLAGE [1] — HEAVY OR SEVERE [1]
- VERY NARROW 1-5m [1] — FENCED PASTURE [1] — MINING/CONSTRUCTION [0]
- NONE [0]

COMMENTS:

**POOL: 5**

POOL/GLIDE AND RIFFLE/RUN QUALITY

MAX. DEPTH (Check 1) — MORPHOLOGY (Check 1) — POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- > 1m [6] — POOL WIDTH > RIFFLE WIDTH [2] — TORRENTIAL [-1] — EDDIES [1]
- 0.7-1m [4] — POOL WIDTH = RIFFLE WIDTH [1] — FAST [1] — INTERSTITIAL [-1] — NO POOL [0]
- 0.4-0.7m [2] — POOL WIDTH < RIFFLE W. [0] — MODERATE [1] — INTERMITTENT [-2]
- < 0.4m [1] — SLOW [1]
- < 0.2m [Pool = 0]

COMMENTS:

**RIFFLE: 2**

RIFFLE/RUN DEPTH — RIFFLE/RUN SUBSTRATE — RIFFLE/RUN EMBEDDEDNESS

- GENERALLY > 10 cm, MAX > 50 [4] — STABLE (e.g., Cobble, Boulder) [2] — EXTENSIVE [-1] — MODERATE [0]
- GENERALLY > 10 cm, MAX < 50 [3] — MOD. STABLE (e.g., Pea Gravel) [1] — LOW [1] — NONE [2]
- GENERALLY 5-10 cm [1] — UNSTABLE (Gravel, Sand) [0] — NO RIFFLE [0]
- GENERALLY < 5 cm [Riffle = 0]

COMMENTS

**GRADIENT: 2**

6] Gradient (feet/mile): .446 %POOL: 47 %RIFFLE: 38 %RUN: 15

EPA 4520

PC13
8/13/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 54 57.5

Stream Pigeon Creek RM ____ Date 8/13/99 River Code ____
Location PC13 County [illegible]

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|
| O O-BLDER/SLABS[10] | ___ ___ | O X-GRAVEL [7] | X X | Substrate Origin (Check all) |
| O O-BOULDER [9] | ___ ___ | O X-SAND [6] | X X | O-LIMESTONE [1] O-RIPRAP [0] |
| O O-COBBLE [8] | X ___ | O O-BEDROCK [5] | ___ ___ | O-TILLS [1] O-HARDPAN [0] |
| O O-HARDPAN [4] | ___ ___ | O O-DETRITUS [3] | ___ ___ | X-SANDSTONE [0] |
| O O-MUCK [2] | ___ ___ | O O-ARTIFIC [0] | X X | O-SHALE [-1] |

SUBSTRATE SCORE: 15 14

Silt Cover (Check One): O-SILT HEAVY [-2] O-SILT MODERATE [-1] X-SILT NORMAL [0] O-SILT FREE [1]
Extent Of Embeddedness (Check One): O-EXTENSIVE [-2] O-MODERATE [-1] X-LOW [0] O-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: X-> 4 [2] O-<= 4 [0] O-COAL FINES [-2]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: 9 –

2) INSTREAM COVER
TYPE (Check All That Apply)
X-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1]
O-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | X - MODERATE [2] | O - RELOCATION | O - ISLANDS |
| O - LOW [2] | O - FAIR [3] | X - RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| X - NONE [1] | X - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12 –
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| O O-WIDE > 50m [4] | X X-FOREST, SWAMP [3] | O O-URBAN OR INDUSTRIAL [0] | O O-NONE OR LITTLE [3] |
| O O-MODERATE 10-50 [3] | O O-OPEN PASTURE/ ROWCROP [0] | O O-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| O O-NARROW 5-10m [2] | O O-RESID., PARK, NEW FIELD [1] | O O-CONSERV. TILLAGE [1] | O O-HEAVY OR SEVERE [1] |
| X X-VERY NARROW 1-5m [1] | O O-FENCED PASTURE [1] | O O-MINING/CONSTRUCTION [0] | |
| O O-NONE [0] | | | |

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6 –

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| O- > 1m [6] | | | |
| X- 0.7-1m [4] | O-POOL WIDTH > RIFFLE WIDTH [2] | O-TORRENTIAL [-1] | O-EDDIES [1] |
| O- 0.4-0.7m [2] | X-POOL WIDTH = RIFFLE WIDTH [1] | O-FAST [1] | O-INTERSTITIAL [-1] |
| O- < 0.4m [1] | O-POOL WIDTH < RIFFLE W. [0] | X-MODERATE [1] | O-INTERMITTENT [-2] |
| O- <0.2m [Pool = 0] | | O-SLOW [1] | |

O-NO POOL [0]

COMMENTS ____

RIFFLE: 2 –

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| O - GENERALLY >10 cm, MAX > 50 [4] | O-STABLE (e.g., Cobble, Boulder) [2] | O-EXTENSIVE [-1] O-MODERATE [0] |
| O - GENERALLY >10 cm, MAX < 50 [3] | O-MOD. STABLE (e.g., Pea Gravel) [1] | X-LOW [1] O-NONE [2] |
| X - GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | O-NO RIFFLE [0] |
| O - GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ____ GRADIENT: 2 –

6) Gradient (feet/mile): 7.57 %POOL: 74 %RIFFLE: 8 %RUN: 18

QA Manual (6th Update) – Fish – September 30, 1989

Procedure No. WQPA-SWS-3 Date Issued 9-30-89

Revision No. 6 Date Effective 9-30-89

PC12
8/12/99

Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: 55

Stream: Pigeon Creek RM: ____ Date: 8/12/99 River Code: ____

Location: PC12 Crew: AS CWB SAB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present) SUBSTRATE SCORE: 11

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS [10]
- BOULDER [9]
- COBBLE [8]
- HARDPAN [4] X X
- MUCK [2]
- GRAVEL [7] X X
- SAND [6] X X
- BEDROCK [5]
- DETRITUS [3]
- ARTIFIC [0]

Substrate Origin (Check all): LIMESTONE [1] X; RIP/RAP [0]; TILLS [1]; HARDPAN [0]; SANDSTONE [0]; SHALE [-1] X

Silt Cover (Check One): SILT HEAVY [-2]; SILT MODERATE [-1]; SILT NORMAL [0]; SILT FREE [1]

Extent Of Embeddedness (Check One): EXTENSIVE [-2]; MODERATE [-1]; LOW [0]; NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2]; <= 4 [0]; COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS: ____

2] INSTREAM COVER COVER SCORE: 8

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- SHALLOWS (IN SLOW WATER) [1]
- DEEP POOLS [2]
- ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

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

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 8

SINUOSITY: HIGH [4]; MODERATE [3]; LOW [2]; NONE [1]

DEVELOPMENT: EXCELLENT [7]; GOOD [5]; FAIR [3]; POOR [1]

CHANNELIZATION: NONE [6]; RECOVERED [4]; RECOVERING [3]; RECENT OR NO RECOVERY [1]

STABILITY: HIGH [3]; MODERATE [2]; LOW [1]

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

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 12

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)

- WIDE > 50m [4]
- MODERATE 10-50 [3]
- NARROW 5-10m [2]
- VERY NARROW 1-5m [1]
- NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)

- FOREST, SWAMP [3]
- OPEN PASTURE/ROWCROP [0]
- RESID., PARK, NEW FIELD [1]
- FENCED PASTURE [1]
- URBAN OR INDUSTRIAL [0]
- SHRUB OR OLD FIELD [2]
- CONSERV. TILLAGE [1]
- MINING/CONSTRUCTION [0]

BANK EROSION

- NONE OR LITTLE [3]
- MODERATE [2]
- HEAVY OR SEVERE [1]

COMMENTS: ____

5] POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 6

MAX. DEPTH (Check 1)

- > 1m [6]
- 0.7-1m [4]
- 0.4-0.7m [2]
- < 0.4m [1]
- < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)

- POOL WIDTH > RIFFLE WIDTH [2]
- POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- TORRENTIAL [-1]
- FAST [1]
- MODERATE [1]
- SLOW [1]
- EDDIES [1]
- INTERSTITIAL [-1]
- INTERMITTENT [-2]

NO POOL [0]

COMMENTS: ____

RIFFLE: 6

RIFFLE/RUN DEPTH

- GENERALLY > 10 cm, MAX > 50 [4]
- GENERALLY > 10 cm, MAX < 50 [3]
- GENERALLY 5-10 cm [1]
- GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- STABLE (e.g., Cobble, Boulder) [2]
- MOD. STABLE (e.g., Pea Gravel) [1]
- UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- EXTENSIVE [-1]
- MODERATE [0]
- LOW [1]
- NONE [2]

NO RIFFLE [0]

COMMENTS: ____ GRADIENT: 4

6] Gradient (feet/mile): 2 %POOL: 43 %RIFFLE: 22 %RUN: 35

EPA 4520

345

Dup [illegible]

PC 11

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 53

Stream: Pigeon Creek RM ____ Date 8/11/99 River Code ____
Location: PC 11 Crew: CSS/CWB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present)

| TYPE | POOL RIFFLE | | POOL RIFFLE | SUBSTRATE QUALITY | |
|---|---|---|---|---|---|
| ☐☐-BLDER/SLABS[10] | | X ☐-GRAVEL [7] | X | Substrate Origin (Check all) | Silt Cover (Check One) |
| ☐☐-BOULDER [9] | | ☐X-SAND [6] | X | ☐-LIMESTONE [1] ☐-RIP/RAP [0] | ☐-SILT HEAVY [-2] ☐-SILT MODERATE [-1] |
| ☐☐-COBBLE [8] | | ☐☐-BEDROCK[5] | | X-TILLS [1] X-HARDPAN [0] | X-SILT NORMAL [0] ☐-SILT FREE [1] |
| ☐☐-HARDPAN [4] | X | ☐☐-DETRITUS[3] | | ☐-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| ☐☐-MUCK [2] | | ☐☐-ARTIFIC [0] | | ☐-SHALE [-1] | ☐-EXTENSIVE [-2] ☐-MODERATE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] X-<= 4 [0] ☐-COAL FINES [-2] X-LOW [0] ☐-NONE [1]

NOTE: (Ignore sludge that originates from point sources; score is based on natural substrates)

SUBSTRATE SCORE: 14

COMMENTS ____

COVER SCORE: 6

2] INSTREAM COVER

TYPE (Check All That Apply)

☐-UNDERCUT BANKS [1] ☐-DEEP POOLS [2] ☐-OXBOWS [1]
☐-OVERHANGING VEGETATION [1] X-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
X-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | X-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| X-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 10

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | XX-FOREST, SWAMP [3] | ☐☐-URBAN OR INDUSTRIAL [0] | ☐☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☐☐-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | XX-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID.,PARK,NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐☐-HEAVY OR SEVERE [1] |
| ☐☐-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| XX-NONE [0] | | | |

COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 7

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐-> 1m [6] | X-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| X-0.7-1m [4] | ☐-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | X-MODERATE [1] | ☐-INTERMITTENT [-2] |
| ☐-< 0.4m [1] | | ☐-SLOW [1] | |
| ☐-< 0.2m [Pool = 0] | | | |

☐-NO POOL [0]

COMMENTS: ____ RIFFLE: 2

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY > 10 cm, MAX.> 50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX.< 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | X-LOW [1] | ☐-NONE [2] |
| X-GENERALLY 5-10 cm [1] | X-UNSTABLE (Gravel, Sand) [0] | | |
| ☐-GENERALLY < 5 cm [Riffle = 0] | | | |

☐-NO RIFFLE [0]

COMMENTS ____ GRADIENT: 4

6] Gradient (feet/mile): 1.158 %POOL: ____ %RIFFLE: ____ %RUN: 100

PC 9 8/10/95

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: [44] 42

Stream [illegible] RM ____ Date 8/10/95 River Code ____
Location ____ Crew [illegible]

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check All types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: [6] 4

O-O-BLDER/SLABS[10] ____ O-O-GRAVEL [7] ____ Substrate Origin (Check all) Silt Cover (Check One)
O-O-BOULDER [9] ____ O-O-SAND [6] X ____ O-LIMESTONE [1] O-RIPRAP [0] X-SILT HEAVY [-2] O-SILT MODERATE [-1]
O-O-COBBLE [8] ____ O-O-BEDROCK [5] ____ ____ O-TILLS [1] X-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
X-O-HARDPAN [4] X ____ O-O-DETRITUS [3] X ____ O-SANDSTONE [0] Extent Of Embeddedness (Check One)
O-O-MUCK [2] ____ O-O-ARTIFIC [0] ____ O-SHALE [-1] O-EXTENSIVE [-2] X-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: O->4 [2] X-<=4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

COVER SCORE: [5]

2] INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

X-UNDERCUT BANKS [1] X-DEEP POOLS [2] O-OXBOWS [1] O-EXTENSIVE > 75% [11]
O-OVERHANGING VEGETATION [1] X-ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O-MODERATE 25-75% [7]
O-SHALLOWS (IN SLOW WATER) [1] O-BOULDERS [1] X-LOGS OR WOODY DEBRIS [1] X-SPARSE 5-25% [3]
O-NEARLY ABSENT < 5% [1]
COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: [12] 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O-HIGH [4] | O-EXCELLENT [7] | O-NONE [6] | O-HIGH [3] | O-SNAGGING | O-IMPOUND. |
| X-MODERATE [3] | O-GOOD [5] | O-RECOVERED [4] | X-MODERATE [2] | O-RELOCATION | O-ISLANDS |
| O-LOW [2] | X-FAIR [3] | X-RECOVERING [3] | O-LOW [1] | O-CANOPY REMOVAL | O-LEVEED |
| O-NONE [1] | X-POOR [1] | O-RECENT OR NO RECOVERY [1] | | O-DREDGING | O-BANK SHAPING |
| | | | | O-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: [3] 1.5
*River Right Looking Downstream*

RIPARIAN WIDTH / EROSION/RUNOFF - FLOOD PLAIN QUALITY / BANK EROSION

L R (Per Bank) — L R (Most Predominant Per Bank) — L R (Per Bank)
O-O-WIDE > 50m [4] — O-O-FOREST, SWAMP [3] — O-O-URBAN OR INDUSTRIAL [0] — O-O-NONE OR LITTLE [3]
O-O-MODERATE 10-50 [3] — X-X-OPEN PASTURE/ROWCROP [0] — O-O-SHRUB OR OLD FIELD [2] — X-X-MODERATE [2]
O-O-NARROW 5-10m [2] — O-O-RESID., PARK, NEW FIELD [1] — O-O-CONSERV. TILLAGE [1] — O-O-HEAVY OR SEVERE [1]
X-X-VERY NARROW 1-5m [1] — O-O-FENCED PASTURE [1] — O-O-MINING/CONSTRUCTION [0]
O-O-NONE [0]
COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: [6]

MAX. DEPTH (Check 1) / MORPHOLOGY (Check 1) / POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

X->1m [6] — O-POOL WIDTH > RIFFLE WIDTH [2] — O-TORRENTIAL [-1] — O-EDDIES [1]
O-0.7-1m [4] — X-POOL WIDTH = RIFFLE WIDTH [1] — O-FAST [1] — O-INTERSTITIAL [-1] — [O-NO POOL [0]]
O-0.4-0.7m [2] — O-POOL WIDTH < RIFFLE W. [0] — O-MODERATE [1] — O-INTERMITTENT [-2]
O-<0.4m [1] — X-SLOW [1]
O-<0.2m [Pool = 0]
COMMENTS ____

RIFFLE: [0]

RIFFLE/RUN DEPTH / RIFFLE/RUN SUBSTRATE / RIFFLE/RUN EMBEDDEDNESS

O-GENERALLY >10 cm, MAX>50 [4] — O-STABLE (e.g. Cobble, Boulder) [2] — O-EXTENSIVE [-1] — O-MODERATE [0]
O-GENERALLY >10 cm, MAX<50 [3] — O-MOD. STABLE (e.g. Pea Gravel) [1] — O-LOW [1] — O-NONE [2]
O-GENERALLY 5-10 cm [1] — O-UNSTABLE (Gravel, Sand) [0] — X-NO RIFFLE [0]
O-GENERALLY < 5 cm [Riffle = 0]
COMMENTS ____ GRADIENT: [2]

5] Gradient (feet/mile): 1.77 %POOL: 100 %RIFFLE: ____ %RUN: ____

8/9/99
PC8

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 44 ·13

Stream Pigeon Creek RM ___ Date 8/9/99 River Code ___
Location → PC 8 Crew C.W., R., E.S.R.

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 12 – 3

| TYPE | POOL | RIFFLE | | POOL | RIFFLE | SUBSTRATE QUALITY | |
|---|---|---|---|---|---|---|---|
| ☐ ☐-BLDER./SLABS[10] | | | ☐ ☐-GRAVEL [7] | | | Substrate Origin (Check all) | Silt Cover (Check One) |
| ☐ ☐-BOULDER [9] | | | X ☐-SAND [6] | X | | ☐-LIMESTONE [1] ☐-RIPRAP [0] | ☐-SILT HEAVY [-2] X SILT MODERATE [-1] |
| ☐ ☐-COBBLE [8] | | | ☐ ☐-BEDROCK[5] | | | X TILLS [1] X HARDPAN [0] | ☐-SILT NORMAL [0] ☐-SILT FREE [1] |
| ☐ ☐-HARDPAN [4] | X | | ☐ X DETRITUS[3] | X | | ☐-SANDSTONE [0] | Extent Of Embeddedness (Check One) |
| ☐ ☐-MUCK [2] | | | ☐ ☐-ARTIFIC.[0] | | | ☐-SHALE [-1] | ☐—EXTENSIVE [-2] X—MODERATE [-1] |

TOTAL NUMBER OF SUBSTRATE TYPES: ☐-> 4 [2] X-<= 4 [0] ☐-COAL FINES [-2] ☐—LOW [0] ☐—NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

COVER SCORE: 6 –

2] INSTREAM COVER

TYPE (Check All That Apply)

AMOUNT (Check ONLY One or check 2 and AVERAGE)

☐-UNDERCUT BANKS [1] X-DEEP POOLS [2] ☐-OXBOWS [1] ☐ - EXTENSIVE > 75% [11]
☐-OVERHANGING VEGETATION [1] X-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1] ☐ - MODERATE 25-75% [7]
X-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] X LOGS OR WOODY DEBRIS [1] X - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ___

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10 –

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☐ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | X MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | ☐ - LOW [1] | ☐ - CANOPY REMOVAL | X LEVEED |
| ☐ - NONE [1] | ☐ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4] RIPARIAN ZONE AND BANK EROSION – (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 7 –

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF – FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| ☐ ☐-WIDE > 50m [4] | X ☐-FOREST, SWAMP [3] | ☐ ☐-URBAN OR INDUSTRIAL [0] | ☐ ☐-NONE OR LITTLE [3] |
| ☐ ☐-MODERATE 10-50 [3] | ☐ ☐-OPEN PASTURE/ ROWCROP [0] | ☐ ☐-SHRUB OR OLD FIELD [2] | X X-MODERATE [2] |
| ☐ ☐-NARROW 5-10m [2] | ☐ ☐- RESID., PARK, NEW FIELD [1] | ☐ ☐-CONSERV. TILLAGE [1] | ☐ ☐-HEAVY OR SEVERE [1] |
| ☐ ☐-VERY NARROW 1-5m [1] | ☐ ☐-FENCED PASTURE [1] | ☐ ☐-MINING/CONSTRUCTION [0] | |
| X X NONE [0] | | | |

COMMENTS: ___

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 8 –

| MAX. DEPTH (Check 1) | MORPHOLOGY No Riffle (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | | |
|---|---|---|---|---|
| X->1m [6] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] | ☐-NO POOL [0] |
| ☐-0.7-1m [4] | X-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] | |
| ☐-0.4-0.7m [2] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] | |
| ☐-< 0.4m [1] | | X SLOW [1] | | |
| ☐-<0.2m (Pool = 0) | | | | |

COMMENTS ___

RIFFLE: 0 –

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐ - GENERALLY >10 cm, MAX>50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐ - GENERALLY >10 cm, MAX<50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐ - GENERALLY 5-10 cm [1] | ☐-UNSTABLE (Gravel, Sand) [0] | | X NO RIFFLE [0] |
| ☐ - GENERALLY < 5 cm (Riffle = 0) | | | |

COMMENTS ___ GRADIENT: 4. –

5] Gradient (feet/mile): 1.64 %POOL: 100 %RIFFLE: ___ %RUN: ___

PC 7
8/9/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**

Stream Pleasant Creek RM ____ Date 8/9/99 QHEI SCORE: 42
Location PC 7 River Code ____ Crew CWB / EJB

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present): SUBSTRATE SCORE: 4

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- BLDER/SLABS[10] ____ / GRAVEL [7] ____ / Substrate Origin (Check all): LIMESTONE [1] / RIPRAP [0] / TILLS [1] / HARDPAN [0] / SANDSTONE [0] / SHALE [-1] / COAL FINES [-2]
- BOULDER [9] ____ / SAND [6] X
- COBBLE [8] ____ / BEDROCK [5]
- HARDPAN [4] X / DETRITUS [3] X
- MUCK [2] ____ / ARTIFIC. [0]

Silt Cover (Check One): X SILT HEAVY [-2] / SILT MODERATE [-1] / SILT NORMAL [0] / SILT FREE [1]

Extent of Embeddedness (Check One): X EXTENSIVE [-2] / MODERATE [-1] / LOW [0] / NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] X <= 4 [0]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2] INSTREAM COVER COVER SCORE: 6

TYPE (Check All That Apply)

- UNDERCUT BANKS [1]
- OVERHANGING VEGETATION [1]
- X SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]
- X ROOTWADS [1]
- BOULDERS [1]
- OXBOWS [1]
- AQUATIC MACROPHYTES [1]
- X LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

- EXTENSIVE > 75% [11]
- MODERATE 25-75% [7]
- X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | X MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | LOW [1] | CANOPY REMOVAL | X LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 10

*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)

- WIDE > 50m [4]
- MODERATE 10-50 [3]
- NARROW 5-10m [2]
- X VERY NARROW 1-5m [1]
- NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)

- X FOREST, SWAMP [3]
- OPEN PASTURE/ ROWCROP [0]
- X RESID., PARK, NEW FIELD [1]
- FENCED PASTURE [1]
- URBAN OR INDUSTRIAL [0]
- SHRUB OR OLD FIELD [2]
- CONSERV. TILLAGE [1]
- MINING/CONSTRUCTION [0]

BANK EROSION

- NONE OR LITTLE [3]
- X MODERATE [2]
- HEAVY OR SEVERE [1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 9

MAX. DEPTH (Check 1)

- X > 1m [6]
- 0.7-1m [4]
- 0.4-0.7m [2]
- < 0.4m [1]
- < 0.2m [Pool = 0]

MORPHOLOGY (Check 1) No Riffles

- POOL WIDTH > RIFFLE WIDTH [2]
- X POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)

- TORRENTIAL [-1]
- FAST [1]
- MODERATE [1]
- X SLOW [1]
- EDDIES [1]
- INTERSTITIAL [-1]
- INTERMITTENT [-2]

NO POOL [0]

COMMENTS ____

RIFFLE: 0

RIFFLE/RUN DEPTH

- GENERALLY > 10 cm, MAX > 50 [4]
- GENERALLY > 10 cm, MAX < 50 [3]
- GENERALLY 5-10 cm [1]
- GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE

- STABLE (e.g., Cobble, Boulder) [2]
- MOD. STABLE (e.g., Pea Gravel) [1]
- UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS

- EXTENSIVE [-1]
- MODERATE [0]
- LOW [1]
- NONE [2]
- X NO RIFFLE [0]

COMMENTS ____ GRADIENT: 2

6] Gradient (feet/mile): 1.56 %POOL: 100 %RIFFLE: ____ %RUN: ____

EPA 4520

PCS
8/7/95

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

Stream Pigeon RM ____ Date 8/7/95 QHEI SCORE: 33
Location PCS River Code ____ Crew ____

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY SUBSTRATE SCORE: 16

O O-BLDER /SLABS[10] ____ O O-GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
O O-BOULDER [9] X X O O-SAND [6] X X O-LIMESTONE [1] X RIP/RAP [0] O-SILT HEAVY [-2] X SILT MODERATE [-1]
X O-COBBLE [8] X X O O-BEDROCK [5] ____ X TILLS [1] O-HARDPAN [0] O-SILT NORMAL [0] O-SILT FREE [1]
O O-HARDPAN [4] X ____ O O-DETRITUS [3] ____ O-SANDSTONE [0] Extent Of Embeddedness (Check One)
O O-MUCK [2] ____ O O-ARTIFIC. [0] ____ O-SHALE [-1] O-EXTENSIVE [-2] X MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] O <= 4 [0] O-COAL FINES [-2] O-LOW [0] O-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

2] INSTREAM COVER COVER SCORE: 11

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

O-UNDERCUT BANKS [1] X DEEP POOLS [2] X OXBOWS [1] O - EXTENSIVE > 75% [11]
X OVERHANGING VEGETATION [1] X ROOTWADS [1] O-AQUATIC MACROPHYTES [1] O - MODERATE 25-75% [7]
X SHALLOWS (IN SLOW WATER) [1] X BOULDERS [1] X LOGS OR WOODY DEBRIS [1] X SPARSE 5-25% [3]
O - NEARLY ABSENT < 5% [1]
COMMENTS: ____

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

SINUOSITY DEVELOPMENT CHANNELIZATION STABILITY MODIFICATIONS/OTHER
O - HIGH [4] O - EXCELLENT [7] O - NONE [6] O - HIGH [3] O - SNAGGING O - IMPOUND.
O - MODERATE [3] O - GOOD [5] O - RECOVERED [4] X MODERATE [2] O - RELOCATION O - ISLANDS
X LOW [2] X FAIR [3] X RECOVERING [3] O - LOW [1] O - CANOPY REMOVAL O - LEVEED
O - NONE [1] O - POOR [1] O - RECENT OR NO RECOVERY [1] O - DREDGING O - BANK SHAPING
O - ONE SIDE CHANNEL MODIFICATIONS
COMMENTS: ____

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6

*River Right Looking Downstream*

RIPARIAN WIDTH EROSION/RUNOFF - FLOOD PLAIN QUALITY BANK EROSION
L R (Per Bank) L R (Most Predominant Per Bank) L R (Per Bank)
O O-WIDE > 50m [4] O O-FOREST, SWAMP [3] X O-URBAN OR INDUSTRIAL [0] O O-NONE OR LITTLE [3]
O O-MODERATE 10-50 [3] O O-OPEN PASTURE/ ROWCROP [0] O O-SHRUB OR OLD FIELD [2] X X MODERATE [2]
O O-NARROW 5-10m [2] O X RESID., PARK, NEW FIELD [1] O O-CONSERV. TILLAGE [1] O O-HEAVY OR SEVERE [1]
X O-VERY NARROW 1-5m [1] O O-FENCED PASTURE [1] O O-MINING/CONSTRUCTION [0]
O X-NONE [0]
COMMENTS ____

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

MAX. DEPTH (Check 1) MORPHOLOGY (Check 1) POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
O- > 1m [6] X POOL WIDTH > RIFFLE WIDTH [2] O-TORRENTIAL [-1] O-EDDIES [1]
O-0.7-1m [4] O-POOL WIDTH = RIFFLE WIDTH [1] O-FAST [1] O-INTERSTITIAL [-1] O-NO POOL [0]
X 0.4-0.7m [2] O-POOL WIDTH < RIFFLE W. [0] X MODERATE [1] O-INTERMITTENT [-2]
O- < 0.4m [1] O-SLOW [1]
O- < 0.2m [Pool = 0]
COMMENTS: ____

RIFFLE: 3

RIFFLE/RUN DEPTH RIFFLE/RUN SUBSTRATE RIFFLE/RUN EMBEDDEDNESS
O - GENERALLY > 10 cm, MAX. > 50 [4] X STABLE (e.g., Cobble, Boulder) [2] O EXTENSIVE [-1] X MODERATE [0]
O - GENERALLY > 10 cm, MAX. < 50 [3] O-MOD. STABLE (e.g., Pea Gravel) [1] O-LOW [1] O-NONE [2]
X GENERALLY 5-10 cm [1] O-UNSTABLE (Gravel, Sand) [0] O-NO RIFFLE [0]
O - GENERALLY < 5 cm [Riffle = 0]
COMMENTS ____ GRADIENT: 2

5] Gradient (feet/mile): ____ %POOL: 25 %RIFFLE: 20 %RUN: 55

PCG
8/9/99



Figure V-4-5 Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

## Ohio EPA Site Description Sheet - Fish

QHEI SCORE: [illegible] 58 42

Stream Pigeon RM ____ Date 8/9/99 River Code ____
Location PCG Crew GWB/EJB

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present):

SUBSTRATE SCORE: ☒ 7

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY
- ☐ ☐ BLDER/SLABS [10] ___ ___ ☐ ☐ GRAVEL [7] ___ ___ Substrate Origin (Check all) Silt Cover (Check One)
- ☐ ☐ BOULDER [9] ___ ___ ☐ ☐ SAND [6] ___ ___ ☐ LIMESTONE [1] ☐ RIPRAP [0] ☒ SILT HEAVY [-2] ☐ SILT MODERATE [-1]
- ☒ ☐ COBBLE [8] X ___ ☐ ☐ BEDROCK [5] ___ ___ ☒ TILLS [1] ☒ HARDPAN [0] ☐ SILT NORMAL [0] ☐ SILT FREE [1]
- ☐ ☐ HARDPAN [4] ___ ___ ☐ ☐ DETRITUS [3] ___ ___ ☐ SANDSTONE [0] Extent Of Embeddedness (Check One)
- ☐ ☒ MUCK [2] X ___ ☐ ☐ ARTIFIC. [0] ___ ___ ☐ SHALE [-1] ☒ EXTENSIVE [-2] ☐ MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☐ > 4 [2] ☒ <= 4 [0] ☐ COAL FINES [-2] ☐ LOW [0] ☐ NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____________

COVER SCORE: 6

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)
- ☐ UNDERCUT BANKS [1] ☒ DEEP POOLS [2] ☐ OXBOWS [1] ☐ EXTENSIVE > 75% [11]
- ☒ OVERHANGING VEGETATION [1] ☒ ROOTWADS [1] ☐ AQUATIC MACROPHYTES [1] ☐ MODERATE 25-75% [7]
- ☐ SHALLOWS (IN SLOW WATER) [1] ☐ BOULDERS [1] ☒ LOGS OR WOODY DEBRIS [1] ☒ SPARSE 5-25% [3]
- ☐ NEARLY ABSENT < 5% [1]

COMMENTS: ____________

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

CHANNEL: 11

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☒ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | ☒ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☐ - LOW [2] | ☒ - FAIR [3] | ☒ - RECOVERING [3] | ☐ - LOW [1] | ☐ - CANOPY REMOVAL | ☐ - LEVEED |
| ☐ - NONE [1] | ☐ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☐ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS ____________

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

RIPARIAN: [illegible] 6

*River Right Looking Downstream*

| RIPARIAN WIDTH | EROSION/RUNOFF - FLOOD PLAIN QUALITY | | BANK EROSION |
|---|---|---|---|
| L R (Per Bank) | L R (Most Predominant Per Bank) | L R (Per Bank) | |
| ☐ ☐ - WIDE > 50m [4] | ☒ ☒ FOREST, SWAMP [3] | ☐ ☐ URBAN OR INDUSTRIAL [0] | ☐ ☐ NONE OR LITTLE [3] |
| ☐ ☐ - MODERATE 10-50 [3] | ☐ ☐ OPEN PASTURE/ ROWCROP [0] | ☐ ☐ SHRUB OR OLD FIELD [2] | ☒ ☒ MODERATE [2] |
| ☐ ☐ - NARROW 5-10m [2] | ☐ ☐ RESID., PARK, NEW FIELD [1] | ☐ ☐ CONSERV. TILLAGE [1] | ☐ ☐ HEAVY OR SEVERE [1] |
| ☒ ☒ - VERY NARROW 1-5m [1] | ☐ ☐ FENCED PASTURE [1] | ☐ ☐ MINING/CONSTRUCTION [0] | |
| ☐ ☐ - NONE [0] | | | |

COMMENTS ____________

5) POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 9

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) No Riffles | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☒ > 1m [6] | | | |
| ☐ 0.7-1m [4] | ☐ POOL WIDTH > RIFFLE WIDTH [2] | ☐ TORRENTIAL [-1] | ☐ EDDIES [1] |
| ☐ 0.4-0.7m [2] | ☒ POOL WIDTH = RIFFLE WIDTH [1] | ☐ FAST [1] | ☐ INTERSTITIAL [-1] |
| ☐ < 0.4m [1] | ☐ POOL WIDTH < RIFFLE W. [0] | ☐ MODERATE [1] | ☐ INTERMITTENT [-2] |
| ☐ < 0.2m [Pool = 0] | | ☒ SLOW [1] | |

☐ NO POOL [0]

COMMENTS: ____________

RIFFLE: 0

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐ - GENERALLY > 10 cm, MAX > 50 [4] | ☐ STABLE (e.g., Cobble, Boulder) [2] | ☐ EXTENSIVE [-1] | ☐ MODERATE [0] |
| ☐ - GENERALLY > 10 cm, MAX < 50 [3] | ☐ MOD. STABLE (e.g., Pea Gravel) [1] | ☐ LOW [1] | ☐ NONE [2] |
| ☐ - GENERALLY 5-10 cm [1] | ☐ UNSTABLE (Gravel, Sand) [0] | | ☒ NO RIFFLE [0] |
| ☐ - GENERALLY < 5 cm [Riffle = 0] | | | |

Fles

COMMENTS ____________

GRADIENT: 2

6) Gradient (feet/mile): 1.000 %POOL: 100 %RIFFLE: ____ %RUN: ____

EPA 4520

PC5
8/7/1

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 53

Stream: Pigeon RM ___ Date: 8/7/91 River Code ___
Location: PC5 Crew: ___

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check All types present); SUBSTRATE SCORE: 16

TYPE POOL RIFFLE / POOL RIFFLE / SUBSTRATE QUALITY

- O-O-BLDER/SLABS[10] / O-GRAVEL [7] X X / Substrate Origin (Check all)
- O-O-BOULDER [9] X X / O-O-SAND [6] X X / O-LIMESTONE [1] X RIPRAP [0] / Silt Cover (Check One): O-SILT HEAVY [-2] X SILT MODERATE [-1]
- X O-COBBLE [8] X X / O-O-BEDROCK[5] / X TILLS [1] / O-HARDPAN [0] / O-SILT NORMAL [0] O-SILT FREE [1]
- O-O-HARDPAN [4] X / O-O-DETRITUS[3] / O-SANDSTONE [0] / Extent Of Embeddedness (Check One)
- O-O-MUCK [2] / O-O-ARTIFIC[0] / O-SHALE [-1] / O-EXTENSIVE [-2] X MODERATE [-1] O-LOW [0] O-NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: X > 4 [2] O-<= 4 [0] O-COAL FINES [-2]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ___

2) INSTREAM COVER COVER SCORE: 11

TYPE (Check All That Apply)
- O-UNDERCUT BANKS [1]
- X OVERHANGING VEGETATION [1]
- O SHALLOWS (IN SLOW WATER) [1]
- X DEEP POOLS [2]
- X ROOTWADS [1]
- X BOULDERS [1]
- X OXBOWS [1]
- O-AQUATIC MACROPHYTES [1]
- X LOGS OR WOODY DEBRIS [1]

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

COMMENTS: ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) CHANNEL: 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| O - HIGH [4] | O - EXCELLENT [7] | O - NONE [6] | O - HIGH [3] | O - SNAGGING | O - IMPOUND. |
| O - MODERATE [3] | O - GOOD [5] | O - RECOVERED [4] | X MODERATE [2] | O - RELOCATION | O - ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | O - LOW [1] | O - CANOPY REMOVAL | O - LEVEED |
| O - NONE [1] | O - POOR [1] | O - RECENT OR NO RECOVERY [1] | | O - DREDGING | O - BANK SHAPING |
| | | | | O - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) RIPARIAN: 6
*River Right Looking Downstream*

RIPARIAN WIDTH L R (Per Bank)
- O-O-WIDE > 50m [4]
- O-O-MODERATE 10-50 [3]
- O-O-NARROW 5-10m [2]
- X O-VERY NARROW 1-5m [1]
- O X NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) L R (Per Bank)
- O-O-FOREST, SWAMP [3]
- O-O-OPEN PASTURE/ ROWCROP [0]
- O X RESID., PARK, NEW FIELD [1]
- O-O-FENCED PASTURE [1]
- X O-URBAN OR INDUSTRIAL [0]
- O-O-SHRUB OR OLD FIELD [2]
- O-O-CONSERV. TILLAGE [1]
- O-O-MINING/CONSTRUCTION [0]

BANK EROSION
- O O-NONE OR LITTLE [3]
- X X MODERATE [2]
- O O-HEAVY OR SEVERE [1]

COMMENTS: ___

POOL/GLIDE AND RIFFLE/RUN QUALITY POOL: 5

MAX. DEPTH (Check 1)
- O > 1m [6]
- O 0.7-1m [4]
- X 0.4-0.7m [2]
- O < 0.4m [1]
- O < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)
- X POOL WIDTH > RIFFLE WIDTH [2]
- O-POOL WIDTH = RIFFLE WIDTH [1]
- O-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- O-TORRENTIAL [-1]
- O-FAST [1]
- X MODERATE [1]
- O-SLOW [1]
- O-EDDIES [1]
- O-INTERSTITIAL [-1]
- O-INTERMITTENT [-2]

O-NO POOL [0]

COMMENTS ___

RIFFLE: 3

RIFFLE/RUN DEPTH
- O - GENERALLY > 10 cm, MAX > 50 [4]
- O - GENERALLY > 10 cm, MAX < 50 [3]
- X GENERALLY 5-10 cm [1]
- O - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
- X STABLE (e.g., Cobble, Boulder) [2]
- O-MOD. STABLE (e.g., Pea Gravel) [1]
- O-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- O-EXTENSIVE [-1]
- X MODERATE [0]
- O-LOW [1]
- O-NONE [2]

O-NO RIFFLE [0]

COMMENTS ___ GRADIENT: 2

5) Gradient (feet/mile): ___ %POOL: 25 %RIFFLE: 20 %RUN: 55

PC2
8/7/99

QA Manual (6th Update) – Fish – September 30, 1989

| | | | |
|---|---|---|---|
| Procedure No. | WQPA–SWS–1 | Date Issued | 5-30-89 |
| Revision No | 6 | Date Effective | 5-30-89 |

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 44

Stream TC 2 RM ____ Date 8/7/99 River Code ____
Location [illegible] Creek Crew F5B/CWR

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

SUBSTRATE SCORE: 11

| TYPE | POOL | RIFFLE | TYPE | POOL | RIFFLE | SUBSTRATE QUALITY |
|---|---|---|---|---|---|---|
| ☐ ☐-BLDER /SLABS[10] | | | ☐ ☐-GRAVEL [7] | X | | Substrate Origin (Check all) |
| ☐ ☐-BOULDER [9] | | | ☒ ☐-SAND [6] | X | | ☐-LIMESTONE [1] ☐-RIPRAP [0] |
| ☐ ☐-COBBLE [8] | | | ☐ ☐-BEDROCK [5] | | | ☒-TILLS [1] ☒-HARDPAN [0] |
| ☒ ☐-HARDPAN [4] | X | | ☐ ☐-DETRITUS [3] | X | | ☐-SANDSTONE [0] |
| ☐ ☐-MUCK [2] | | | ☐ ☐-ARTIFIC [0] | X | | ☐-SHALE [-1] |

Silt Cover (Check One): ☐-SILT HEAVY [-2] ☒-SILT MODERATE [-1] ☐-SILT NORMAL [0] ☐-SILT FREE [1]

Extent Of Embeddedness (Check One): ☐—EXTENSIVE [-2] ☒—MODERATE [-1] ☐—LOW [0] ☐—NONE [1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☒—> 4 [2] ☐—<= 4 [0] ☐-COAL FINES [-2]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ____

2) INSTREAM COVER

COVER SCORE: 12

TYPE (Check All That Apply)

☐-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐-OXBOWS [1]
☒-OVERHANGING VEGETATION [1] ☒-ROOTWADS [1] ☐-AQUATIC MACROPHYTES [1]
☐-SHALLOWS (IN SLOW WATER) [1] ☐-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1]

AMOUNT (Check ONLY One or check 2 and AVERAGE)

☐ - EXTENSIVE > 75% [11]
☒ - MODERATE 25-75% [7]
☐ - SPARSE 5-25% [3]
☐ - NEARLY ABSENT < 5% [1]

COMMENTS: ____

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

CHANNEL: 7

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ - HIGH [4] | ☐ - EXCELLENT [7] | ☐ - NONE [6] | ☐ - HIGH [3] | ☐ - SNAGGING | ☐ - IMPOUND. |
| ☐ - MODERATE [3] | ☐ - GOOD [5] | ☐ - RECOVERED [4] | ☐ - MODERATE [2] | ☐ - RELOCATION | ☐ - ISLANDS |
| ☒ - LOW [2] | ☐ - FAIR [3] | ☒ - RECOVERING [3] | ☒ - LOW [1] | ☐ - CANOPY REMOVAL | ☒ - LEVEED |
| ☒ - NONE [1] | ☒ - POOR [1] | ☐ - RECENT OR NO RECOVERY [1] | | ☐ - DREDGING | ☐ - BANK SHAPING |
| | | | | ☒ - ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: Dam upstream

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

RIPARIAN: 4

*River Right Looking Downstream*

RIPARIAN WIDTH
L R (Per Bank)
☐ ☐-WIDE > 50m [4]
☐ ☐-MODERATE 10-50 [3]
☐ ☐-NARROW 5-10m [2]
☐ ☐-VERY NARROW 1-5m [1]
☒ ☒-NONE [0]

EROSION/RUNOFF - FLOOD PLAIN QUALITY
L R (Most Predominant Per Bank)
☐ ☐-FOREST, SWAMP [3]
☐ ☐-OPEN PASTURE/ ROWCROP [0]
☐ ☐-RESID.,PARK,NEW FIELD [1]
☐ ☐-FENCED PASTURE [1]

L R (Per Bank)
☒ ☒-URBAN OR INDUSTRIAL [0]
☐ ☐-SHRUB OR OLD FIELD [2]
☐ ☐-CONSERV. TILLAGE [1]
☐ ☐-MINING/CONSTRUCTION [0]

BANK EROSION
☐ ☐-NONE OR LITTLE [3]
☒ ☒-MODERATE [2]
☐ ☐-HEAVY OR SEVERE [1]

COMMENTS: ____

POOL/GLIDE AND RIFFLE/RUN QUALITY

POOL: 8

MAX. DEPTH (Check 1)
☒ > 1m [6]
☐ 0.7-1m [4]
☐ 0.4-0.7m [2]
☐ < 0.4m [1]
☐ < 0.2m [Pool = 0]

MORPHOLOGY (Check 1)
☐-POOL WIDTH > RIFFLE WIDTH [2]
☒-POOL WIDTH = RIFFLE WIDTH [1]
☐-POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
☐-TORRENTIAL [-1] ☐-EDDIES [1]
☐-FAST [1] ☐-INTERSTITIAL [-1]
☐-MODERATE [1] ☐-INTERMITTENT [-2]
☒-SLOW [1]

☐-NO POOL [0]

COMMENTS ____

RIFFLE: 0

RIFFLE/RUN DEPTH
☐ - GENERALLY > 10 cm, MAX > 50 [4]
☐ - GENERALLY > 10 cm, MAX < 50 [3]
☐ - GENERALLY 5-10 cm [1]
☐ - GENERALLY < 5 cm [Riffle = 0]

RIFFLE/RUN SUBSTRATE
☐-STABLE (e.g., Cobble, Boulder) [2]
☐-MOD. STABLE (e.g., Pea Gravel) [1]
☐-UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
☐-EXTENSIVE [-1] ☐-MODERATE [0]
☐-LOW [1] ☐-NONE [2]
☒-NO RIFFLE [0]

COMMENTS ____

GRADIENT: 2

5) Gradient (feet/mile): .880 %POOL: 100 %RIFFLE: ____ %RUN: ____

EPA 4520

PC1
6/6/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** **QHEI SCORE: 47**

Stream Pigeon Creek RM ____ Date 6/6/99 River Code ____
Location PC1 Crew E S R/C L/C

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check All Types present):

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE: 9**

☐☐-BLDER/SLABS[10] ____ ____ ☐☐-GRAVEL [7] X ____ Substrate Origin (Check all) Silt Cover (Check One)
☐☐-BOULDER [9] X ____ ☐☐-SAND [6] X ____ ☐-LIMESTONE [1] ☐-RIP/RAP [0] ☒-SILT HEAVY [-2] ☐-SILT MODERATE [-1]
☐☐-COBBLE [8] ____ ____ ☐☐-BEDROCK [5] ____ ____ ☒-TILLS [1] ☒-HARDPAN [0] ☐-SILT NORMAL [0] ☐-SILT FREE [1]
☒☒-HARDPAN [4] X ____ ☐☐-DETRITUS [3] X ____ ☐-SANDSTONE [0] Extent Of Embeddedness (Check One)
☐☐-MUCK [2] ____ ____ ☐☐-ARTIFIC. [0] ____ ____ ☐-SHALE [-1] ☐-EXTENSIVE [-2] ☐-MODERATE [-1]
TOTAL NUMBER OF SUBSTRATE TYPES: ☒ > 4 [2] ☐ < or = 4 [0] ☐-COAL FINES [-2] ☐-LOW [0] ☐-NONE [1]
NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)
COMMENTS ____

**COVER SCORE: 11**

2) INSTREAM COVER

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)

☐-UNDERCUT BANKS [1] ☒-DEEP POOLS [2] ☐-OXBOWS [1] ☐-EXTENSIVE > 75% [11]
☒-OVERHANGING VEGETATION [1] ☒-ROOTWADS [1] ☒-AQUATIC MACROPHYTES [1] ☐-MODERATE 25-75% [7]
☒-SHALLOWS (IN SLOW WATER) [1] ☒-BOULDERS [1] ☒-LOGS OR WOODY DEBRIS [1] ☒-SPARSE 5-25% [3]
☐-NEARLY ABSENT < 5% [1]

COMMENTS: ____

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL: 10**

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐-HIGH [4] | ☐-EXCELLENT [7] | ☐-NONE [6] | ☐-HIGH [3] | ☐-SNAGGING | ☐-IMPOUND. |
| ☐-MODERATE [3] | ☐-GOOD [5] | ☐-RECOVERED [4] | ☒-MODERATE [2] | ☐-RELOCATION | ☐-ISLANDS |
| ☒-LOW [2] | ☒-FAIR [3] | ☒-RECOVERING [3] | ☐-LOW [1] | ☐-CANOPY REMOVAL | ☐-LEVEED |
| ☐-NONE [1] | ☐-POOR [1] | ☐-RECENT OR NO RECOVERY [1] | | ☐-DREDGING | ☐-BANK SHAPING |
| | | | | ☐-ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ____

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN: 6**
*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOODPLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐-WIDE > 50m [4] | ☐☐-FOREST, SWAMP [3] | ☒☒-URBAN OR INDUSTRIAL [0] | ☐☐-NONE OR LITTLE [3] |
| ☐☐-MODERATE 10-50 [3] | ☐☐-OPEN PASTURE/ROWCROP [0] | ☐☐-SHRUB OR OLD FIELD [2] | ☒☒-MODERATE [2] |
| ☐☐-NARROW 5-10m [2] | ☐☐-RESID., PARK, NEW FIELD [1] | ☐☐-CONSERV. TILLAGE [1] | ☐☐-HEAVY OR SEVERE [1] |
| ☒☒-VERY NARROW 1-5m [1] | ☐☐-FENCED PASTURE [1] | ☐☐-MINING/CONSTRUCTION [0] | |
| ☐☐-NONE [0] | | | |

COMMENTS ____

5) POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL: 8**

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☒- > 1m [6] | | | |
| ☐-0.7-1m [4] | ☐-POOL WIDTH > RIFFLE WIDTH [2] | ☐-TORRENTIAL [-1] | ☐-EDDIES [1] |
| ☐-0.4-0.7m [2] | ☒-POOL WIDTH = RIFFLE WIDTH [1] | ☐-FAST [1] | ☐-INTERSTITIAL [-1] |
| ☐- < 0.4m [1] | ☐-POOL WIDTH < RIFFLE W. [0] | ☐-MODERATE [1] | ☐-INTERMITTENT [-2] |
| ☐- < 0.2m [Pool = 0] | | ☒-SLOW [1] | |

☐-NO POOL [0]

COMMENTS ____

**RIFFLE: 0**

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS | |
|---|---|---|---|
| ☐-GENERALLY > 10 cm, MAX > 50 [4] | ☐-STABLE (e.g., Cobble, Boulder) [2] | ☐-EXTENSIVE [-1] | ☐-MODERATE [0] |
| ☐-GENERALLY > 10 cm, MAX < 50 [3] | ☐-MOD. STABLE (e.g., Pea Gravel) [1] | ☐-LOW [1] | ☐-NONE [2] |
| ☐-GENERALLY 5-10 cm [1] | ☐-UNSTABLE (Gravel, Sand) [0] | | |
| ☐-GENERALLY < 5 cm [Riffle = 0] | | | |

☒-NO RIFFLE [0]

COMMENTS ____ **GRADIENT: H**

6) Gradient (feet/mile): 1.100 %POOL: 100 %RIFFLE: ____ %RUN ____

PC 4
8/7/99

Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish**

Stream Pigeon RM Date 8/7 **QHEI SCORE:** 51
Location PC4 Crew EJB CW B River Code

1] SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check all types present);

**SUBSTRATE SCORE:** 17

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY
- BLDER /SLABS[10] — GRAVEL [7] X X Substrate Origin (Check all) Silt Cover (Check One)
- BOULDER [9] X X SAND [6] X X LIMESTONE [1] RIPRAP [0] SILT HEAVY [-2] SILT MODERATE [-1]
- COBBLE [8] X X BEDROCK [5] TILLS [1] HARDPAN [0] SILT NORMAL [0] SILT FREE [1]
- HARDPAN [4] X X DETRITUS [3] SANDSTONE [0] Extent Of Embeddedness (Check One)
- MUCK [2] ARTIFIC. [0] SHALE [-1] EXTENSIVE [-2] MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: > 4 [2] <= 4 [0] COAL FINES [-2] LOW [0] NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS

2] INSTREAM COVER **COVER SCORE:** 6

TYPE (Check All That Apply) AMOUNT (Check ONLY One or check 2 and AVERAGE)
- UNDERCUT BANKS [1] DEEP POOLS [2] OXBOWS [1] EXTENSIVE > 75% [11]
- OVERHANGING VEGETATION [1] X ROOTWADS [1] AQUATIC MACROPHYTES [1] MODERATE 25-75% [7]
- X SHALLOWS (IN SLOW WATER) [1] BOULDERS [1] X LOGS OR WOODY DEBRIS [1] X SPARSE 5-25% [3]
- NEARLY ABSENT < 5% [1]

COMMENTS:

3] CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 10

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| HIGH [4] | EXCELLENT [7] | NONE [6] | HIGH [3] | SNAGGING | IMPOUND. |
| MODERATE [3] | GOOD [5] | RECOVERED [4] | X MODERATE [2] | RELOCATION | ISLANDS |
| X LOW [2] | X FAIR [3] | X RECOVERING [3] | LOW [1] | CANOPY REMOVAL | X LEVEED |
| NONE [1] | POOR [1] | RECENT OR NO RECOVERY [1] | | DREDGING | BANK SHAPING |
| | | | | ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS:

4] RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 7

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| WIDE > 50m [4] | FOREST, SWAMP [3] | X URBAN OR INDUSTRIAL [0] | NONE OR LITTLE [3] |
| MODERATE 10-50 [3] | OPEN PASTURE/ ROWCROP [0] | SHRUB OR OLD FIELD [2] | X X MODERATE [2] |
| NARROW 5-10m [2] | X RESID., PARK, NEW FIELD [1] | CONSERV. TILLAGE [1] | HEAVY OR SEVERE [1] |
| X X VERY NARROW 1-5m [1] | FENCED PASTURE [1] | MINING/CONSTRUCTION [0] | |
| NONE [0] | | | |

COMMENTS

5] POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 5

MAX. DEPTH (Check 1)
- > 1m [6]
- 0.7-1m [4]
- X 0.4-0.7m [2]
- < 0.4m [1]
- < 0.2m (Pool = 0)

MORPHOLOGY (Check 1)
- X POOL WIDTH > RIFFLE WIDTH [2]
- POOL WIDTH = RIFFLE WIDTH [1]
- POOL WIDTH < RIFFLE W. [0]

POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply)
- TORRENTIAL [-1] EDDIES [1]
- FAST [1] INTERSTITIAL [-1]
- MODERATE [1] INTERMITTENT [-2]
- X SLOW [1]

NO POOL [0]

COMMENTS:

**RIFFLE:** 2

RIFFLE/RUN DEPTH
- GENERALLY > 10 cm, MAX > 50 [4]
- GENERALLY > 10 cm, MAX < 50 [3]
- GENERALLY 5-10 cm [1]
- X GENERALLY < 5 cm (Riffle = 0)

RIFFLE/RUN SUBSTRATE
- X STABLE (e.g., Cobble, Boulder) [2]
- MOD. STABLE (e.g., Pea Gravel) [1]
- UNSTABLE (Gravel, Sand) [0]

RIFFLE/RUN EMBEDDEDNESS
- EXTENSIVE [-1] X MODERATE [0]
- LOW [1] NONE [2]

NO RIFFLE [0]

COMMENTS **GRADIENT:** 4

6] Gradient (feet/mile): 1.57 %POOL: 0 %RIFFLE: 54 %RUN: 46

EPA 4520

PC3 x
8/7/99



Figure V-4-5. Front side of the Ohio EPA Site Description Sheet for evaluating the geographical and physical characteristics of fish sampling locations. This is used to record information for the calculation of the Qualitative Habitat Evaluation Index (QHEI).

**Ohio EPA Site Description Sheet - Fish** QHEI SCORE: 70 41

Stream Pigeon RM ___ Date 8/7/99 River Code ___
Location PC3 Crew ESP, CWD

1) SUBSTRATE (Check ONLY Two Substrate TYPE BOXES; Check All types present);

TYPE POOL RIFFLE POOL RIFFLE SUBSTRATE QUALITY **SUBSTRATE SCORE:** 18 8

- ☒ BOULDER/SLABS[10] X X — ☐ GRAVEL [7] X X — Substrate Origin (Check all) — Silt Cover (Check One)
- ☐ BOULDER [9] X — ☐ SAND [6] X X — ☐ LIMESTONE [1] ☐ RIP/RAP [0] — ☐ SILT HEAVY [-2] ☒ SILT MODERATE [-1]
- ☒ COBBLE [8] X — ☐ BEDROCK [5] — ☒ TILLS [1] ☒ HARDPAN [0] — ☐ SILT NORMAL [0] ☐ SILT FREE [1]
- ☐ HARDPAN [4] X X — ☐ DETRITUS [3] — ☐ SANDSTONE [0] — Extent Of Embeddedness (Check One)
- ☐ MUCK [2] — ☐ ARTIFIC [0] — ☒ SHALE [-1] — ☐ EXTENSIVE [-2] ☒ MODERATE [-1]

TOTAL NUMBER OF SUBSTRATE TYPES: ☒ > 4 [2] ☐ <= 4 [0] ☐ COAL FINES [-2] — ☐ LOW [0] ☐ NONE [1]

NOTE: (Ignore sludge that originates from point-sources; score is based on natural substrates)

COMMENTS ___

**COVER SCORE:** 10

2) INSTREAM COVER

TYPE (Check All That Apply) — AMOUNT (Check ONLY One or check 2 and AVERAGE)

- ☐ UNDERCUT BANKS [1] — ☒ DEEP POOLS [2] — ☐ OXBOWS [1] — ☐ EXTENSIVE > 75% [11]
- ☐ OVERHANGING VEGETATION [1] — ☒ ROOTWADS [1] — ☒ AQUATIC MACROPHYTES [1] — ☐ MODERATE 25-75% [7]
- ☒ SHALLOWS (IN SLOW WATER) [1] — ☒ BOULDERS [1] — ☒ LOGS OR WOODY DEBRIS [1] — ☒ SPARSE 5-25% [3]
- ☐ NEARLY ABSENT < 5% [1]

COMMENTS: ___

3) CHANNEL MORPHOLOGY: (Check ONLY One PER Category OR check 2 and AVERAGE) **CHANNEL:** 10 11

| SINUOSITY | DEVELOPMENT | CHANNELIZATION | STABILITY | MODIFICATIONS/OTHER | |
|---|---|---|---|---|---|
| ☐ HIGH [4] | ☐ EXCELLENT [7] | ☐ NONE [6] | ☐ HIGH [3] | ☐ SNAGGING | ☐ IMPOUND. |
| ☒ MODERATE [3] | ☐ GOOD [5] | ☒ RECOVERED [4] | ☒ MODERATE [2] | ☐ RELOCATION | ☐ ISLANDS |
| ☐ LOW [2] | ☒ FAIR [3] | ☐ RECOVERING [3] | ☐ LOW [1] | ☐ CANOPY REMOVAL | ☐ LEVEED |
| ☐ NONE [1] | ☐ POOR [1] | ☐ RECENT OR NO RECOVERY [1] | | ☐ DREDGING | ☐ BANK SHAPING |
| | | | | ☐ ONE SIDE CHANNEL MODIFICATIONS | |

COMMENTS: ___

4) RIPARIAN ZONE AND BANK EROSION - (check ONE box per bank or check 2 and AVERAGE per bank) **RIPARIAN:** 5

*River Right Looking Downstream*

| RIPARIAN WIDTH L R (Per Bank) | EROSION/RUNOFF - FLOOD PLAIN QUALITY L R (Most Predominant Per Bank) | L R (Per Bank) | BANK EROSION |
|---|---|---|---|
| ☐☐ WIDE > 50m [4] | ☐☐ FOREST, SWAMP [3] | ☒☐ URBAN OR INDUSTRIAL [0] | ☐☐ NONE OR LITTLE [3] |
| ☐☐ MODERATE 10-50 [3] | ☐☐ OPEN PASTURE/ ROWCROP [0] | ☐☐ SHRUB OR OLD FIELD [2] | ☒☒ MODERATE [2] |
| ☐☐ NARROW 5-10m [2] | ☐☒ RESID., PARK, NEW FIELD [1] | ☐☐ CONSERV. TILLAGE [1] | ☐☐ HEAVY OR SEVERE [1] |
| ☐☐ VERY NARROW 1-5m [1] | ☐☐ FENCED PASTURE [1] | ☐☐ MINING/CONSTRUCTION [0] | |
| ☒☒ NONE [0] | | | |

COMMENTS: ___

POOL/GLIDE AND RIFFLE/RUN QUALITY **POOL:** 7

| MAX. DEPTH (Check 1) | MORPHOLOGY (Check 1) | POOL/RUN/RIFFLE CURRENT VELOCITY (Check All That Apply) | |
|---|---|---|---|
| ☐ > 1 m [6] | ☒ POOL WIDTH > RIFFLE WIDTH [2] | ☐ TORRENTIAL [-1] | ☐ EDDIES [1] |
| ☒ 0.7-1 m [4] | ☐ POOL WIDTH = RIFFLE WIDTH [1] | ☐ FAST [1] | ☐ INTERSTITIAL [-1] |
| ☐ 0.4-0.7m [2] | ☐ POOL WIDTH < RIFFLE W. [0] | ☒ MODERATE [1] | ☐ INTERMITTENT [-2] |
| ☐ < 0.4m [1] | | ☐ SLOW [1] | |
| ☐ < 0.2m [Pool = 0] | | | |

☐ NO POOL [0]

COMMENTS ___

**RIFFLE:** 4

| RIFFLE/RUN DEPTH | RIFFLE/RUN SUBSTRATE | RIFFLE/RUN EMBEDDEDNESS |
|---|---|---|
| ☐ GENERALLY > 10 cm, MAX > 50 [4] | ☒ STABLE (e.g., Cobble, Boulder) [2] | ☐ EXTENSIVE [-1] ☐ MODERATE [0] |
| ☐ GENERALLY > 10 cm, MAX < 50 [3] | ☐ MOD. STABLE (e.g., Pea Gravel) [1] | ☒ LOW [1] ☐ NONE [2] |
| ☒ GENERALLY 5-10 cm [1] | ☐ UNSTABLE (Gravel, Sand) [0] | ☐ NO RIFFLE [0] |
| ☐ GENERALLY < 5 cm [Riffle = 0] | | |

COMMENTS ___ **GRADIENT:** 4

5) Gradient (feet/mile): 1.374 %POOL: 31 %RIFFLE: 8 %RUN: 61

Table __

MACROINVERTEBRATE MATRIX SCORES FROM AUGUST 1999

| Site | Waterbody | Taxa Richness | Family Biotic Index | Ratio of Scraper/Filterer | Ratio of EPT/Chironomidae | % Contribution on Dominant Family | EPT Index | Ratio of Shredder/Nonshredder | Total Number Collected | Ratio of Scraper+1/Filterer+1 | Ratio of EPT+1/Chironomidae+1 | Ratio of Shredder+1/Nonshredder+1 | Scrapers | Filterers | Shredders | Nonshredders | EPT | Chironomids |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| PC1 | Pigeon Creek | 13 | 7.6 | (12/0) | 0.62 | 0.26 | 1 | 0.067 | 127 | 13 | | | | | | | | |
| PC2 | Pigeon Creek | 14 | 6.3 | (0/6) | 0.07 | 0.27 | 1 | 0.033 | 105 | 0.142857143 | 0.090909091 | 0.058823529 | 0 | 6 | 2 | 50 | 3 | 43 |
| PC3 | Pigeon Creek | 14 | 4.6 | 0.01 | 6.8 | 0.58 | 3 | 0.05 | 155 | | | | | | | | | |
| PC4 | Pigeon Creek | 7 | 4.2 | (0/73) | 20 | 0.61 | 2 | (0/60) | 119 | 0.013513514 | | 0.016393443 | 0 | 73 | | | | |
| PC5 | Pigeon Creek | 13 | 4.3 | 0.011 | 17 | 0.71 | 4 | (0/60) | 130 | | | 0.016393443 | | | | | | |
| PC6 | Pigeon Creek | 16 | 6.7 | 5.5 | 0.25 | 0.22 | 2 | 0.2 | 141 | | | | | | | | | |
| PC7 | Pigeon Creek | 11 | 5.8 | 0.083 | 0.21 | 0.45 | 2 | 0.017 | 127 | 0.153846154 | 0.225806452 | 0.032786885 | 1 | 12 | 1 | 60 | 13 | 61 |
| PC8 | Pigeon Creek | 12 | 4.9 | (0/77) | 3 | 0.5 | 2 | 0.067 | 155 | 0.012820513 | 2.9 | 0.081967213 | 0 | 77 | 4 | 60 | 86 | 29 |
| PC9 | Pigeon Creek | 12 | 6 | (0/1) | 0.23 | 0.25 | 3 | 0.083 | 116 | 0.5 | 0.25 | 0.098360656 | 0 | 1 | 5 | 60 | 7 | 31 |
| PC11 | Pigeon Creek | 11 | 4.8 | 0.13 | 6.1 | 0.48 | 6 | 0.033 | 129 | 0.140625 | 5.8125 | 0.049180328 | 8 | 63 | 2 | 60 | 92 | 15 |
| PC12 | Pigeon Creek | 8 | 4.6 | (0/75) | 7.9 | 0.49 | 2 | (0/60) | 144 | 0.013157895 | | 0.016393443 | | | | | | |
| PC13 | Pigeon Creek | 13 | 5.3 | 0.058 | 2.4 | 0.35 | 3 | (0/60) | 123 | | | 0.016393443 | | | | | | |
| PC14 | Pigeon Creek | 12 | 5.9 | 0.29 | 2.8 | 0.34 | 4 | 0.017 | 140 | 0.32 | 2.724137931 | 0.032786885 | 7 | 24 | 1 | 60 | 78 | 28 |
| PC15 | Pigeon Creek | 15 | 5.2 | 0.016 | 13 | 0.37 | 3 | 0.033 | 118 | | | | | | | | | |
| PC16 | Pigeon Creek | 11 | 7.4 | 89 | (3/0) | 0.65 | 2 | 0.016 | 129 | | | | | | | | | |
| LC1 | Locust Creek | 12 | 6 | 0.41 | 1.1 | 0.16 | 1 | 0.033 | 115 | 0.424242424 | 1.052631579 | 0.049180328 | 13 | 32 | 2 | 60 | 19 | 18 |
| LC2 | Locust Creek | 16 | 6.7 | 3 | 0.023 | 0.21 | 1 | 0.5 | 174 | | | | | | | | | |
| LP1 | Little Pigeon Creek | 13 | 5.9 | 0.15 | 1.6 | 0.45 | 3 | 0.05 | 145 | 0.164383562 | 1.571428571 | 0.06557377 | 11 | 72 | 3 | 60 | 32 | 20 |
| LP2 | Little Pigeon Creek | 13 | 5.1 | 5.5 | 2.2 | 0.39 | 3 | 0.1 | 145 | | 1.052631579 | | | | | | | |
| BC1 | Bluegrass Creek | 11 | 5.6 | 0.16 | 1.7 | 0.35 | 1 | (0/60) | 115 | 0.176470588 | 1.64 | 0.016393443 | 8 | 50 | 0 | 60 | 40 | 24 |
| BC2 | Bluegrass Creek | 15 | 8.2 | 1 | 0.057 | 0.4 | 2 | 0.017 | 150 | 1.043478261 | | | | | | | | |
| BC3 | Bluegrass Creek | 15 | 6.4 | 2.9 | 1.7 | 0.3 | 3 | 0.05 | 185 | 2.7 | 1.692307692 | 0.06557377 | 26 | 9 | 3 | 60 | 65 | 38 |
| WD1 | Weinsheimer Ditch | 12 | 6 | 2 | 3.4 | 0.3 | 2 | 0.033 | 147 | 1.75 | 3.266666667 | 0.049180328 | 6 | 3 | 2 | 60 | 48 | 14 |
| SD1 | Stollberg Ditch | 9 | 7.7 | 2 | 0.04 | 0.77 | 1 | 0.017 | 121 | | | | | | | | | |
| UN1 | Unnamed Tributary | 16 | 6.7 | 33 | (0/5) | 0.41 | 0 | 0.18 | 118 | | | | | | | | | |
| SC1 | Squaw Creek | 12 | 6.3 | (0/61) | 1.6 | 0.25 | 2 | 0.05 | 138 | 0.016129032 | | 0.06557377 | 0 | 61 | 3 | 60 | 32 | 20 |
| BG1 | Big Creek | 14 | 5.8 | 0.19 | 0.36 | 0.28 | 3 | 0.017 | 135 | 0.235294118 | 0.382352941 | 0.032786885 | 3 | 16 | 1 | 60 | 12 | 33 |
| BG2 | Big Creek | 16 | 6.4 | 0.04 | 0.63 | 0.21 | 2 | (0/60) | 121 | 0.076923077 | 0.65 | 0.016393443 | 1 | 25 | 0 | 60 | 12 | 19 |
| SF1 | Smith Fork | 17 | 5.6 | 0.44 | 1.5 | 0.19 | 2 | (0/60) | 131 | 0.45 | 1.5 | 0.016393443 | 17 | 39 | 0 | 60 | 35 | 23 |
| SF2 | Smith Fork | 14 | 7 | (20/0) | 0.38 | 0.21 | 2 | (0/60) | 129 | 21 | | 0.016393443 | 20 | 0 | 0 | 60 | 13 | 34 |
| SF3 | Smith Fork | 18 | 5.4 | 0.11 | 2.4 | 0.31 | 5 | 0.33 | 130 | | | | | | | | | |
| WF1 | West Fork | 18 | 6.1 | 0.15 | 2.2 | 0.3 | 3 | (0/60) | 155 | 0.171428571 | 2.212121212 | 0.016393443 | 5 | 34 | 0 | 60 | 72 | 32 |
| WF2 | West Fork | 14 | 5.4 | 0.11 | 0.94 | 0.38 | 2 | (0/60) | 128 | | | 0.016393443 | | | | | | |
| WF3 | West Fork | 16 | 7.8 | 2 | 0.04 | 0.37 | 1 | (0/60) | 107 | | | 0.016393443 | | | | | | |
| HC1 | Hurricane Creek | 12 | 6.7 | 17 | 0.11 | 0.28 | 2 | (0/60) | 122 | 11.66666667 | 0.114285714 | 0.016393443 | 34 | 2 | 0 | 60 | 4 | 35 |
| SA1 | Sand Creek | 10 | 6.4 | 1.2 | 0.063 | 0.47 | 2 | 0.048 | 128 | 1.2 | 0.072164948 | 0.069767442 | 5 | 4 | 2 | 42 | 6 | 96 |
| | Average | 13.19444 | 6.022222 | 5.944929 | 3.012441176 | 0.375556 | 2.305556 | 0.085042 | 133.25 | | | | | | | | | |
| | Max | 18 | 8.2 | 89 | 20 | 0.77 | 6 | 0.5 | 185 | | | | | | | | | |
| | Min | 7 | 4.2 | 0.01 | 0.023 | 0.16 | 0 | 0.016 | 105 | | | | | | | | | |

BC1 8/9/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 0 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 3 | | 0.000 | | |
| Gastropoda | Physa | 8 | 8 | 0.703 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 10 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 7 | 9 | 0.692 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 40 | 4 | 1.758 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious |
| | Elmidae | 4 | 4 | 0.176 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 17 | 8 | 1.495 | Gathers | |
| | Other Chironomidae | 7 | 6 | 0.462 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavengers | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 2 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 8 | 4 | 0.352 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavengers | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 11 |
| **FBI** | 5.637 |
| **Scraper/Filters** | 0.160 |
| **EPT/Chironomidae** | 1.667 |
| **% Contribution of Dominant Family** | 0.348 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.000 |
| Total Number Collected | 115 |

BC2 8/10/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 16 | 8 | 1.085 | Scrapers | Lefthanded |
| | Planorbidae | 2 | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 5 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 21 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 1 | 7 | 0.059 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.025 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | 1 | 3 | 0.025 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 60 | 9 | 4.576 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.034 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 4 | | 0.000 | Predators | Predacious |
| | Elmidae | 1 | 4 | 0.034 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 28 | 8 | 1.898 | Gathers | |
| | Other Chironomidae | 7 | 6 | 0.356 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.068 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.051 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 15 |
| **FBI** | 8.212 |
| **Scraper/Filters** | 1.045 |
| **EPT/Chironomidae** | 0.057 |
| **% Contribution of Dominant Family** | 0.400 |
| **EPT Index** | 2.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.017 |
| Total Number Collected | 150 |

BC3 8/11/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 19 | 8 | 0.944 | Scrapers | Lefthanded |
| | Planorbidae | 1 | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 9 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 55 | 7 | 2.391 | Gathers | Backplate |
| | Baetidae | 4 | 4 | 0.099 | Gathers | |
| | Heptageniidae | 6 | 4 | 0.149 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 22 | 3 | 0.410 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 14 | 9 | 0.783 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 2 | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | 4 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 6 | 8 | 0.298 | Gathers | |
| | Other Chironomidae | 32 | 6 | 1.193 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 8 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.050 | Shredders | Pillbug |
| Amphipod | | 2 | 4 | 0.050 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

**TAXA RICHNESS** 15
**FBI** 6.366
**Scraper/Filters** 2.889
**EPT/Chironomidae** 1.711
**% Contribution of Dominant Family** 0.297
**EPT Index** 3.000
**Community Similarity Indices**
**CPOM** 0.050
Total Number Collected 185

BG1 8/14/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 2 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 3 | 8 | 0.220 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 13 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 8 | 7 | 0.514 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | 1 | 5 | 0.046 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 18 | 9 | 1.486 | Predators | |
| | Calopterygidae | 1 | 5 | 0.046 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 3 | 4 | 0.110 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | 1 | 1 | 0.009 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 38 | 4 | 1.394 | Gathers | Riffle |
| | Haliplidae | 11 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.147 | Gathers | |
| | Other Chironomidae | 31 | 6 | 1.706 | Gathers | |
| | Culicidae | 2 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 3 | 4 | 0.110 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 14 |
| **FBI** | 5.789 |
| **Scraper/Filters** | 0.188 |
| **EPT/Chironomidae** | 0.364 |
| **% Contribution of Dominant Family** | 0.281 |
| **EPT Index** | 3.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.017 |
| Total Number Collected | 135 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| BG2 | 8/13/1999 | | | | | | |
| | | | | | | | |
| Periphyton | 2 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 1 | | | |
| Macrophytes | 1 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 2 | | 0.000 | | | |
| Gastropoda | Physa | 1 | 8 | 0.088 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 23 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 10 | 7 | 0.769 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | 1 | 3 | 0.033 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 25 | 9 | 2.473 | Predators | | |
| | Calopterygidae | 4 | 5 | 0.220 | Predators | Stiffantaena | |
| Plecoptera | | | | 0.000 | | | |
| Trichoptera | Hydropsychidae | 2 | 4 | 0.088 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed | |
| | Dytiscidae | 3 | | 0.000 | Predators | Predacious | |
| | Elmidae | 25 | 4 | 1.099 | Gathers | Riffle | |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 6 | 8 | 0.527 | Gathers | | |
| | Other Chironomidae | 13 | 6 | 0.857 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | 1 | 6 | 0.066 | Predators | Crayfish | |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | 3 | 4 | 0.132 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 16 | | | | | | |
| **FBI** | 6.352 | | | | | | |
| **Scraper/Filters** | 0.040 | | | | | | |
| **EPT/Chironomidae** | 0.632 | | | | | | |
| **% Contribution of Dominant Family** | 0.207 | | | | | | |
| **EPT Index** | 2.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.000 | | | | | | |
| Total Number Collected | 121 | | | | | | |

HC1 8/15/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 1 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 34 | 8 | 3.056 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 2 | 4 | 0.090 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 2 | 3 | 0.067 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 7 | 9 | 0.708 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 2 | 4 | 0.090 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 21 | | 0.000 | Predators | Predacious |
| | Elmidae | 7 | 4 | 0.315 | Gathers | Riffle |
| | Haliplidae | 9 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.090 | Gathers | |
| | Other Chironomidae | 34 | 6 | 2.292 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 2 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 6.708 | |
| **Scraper/Filters** | 17.000 | |
| **EPT/Chironomidae** | 0.114 | |
| **% Contribution of Dominant Family** | 0.279 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 122 | |

LC1 8/8/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 14 | | 0.000 | | |
| Gastropoda | Physa | 13 | 8 | 1.253 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 13 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 7 | 9 | 0.759 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 19 | 4 | 0.916 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 15 | 5 | 0.904 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 9 | 4 | 0.434 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 12 | 8 | 1.157 | Gathers | |
| | Other Chironomidae | 6 | 6 | 0.434 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 3 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 2 | 8 | 0.193 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 12 |
| **FBI** | 6.048 |
| **Scraper/Filters** | 0.406 |
| **EPT/Chironomidae** | 1.056 |
| **% Contribution of Dominant Family** | 0.165 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.033 |
| Total Number Collected | 115 |

LC2 8/10/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 19 | | 0.000 | | |
| Gastropoda | Physa | 6 | 8 | 0.490 | Scrapers | Lefthanded |
| | Planorbidae | 20 | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 9 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 1 | 4 | 0.041 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.031 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.092 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 25 | | 0.000 | Predators | Predacious |
| | Elmidae | 20 | 4 | 0.816 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 36 | 8 | 2.939 | Gathers | |
| | Other Chironomidae | 8 | 6 | 0.490 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | 1 | 3 | 0.031 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 2 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | 1 | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 19 | 8 | 1.551 | Shredders | Pillbug |
| Amphipod | | 5 | 4 | 0.204 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 16 |
| **FBI** | 6.684 |
| **Scraper/Filters** | 3.000 |
| **EPT/Chironomidae** | 0.023 |
| **% Contribution of Dominant Family** | 0.207 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.500 |
| Total Number Collected | 174 |

LP1 8/8/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 3 | | 0.000 | | |
| Gastropoda | Physa | 11 | 8 | 1.189 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 65 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 8 | 7 | 0.757 | Gathers | Backplate |
| | Baetidae | 17 | 4 | 0.919 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 7 | 4 | 0.378 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 3 | 5 | 0.203 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 13 | 8 | 1.405 | Gathers | |
| | Other Chironomidae | 7 | 6 | 0.568 | Gathers | |
| | Culicidae | 2 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 6 | 4 | 0.324 | Shredders | Shrimp |
| Decapoda | | 2 | 6 | 0.162 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 13 |
| **FBI** | 5.905 |
| **Scraper/Filters** | 0.153 |
| **EPT/Chironomidae** | 1.600 |
| **% Contribution of Dominant Family** | 0.448 |
| **EPT Index** | 3.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.050 |
| Total Number Collected | 145 |

LP2 8/8/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 56 | 4 | 1.764 | Gathers | |
| | Heptageniidae | 22 | 4 | 0.693 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 4 | 4 | 0.126 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | 2 | 4 | 0.063 | Gathers | Riffle |
| | Haliplidae | 4 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 23 | 8 | 1.449 | Gathers | |
| | Other Chironomidae | 15 | 6 | 0.709 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 5 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 6 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 4 | 8 | 0.252 | Shredders | Pillbug |
| Amphipod | | 1 | 4 | 0.031 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 13 | |
| **FBI** | 5.087 | |
| **Scraper/Filters** | 5.500 | |
| **EPT/Chironomidae** | 2.158 | |
| **% Contribution of Dominant Family** | 0.386 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.100 | |
| Total Number Collected | | 145 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC1 | 8/6/1999 | | | | | | |
| | | | | | | | |
| Periphyton | 1 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 2 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 2 | | 0.000 | | | |
| Gastropoda | Physa | 12 | 8 | 1.371 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 5 | 7 | 0.500 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | 2 | 3 | 0.086 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 33 | 9 | 4.243 | Predators | | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena | |
| Plecoptera | | | | 0.000 | | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | 6 | 5 | 0.429 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | 4 | 4 | 0.229 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.343 | Gathers | | |
| | Other Chironomidae | 5 | 6 | 0.429 | Gathers | | |
| | Culicidae | 5 | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | 20 | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | 25 | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | 5 | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 13 | | | | | | |
| **FBI** | 7.629 | | | | | | |
| **Scraper/Filters** | #DIV/0! | 12/0 | | | | | |
| **EPT/Chironomidae** | 0.625 | | | | | | |
| **% Contribution of Dominant Family** | 0.260 | | | | | | |
| **EPT Index** | 1.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.067 | | | | | | |
| Total Number Collected | 127 | | | | | | |

PC2 8/7/1999

| | | | | |
|---|---|---|---|---|
| Periphyton | 0 | | Slimes | 0 |
| Filamentous Algae | 0 | | Macroinvertebrates | 1 |
| Macrophytes | 0 | | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 3 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.042 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 2 | 9 | 0.254 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 3 | 4 | 0.169 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 12 | 5 | 0.845 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 7 | 4 | 0.394 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 28 | 8 | 3.155 | Gathers | |
| | Other Chironomidae | 15 | 6 | 1.268 | Gathers | |
| | Culicidae | 6 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 19 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 3 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 3 | 4 | 0.169 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 6.296 | |
| **Scraper/Filters** | 0.000 | 0/6 |
| **EPT/Chironomidae** | 0.070 | |
| **% Contribution of Dominant Family** | 0.267 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.033 | |
| Total Number Collected | | 105 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| PC3 | 8/7/1999 | | | | | | | |
| | | | | | | | | |
| Periphyton | 1 | | Slimes | 0 | | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 3 | | | | |
| Macrophytes | 1 | | Fish | 2 | | | | |
| | | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | | |
| | | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | | |
| Oligochaeta | | 1 | | 0.000 | | | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded | | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | | |
| | Ancylidae | 1 | | 0.000 | Scrapers | Limpet | | |
| Bivalvia | | 12 | | 0.000 | Filters | | | |
| Ephemeroptera | Canidae | 4 | 7 | 0.204 | Gathers | Backplate | | |
| | Baetidae | 2 | 4 | 0.058 | Gathers | | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | | |
| | Libellulidae | | 9 | 0.000 | Predators | | | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | | | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena | | |
| Plecoptera | | | | 0.000 | | | | |
| Trichoptera | Hydropsychidae | 90 | 4 | 2.628 | Filters | Webspinner | | |
| | Philopotamide | | 3 | 0.000 | Gathers | | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | | |
| Coleoptera | Dryopidae | 15 | 5 | 0.547 | Predators | Longtoed | | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | | |
| | Elmidae | 6 | 4 | 0.175 | Gathers | Riffle | | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | | |
| Diptera | Blood-red Chironomidae | 5 | 8 | 0.292 | Gathers | | | |
| | Other Chironomidae | 9 | 6 | 0.394 | Gathers | | | |
| | Culicidae | 2 | | 0.000 | Shredders | Mosquito | | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | | |
| | Tabanidae | | 6 | 0.000 | Predators | | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | | |
| | Nepidae | | | 0.000 | | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | | |
| Isopoda | Asellidae | 5 | 8 | 0.292 | Shredders | Pillbug | | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | | |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech | | |
| Megaloptera | Sialidae | 1 | 4 | 0.029 | Predators | Dobsenfly | | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | | |
| | | | | | | | | |
| **TAXA RICHNESS** | 14 | | | | | | | |
| **FBI** | 4.620 | | | | | | | |
| **Scraper/Filters** | 0.010 | | | | | | | |
| **EPT/Chironomidae** | 6.857 | | | | | | | |
| **% Contribution of Dominant Family** | 0.581 | | | | | | | |
| **EPT Index** | 3.000 | | | | | | | |
| **Community Similarity Indices** | | | | | | | | |
| **CPOM** | 0.050 | | | | | | | |
| Total Number Collected | 155 | | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| PC4 | 8/7/1999 | | | | | |
| | | | | | | |
| Periphyton | 2 | | Slimes | 0 | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 3 | | |
| Macrophytes | 1 | | Fish | 2 | | |
| | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | |
| | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | |
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 27 | 4 | 0.915 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.025 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 73 | 4 | 2.475 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 12 | 5 | 0.508 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | | 4 | 0.000 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.203 | Gathers | |
| | Other Chironomidae | 2 | 6 | 0.102 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |
| | | | | | | |
| **TAXA RICHNESS** | 7 | | | | | |
| **FBI** | 4.229 | | | | | |
| **Scraper/Filters** | 0.000 | 0/73 | | | | |
| **EPT/Chironomidae** | 20.000 | | | | | |
| **% Contribution of Dominant Family** | 0.613 | | | | | |
| **EPT Index** | 2.000 | | | | | |
| **Community Similarity Indices** | | | | | | |
| **CPOM** | 0.000 | 0/60 | | | | |
| Total Number Collected | 119 | | | | | |

PC5 8/7/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 3 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 2 | 7 | 0.109 | Gathers | Backplate |
| | Baetidae | 9 | 4 | 0.281 | Gathers | |
| | Heptageniidae | 1 | 4 | 0.031 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.070 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 92 | 4 | 2.875 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | 9 | 5 | 0.352 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 6 | 4 | 0.188 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.188 | Gathers | |
| | Other Chironomidae | 3 | 6 | 0.141 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.047 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | 1 | 4 | 0.031 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 13 | |
| **FBI** | 4.313 | |
| **Scraper/Filters** | 0.011 | |
| **EPT/Chironomidae** | 17.333 | |
| **% Contribution of Dominant Family** | 0.708 | |
| **EPT Index** | 4.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 130 | |

PC6 8/9/1999

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 3 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 8 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 2 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 6 | 7 | 0.420 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 3 | 4 | 0.120 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 2 | 3 | 0.060 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 9 | 9 | 0.810 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious |
| | Elmidae | 13 | 4 | 0.520 | Gathers | Riffle |
| | Haliplidae | 2 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 5 | 8 | 0.400 | Gathers | |
| | Other Chironomidae | 31 | 6 | 1.860 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 12 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 2 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 31 | 8 | 2.480 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 3 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 16 |
| **FBI** | 6.670 |
| **Scraper/Filters** | 5.500 |
| **EPT/Chironomidae** | 0.250 |
| **% Contribution of Dominant Family** | 0.220 |
| **EPT Index** | 2.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.200 |
| Total Number Collected | 141 |

PC7 8/9/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 6 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | 1 | 4 | 0.042 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 8 | 9 | 0.758 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 12 | 4 | 0.505 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 19 | | 0.000 | Predators | Predacious |
| | Elmidae | 12 | 4 | 0.505 | Gathers | Riffle |
| | Haliplidae | 2 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 4 | 8 | 0.337 | Gathers | |
| | Other Chironomidae | 57 | 6 | 3.600 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.084 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 5 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 11 |
| **FBI** | 5.832 |
| **Scraper/Filters** | 0.083 |
| **EPT/Chironomidae** | 0.213 |
| **% Contribution of Dominant Family** | 0.449 |
| **EPT Index** | 2.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.017 |
| Total Number Collected | 127 |

PC8 8/9/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 9 | 7 | 0.492 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 77 | 4 | 2.406 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 17 | | 0.000 | Predators | Predacious |
| | Elmidae | 6 | 4 | 0.188 | Gathers | Riffle |
| | Haliplidae | 4 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 3 | 8 | 0.188 | Gathers | |
| | Other Chironomidae | 26 | 6 | 1.219 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 2 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 2 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 5 | 8 | 0.313 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 2 | 4 | 0.063 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 4.867 | |
| **Scraper/Filters** | 0.000 | 0/77 |
| **EPT/Chironomidae** | 2.966 | |
| **% Contribution of Dominant Family** | 0.497 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.067 | |
| Total Number Collected | | 155 |

PC9 8/10/1999

| | | | | |
|---|---|---|---|---|
| Periphyton | 1 | | Slimes | 0 |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 |
| Macrophytes | 0 | | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 5 | 7 | 0.398 | Gathers | Backplate |
| | Baetidae | 1 | 4 | 0.045 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 11 | 9 | 1.125 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.045 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 9 | | 0.000 | Predators | Predacious |
| | Elmidae | 29 | 4 | 1.318 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 21 | 8 | 1.909 | Gathers | |
| | Other Chironomidae | 10 | 6 | 0.682 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 17 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 1 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 9 | 4 | 0.409 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 1 | 4 | 0.045 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 5.977 | |
| **Scraper/Filters** | 0.000 | 0/1 |
| **EPT/Chironomidae** | 0.226 | |
| **% Contribution of Dominant Family** | 0.252 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.083 | |
| Total Number Collected | 115 | |

PC11 8/11/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.124 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 16 | 7 | 0.868 | Gathers | Backplate |
| | Baetidae | 4 | 4 | 0.124 | Gathers | |
| | Heptageniidae | 6 | 4 | 0.186 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 62 | 4 | 1.922 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | 1 | 6 | 0.047 | Filters | |
| | Leptoceridae | 3 | 1 | 0.023 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 17 | 4 | 0.527 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 11 | 8 | 0.682 | Gathers | |
| | Other Chironomidae | 4 | 6 | 0.186 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 3 | 4 | 0.093 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 11 |
| **FBI** | 4.783 |
| **Scraper/Filters** | 0.127 |
| **EPT/Chironomidae** | 6.133 |
| **% Contribution of Dominant Family** | 0.481 |
| **EPT Index** | 6.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.033 |
| Total Number Collected | 129 |

PC12 8/12/1999

| | | | | |
|---|---|---|---|---|
| Periphyton | 2 | | Slimes | 0 |
| Filamentous Algae | 1 | | Macroinvertebrates | 2 |
| Macrophytes | 0 | | Fish | 1 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 5 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 17 | 7 | 0.862 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.065 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 70 | 4 | 2.029 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 1 | | 0.000 | Predators | Predacious |
| | Elmidae | 37 | 4 | 1.072 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | | 8 | 0.000 | Gathers | |
| | Other Chironomidae | 11 | 6 | 0.478 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 2 | 4 | 0.058 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 8 | |
| **FBI** | 4.565 | |
| **Scraper/Filters** | 0.000 | 0/75 |
| **EPT/Chironomidae** | 7.909 | |
| **% Contribution of Dominant Family** | 0.486 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | |
| Total Number Collected | | 144 |

PC13 8/13/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 1 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 3 | 8 | 0.220 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 9 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 18 | 7 | 1.156 | Gathers | Backplate |
| | Baetidae | 3 | 4 | 0.110 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 2 | 9 | 0.165 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 43 | 4 | 1.578 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 3 | | 0.000 | Predators | Predacious |
| | Elmidae | 11 | 4 | 0.404 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | 1 | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 4 | 8 | 0.294 | Gathers | |
| | Other Chironomidae | 23 | 6 | 1.266 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 2 | 4 | 0.073 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 13 | |
| **FBI** | 5.266 | |
| **Scraper/Filters** | 0.058 | |
| **EPT/Chironomidae** | 2.370 | |
| **% Contribution of Dominant Family** | 0.350 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 123 | |

PC14 8/16/1999

| | | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 3 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 4 | 8 | 0.283 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 21 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 48 | 7 | 2.973 | Gathers | Backplate |
| | Baetidae | 24 | 4 | 0.850 | Gathers | |
| | Heptageniidae | 3 | 4 | 0.106 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.027 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 3 | 4 | 0.106 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 2 | 4 | 0.071 | Gathers | Riffle |
| | Haliplidae | 4 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.071 | Gathers | |
| | Other Chironomidae | 27 | 6 | 1.434 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 12 |
| **FBI** | 5.920 |
| **Scraper/Filters** | 0.292 |
| **EPT/Chironomidae** | 2.786 |
| **% Contribution of Dominant Family** | 0.343 |
| **EPT Index** | 4.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.017 |
| Total Number Collected | 140 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC16 | 8/6/1999 | | | | | | |
| | | | | | | | |
| Periphyton | 2 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 1 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | 1 | | 0.000 | | | |
| Gastropoda | Physa | 1 | 8 | 0.118 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | 44 | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 12 | 7 | 1.235 | Gathers | Backplate | |
| | Baetidae | 20 | 4 | 1.176 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 5 | 9 | 0.662 | Predators | | |
| | Calopterygidae | 3 | 5 | 0.221 | Predators | Stiffantaena | |
| Plecoptera | | | | 0.000 | | | |
| Trichoptera | Hydropsychidae | 20 | 4 | 1.176 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | 2 | 5 | 0.147 | Predators | Longtoed | |
| | Dytiscidae | 2 | | 0.000 | Predators | Predacious | |
| | Elmidae | 1 | 4 | 0.059 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.235 | Gathers | | |
| | Other Chironomidae | 2 | 6 | 0.176 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | 1 | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 15 | | | | | | |
| **FBI** | 5.206 | | | | | | |
| **Scraper/Filters** | 0.016 | | | | | | |
| **EPT/Chironomidae** | 13.000 | | | | | | |
| **% Contribution of Dominant Family** | 0.373 | | | | | | |
| **EPT Index** | 3.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.033 | | | | | | |
| Total Number Collected | 118 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| PC16 | 8/5/1999 | | | | | | |
| | | | | | | | |
| Periphyton | 1 | | Slimes | 0 | | | |
| Filamentous Algae | 2 | | Macroinvertebrates | 3 | | | |
| Macrophytes | 0 | | Fish | 3 | | | |
| | | | | | | | |
| | Macrobenthos Qualitative Sample List | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | **Feeding Group** | | |
| Oligochaeta | | 1 | | 0.000 | | | |
| Gastropoda | Physa | 84 | 8 | 5.508 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | 5 | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate | |
| | Baetidae | 2 | 4 | 0.066 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | 6 | 3 | 0.148 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 14 | 9 | 1.033 | Predators | | |
| | Calopterygidae | 3 | 5 | 0.123 | Predators | Stiffantaena | |
| Plecoptera | | | | 0.000 | | | |
| Trichoptera | Hydropsychidae | 1 | 4 | 0.033 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | 9 | 5 | 0.369 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | 3 | 4 | 0.098 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | | 8 | 0.000 | Gathers | | |
| | Other Chironomidae | | 6 | 0.000 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavengers | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavengers | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 11 | | | | | | |
| **FBI** | 7.377 | | | | | | |
| **Scraper/Filters** | 89.000 | | | | | | |
| **EPT/Chironomidae** | #DIV/0! | 3/0 | | | | | |
| **% Contribution of Dominant Family** | 0.651 | | | | | | |
| **EPT Index** | 2.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.016 | | | | | | |
| Total Number Collected | 129 | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SA1 | 8/6/1999 | | | | | | |
| | | | | | | | |
| Periphyton | 1 | | Slimes | 0 | | | |
| Filamentous Algae | 3 | | Macroinvertebrates | 2 | | | |
| Macrophytes | 0 | | Fish | 2 | | | |
| | | | | | | | |
| Macrobenthos Qualitative Sample List | | | | | | | |
| | | | | | | | |
| **ORDER** | **FAMILY** | **COUNT** | **TOLERANCE VALUES** | **FBI** | | | |
| Oligochaeta | | | | 0.000 | | | |
| Gastropoda | Physa | 4 | 8 | 0.256 | Scrapers | Lefthanded | |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn | |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded | |
| | Ancylidae | 1 | | 0.000 | Scrapers | Limpet | |
| Bivalvia | | | | 0.000 | Filters | | |
| Ephemeroptera | Canidae | 2 | 7 | 0.112 | Gathers | Backplate | |
| | Baetidae | | 4 | 0.000 | Gathers | | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping | |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg | |
| | Cordulegastridae | | 3 | 0.000 | Predators | | |
| | Libellulidae | | 9 | 0.000 | Predators | | |
| Zygoptera | Coenagrioidae | 1 | 9 | 0.072 | Predators | | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena | |
| Plecoptera | | | | 0.000 | | | |
| Trichoptera | Hydropsychidae | 4 | 4 | 0.128 | Filters | Webspinner | |
| | Philopotamide | | 3 | 0.000 | Gathers | | |
| | Polycentropodidae | | 6 | 0.000 | Filters | | |
| | Leptoceridae | | 1 | 0.000 | Gathers | | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell | |
| Coleoptera | Dryopidae | 16 | 5 | 0.640 | Predators | Longtoed | |
| | Dytiscidae | | | 0.000 | Predators | Predacious | |
| | Elmidae | 2 | 4 | 0.064 | Gathers | Riffle | |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling | |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny | |
| | Gyrinidae | | | 0.000 | Predators | 4eyed | |
| Diptera | Blood-red Chironomidae | 36 | 8 | 2.304 | Gathers | | |
| | Other Chironomidae | 60 | 6 | 2.880 | Gathers | | |
| | Culicidae | | | 0.000 | Shredders | Mosquito | |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly | |
| | Tabanidae | | 6 | 0.000 | Predators | | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly | |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge | |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp | |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen | |
| | Nepidae | | | 0.000 | | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider | |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug | |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp | |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish | |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech | |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly | |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair | |
| Tubellaria | | | | 0.000 | Scavenger | Planaria | |
| | | | | | | | |
| **TAXA RICHNESS** | 10 | | | | | | |
| **FBI** | 6.456 | | | | | | |
| **Scraper/Filters** | 1.250 | | | | | | |
| **EPT/Chironomidae** | 0.063 | | | | | | |
| **% Contribution of Dominant Family** | 0.469 | | | | | | |
| **EPT Index** | 2.000 | | | | | | |
| **Community Similarity Indices** | | | | | | | |
| **CPOM** | 0.048 | | | | | | |
| Total Number Collected | 128 | | | | | | |

SC1 8/11/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | | 8 | 0.000 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 33 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 4 | 7 | 0.269 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 34 | 9 | 2.942 | Predators | |
| | Calopterygidae | 1 | 5 | 0.048 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 28 | 4 | 1.077 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | | | 0.000 | Predators | Predacious |
| | Elmidae | 7 | 4 | 0.269 | Gathers | Riffle |
| | Haliplidae | 1 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.154 | Gathers | |
| | Other Chironomidae | 18 | 6 | 1.038 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 3 | 8 | 0.231 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.058 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 6 | 4 | 0.231 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 12 | |
| **FBI** | 6.317 | |
| **Scraper/Filters** | 0.000 | 0/61 |
| **EPT/Chironomidae** | 1.600 | |
| **% Contribution of Dominant Family** | 0.246 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.050 | |
| Total Number Collected | | 138 |

SD1 8/13/1999

| | | | | |
|---|---|---|---|---|
| Periphyton | 2 | | Slimes | 0 |
| Filamentous Algae | 1 | | Macroinvertebrates | 3 |
| Macrophytes | 0 | | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 8 | 8 | 0.566 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 4 | 4 | 0.142 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 6 | | 0.000 | Predators | Predacious |
| | Elmidae | 1 | 4 | 0.035 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 93 | 8 | 6.584 | Gathers | |
| | Other Chironomidae | 6 | 6 | 0.319 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 1 | 8 | 0.071 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 9 |
| **FBI** | 7.717 |
| **Scraper/Filters** | 2.000 |
| **EPT/Chironomidae** | 0.040 |
| **% Contribution of Dominant Family** | 0.769 |
| **EPT Index** | 1.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.017 |
| Total Number Collected | 121 |

SF1 8/14/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 16 | 8 | 1.255 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 1 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 14 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 10 | 7 | 0.686 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 1 | 3 | 0.029 | Predators | |
| | Corduliidae | 2 | 5 | 0.098 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 3 | 9 | 0.265 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 25 | 4 | 0.980 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 11 | | 0.000 | Predators | Predacious |
| | Elmidae | 14 | 4 | 0.549 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 2 | 8 | 0.157 | Gathers | |
| | Other Chironomidae | 21 | 6 | 1.235 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | 2 | 3 | 0.059 | Predators | Cranefly |
| | Tabanidae | 3 | 6 | 0.176 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech |
| Megaloptera | Sialidae | 3 | 4 | 0.118 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 17 | |
| **FBI** | 5.608 | |
| **Scraper/Filters** | 0.436 | |
| **EPT/Chironomidae** | 1.522 | |
| **% Contribution of Dominant Family** | 0.191 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 131 | |

SF2 8/14/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 2 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 19 | 8 | 1.382 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 11 | 7 | 0.700 | Gathers | Backplate |
| | Baetidae | 2 | 4 | 0.073 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 2 | 3 | 0.055 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | 1 | 3 | 0.027 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 27 | 9 | 2.209 | Predators | |
| | Calopterygidae | 2 | 5 | 0.091 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 2 | | 0.000 | Predators | Predacious |
| | Elmidae | 7 | 4 | 0.255 | Gathers | Riffle |
| | Haliplidae | 17 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | 1 | 4 | 0.036 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 8 | 8 | 0.582 | Gathers | |
| | Other Chironomidae | 26 | 6 | 1.418 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | 4 | 4 | 0.145 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 6.973 | |
| **Scraper/Filters** | #DIV/0! | 20/0 |
| **EPT/Chironomidae** | 0.382 | |
| **% Contribution of Dominant Family** | 0.209 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 129 | |

UN1 8/12/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 1 |
| Macrophytes | 2 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 2 | | 0.000 | | |
| Gastropoda | Physa | 32 | 8 | 4.339 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 2 | 9 | 0.305 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 48 | | 0.000 | Predators | Predacious |
| | Elmidae | 13 | 4 | 0.881 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | 1 | 4 | 0.068 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.136 | Gathers | |
| | Other Chironomidae | 4 | 6 | 0.407 | Gathers | |
| | Culicidae | 1 | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 2 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 2 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 2 | 8 | 0.271 | Shredders | Pillbug |
| Amphipod | | 4 | 4 | 0.271 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 2 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | 1 | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 16 | |
| **FBI** | 6.678 | |
| **Scraper/Filters** | 33.000 | |
| **EPT/Chironomidae** | 0.000 | 0/5 |
| **% Contribution of Dominant Family** | 0.407 | |
| **EPT Index** | 0.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.183 | |
| Total Number Collected | | 118 |

SF3 8/14/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 5 | 8 | 0.345 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 12 | 7 | 0.724 | Gathers | Backplate |
| | Baetidae | 1 | 4 | 0.034 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | 1 | 5 | 0.043 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | 17 | 5 | 0.733 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 40 | 4 | 1.379 | Filters | Webspinner |
| | Philopotamide | 1 | 3 | 0.026 | Gathers | |
| | Polycentropodidae | 4 | 6 | 0.207 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 2 | | 0.000 | Predators | Predacious |
| | Elmidae | 1 | 4 | 0.034 | Gathers | Riffle |
| | Haliplidae | 10 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 5 | 8 | 0.345 | Gathers | |
| | Other Chironomidae | 19 | 6 | 0.983 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | 2 | 3 | 0.052 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | 1 | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | 6 | 8 | 0.414 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 1 | | 0.000 | | Leech |
| Megaloptera | Sialidae | 2 | 4 | 0.069 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 18 | |
| **FBI** | 5.388 | |
| **Scraper/Filters** | 0.114 | |
| **EPT/Chironomidae** | 2.417 | |
| **% Contribution of Dominant Family** | 0.308 | |
| **EPT Index** | 5.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.333 | (20/60) |
| Total Number Collected | 130 | |

WD1 8/12/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 0 | Fish | 2 |

Macrobenthos Qualitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | | | 0.000 | | |
| Gastropoda | Physa | 6 | 8 | 0.500 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 3 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 44 | 7 | 3.208 | Gathers | Backplate |
| | Baetidae | 4 | 4 | 0.167 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | 2 | 3 | 0.063 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | | 9 | 0.000 | Predators | |
| | Calopterygidae | | 5 | 0.000 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 23 | | 0.000 | Predators | Predacious |
| | Elmidae | 22 | 4 | 0.917 | Gathers | Riffle |
| | Haliplidae | | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 4 | 8 | 0.333 | Gathers | |
| | Other Chironomidae | 10 | 6 | 0.625 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 12 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | 4 | 4 | 0.167 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | 13 | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | | | 0.000 | Parasite | Horsehair |
| Tubellaria | | | | 0.000 | Scavenger | Planaria |

| | |
|---|---|
| **TAXA RICHNESS** | 12 |
| **FBI** | 5.979 |
| **Scraper/Filters** | 2.000 |
| **EPT/Chironomidae** | 3.429 |
| **% Contribution of Dominant Family** | 0.299 |
| **EPT Index** | 2.000 |
| **Community Similarity Indices** | |
| **CPOM** | 0.033 |
| Total Number Collected | 147 |

| WF1 | 8/16/1999 | | |
|---|---|---|---|
| Periphyton | 1 | Slimes | 0 |
| Filamentous Algae | 2 | Macroinvertebrates | 2 |
| Macrophytes | 1 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 4 | 8 | 0.241 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | 1 | 6 | 0.045 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 11 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 47 | 7 | 2.474 | Gathers | Backplate |
| | Baetidae | 3 | 4 | 0.090 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | 1 | 3 | 0.023 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 9 | 9 | 0.609 | Predators | |
| | Calopterygidae | 11 | 5 | 0.414 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 22 | 4 | 0.662 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 3 | | 0.000 | Predators | Predacious |
| | Elmidae | 2 | 4 | 0.060 | Gathers | Riffle |
| | Haliplidae | 2 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 1 | 8 | 0.060 | Gathers | |
| | Other Chironomidae | 31 | 6 | 1.398 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | 1 | 6 | 0.045 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | 2 | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 3 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 18 | |
| **FBI** | 6.120 | |
| **Scraper/Filters** | 0.147 | |
| **EPT/Chironomidae** | 2.250 | |
| **% Contribution of Dominant Family** | 0.303 | |
| **EPT Index** | 3.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 155 | |

WF2 8/15/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 3 | Macroinvertebrates | 2 |
| Macrophytes | 1 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 4 | 8 | 0.288 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | 1 | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 3 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | 2 | 7 | 0.126 | Gathers | Backplate |
| | Baetidae | | 4 | 0.000 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 7 | 9 | 0.568 | Predators | |
| | Calopterygidae | 1 | 5 | 0.045 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | 43 | 4 | 1.550 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 3 | | 0.000 | Predators | Predacious |
| | Elmidae | 6 | 4 | 0.216 | Gathers | Riffle |
| | Haliplidae | 5 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | | 8 | 0.000 | Gathers | |
| | Other Chironomidae | 48 | 6 | 2.595 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | | 6 | 0.000 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | 1 | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 3 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 14 | |
| **FBI** | 5.387 | |
| **Scraper/Filters** | 0.109 | |
| **EPT/Chironomidae** | 0.938 | |
| **% Contribution of Dominant Family** | 0.375 | |
| **EPT Index** | 2.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | | 128 |

WF3 8/15/1999

| | | | |
|---|---|---|---|
| Periphyton | 2 | Slimes | 0 |
| Filamentous Algae | 3 | Macroinvertebrates | 2 |
| Macrophytes | 1 | Fish | 2 |

Macrobenthos Quailitative Sample List

| ORDER | FAMILY | COUNT | TOLERANCE VALUES | FBI | | |
|---|---|---|---|---|---|---|
| Oligochaeta | | 1 | | 0.000 | | |
| Gastropoda | Physa | 2 | 8 | 0.222 | Scrapers | Lefthanded |
| | Planorbidae | | | 0.000 | Scrapers | Ramshorn |
| | Lymnaeidae | | 6 | 0.000 | Scrapers | Righthanded |
| | Ancylidae | | | 0.000 | Scrapers | Limpet |
| Bivalvia | | 1 | | 0.000 | Filters | |
| Ephemeroptera | Canidae | | 7 | 0.000 | Gathers | Backplate |
| | Baetidae | 1 | 4 | 0.056 | Gathers | |
| | Heptageniidae | | 4 | 0.000 | Scrapers | Scraping |
| Anisoptera | Aeshnidae | | 3 | 0.000 | Predators | |
| | Corduliidae | | 5 | 0.000 | Predators | Longleg |
| | Cordulegastridae | | 3 | 0.000 | Predators | |
| | Libellulidae | | 9 | 0.000 | Predators | |
| Zygoptera | Coenagrioidae | 40 | 9 | 5.000 | Predators | |
| | Calopterygidae | 1 | 5 | 0.069 | Predators | Stiffantaena |
| Plecoptera | | | | 0.000 | | |
| Trichoptera | Hydropsychidae | | 4 | 0.000 | Filters | Webspinner |
| | Philopotamide | | 3 | 0.000 | Gathers | |
| | Polycentropodidae | | 6 | 0.000 | Filters | |
| | Leptoceridae | | 1 | 0.000 | Gathers | |
| | Hydroptilidae | | 4 | 0.000 | Filters | Sandsnailshell |
| Coleoptera | Dryopidae | | 5 | 0.000 | Predators | Longtoed |
| | Dytiscidae | 21 | | 0.000 | Predators | Predacious |
| | Elmidae | 2 | 4 | 0.111 | Gathers | Riffle |
| | Haliplidae | 3 | | 0.000 | Predators | Hairycrawling |
| | Psephenidae | | 4 | 0.000 | Scrapers | Waterpenny |
| | Gyrinidae | | | 0.000 | Predators | 4eyed |
| Diptera | Blood-red Chironomidae | 5 | 8 | 0.556 | Gathers | |
| | Other Chironomidae | 20 | 6 | 1.667 | Gathers | |
| | Culicidae | | | 0.000 | Shredders | Mosquito |
| | Tipulidae | | 3 | 0.000 | Predators | Cranefly |
| | Tabanidae | | 6 | 0.000 | Predators | |
| | Simulidae | | 6 | 0.000 | Filters | Blackfly |
| | Ceratopogonidae | | 6 | 0.000 | Gathers | Bitingmidge |
| Ostracoda | | 5 | | 0.000 | Scavenger | DaphniaSeedshrimp |
| Hemiptera | Corixidae | 1 | | 0.000 | Predators | Waterboatmen |
| | Nepidae | | | 0.000 | | |
| | Gerridae | | | 0.000 | Predators | Waterstrider |
| Isopoda | Asellidae | | 8 | 0.000 | Shredders | Pillbug |
| Amphipod | | | 4 | 0.000 | Shredders | Shrimp |
| Decapoda | | 1 | 6 | 0.083 | Predators | Crayfish |
| Annelid | Hirudinea | | | 0.000 | | Leech |
| Megaloptera | Sialidae | | 4 | 0.000 | Predators | Dobsenfly |
| Nematomorpha | | 1 | | 0.000 | Parasite | Horsehair |
| Tubellaria | | 2 | | 0.000 | Scavenger | Planaria |

| | | |
|---|---|---|
| **TAXA RICHNESS** | 16 | |
| **FBI** | 7.764 | |
| **Scraper/Filters** | 2.000 | |
| **EPT/Chironomidae** | 0.040 | |
| **% Contribution of Dominant Family** | 0.374 | |
| **EPT Index** | 1.000 | |
| **Community Similarity Indices** | | |
| **CPOM** | 0.000 | 0/60 |
| Total Number Collected | 107 | |

Tabular summary generated by Transect v2.15 at 2:24:30 pm on Fri 8-Dec-00

Project: Indiana T by 2000 Watershed Soil Loss Transects
Transects: 4
State: Indiana
Year: 2000
Counties: 4

Number of Watershed 05140202 020 acres with indicated Slope

| | Slope percent | | | | | |
|---|---|---|---|---|---|---|
| Present crop | 0-2% | 3-4% | 5-7% | 8-10% | >10% | Total |
| Corn | 26266 | 8519 | 5679 | 5679 | 355 | 46498 |
| Soybeans | 7099 | 4259 | 3195 | 355 | 0 | 14908 |
| Small grains | 3904 | 3904 | 1420 | 1065 | 0 | 10294 |
| Forage | 0 | 0 | 0 | 0 | 0 | 0 |
| Idle | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 37270 | 16683 | 10294 | 7099 | 355 | 71700 |

Number of Watershed 05140202 030 acres with indicated Slope

| Present crop | 0-2% | 3-4% | 5-7% | 8-10% | >10% | Total |
|---|---|---|---|---|---|---|
| Corn | 4240 | 2475 | 975 | 710 | 0 | 8399 |
| Soybeans | 2120 | 2125 | 1150 | 265 | 0 | 5660 |
| Small grains | 530 | 530 | 530 | 0 | 0 | 1590 |
| Forage | 0 | 265 | 265 | 0 | 0 | 530 |
| Idle | 0 | 265 | 0 | 0 | 0 | 265 |
| Total | 6890 | 5660 | 2920 | 975 | 0 | 16444 |

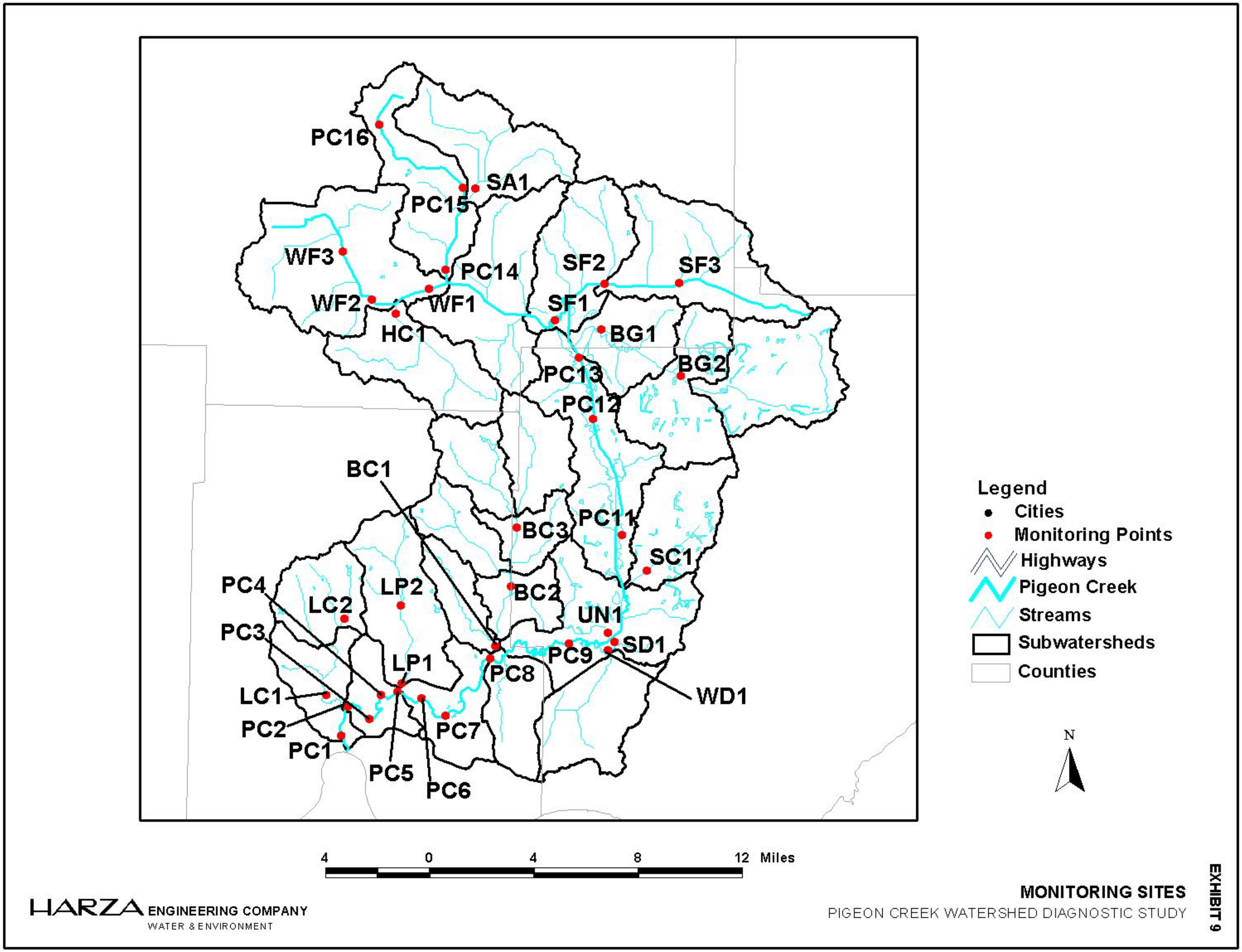
Number of Watershed 05140202 040 acres with indicated Slope

| Present crop | 0-2% | 3-4% | 5-7% | 8-10% | >10% | Total |
|---|---|---|---|---|---|---|
| Corn | 8339 | 2828 | 324 | 324 | 0 | 11816 |
| Soybeans | 4624 | 2033 | 1887 | 649 | 0 | 9193 |
| Small grains | 854 | 324 | 649 | 324 | 0 | 2152 |
| Forage | 589 | 0 | 0 | 0 | 324 | 914 |
| Idle | 854 | 0 | 0 | 0 | 0 | 854 |
| Total | 15261 | 5186 | 2861 | 1298 | 324 | 24929 |

| Site | Water body | Silt Cover (points) |
|---|---|---|
| PC1 | Pigeon Creek | Heavy (-2) |
| PC2 | Pigeon Creek | Moderate (-1) |
| PC3 | Pigeon Creek | Moderate (-1) |
| PC4 | Pigeon Creek | Normal (0) |
| PC5 | Pigeon Creek | Moderate (-1) |
| PC6 | Pigeon Creek | Heavy (-2) |
| PC7 | Pigeon Creek | Heavy (-2) |
| PC8 | Pigeon Creek | Moderate (-1) |
| PC9 | Pigeon Creek | Heavy (-2) |
| PC11 | Pigeon Creek | Normal (0) |
| PC12 | Pigeon Creek | Moderate (-1) |
| PC13 | Pigeon Creek | Normal (0) |
| PC14 | Pigeon Creek | Moderate (-1) |
| PC15 | Pigeon Creek | Normal (0) |
| PC16 | Pigeon Creek | Moderate (-1) |
| LC1 | Locust Creek | Moderate (-1) |
| LC2 | Locust Creek | Moderate (-1) |
| LP1 | Little Pigeon Creek | Moderate (-1) |
| LP2 | Little Pigeon Creek | Moderate (-1) |
| BC1 | Bluegrass Creek | Moderate (-1) |
| BC2 | Bluegrass Creek | Heavy (-2) |
| BC3 | Bluegrass Creek | Normal (0) |
| WD1 | Weinsheimer Ditch | Moderate (-1) |
| SD1 | Stollberg Ditch | Moderate (-1) |
| UN1 | Unnamed Tributary | Moderate (-1) |
| SC1 | Squaw Creek | Moderate (-1) |
| BG1 | Big Creek | Normal (0) |
| BG2 | Big Creek | Normal (0) |
| SF1 | Smith Fork | Moderate (-1) |
| SF2 | Smith Fork | Moderate (-1) |
| SF3 | Smith Fork | Normal (0) |
| WF1 | West Fork | Normal (0) |
| WF2 | West Fork | Normal (0) |
| WF3 | West Fork | Moderate (-1) |
| HC1 | Hurricane Creek | Normal (0) |
| SA1 | Sand Creek | Moderate (-1) |

| LSite | SampleNumber | SampleDate | SampleTime | SampleType | Dissolved O2 | pH | WaterTemp | SpecificConductivity | Turbidity | Chloride | Saturation Pct | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OHP040-0004 | DI27066 | 4/20/1999 | 16:30 | 1 | 10.5 | 8.2 | 12.8 | 1288 | 22.1 | | | |
| OHP040-0004 | DI27305 | 5/12/1999 | 6:50 | 1 | 8.1 | 7.9 | 21.1 | 1080 | 23.4 | | | |
| OHP040-0004 | DI27503 | 6/9/1999 | 11:20 | 1 | 4.5 | 7.8 | 27.6 | 840 | 133 | | | |
| OHP040-0004 | DI27684 | 7/21/1999 | 18:30 | 1 | 7.2 | 8.1 | 31.4 | 760 | 24.2 | | | |
| OHP040-0004 | DI27892 | 8/12/1999 | 8:30 | 1 | 5.9 | 7.9 | 24.9 | 2080 | 11.8 | | | |
| OHP040-0004 | DI28095 | 9/8/1999 | 17:30 | 1 | 6.6 | 8 | 26.1 | 2050 | 14.8 | | | |
| OHP040-0004 | DI28307 | 10/13/1999 | 17:45 | 1 | 6 | 7.6 | 18.5 | | 28.2 | | | |
| OHP040-0004 | DI28507 | 11/9/1999 | 14:30 | 1 | 7 | 8.3 | 16.3 | 2350 | 35.1 | | | |
| OHP040-0004 | DI28697 | 12/9/1999 | 15:00 | 1 | 10.2 | 8.3 | 9 | 2470 | 11.6 | | | |
| OHP040-0004 | DI28883 | 1/12/2000 | 17:30 | 1 | 10.7 | 7.9 | 7.6 | 1254 | 38.9 | | | |
| OHP040-0004 | DI29110 | 2/22/2000 | 9:30 | 1 | 9.7 | 8.1 | 7.1 | 392 | 148 | | | |
| OHP040-0004 | DI29282 | 3/15/2000 | 16:40 | 1 | 10.4 | 8.1 | 13.3 | 1025 | 31.8 | | | |
| OHP040-0004 | DI29423 | 4/13/2000 | 12:20 | 1 | 7.7 | 7.5 | 14.3 | 950 | 37.2 | | | |
| OHP040-0004 | DI29657 | 5/4/2000 | 10:00 | 1 | 5.9 | 7.7 | 18.9 | 1490 | 88.2 | | | |
| OHP040-0004 | DI29854 | 6/8/2000 | 7:30 | 1 | 6.2 | 7.7 | 19.1 | 1600 | 30.1 | | | |
| OHP040-0004 | DI30050 | 7/10/2000 | 18:30 | 1 | 7.88 | 7.92 | 29.58 | 1086 | 41.4 | | | |
| OHP040-0004 | DI30237 | 8/7/2000 | 17:30 | 1 | 4.3 | 7.6 | 26 | 571 | 112 | | | |
| OHP040-0004 | DI30416 | 9/6/2000 | 8:30 | 1 | 6.7 | 7.5 | 21.2 | 1016 | 23.7 | | | |
| OHP040-0005 | AA00364 | 6/26/2000 | 12:45 | 1 | 7.8 | 7.3 | 26.2 | 778 | 40.7 | | | |
| OHP040-0005 | AA01393 | 8/7/2000 | 15:55 | 1 | 4.35 | 7.18 | 25.74 | 683 | 84 | 36.6 | 55.2 | |
| OHP040-0006 | AA00365 | 6/26/2000 | 13:00 | 1 | 6 | 7.5 | 24.7 | 712 | 40.6 | | | |
| OHP040-0006 | AA01394 | 8/7/2000 | 16:35 | 1 | 4.18 | 7.22 | 25.32 | 673 | 82.3 | 25.9 | 53 | THE VALUE FOR CHLOROPHYLL IS (-1.8) |
| OHP040-0007 | AA00366 | 6/26/2000 | 13:30 | 1 | 6.48 | 7.58 | 24.9 | 644 | 40.7 | | | |
| OHP040-0007 | AA01398 | 8/7/2000 | 17:00 | 1 | 4.07 | 7.18 | 25.24 | 655 | 86.4 | 24.6 | 53.3 | VALUE FOR CHLOROPHYLL IS (-1.5) |
| OHP040-0008 | AA00367 | 6/26/2000 | 13:55 | 1 | 5.35 | 7.59 | 24.72 | 574 | 40.6 | | | |
| OHP040-0008 | AA01399 | 8/8/2000 | 10:40 | 1 | 4.53 | 7.04 | 23.76 | 231 | 228 | 12.16 | 53.8 | |
| OHP040-0010 | AA00369 | 6/26/2000 | 14:25 | 1 | 6.23 | 7.67 | 24.76 | 548 | 40.7 | | | |
| OHP040-0010 | AA01401 | 8/8/2000 | 10:10 | 1 | 4.8 | 7.13 | 23.68 | 227 | 287.4 | 13.5 | 56.8 | |
| OHP040-0012 | AA00371 | 6/26/2000 | 15:35 | 1 | 6.54 | 7.4 | 26.47 | 511 | 41.5 | | | |
| OHP040-0012 | AA01403 | 8/8/2000 | 9:10 | 1 | 4.4 | 7.11 | 23.87 | 314 | 258 | 15.58 | 52.1 | |

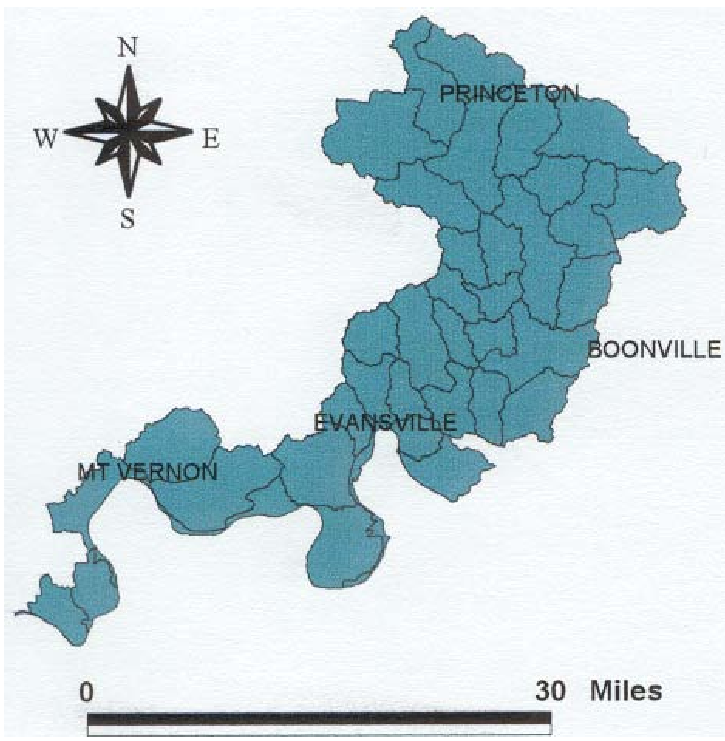
Sample site locations: Diagnostic Study of Pigeon Creek, August 1999 and May 2000, Harza, Inc.



# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**<u>Appendix B:</u> Data from Pigeon-Highland Watershed Steering Committee for Pigeon Creek basin and Carpentier Creek.**

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 3:00 PM | 6/28/2000 | Clear/Sunny | Clear/Sunny | 63.56 | 10 | 105 | 1300 | 10.1 | | | | 0 | 0 | 30 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 1/29/2002 | Overcast | Clear/Sunny | 71.08 | 11 | 100 | 2500 | 7.9 | 2 | | | 0.5 | 0.6 | 10 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:30 PM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 74.22 | 10 | 92 | 200 | 7.9 | 4 | | | 0.05 | 0.1 | 32 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:00 AM | 4/12/2002 | Overcast | Clear/Sunny | 72.57 | 10 | 100 | 363 | 8.2 | 2 | | | 0.5 | 0.1 | 10 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:30 AM | 6/11/2002 | Overcast | Clear/Sunny | 71.34 | 7 | 85 | 561 | 7.2 | 1 | | | 0.6 | 0.6 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:15 AM | 7/31/2002 | Clear/Sunny | Stormy | 84.76 | 7 | 82 | 0 | 7.7 | 1 | | | 0.6 | 0.35 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 2:00 PM | 8/28/2002 | Clear/Sunny | Clear/Sunny | 82.84 | 6 | 70 | 0 | 8.1 | 1 | | | 0.4 | 0.1 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 62.02 | 5 | 57 | 222 | 7.7 | 3 | | | 0.75 | 0 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:00 AM | 10/15/2002 | Overcast | Clear/Sunny | 75.12 | 9 | 82 | 134 | 7.6 | 2 | | | 0.4 | 0.2 | 18 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:30 AM | 11/14/2002 | Overcast | Clear/Sunny | 74.45 | 9 | 78 | 67 | 7.5 | 2 | | | 0.5 | 0.35 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:01 PM | 12/12/2002 | Overcast | Showers | 72.11 | 11 | 85 | 266.4 | 7.4 | 2 | | | 0.6 | 0.1 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:01 PM | 2/13/2003 | Clear/Sunny | Clear/Sunny | 79.06 | 14 | 105 | 100 | 7.4 | 1 | | | 0.35 | 0.45 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:30 AM | 3/18/2003 | Showers | Overcast | 74.36 | 12 | 115 | 130 | 8 | 1 | | | 0.7 | 0.1 | Less Than 15 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:30 AM | 4/15/2003 | Clear/Sunny | Clear/Sunny | 71.52 | 10 | 97 | 200 | 8.1 | 1 | | | 0.95 | 0.2 | Less Than 15 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth(ft) | Ave Width(ft) | Ave Velocity(ft/sec) | n value | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:30 PM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 1.03 | 18 | 0 | 0.9 | 0 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 1/29/2002 | Overcast | Clear/Sunny | 0.83 | 18.5 | 0.42 | 0.9 | 5.8 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:00 AM | 4/12/2002 | Overcast | Clear/Sunny | 0.61 | 10.5 | 2 | 0.8 | 10.25 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:30 AM | 6/11/2002 | Overcast | Clear/Sunny | 0.38 | 7 | 0.76 | 0.8 | 1.62 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:15 AM | 7/31/2002 | Clear/Sunny | Stormy | 0.44 | 6 | 0.92 | 0.9 | 2.19 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 2:00 PM | 8/28/2002 | Clear/Sunny | Clear/Sunny | 0.53 | 15 | 0.8 | 0.9 | 5.72 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 0.25 | 6 | 0.6 | 0.9 | 0.81 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:00 AM | 10/15/2002 | Overcast | Clear/Sunny | 0.67 | 11.5 | 0.14 | 0.9 | 0.97 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:30 AM | 11/14/2002 | Overcast | Clear/Sunny | 0.55 | 10.5 | 0.2 | 0.9 | 1.04 |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 3:00 PM | 6/28/2000 | Clear/Sunny | Clear/Sunny | 5 | | | | | | | | | | | x | | | | | | | | x | x | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 1/29/2002 | Overcast | Clear/Sunny | 11 | | | | | | | | | 1 | 8 | 15 | | | | | | | 20 | | 2 | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:30 PM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 6 | | | | | | | | | | 3 | | | | | | | | 24 | 2 | 30 | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:00 AM | 4/12/2002 | Overcast | Clear/Sunny | 22 | | 1 | | 1 | 1 | | | 3 | | | | | 4 | | | | | 12 | 2 | | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:30 AM | 6/11/2002 | Overcast | Clear/Sunny | 25 | | | 9 | | 1 | | | 2 | | 4 | 25 | | 6 | | | | 1 | 2 | 1 | 1 | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:15 AM | 7/31/2002 | Clear/Sunny | Stormy | 21 | | | 10 | | 1 | | | | | 1 | 12 | | 5 | | | | 1 | 2 | 12 | | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 2:00 PM | 8/28/2002 | Clear/Sunny | Clear/Sunny | 24 | | | 4 | | 2 | | | 5 | | 9 | 3 | | 3 | | | | 1 | 9 | 3 | | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 18 | | 4 | 3 | | | | | 6 | | | 13 | | 27 | | | | | | 3 | | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:00 AM | 10/15/2002 | Overcast | Clear/Sunny | 13 | | 2 | | | | | | 4 | | 5 | 10 | | | | | | | | | | |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:30 AM | 11/14/2002 | Overcast | Clear/Sunny | 15 | | | | | | | | | 4 | 12 | 2 | | 1 | | | | | 8 | 1 | 5 | |

Standard Chemical Data

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 3:00 PM | 6/28/2000 | Clear/Sunny | Clear/Sunny | 6 | 16 | 12 | 10.5 | 5 | 4 | 53.5 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 1/29/2002 | Overcast | Clear/Sunny | 6 | 12 | 12 | 9 | 6 | 8 | 53 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:30 PM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 3 | 8 | 9 | 12 | 5 | 0 | 37 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:00 AM | 4/12/2002 | Overcast | Clear/Sunny | 8 | 14 | 12 | 11 | 9 | 10 | 64 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:30 AM | 6/11/2002 | Overcast | Clear/Sunny | 3 | 14 | 15 | 10 | 9 | 8 | 59 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:15 AM | 7/31/2002 | Clear/Sunny | Stormy | 3 | 14 | 12 | 11 | 9 | 9 | 58 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 2:00 PM | 8/28/2002 | Clear/Sunny | Clear/Sunny | 8 | 16 | 12 | 13 | 9 | 8 | 66 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 10:00 AM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 3 | 16 | 12 | 13 | 9 | 8 | 61 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 9:00 AM | 10/15/2002 | Overcast | Clear/Sunny | 3 | 16 | 12 | 12 | 6 | 8 | 57 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 11:30 AM | 11/14/2002 | Overcast | Clear/Sunny | 3 | 14 | 12 | 12 | 6 | 0 | 47 |
| 221 | Highland-Pigeon 05140202 | Carpentier Creek | south side of Hogue Rd. bridge | 12:01 PM | 2/13/2003 | Clear/Sunny | Clear/Sunny | 3 | 8 | 9 | 2 | 6 | 0 | 28 |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 5/18/2001 | Clear/Sunny | Clear/Sunny | 7 | | | | | 6 | | | | | | | | | | | | 1 | | | 2 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 4/18/2001 | Clear/Sunny | Clear/Sunny | 15 | | | x | | x | | x | | x | | | | | | | | | | | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 10:30 AM | 8/22/2001 | Clear/Sunny | Clear/Sunny | 11 | | | 12 | | | | | | | | | | 3 | | | | 1 | | 1 | 12 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 10:00 AM | 8/21/2001 | Clear/Sunny | Clear/Sunny | 11 | | 2 | | | 4 | | | | | | | | 1 | | | | | | | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 18 | | 1 | 2 | | | | | | | 10 | | | 10 | | | | 3 | | 12 | 2 | |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:15 PM | 1/22/2002 | Clear/Sunny | Overcast | 9 | | | | | | | | 2 | | 5 | | | | | | | 1 | | | 5 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:35 PM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 7 | | | | | 1 | | | | | 1 | | | | | | | | | | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 8:00 AM | 4/12/2002 | Clear/Sunny | Clear/Sunny | 6 | | | | | | | | | | | | | 6 | | | | 1 | | 20 | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 7/31/2002 | Clear/Sunny | Stormy | 10 | | | 12 | | | | | | | | | | 1 | | | | | 1 | 12 | 4 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 11:00 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 4 | | | | | | | | | | 2 | | | | | | | | | | 6 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 12:01 PM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | | | | | 2 | | 3 | | | | | | | 1 | | | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 3:00 PM | 8/28/2002 | Overcast | Clear/Sunny | 11 | | | 2 | | | | | | | 3 | | | | | | | 2 | | 10 | 2 | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 12:30 PM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 19 | | | 35 | | 6 | | | 2 | | 1 | | | 30 | | | | | 1 | 2 | | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:30 PM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | | | | | 2 | 1 | | | | | | | | | | 2 | 1 | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:30 AM | 10/15/2002 | Clear/Sunny | Clear/Sunny | 19 | | | 4 | | | | | 1 | | 5 | | | 15 | | | | 2 | 1 | | 7 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 10/18/2002 | Clear/Sunny | Showers | 13 | | | 1 | | | | | 3 | 2 | | | | | | | | 1 | | 1 | | |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:50 AM | 11/14/2002 | Clear/Sunny | Clear/Sunny | 11 | | | 2 | | | | | | | | | | 3 | | | | 1 | | 3 | 15 | |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 11/8/2002 | Clear/Sunny | Showers | 10 | | | | | | | | 1 | 1 | 3 | | | | | | | | | 1 | | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 5/18/2001 | Clear/Sunny | Clear/Sunny | 64.93 | 10 | | 300 | 8.2 | | 0 | 22 | 0.8 | 0 | 30 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 4/18/2001 | Clear/Sunny | Clear/Sunny | 60.22 | 7 | 75 | 300 | 8.3 | | | | 3.5 | 0.1 | 30 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 6/12/2001 | Clear/Sunny | Clear/Sunny | 79.18 | 9 | 110 | 0 | 7.6 | | | | 2 | 0.1 | 40 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 10:30 AM | 8/22/2001 | Clear/Sunny | Clear/Sunny | 66.1 | 8 | 95 | 300 | 8.1 | 4 | | | 1 | 0.1 | 40 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 10:00 AM | 8/21/2001 | Clear/Sunny | Clear/Sunny | 65.55 | 7 | 78 | 200 | 8 | 6 | | | 0.5 | 0.3 | 32 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 78.64 | 8 | 72 | 0 | 8 | 1 | | | 1 | 2 | 20 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 11/27/2001 | Overcast | Stormy | 51.89 | 7 | 65 | 5400 | 7.6 | 4 | | | 3.5 | 0.6 | 70 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 1:00 PM | 1/29/2002 | Overcast | Clear/Sunny | 64.49 | 10 | 87 | 800 | 8.1 | 4 | | | 0.6 | 2.5 | 40 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:15 PM | 1/22/2002 | Clear/Sunny | Overcast | 70.87 | 11 | 85 | 100 | 8.1 | 4 | | | 0.6 | 0.9 | 20 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:35 PM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 74.24 | 11 | 97 | 133.2 | 8.1 | 2 | | | 0.5 | 1 | 15 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 3/14/2002 | Clear/Sunny | Clear/Sunny | 63.62 | 11 | 110 | 700 | 7.8 | 4 | | | 0.7 | 2 | 70 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 8:00 | 4/12/2002 | Clear/Sunny | Clear/Sunny | 66.78 | 8 | 88 | 300 | 7.9 | 4 | | | 0.8 | 0.2 | 40 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 3:00 PM | 6/4/2002 | Clear/Sunny | Clear/Sunny | 67.88 | 6 | 74 | 825 | 8.1 | 2 | | | 0.4 | 0.5 | 22 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 1:00 PM | 6/11/2002 | Clear/Sunny | Clear/Sunny | 65.79 | 6 | 75 | 500 | 7.7 | 2 | | | 0.8 | 1.5 | 21 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 7/31/2002 | Clear/Sunny | Stormy | 69.93 | 10 | 127 | 66 | 8.2 | 2 | | | 0.8 | 0.2 | 36 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 11:00 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 64.38 | 6 | 70 | 231 | 8.1 | 1 | | | 0.9 | 0.2 | 32 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 12:01 PM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 68.75 | 6 | 72 | 100 | 8.2 | 2 | | | 0.8 | 0.8 | 18 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 3:00 PM | 8/28/2002 | Overcast | Clear/Sunny | 70.06 | 8 | 99 | 132 | 8.4 | 1 | | | 1 | 0.2 | 40 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 12:30 PM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 66.44 | 7 | 85 | 300 | 8.4 | 2 | | | 1 | 0.1 | 35 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:30 PM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 55.67 | 5 | 52 | 400 | 8.1 | 2 | | | 1 | 0.35 | 40 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:30 AM | 10/15/2002 | Clear/Sunny | Clear/Sunny | 66.26 | 7 | 70 | 167 | 8 | 1 | | | 1 | 0.2 | 22 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 10/18/2002 | Clear/Sunny | Showers | 72.62 | 9 | 83 | 34 | 8.2 | 2 | | | 1 | 0.2 | 18 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:50 AM | 11/14/2002 | Clear/Sunny | Clear/Sunny | 63.49 | 8 | 70 | 133 | 7.7 | 2 | | | 1 | 1 | 49 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 11/8/2002 | Clear/Sunny | Showers | 59.16 | 5 | 45 | 267 | 7.6 | 1 | | | 0.9 | 1 | 20 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 0300 pm | 12/17/2002 | Overcast | Showers | 67.26 | 11 | 98 | 199.8 | 7.9 | 3 | | | 0.8 | 4.5 | 19 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 2:00 PM | 12/12/2002 | Overcast | Showers | 70.55 | 12 | 87 | 333 | 7.6 | 1 | | | 1 | 0.8 | 20 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Scor | DO(ppm) | DO(%Satura | E-coli(colo | pH | BOD 5(mg | Temp Cha | Temp (c) | Total Phos | Nitrate NO | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 2:00 PM | 2/13/2003 | Clear/Sunny | Clear/Sunny | 72.94 | 15 | 110 | 199.8 | 8.1 | 2 | | | 0.4 | 2 | 20 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:15 PM | 3/4/2003 | Overcast | Clear/Sunny | 66.36 | 11 | 86 | 334 | 7.1 | 2 | | | 0.55 | 6 | 34 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 10:30 AM | 3/28/2003 | Overcast | Clear/Sunny | 63.94 | 8 | 80 | 134 | 8.1 | 2 | | | 1 | 8 | 20 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 12:45 PM | 4/16/2003 | Overcast | Clear/Sunny | 67.18 | 8 | 82 | 100 | 8.3 | 2 | | | 2 | 2 | 18 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 4/15/2003 | Clear/Sunny | Clear/Sunny | 69.52 | 10 | 105 | 100 | 8.6 | 3 | | | 1 | 0.55 | 20 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 5/18/2001 | Clear/Sunny | Clear/Sunny | 0 | 10 | 12 | 15 | 7 | 8 | 52 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:00 PM | 4/18/2001 | Clear/Sunny | Clear/Sunny | 0 | 12 | 12 | 17 | 8 | 12 | 61 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 6/12/2001 | Clear/Sunny | Clear/Sunny | 0 | 8 | 12 | 15.5 | 7 | 0 | 42.5 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 10:30 AM | 8/22/2001 | Clear/Sunny | Clear/Sunny | 3 | 12 | 12 | 16.5 | 9 | 10 | 62.5 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 10:00 AM | 8/21/2001 | Clear/Sunny | Clear/Sunny | 7 | 10 | 12 | 17 | 9 | 13 | 68 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 3 | 12 | 12 | 11 | 8 | 10 | 56 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:15 PM | 1/22/2002 | Clear/Sunny | Overcast | 7 | 6 | 12 | 17 | 10 | 10 | 62 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:35 PM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 7 | 6 | 9 | 15 | 10 | 15 | 62 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 8:00 AM | 4/12/2002 | Clear/Sunny | Clear/Sunny | 5 | 6 | 9 | 9 | 6 | 0 | 35 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 7/31/2002 | Clear/Sunny | Stormy | 3 | 8 | 9 | 11 | 8 | 10 | 49 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 11:15 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 5 | 4 | 6 | 15 | 8 | 13 | 51 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 12:01 PM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 7 | 6 | 6 | 14 | 8 | 10 | 51 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 3:00 PM | 8/28/2002 | Overcast | Clear/Sunny | 3 | 10 | 9 | 11 | 8 | 8 | 49 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 12:30 PM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 5 | 10 | 6 | 11 | 9 | 10 | 51 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:30 PM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 5 | 6 | 6 | 17 | 8 | 6 | 48 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:30 AM | 10/15/2002 | Clear/Sunny | Clear/Sunny | 5 | 12 | 6 | 11 | 9 | 10 | 53 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 10/18/2002 | Clear/Sunny | Showers | 7 | 8 | 9 | 17 | 8 | 10 | 59 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:50 AM | 11/14/2002 | Clear/Sunny | Clear/Sunny | 5 | 8 | 6 | 11 | 8 | 10 | 48 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 11/8/2002 | Clear/Sunny | Showers | 5 | 6 | 6 | 17 | 8 | 0 | 42 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 10:30 AM | 8/22/2001 | Clear/Sunny | Clear/Sunny | 0.6 | 62.5 | 3.33 | 0.8 | 99.9 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 10:00 AM | 8/21/2001 | Clear/Sunny | Clear/Sunny | 1.71 | 22.5 | 2.25 | 0.8 | 69.26 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:30 AM | 11/17/2001 | Clear/Sunny | Clear/Sunny | 0.81 | 63 | 2.5 | 0.8 | 102.06 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:15 PM | 1/22/2002 | Clear/Sunny | Overcast | 1.5 | 32.5 | 1.43 | 0.9 | 62.74 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:35 PM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 2.17 | 50 | 2 | 0.9 | 195.3 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 7/31/2002 | Clear/Sunny | Stormy | 0.64 | 58.5 | 1.67 | 0.8 | 50.02 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 11:00 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 0.67 | 42.5 | 1.11 | 0.9 | 28.45 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 12:01 PM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 0.86 | 27.5 | 1 | 0.9 | 21.28 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 03:00pm | 8/28/2002 | Overcast | Clear/Sunny | 0.64 | 42.5 | 1.43 | 0.9 | 35.01 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:00 AM | 9/11/2002 | Clear/Sunny | Clear/Sunny | 0.47 | 67 | 1.43 | 0.8 | 36.02 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 1:30 PM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 0.95 | 40 | 0.83 | 0.9 | 28.39 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 11:30 AM | 10/15/2002 | Clear/Sunny | Clear/Sunny | 0.47 | 73.5 | 1.35 | 0.8 | 37.31 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 10/18/2002 | Clear/Sunny | Showers | 0.93 | 42.5 | 1.25 | 0.9 | 44.47 |
| 75 | Highland-Pigeon 05140202 | Pigeon Creek | Pigeon Creek @ Heidelbach Ave. Boat Launch | 9:50 AM | 11/14/2002 | Clear/Sunny | Clear/Sunny | 0.64 | 71 | 2 | 0.8 | 72.7 |
| 66 | Highland-Pigeon 05140202 | Pigeon Creek | Approx. 1 mile west of Chandler on Heim Rd. | 2:00 PM | 11/8/2002 | Clear/Sunny | Showers | 0.9 | 44.5 | 1.11 | 0.9 | 40.01 |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:30 PM | 4/6/2001 | Clear/Sunny | Clear/Sunny | 19 | | | 2 | | 1 | | | | 1 | 2 | | | | | | | 1 | 1 | 1 | 1 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 15 | | | 4 | | 6 | | | 5 | | 1 | | | | | | | | | | 7 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 11/30/2001 | Clear/Sunny | Showers | 15 | | | 2 | | 8 | | | 2 | | 10 | | | | | | | | | | 13 | |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:45 PM | 1/25/2002 | Clear/Sunny | Showers | 12 | | | 2 | | | | | | | 8 | 3 | | | | | | | 4 | | 6 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 9 | | | | | | | | 2 | 1 | | 3 | | | | | | | | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 4/11/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | | | | | | | 4 | 2 | | | | | | | | 2 | 1 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 5/20/2002 | Clear/Sunny | Overcast | 6 | | | | | | | | 3 | | 3 | | | | | | | | | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 6/17/2002 | Clear/Sunny | Clear/Sunny | 4 | | | | | | | | | | 1 | | | | | | | | | | 1 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 4 | | | | | | | | | | 3 | | | | | | | | | | 4 | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 8/26/2002 | Overcast | Clear/Sunny | 4 | | | | | | | | | | 3 | | | | | | | | 2 | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 17 | | | 1 | 1 | | | | 14 | 8 | 3 | | | | | | | | | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 6 | | | | | | | | 12 | 4 | | | | | | | | | | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:30 PM | 11/13/2002 | Clear/Sunny | Rain | 7 | | | | | | | | | 1 | 3 | | | | | | | | 2 | | | |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:00 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | 1 | | | | | 2 | | | | | | | | | | | 8 | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:30 PM | 4/6/2001 | Clear/Sunny | Clear/Sunny | 61.03 | 8 | 80 | 200 | 8.5 | | | | 1.5 | 2 | 31 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 71.71 | 9 | 97 | 700 | 7.9 | 7 | | | 0.25 | 0.1 | 12 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 11/30/2001 | Clear/Sunny | Showers | 73.21 | 8 | 85 | 400 | 8.1 | 2 | | | 0.2 | 0.5 | 25 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:45 PM | 1/25/2002 | Clear/Sunny | Showers | 52.45 | 10 | | 1000 | 7.7 | 4 | | | 1 | 2.5 | 70 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 59.48 | 6 | 52 | 1000 | 7.7 | 2 | | | 0.55 | 0.25 | 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 4/11/2002 | Clear/Sunny | Clear/Sunny | 72.6 | 10 | 92 | 528 | 7.8 | 4 | | | 0.3 | 0.4 | 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 5/20/2002 | Clear/Sunny | Overcast | 75.06 | 9 | 90 | 99 | 7.7 | 1 | | | 0.7 | 0.8 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 6/17/2002 | Clear/Sunny | Clear/Sunny | 76.42 | 10 | 107 | 330 | 7.8 | 1 | | | 0.4 | 0.35 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 72.71 | 9 | 105 | 198 | 8 | 1 | | | 0.85 | 0.6 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 8/26/2002 | Overcast | Clear/Sunny | 77.71 | 9 | 102 | 132 | 8.1 | 1 | | | 0.4 | 0.25 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 69.63 | 8 | 80 | 267 | 7.6 | 1 | | | 1 | 0.2 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 72.6 | 9 | 78 | 234 | 8 | 2 | | | 0.4 | 0.1 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:30 PM | 11/13/2002 | Clear/Sunny | Rain | 70.82 | 10 | 88 | 267 | 7.8 | 1 | | | 0.9 | 1.5 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:00 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 77.2 | 12 | 92 | 233 | 7.8 | 2 | | | 0.2 | 0.2 | Less Than 15 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 3:00 PM | 3/17/2003 | Overcast | Clear/Sunny | 63.28 | 11 | 127 | 300 | 7.9 | 2 | | | 2 | 4.5 | Less Than 15 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 4/18/2003 | Overcast | Rain | 74.39 | 8 | 77 | 100 | 7.9 | 2 | | | 0.4 | 1.5 | Less Than 15 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:30 PM | 4/6/2001 | Clear/Sunny | Clear/Sunny | 7 | 8 | 12 | 4 | 8 | 10 | 49 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 7 | 12 | 9 | 13.5 | 8 | 13 | 62.5 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 11/30/2001 | Clear/Sunny | Showers | 7 | 12 | 9 | 13.5 | 8 | 13 | 62.5 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:45 PM | 1/25/2002 | Clear/Sunny | Showers | 3 | 4 | 12 | 16.5 | 8 | 10 | 53.5 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 3 | 8 | 9 | 10 | 8 | 8 | 46 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 4/11/2002 | Clear/Sunny | Clear/Sunny | 6 | 6 | 6 | 9 | 9 | 10 | 46 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 5/20/2002 | Clear/Sunny | Overcast | 3 | 4 | 9 | 10 | 9 | 10 | 45 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 6/17/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 6 | 10 | 9 | 8 | 40 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 0 | 5 | 9 | 4 | 25 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 8/26/2002 | Overcast | Clear/Sunny | 3 | 4 | 9 | 10 | 8 | 8 | 42 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 9 | 10 | 8 | 4 | 38 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 3 | 12 | 8 | 10 | 40 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:30 PM | 11/13/2002 | Clear/Sunny | Rain | 3 | 2 | 0 | 5 | 8 | 4 | 22 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:00 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 3 | 5 | 4 | 4 | 23 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width( | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 1.05 | 13.67 | 0.92 | 0.9 | 11.88 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 11/30/2001 | Clear/Sunny | Showers | 1.33 | 14.33 | 1.33 | 0.9 | 22.81 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width( | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:45 PM | 1/25/2002 | Clear/Sunny | Showers | 1 | 21.5 | 0.67 | 0.9 | 12.96 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 10:00 AM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 0.38 | 8 | 1.58 | 0.9 | 4.32 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 4/11/2002 | Clear/Sunny | Clear/Sunny | 0.56 | 18 | 1.61 | 0.9 | 14.61 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 5/20/2002 | Clear/Sunny | Overcast | 0.57 | 7 | 1.5 | 0.9 | 5.39 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 6/17/2002 | Clear/Sunny | Clear/Sunny | 0.4 | 8 | 1.9 | 0.9 | 5.47 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 0.31 | 7 | 0.89 | 0.9 | 1.74 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:00 AM | 8/26/2002 | Overcast | Clear/Sunny | 0.31 | 8.5 | 1.32 | 0.9 | 3.13 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 11:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 0.36 | 7.5 | 2.4 | 0.9 | 5.83 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 9:00 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 0.33 | 7.75 | 1.25 | 0.9 | 2.88 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 1:30 PM | 11/13/2002 | Clear/Sunny | Rain | 0.52 | 6.5 | 1.25 | 0.9 | 3.8 |
| 165 | Highland-Pigeon 05140202 | Pigeon Creek-Clear Fork | near Gibson Co. landfill, bridge on CR 175E | 2:00 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 0.4 | 6.5 | 1.11 | 0.9 | 2.6 |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 12:45 PM | 1/8/2002 | Clear/Sunny | Clear/Sunny | 7 | | | | | | | | | | 30 | 5 | | | | | | | 2 | | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 11:00 AM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 9 | | | | | 9 | | | | | 20 | | | | | | | | 2 | 2 | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 3/8/2002 | Clear/Sunny | Clear/Sunny | 31 | | 5 | 12 | | 2 | | 2 | 2 | 1 | 40 | 10 | | | | | | | 1 | 4 | 1 | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 4/2/2002 | Overcast | Clear/Sunny | 23 | | 3 | 10 | | 4 | | | 2 | | 20 | 3 | | | | | | | 2 | 2 | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 1:15 PM | 5/21/2002 | Clear/Sunny | Clear/Sunny | 16 | | | | | 8 | | | 2 | 1 | 10 | | | | | | | | 2 | | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 6/4/2002 | Clear/Sunny | Clear/Sunny | 20 | | | 15 | | 8 | | | 1 | | 17 | | 1 | | | | | | 6 | 1 | 10 | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:30 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 17 | | | 15 | | 2 | | | | | 30 | 5 | | | | | | | 4 | 1 | 3 | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 22 | | 3 | 5 | | 9 | | | 4 | 2 | 10 | | | | | | | | 3 | | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 24 | | 2 | 8 | | 10 | | | 4 | 2 | 6 | | | | | | | 1 | 4 | | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 10/18/2002 | Clear/Sunny | Showers | 20 | | 1 | 15 | | | | | 15 | 12 | 10 | | | | | | | | 2 | | | |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 11/8/2002 | Clear/Sunny | Showers | 11 | | | 3 | | | | | 1 | | 7 | | | | | | | | 3 | | | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 282 | Highland-Pigeon 05140202 | Smith Fork | CR 850E bridge | 2:00 PM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 75.03 | 8 | 110 | 1000 | 8.7 | 1 | | | 0.05 | 0 | 5 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:30 AM | 8/22/2001 | Clear/Sunny | Clear/Sunny | 71.52 | 11 | 132 | 100 | 8.3 | 7 | | | 0.35 | 0.25 | 2 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 11/27/2001 | Showers | Stormy | 55.38 | 8 | 72 | 4500 | 7.4 | 6 | | | 2 | 1 | 40 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 12:45 PM | 1/8/2002 | Clear/Sunny | Clear/Sunny | 73.85 | 16 | 112 | 100 | 7.8 | 4 | | | 0.6 | 0.3 | 5 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 11:00 AM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 82.82 | 14 | 120 | 33.3 | 8.1 | 1 | | | 0.15 | 0.2 | 5 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 3/8/2002 | Clear/Sunny | Clear/Sunny | 84.72 | 10 | 97 | 33 | 7.9 | 0 | | | 0.2 | 0.1 | 10 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 4/2/2002 | Overcast | Clear/Sunny | 78.31 | 11 | 100 | 165 | 7.7 | 1 | | | 0.3 | 0.2 | 18 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 1:15 PM | 5/21/2002 | Clear/Sunny | Clear/Sunny | 68.54 | 6 | 65 | 66 | 8.1 | 1 | | | 0.9 | 0.1 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 6/4/2002 | Clear/Sunny | Clear/Sunny | 75.31 | 9 | 105 | 132 | 7.8 | 1 | | | 0.7 | 0.1 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:30 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 71.42 | 5 | 60 | 99 | 7.9 | 1 | | | 0.2 | 0.35 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 88.09 | 7 | 77 | 0 | 7.9 | 0 | | | 0.3 | 0.35 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 83.02 | 10 | 100 | 33 | 8 | 0 | | | 0.3 | 0.1 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 10/18/2002 | Clear/Sunny | Showers | 65.48 | 6 | 54 | 434 | 7.9 | 2 | | | 0.1 | 0 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 11/8/2002 | Clear/Sunny | Showers | 75.94 | 5 | 42 | 0 | 7.5 | 1 | | | 0.4 | 0.2 | Less Than 15 |
| 278 | Highland-F | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 12/17/2002 | Overcast | Showers | 67.09 | 8 | 64 | 166.5 | 7.1 | 2 | | | 0.5 | 0.35 | Less Than 15 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 8:40 AM | 3/4/2003 | Clear/Sunny | Clear/Sunny | 75.35 | 12 | 86 | 67 | 7.4 | 1 | | | 0.65 | 2 | 17 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 3/21/2003 | Overcast | Rain | 63.63 | 10 | 92 | 366 | 7.2 | 3 | | | 4 | 1.5 | 30 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 4/4/2003 | Overcast | Clear/Sunny | 70.64 | 10 | 100 | 200 | 8.1 | 2 | | | 1 | 0.2 | Less Than 15 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 3:00 PM | 4/16/2003 | Overcast | Clear/Sunny | 74.67 | 10 | 97 | 67 | 8.1 | 1 | | | 0.9 | 0.9 | Less Than 15 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 12:45 PM | 1/8/2002 | Clear/Sunny | Clear/Sunny | 6 | 12 | 12 | 12 | 8 | 4 | 54 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 11:00 AM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 3 | 14 | 12 | 13 | 6 | 8 | 56 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 3/6/2002 | Clear/Sunny | Clear/Sunny | 3 | 12 | 12 | 13 | 9 | 10 | 59 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 4/2/2002 | Overcast | Clear/Sunny | 10 | 12 | 12 | 13 | 8 | 10 | 65 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 1:15 PM | 5/21/2002 | Clear/Sunny | Clear/Sunny | 8 | 14 | 12 | 13 | 9 | 8 | 64 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 6/4/2002 | Clear/Sunny | Clear/Sunny | 13 | 8 | 12 | 13 | 9 | 10 | 65 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:30 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 5 | 10 | 12 | 13 | 6 | 8 | 54 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 8 | 16 | 12 | 14 | 9 | 8 | 67 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 8 | 14 | 12 | 11 | 9 | 4 | 58 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 10/18/2002 | Clear/Sunny | Showers | 8 | 14 | 12 | 12 | 6 | 8 | 60 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 11/8/2002 | Clear/Sunny | Showers | 10 | 14 | 12 | 11 | 6 | 8 | 61 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width( | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 12:45 PM | 1/8/2002 | Clear/Sunny | Clear/Sunny | 0.31 | 10 | 0.3 | 0.8 | 0.74 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 11:00 AM | 2/25/2002 | Clear/Sunny | Clear/Sunny | 0.39 | 10.5 | 0.5 | 0.8 | 1.64 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 3/8/2002 | Clear/Sunny | Clear/Sunny | 0.36 | 9 | 0.68 | 0.8 | 1.76 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 4/2/2002 | Overcast | Clear/Sunny | 0.38 | 11.5 | 0.65 | 0.8 | 2.27 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 1:15 PM | 5/21/2002 | Clear/Sunny | Clear/Sunny | 0.46 | 12 | 0.6 | 0.9 | 2.98 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 6/4/2002 | Clear/Sunny | Clear/Sunny | 0.47 | 11.5 | 0.4 | 0.8 | 1.73 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:30 AM | 7/25/2002 | Clear/Sunny | Clear/Sunny | 0.36 | 9 | 0.33 | 0.9 | 0.96 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 8/27/2002 | Clear/Sunny | Clear/Sunny | 0.49 | 9.33 | 0.72 | 0.9 | 2.96 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 10:00 AM | 9/27/2002 | Clear/Sunny | Clear/Sunny | 0.5 | 10 | 0.5 | 0.8 | 2 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 10/18/2002 | Clear/Sunny | Showers | 0.46 | 9.5 | 0.25 | 0.8 | 0.87 |
| 278 | Highland-Pigeon 05140202 | Smith Fork | bridge at Petersburg Rd. | 9:00 AM | 11/8/2002 | Clear/Sunny | Showers | 0.5 | 9.5 | 0.3 | 0.8 | 1.14 |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tolleranc e Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mu ssels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:50 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 14 | | 4 | | | 1 | | | 5 | | | | | 7 | | | | | | | | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:30 PM | 11/30/2001 | Clear/Sunny | Showers | 18 | | 2 | | | 4 | | | 5 | | 2 | | | 5 | | | | | | 1 | | |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 1/28/2002 | Clear/Sunny | Clear/Sunny | 9 | | | | | | | | | | 12 | 2 | | | | | | | 5 | 1 | 2 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 7 | | | | | | | | | | 1 | | | 6 | | | | | | | 2 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 13 | | | | | | | | | | 4 | 12 | | 5 | | | | 2 | 2 | | 12 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 8/26/2002 | Clear/Sunny | Clear/Sunny | 9 | | | | | | | | | | 3 | | | 2 | | | | | 6 | 5 | 3 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 19 | | >12 | | | 3 | | | 8 | 2 | | | | >12 | | | | 2 | | | | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 10:30 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 10 | | | | | | | | 4 | 3 | | | | 2 | | | | | 7 | | | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:00 AM | 11/13/2002 | Clear/Sunny | Rain | 8 | | | | | | | | | 2 | | | | 3 | | | | | | 2 | 10 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 12:01 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 11 | | | | | | | | | 1 | 5 | | | 2 | | | | | 3 | 1 | | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:50 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 50.99 | 12 | Greater Th | 400 | 8.7 | 4 | | | 1.5 | 6.5 | 12 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:30 PM | 11/30/2001 | Clear/Sunny | Showers | 58.06 | 10 | 110 | 700 | 8.5 | 5 | | | 1.5 | 5 | 30 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 1/28/2002 | Clear/Sunny | Clear/Sunny | 64.66 | 9 | 80 | 1200 | 8 | 3 | | | 0.8 | 0.9 | 20 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 67.13 | 12 | 104 | 1200 | 8.1 | 4 | | | 1 | 0.7 | 5 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:30 PM | 6/17/2002 | Clear/Sunny | Clear/Sunny | 55.11 | 8 | 92 | 1914 | 8 | 2 | | | 2 | 26 | 45 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 11:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | NA | | | | | | | | | 0.45 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 67.25 | 8 | 102 | 33 | 8.2 | 3 | | | 3.5 | 6 | Less Than 15 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 10:30 AM | 8/26/2002 | Clear/Sunny | Clear/Sunny | NA | | | | | | | | | 0.2 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 8/26/2002 | Clear/Sunny | Clear/Sunny | 58.67 | 8 | 95 | 264 | 8 | 3 | | | 5 | 17.5 | 25 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 63.63 | 6 | 63 | 67 | 7.6 | 2 | | | 2 | 1.5 | 21 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 10:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | NA | | | | | | | | | 0.1 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 10:30 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 54.17 | 7 | 65 | 334 | 8.2 | 3 | | | 4 | 9 | 19 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 11:30 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | NA | | | | | | | | | 0.1 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:00 AM | 11/13/2002 | Clear/Sunny | Rain | 65.6 | 10 | 88 | 100 | 7.6 | 3 | | | 1.5 | 4.5 | 32 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 12:05 PM | 11/13/2002 | Clear/Sunny | Rain | NA | | | | | | | | | 3 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 12:01 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 66.1 | 14 | 107 | 166.5 | 7.5 | 4 | | | 2.5 | 3.5 | 20 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 1:45 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | NA | | | | | | | | | 0.1 | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 2:15 PM | 3/17/2003 | Overcast | Clear/Sunny | NA | | | 34 | | | | | | 0.9 | 19 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:15 PM | 3/17/2003 | Overcast | Clear/Sunny | 57.45 | 13 | 120 | 730 | 8.1 | 3 | | | 1 | 26 | 30 |
| 402 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | bridge on Coal Mine Rd.- upstream from wastewater treatment plant | 11:30 AM | 4/18/2003 | Overcast | Rain | NA | 8 | 80 | | 8.1 | | | | | 10 | |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 10:30 AM | 4/18/2003 | Overcast | Rain | 59.2 | 8 | 78 | 167 | 8.1 | 3 | | | 1.5 | 11 | 40 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:50 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 7 | 8 | 0 | 10 | 9 | 10 | 44 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:30 PM | 11/30/2001 | Clear/Sunny | Showers | 7 | 4 | 0 | 3 | 8 | 10 | 32 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 1/28/2002 | Clear/Sunny | Clear/Sunny | 0 | 0 | 0 | 3 | 7 | 6 | 16 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 7 | 6 | 0 | 5 | 8 | 10 | 36 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 5 | 6 | 0 | 5 | 9 | 10 | 35 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 8/26/2002 | Clear/Sunny | Clear/Sunny | 5 | 6 | 0 | 3 | 8 | 10 | 32 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 5 | 6 | 0 | 3 | 8 | 8 | 30 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 10:30 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 5 | 10 | 0 | 3 | 8 | 8 | 34 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:00 AM | 11/13/2002 | Clear/Sunny | Rain | 3 | 2 | 0 | 3 | 8 | 4 | 20 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 12:01 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 5 | 4 | 0 | 3 | 8 | 4 | 24 |

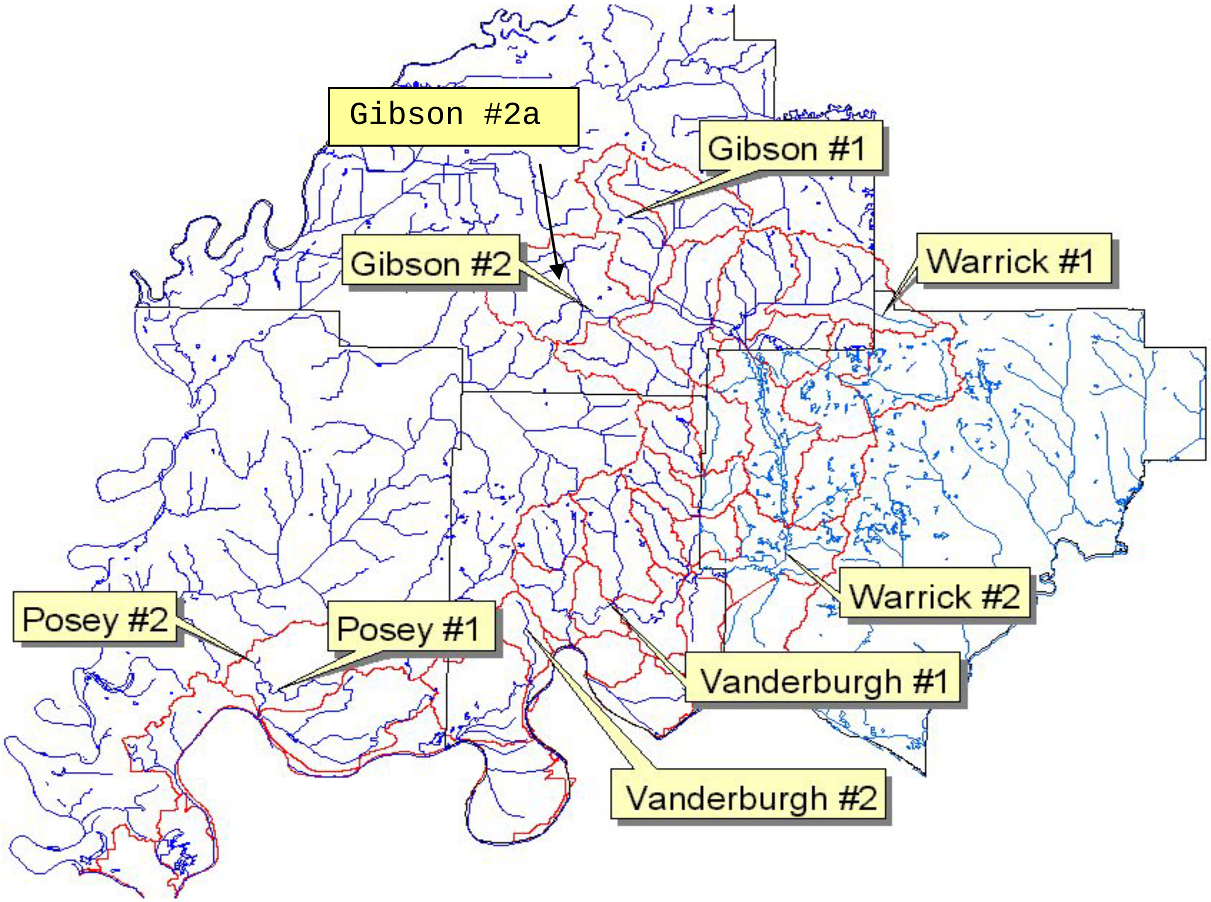
Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth(ft) | Ave Width(ft) | Ave Velocity(ft/sec) | n value | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:50 AM | 8/15/2001 | Clear/Sunny | Clear/Sunny | 0.65 | 12 | 1.2 | 0.8 | 7.49 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:30 PM | 11/30/2001 | Clear/Sunny | Showers | 1.12 | 13 | 1.5 | 0.9 | 19.66 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth(ft) | Ave Width(ft) | Ave Velocity(ft/sec) | n value | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 1/28/2002 | Clear/Sunny | Clear/Sunny | 0.96 | 16.5 | 0.83 | 0.9 | 11.83 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 1:00 PM | 2/18/2002 | Clear/Sunny | Clear/Sunny | 0.96 | 24 | 1.67 | 0.9 | 34.63 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 7/30/2002 | Clear/Sunny | Clear/Sunny | 0.58 | 11 | 1.2 | 0.9 | 6.89 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:00 AM | 8/26/2002 | Clear/Sunny | Clear/Sunny | 0.48 | 11.5 | 0.95 | 0.9 | 4.72 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 9:30 AM | 9/24/2002 | Clear/Sunny | Clear/Sunny | 1.06 | 12 | 0.22 | 0.9 | 2.52 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 10:30 AM | 10/16/2002 | Clear/Sunny | Clear/Sunny | 0.7 | 9.5 | 0.71 | 0.9 | 4.25 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 11:00 AM | 11/13/2002 | Clear/Sunny | Rain | 0.83 | 11.5 | 0.78 | 0.9 | 6.7 |
| 281 | Highland-Pigeon 05140202 | West Fork Pigeon Creek | US 41 bridge | 12:01 PM | 12/9/2002 | Clear/Sunny | Clear/Sunny | 0.81 | 11 | 0.6 | 0.9 | 4.81 |

Sample Site Locations: Pigeon-Highland Watershed Steering Committee Data, November 2001 to April 2003.

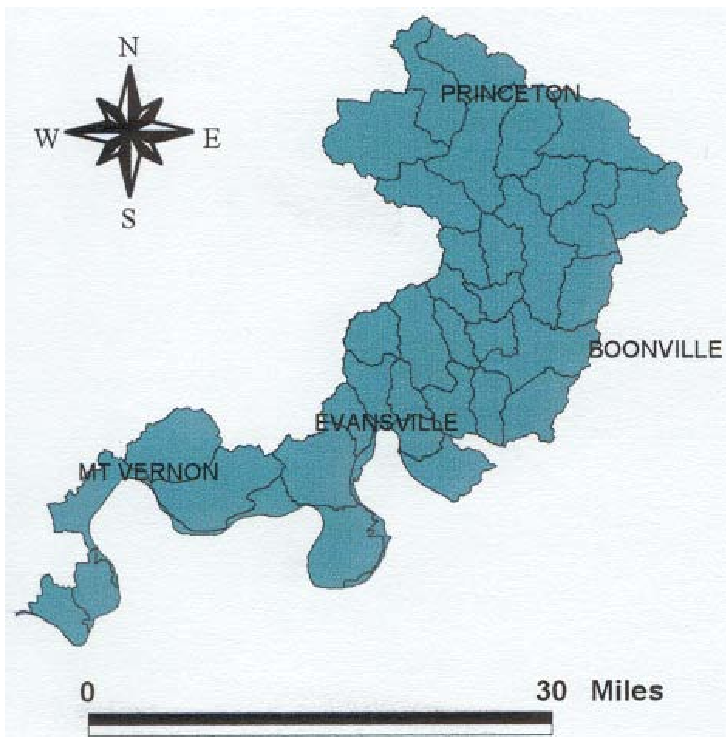



Gibson #1 = Pigeon Creek-Clear Fork, Hoosier Riverwatch Site #165
Gibson #2 = Pigeon Creek-West Fork, HR Site #281
Gibson #2a = Pigeon Creek-West Fork, HR Site #402
Warrick #1 = Smith Fork, HR Site #278
Warrick #2 = Pigeon Creek-Heim Rd., HR Site #66
Vanderburgh #1 = Pigeon Creek-Heidelbach, HR Site #75
Vanderburgh #2 = Carpentier Creek, HR Site #221
Posey #1 = trib. of McFadden Cr. At SR69 bypass, HR Site #65
Posey #2 = trib. of Mcfadden Cr. At Seibert Rd, HR Site #279

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**Appendix C: Summary of Combined Sewer Overflow Effects**

**Combined sewer overflow (CSO) Monitoring**

Rainfall and CSO events were monitored between January 2000 and September 2000. Rainfall events were monitored using an existing rain gauge at CSO No. 025 (Diamond Avenue). The frequency and magnitude of CSO events was monitored using existing measurement equipment at three CSO outfalls, deemed representative of the system. Based upon the characteristics of all permitted CSO outfalls to Pigeon Creek three CSOs were selected for monitoring (Harza 1999):

CSO No. 025 – Diamond
CSO No. 011 - Oakhill/Weinbach
CSO No. 012 – Maryland

ADS Environmental Services, Inc. of Indianapolis provided installation and maintenance services for CSS monitoring equipment. It was intended to use their automatic recording ultrasonic velocity meters and pressure transducers to compute overflow hydrographs. However, quality control questions about data reliability precluded the use of this data. Instead, data from the existing “totalizers” at each outfall were used. These compute daily flow volumes based on hydraulic head and gate opening at each CSO.

Automatic samplers were installed and operated to monitor CSO discharge quality. The automated samplers were installed at CSO Nos. 025 and 011, Diamond and Oakhill. Sampling was initiated manually, with samples taken at 15-minute intervals for two hours, followed by sampling at 30-minute intervals for two hours. Generally, 12 samples were collected over a four-hour period for each monitored wet weather discharge event. This sampling was paired with manual sampling of Pigeon Creek at five locations during the event. Details on sampling and analytical methods may be found in the QAPP (Harza 1999).

**Frequency and Magnitude of Combined Sewer Overflows**

During the 8-month monitoring period, cumulative overflow volumes were recorded by the totalizers at CSO Nos. 025, 012, and 011 (Diamond, Maryland, and Oakhill respectively) through the gate just downstream of the diversion point (throttle pipe) to the wastewater treatment plant and the overflow control structure. The volumes measured therefore represented the total overflow and do not include flows to the treatment plant.

Frequency and magnitude of overflows were evaluated based on data collected between January 18, 2000 and August 15, 2000. During this 211-day time period, there was a complete record of overflows for all three locations. EMC staff routinely visit each CSO station daily, except for weekends and holidays, and record the totalizer readings. There were 13 CSO events at Oakhill, 37 events at Maryland, and 28 at Diamond during the 211-day period. There were approximately two CSOs per month at Oakhill, five per month at Maryland and about four per month at Diamond. CSO volumes were generally three times greater at Maryland than at Oakhill and twice the CSO volumes at Diamond. The average CSO at Maryland was 43 million gallons, compared to 14 million at Oakhill and 21 million at Diamond.

| OVERFLOW EVENTS AT OAKHILL | |
|---|---|
| **Date** | **Volume (MG)** |
| 02/14/00 | 7.53 |
| 02/22/00 | 41.60 |
| 02/24/00 | 0.18 |
| 02/28/00 | 12.30 |
| 03/16/00 | 1.41 |
| 03/17/00 | 13.42 |
| 03/20/00 | 1.43 |
| 04/10/00 | 3.95 |
| 07/03/00 | 0.03 |
| 07/12/00 | 78.57 |
| 07/19/00 | 16.51 |
| 07/31/00 | 0.04 |
| 08/28/00 | 3.03 |

| | |
|---|---|
| **OVERFLOW EVENTS AT MARYLAND Date Volume (MG)** | |
| 01/18/00 | 5.15 |
| 02/14/00 | 26.27 |
| 02/18/00 | 37.57 |
| 02/22/00 | 753.96 |
| 02/24/00 | 202.00 |
| 02/28/00 | 121.63 |
| 03/13/00 | 2.51 |
| 03/16/00 | 29.96 |
| 03/17/00 | 19.28 |
| 03/20/00 | 64.81 |
| 03/21/00 | 1.11 |
| 03/27/00 | 2.95 |
| 04/10/00 | 62.75 |
| 04/28/00 | 2.01 |
| 05/08/00 | 0.80 |
| 05/10/00 | 0.73 |
| 05/15/00 | 0.30 |
| 05/19/00 | 6.12 |
| 05/24/00 | 4.32 |
| 05/30/00 | 8.92 |
| 06/05/00 | 0.32 |
| 06/06/00 | 0.38 |
| 06/15/00 | 6.26 |
| 06/19/00 | 110.23 |
| 06/21/00 | 12.86 |
| 06/26/00 | 14.56 |
| 06/27/00 | 8.56 |
| 06/28/00 | 1.94 |
| 07/03/00 | 1.86 |
| 07/05/00 | 5.02 |
| 07/12/00 | 0.58 |
| 07/19/00 | 11.76 |

| OVERFLOW EVENTS AT MARYLAND Date | Continued<br><br>Volume (MG) |
|---|---|
| 07/31/00 | 6.10 |
| 08/08/00 | 3.18 |
| 08/09/00 | 1.22 |
| 08/24/00 | 11.89 |
| 08/28/00 | 25.11 |

| | |
|---|---|
| | |
| **OVERFLOW EVENTS AT DIAMOND** | |
| **Date** | **Volume (MG)** |
| 01/18/00 | 6.12 |
| 02/14/00 | 20.56 |
| 02/18/00 | 62.21 |
| 02/22/00 | 224.44 |
| 02/24/00 | 47.57 |
| 02/28/00 | 47.55 |
| 03/16/00 | 14.62 |
| 03/17/00 | 15.67 |
| 03/24/00 | 1.00 |
| 03/27/00 | 1.95 |
| 04/10/00 | 20.25 |
| 05/19/00 | 3.67 |
| 05/24/00 | 11.78 |
| 05/30/00 | 4.33 |
| 06/19/00 | 37.70 |
| 06/21/00 | 8.42 |
| 06/22/00 | 3.94 |
| 06/26/00 | 3.27 |
| 06/27/00 | 12.01 |
| 06/28/00 | 1.73 |
| 07/05/00 | 3.16 |
| 07/12/00 | 3.54 |
| 07/19/00 | 6.69 |
| 07/31/00 | 4.37 |
| | |

| **OVERFLOW EVENTS AT DIAMOND** | continued |
|---|---|
| 08/09/00 | 4.32 |
| 08/24/00 | 9.27 |
| 08/28/00 | 12.06 |

**Water Quality Effects**

Automated samplers at the Maryland and Diamond CSOs took samples during select events between February and August 2000. Combined sewage samples were analyzed for suspended solids, BOD, *E. coli*, phosphorus, total Kjeldahl nitrogen (TKN), ammonia nitrogen, arsenic, zinc, chromium, copper, lead, cadmium and nickel. Typically, twelve samples were collected at each CSO during an overflow event. During the monitoring period, concurrent surface water samples were also taken. Creek samples were collected manually at five locations once during each sampling events. Creek samples were taken from PC7, upstream of all CSOs, PC4, PC3, PC2 and Highway 62.

To assess the impacts of the CSOs to water quality, we compared the sampling results to Indiana surface water standards. The exceedances of standards were limited to *E. coli* bacteria (Table 39). The Indiana standard for E. coli is a recreational standard and a maximum at 235, measured as bacteria per 100 mL. Four out of the five storm events we sampled surpassed the *E. coli* limit. Sampling station PC7 is upstream of CSOs and reflects nonpoint and point source coliform loadings from the upper watershed. Note that these upstream sources also cause the creek to exceed the state water quality standard. PC4 is downstream of Oakhill CSO and upstream of all other CSOs, including Diamond and Maryland. PC3 is downstream of two more CSOs, including Diamond Avenue. PC2 is located upstream of Dresden CSO (014) as well as Maryland, and downstream of 6th Avenue (CSO 017). The sample at US Highway 62 is near the Ohio River, below all Pigeon Creek CSOs.

| *E. COLI* CONCENTRATIONS DURING STORM EVENTS | | | | | |
|---|---|---|---|---|---|
| **Storm Event** | **PC7** | **PC4** | **PC3** | **PC2** | **Hwy 62** |
| 02/13/00 | No creek samples collected | | | | |
| 03/16/00 | 3,100 | 10 | 45,000 | 10,000 | 23,000 |
| 05/23/00 | 55 | 15 | 25 | 8 | 28 |
| 06/21/00 | 270 | 370 | 1,140 | 1,710 | 640 |
| 08/08/00 | 570 | 510 | 580 | 360 | 240 |
| 08/18/00 | 3,500 | 27,000 | 39,900 | 50,000 | 17,100 |

Concentrations are plotted against distance from the mouth of the Ohio River. As points of reference, the locations of various CSOs and the Little Pigeon and Locust Creeks are also included.

**Phosphorus.** Based on the data collected, phosphorus concentrations are relatively constant at all points along Pigeon Creek in the CSO impact area. We generally did not observe more than a 0.3 mg/L fluctuation between sampling points during any given storm event. In all monitored events, there was either no change or a decrease in phosphorus concentrations upstream of the CSOs, as represented by the PC7 sample, or downstream past the Oakhill outfall to PC4. It would therefore appear that the Oakhill CSO has a minor contribution to the watershed's overall phosphorus budget. Downstream of PC4, the Diamond (CSO 025) and Baker (CSO 024) outfalls discharge, contributing pollutants that would have been measured at the PC3 sampling location. In three of the five events, significant increases in phosphorus concentrations were observed at PC3. Typically concentrations were relatively stable or decreased downstream of PC3, at PC2, PC1, and through the final monitoring location at US Highway 62, below all Pigeon Creek CSOs. The state does not have a water quality standard for phosphorus, although nutrient criteria may be developed in the next five years.

**BOD.** With the exception of the May 23, 2000 event, BOD in Pigeon Creek during wet weather was relatively unaffected by the CSO loads. The March 16, 2000 storm event data indicate a dramatic increase between the BOD concentrations at the PC4 and PC7 sampling points. We believe the BOD analysis of the PC7 sample is not representative of instream water quality and may be due to sampling or measurement error. The general BOD trend seems to be one of minor contributions from Evansville's CSOs.

**Suspended Solids.** While there is substantial noise in the data, the suspended solids concentrations along the waterway seem to be unaffected by the CSO inflows. We attribute this noise to the lack of flow-weighted sampling and incomplete mixing downstream of CSOs discharges. During all monitored storm events, TSS levels are high throughout the creek reach we studied, including PC7, upstream of the CSOs. The data do not provide clear evidence for an adverse effect of Evansville's CSOs.

Maryland and Diamond CSO subsystems serve areas considered to be at different levels of risk for soil erosion. Diamond subsystem has a high rating for soil erosion and potential solids and floatables impacts, but Maryland has a low potential for soil erosion (but high potential for potential solids and floatables impacts). Peak concentrations in the combined sewage of the two CSOs were similar, although Maryland's was typically slightly higher than that found in Diamond Avenue sewage.

***E. coli*.** As discussed earlier, the *E. coli* concentrations (measured per 100 mL) are consistently high during all except the May 23, 2000 storm event and over the entire distance of the creek. There is often an increase in *E. coli* concentrations going from the first data point at PC7 to PC4. This increase occurs in two out of the five storm events. In addition, aside from some variation, the general trend downstream is for the *E. coli* concentration to increase. Even when there are decreases within the data, the *E. coli* levels are higher than the recreational water quality standard. There is a frequent increase from PC4 downstream to PC3 in *E. coli* concentration, suggesting that the Baker Street (CSO 024) and/or Diamond Avenue (CSO 025) have compounding effects on receiving water quality.

Historically, concentrations of *E. coli* in Pigeon Creek have commonly exceeded the state's standard, both upstream and downstream of the CSO area of influence. There are point and/or nonpoint sources of coliforms upstream of Evansville that contaminate the stream, confirmed by watershed sampling.

**Ammonia Nitrogen.** Creek concentrations reach no more than 4 mg/L in any storm event. Instream temperature and pH measurements were not taken, so the concentration of ammonium ion cannot be estimated properly. Ammonia nitrogen concentrations generally decrease over the stretch of the sampling area.

**Total Kjeldahl Nitrogen (TKN).** The TKN data also contain a considerable amount of noise. Because of this, it is difficult to draw conclusions regarding the impact of the CSOs on TKN. In four out of five events, increases in TKN concentration were observed downstream of PC7, but, by Hwy 62, may return to the levels found upstream (at PC7).

**Nitrate Nitrogen.** Nitrate concentrations exhibit less fluctuation along the CSO-affected stretch of the creek. The largest change in concentration from one sampling point to the next was 0.8 mg/L, with the other fluctuations being well below that. We conclude that the nitrate loads from the CSOs and streams do not significantly affect the instream nitrate concentrations.

**Metals.** The Maryland CSO subsystem serves an area of moderate residential population, moderate industrial development, with a low risk of a hazardous material spill. Diamond CSO subsystem serves an area of relatively moderate residential population, relatively high industrial development, with a high risk of a hazardous material spill. We monitored several heavy metals in the two CSOs. Arsenic concentrations were similar in Diamond and Maryland discharges. In no cases was arsenic in the CSO discharge measured to exceed acute aquatic criteria in 327 IAC 2-1-6, assuming 100 mg $CaCO_3$/L hardness.

Maximum zinc concentrations were 0.5 mg/L in each of the two monitored CSOs . Again, assuming 100 mg/L hardness, we observed two samples to exceed the zinc acute aquatic criteria in 312 IAC 2-1-6.

In four of five discharge events, maximum chromium and copper concentrations in Maryland were higher than Diamond. Chromium in the CSO discharge was not measured to exceed the State's acute aquatic standards in either outfall, however copper values did in both.

For lead, Diamond CSO exhibited higher concentrations than Maryland, and exceeded the acute aquatic criteria. Maryland discharge was not measured to exceed the lead acute aquatic criteria. Nickel concentrations were similar in the two discharges, and were well below the criteria.

## 5.4 MUNICIPALITIES, SENSITIVE AREAS AND RECREATIONAL FACILITIES

Federal and state CSO policies require that the highest priorities be given to controlling overflows to waterways in sensitive areas. Therefore, as part of developing the long-term control plan, the EWSU is expected to identify all sensitive waterbodies and the CSO outfalls that discharge to them. Sensitive areas have been defined by the US EPA as:

- National Marine Sanctuaries
- Outstanding National
- Resource Waters
- Waters with threatened or endangered species or their designated critical habitats
- Primary contact recreation waters, such as bathing beaches,
- Public drinking water intakes or their designated protection areas, and,
- Shellfish beds

The State of Indiana only recently defined outstanding national resource waters (SEA, Section 17, adds IC 13-18-3-2(d) effective July 1, 2000) and none are yet designated in the study area or Ohio River. There are also no national marine sanctuaries in the study area. The only recording of a state or federally listed species occurring in the Pigeon Creek floodplain downstream of the Oakhill discharge (CSO #011) is the hellbender, a giant aquatic salamander. Hellbender is a state-listed endangered species. Hellbenders prefer clear fast-flowing streams and rivers with rocky bottoms (Behler and King 1998). They are reclusive, hiding under rocks, feeding on macroinvertebrates. Pigeon Creek in Evansville is generally sluggish and turbid with a silt, sand or gravel bottom. There is no date in DNR's database for the last sighting of hellbenders in Evansville. Even with elimination of CSO discharges, Pigeon Creek will remain sluggish and turbid due to its low gradient, backwater effects of the Ohio River, and nonpoint pollution sources of siltation from upstream areas.

There are no primary contact recreation waters in that portion of Pigeon Creek within the CSO area of influence. Heidelbach canoe launch is located on Pigeon Creek approximately two miles downstream of the Oakhill discharge (CSO #011). Canoeing is secondary contact recreation, and would not be expected to occur during or shortly after a storm event. Also the Pigeon Creek Greenway starts at the Heidelbach canoe launch and continues downstream to the Ohio River. The Greenway trail is separated from Pigeon Creek by a minimum 50 to 100-foot wide forest or prairie buffer and steep muddy banks. Similarly the Greenway is not typically used during or shortly after storms, and, the muddy banks and forest buffer provide a barrier discouraging contact with the creek. The entire reach of Pigeon Creek affected by CSO discharges is signed by EWSU to caution users against contact recreation after wet weather.

There are no public water intakes in the Pigeon Creek CSO area. The City of Evansville's intake is in the Ohio River, upstream of Pigeon Creek, north of Sunset Park.

Pigeon Creek harbors freshwater mussels. There are no shellfish beds that are harvested for food there, which is EPA's general regulatory focus. Freshwater mussels are threatened nationally due to water quality and habitat degradation. The CSOs are an example of water quality degradation, but no threatened or endangered species of mussels are recorded for this area.

Seveal locations along Pigeon Creek that may fit IDEM's "priority area" designation are the Hiedelbach Canoe Launch, Kleymeyer Park, Garvin Park, and Nut Club Field. These areas should be given priority attention in the city's long-term CSO control plan.

**CONCLUSIONS AND RECOMMENDATIONS**

The data collected as part of this study has served to confirm that there are frequent combined sewage overflows from the Evansville sewer system. There is very little baseline data available on Evansville's CSOs. It is therefore difficult to quantify what decrease in frequency and magnitude of CSO discharges have occurred by implementation of the nine minimum controls. The seven automated control structures constructed in 1980 and upgraded in 1990 undoubtedly reduce the frequency and volume of discharges from the largest Pigeon Creek CSOs. Many collection system and treatment plant projects in recent years have also helped reduce overflows. Sewer separation and inflow and infiltration projects planned and in-progress are helping lessen CSO loadings. Forthcoming Phase II Storm Water Regulations will also eventually aid in CSO reduction. Environmental education efforts will also expand as the LTCP elements are completed.

This report recommends several courses of action be taken to directly and indirectly reduce CSO discharges to Pigeon Creek. Those recommendations include development of a monitoring and modeling plan, continued sewer separation, increasing primary treatment at the wastewater plants (when approved by the IDEM), continued inflow and infiltration reduction efforts, inline storage projects, and a runoff control program. The LTCP, which has been initiated, will consider the feasibility of these and additional technology-based CSO controls.

Evansville, as all other CSO municipalities in Indiana, will be required to develop a technically feasible, affordable, and comprehensive LTCP consistent with the CSO Control Policy. That Policy is intended to document how and when a community will meet the Clean Water Act requirements. The two main methods to demonstrate compliance were the Demonstration and the Presumption Approaches.

The Presumption Approach requires that the LTCP implementation will result in:

- No more than an average of four overflow events a year
- The elimination or capture of no less than 85% by volume of the combined sewage collected in the CSS during precipitation events on a system-wide annual average basis
- The elimination or removal of no less than the mass of the pollutants identified as causing water quality impairment through the sewer system characterization, monitoring, and modeling effort for the volumes that would be eliminated or captured for treatment

Computer modeling during the LTCP will estimate the reduction in overflow volume that the seven automated structures have created since their construction. However, it is unlikely that the Presumption Approach will suffice on Pigeon Creek due to the criteria of no more than an average of four overflow events yearly. The Demonstration Approach requires successfully demonstrating compliance with the following criteria:

- The planned control program is adequate to meet water quality standards and protect designated uses, unless standards or uses cannot be met as a result of natural background conditions or pollution sources other than CSOs
- The CSO discharges remaining after implementation of the planned control program will not preclude attainment of water quality standards or the receiving waters designated uses or contribute to their impairment
- The planned control plan will provide the maximum pollution reduction benefits reasonably attainable, and
- The planned control program is designed to allow cost-effective expansion or cost-effective retrofitting if additional controls become necessary to meet standards or designated uses

Consequently, as part of this study, we have attempted to indicate if Evansville can demonstrate that it meets the water quality based objectives of the Clean Water Act through use of the Demonstration Approach.

In addition to these two approaches to CSO control, the State of Indiana is presently developing guidance for the creation of CSO controls that are practical and cost-effective. Senate enrolled Act 431, signed into law on March 17, 2000, requires the IDEM to develop guidance for Combined Sewer municipalities on how to comply with the Act. More specifically, the guidance will detail the process and procedures with which municipalities must comply in order to develop and submit a LTCP and an Use Attainability Analysis that may be approved by IDEM and the EPA.

The provisions of SEA 431 authorize the temporary suspension of designated uses and associated water quality criteria, provided certain requirements are met. An Use Attainability Analysis (UAA) is a structured scientific assessment of the physical, chemical, biological, and economic factors affecting the attainment of a designated use as defined in 40CFR 131.3(g). The UAA provides a process by which a CSO community may demonstrate that a designated use is not attainable and may obtain a temporary suspension of that designated use. Much of the information required in the UAA is the same as what is required in the LTCP; therefore, IDEM will use the approved LTCP as much as possible to satisfy the requirements of the UAA.

It should be noted that the guidance for these requirements is presently being created. The eventual outcome should be a more realistic approach to CSO controls. Evansville's LTCP and UAA will determine exactly which route best serves both pollution prevention and fiscal responsibility.

As a component of this Pigeon Creek Watershed Diagnostic Study, the SRCER for Pigeon Creek is included. The broad scope of this watershed analysis actually includes more information than required by the SRCER. The data acquired for the chemical, physical, and biological health of the watershed should benefit all parties involved. Evansville will probably find that a combination of the Demonstration Approach and the provisions of SEA 431 will be the best method of CSO reduction.

From the available water quality data, we can confirm that Pigeon Creek is affected by CSO discharges of *E. coli* bacteria and that this water quality standard is regularly exceeded during wet weather. No other water quality standards, as monitored as part of this study, are conclusively and adversely impacted by the CSOs.

Historic concentrations of *E. coli* in Pigeon Creek have commonly exceeded the state's standard, both upstream and downstream of the CSO area of influence. There are point and/or nonpoint sources of coliforms upstream of Evansville that contaminate the stream, confirmed by our sampling.

Despite this relatively minor impact of CSO's discharges to water quality in Pigeon Creek, there are still a number of measures that EWSU should continue to optimize the operation of the sewer system and further reduce CSO's and their adverse impacts on water quality in Pigeon Creek. Recommended measures are as follows:

**Monitoring and Modeling Plan**
EWSU should continue development of a Monitoring and Modeling Plan as part of the LTCP for the sewer system. This will assist the Utility in developing a full understanding of the sewer system, its response to various precipitation events, and the characteristics of the overflows. The monitoring program will also serve to confirm the findings of this study and help establish the effectiveness of the CSO controls implemented to date.

Using the model, hydraulic restrictions in the system could be eliminated if flow monitoring work verifies modeling parameters. Specifically, restrictions in throttle pipes at CSOs 009, 012, 016 and 025, which may be at or near their capacity, should be investigated. If upsizing of throttle pipes is warranted, further study of capacity remaining in the Pigeon Creek Interceptor may be necessary.

**Continued Sewer Separation**
EWSU currently operates both separate sanitary and combined sewers in the various subsystems. However, in a number of cases, separate sanitary sewers discharge to downstream combined sewers for conveyance of the wastewater to the two treatment plants. For example, the Pfeiffer pump station discharges sanitary sewage for Basin W10 into the 102" CS in Basin W6. This discharge is upstream of Diamond CSO (025) on the 102" line. Consequently, during precipitation events, this sanitary sewage is contributing to the overflows or may in fact be the cause of the overflow.

The recommendation now is for EWSU to review options for keeping the sanitary sewage separate from the combined sewers. This can be done by installing a separate sanitary interceptor line that terminates at one of the two wastewater treatment plants. This objective may also be achieved by investigating measures that will allow sanitary sewage to be given priority for discharge into the existing combined sewer interceptors, such as the Pigeon Creek Interceptor. The objective of either of these approaches will be to remove separate sanitary sewage from combined sewage overflows, thus changing the characteristics of such overflows and improving water quality.

It is our understanding that a third treatment plant has been proposed for Evansville and that, thus far, much of the separately sewered areas will be diverted to this new plant. A decision to proceed in this manner will be fully compatible with this approach and will achieve the objective of keeping separate sewage out of the combined sewers.

**Treatment Plant Operation**

EWSU should approach IDEM with a request for utilizing the existing unused primary treatment capacity at the treatment plants during wet weather. This will allow EWSU to capture and treat a greater percentage of the flows and reduce overflows of untreated combined sewage.

In order to implement such actions, EWSU must also review the capacity of its conveyance system to the plants, and determine whether there is sufficient sewer capacity to deliver the larger flows to the WWTPs. If not, EWSU must review options for increasing sewer capacity to be able to maximize primary treatment at the plants.

**Inflow and Infiltration Reductions**

It is recommended that all commercial and industrial structures be inspected to identify all sources of inflow and infiltration to the sewer system. Efforts should be made to disconnect such direct sources of inflow, such as downspouts, as much as possible.

The inflow/infiltration monitoring program should be expanded in the combined sewer system. As problems are identified, they should be corrected.

**Inline Storage**

A gate control system, which would control the non-automated CSOs to Pigeon Creek and the Ohio River, would allow the storage of combined sewerage in the interceptors tributary to the diversions. This gate control system could provide about 154,5000 cubic feet (11.6 MG) of storage. To obtain the full amount of storage, available, additional weirs, gates, etc. may be necessary. A study to investigate the feasibility of such a system, and the condition of the sewers at the storage sites (to avoid damage from surcharging) is warranted. This option will be further investigated during development of the LTCP.

**Runoff Control Program**

Evaluation of a runoff control program to store and control runoff before it enters the combined system is also recommended. The feasibility and effectiveness of this alternative and others requires development of a system model, scheduled for completion as part of the LTCP.

**LTCP**

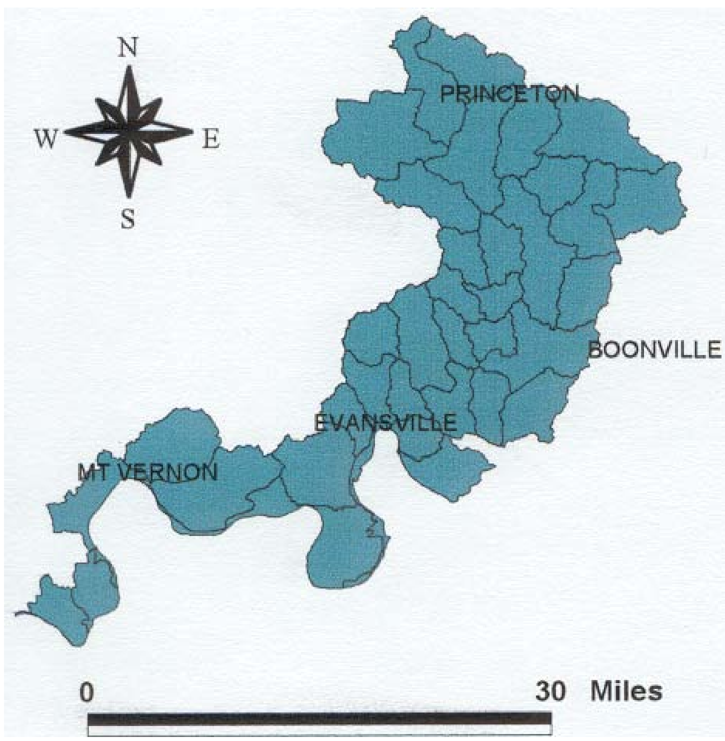
EWSU has retained a consultant to develop a long-term CSO control plan (LTCP) for their sewer service area. The LTCP will include the following elements:

1. The LTCP must be consistent with the federal CSO Policy (58 Fed. Reg. 18688). The LTCP must be approved by the IDEM and ultimately implemented by the CSO community according to a schedule determined by the IDEM.
2. The LTCP must be developed with public participation, using a process designed to promote active involvement by the affected public.
3. The LTCP must use characterization, monitoring and modeling of the combined sewer system to determine:
    a. the response of the combined sewer system to various precipitation events;
    b. the characteristics of the overflows from the combined sewer system (volume and pollutants), and
    c. the water quality impacts that result from the overflows
4. The LTCP must contain an evaluation of a reasonable range of control alternatives, taking into account expected and projected future growth.
5. The LTCP must consider the impact of CSOs on sensitive areas and give highest priority to controlling overflows in those areas.
6. The LTCP must contain cost and performance analysis of the control alternatives evaluated.
7. The LTCP must maximize treatment of wet weather flows at the treatment plant.
8. The LTCP must contain a practical implementation schedule for the selected control alternative.
9. The LTCP must contain a post-construction compliance monitoring program adequate to ascertain:
    a. the effectiveness of the selected control alternative; and
    b. the extent to which water quality standards have been attained.

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**<u>Appendix D:</u> Data from Harza Diagnostic Study and PHWSC for McFadden Creek**

Harza Habitat Evaluation

## QUALITATIVE HABITAT EVALUATION INDEX

| Site | Water body | Substrate | Cover | Channel | Riparian | Pool | Riffle | Gradient | QHEI |
|---|---|---|---|---|---|---|---|---|---|
| MF-1 | McFadden Creek | 10 | 7 | 7 | 9 | 7 | 2 | 10 | 52 |
| MF-2 | McFadden Creek | 16 | 9 | 8 | 12 | 7 | 1 | 10 | 63 |
| MF-3 | Second Tributary* | 14 | 7 | 8 | 10 | 4 | 1 | 4 | 48 |
| MF-4 | Fourth Tributary* | 16 | 8 | 10 | 10 | 4 | 2 | 6 | 56 |
| MF-5 | McFadden Creek | 5 | 4 | 9 | 12 | 8 | 4 | 10 | 52 |
| MF-6 | Fifth Tributary* | 4 | 6 | 9 | 9 | 6 | 4 | 8 | 46 |
| MF-7 | McFadden Creek | 7 | 7 | 9 | 8 | 8 | 5 | 4 | 48 |
| MF-8 | McFadden Creek | 5 | 7 | 7 | 6 | 6 | 4 | 4 | 39 |
| MF-9 | Eleventh Tributary* | 12 | 6 | 6 | 6 | 4 | 4 | 4 | 42 |
| MF-10 | Tenth Tributary* | 3 | 4 | 6 | 6 | 3 | 1 | 10 | 33 |

* Tributaries are denoted numerically from downstream to upstream.

Harza Substrate Evaluation

## SUBSTRATE QUALITY SCORING

| Site | Waterbody | Silt Cover (points) | Extent of Embeddness (points) |
|---|---|---|---|
| MF-1 | McFadden Creek | Silt normal (0) | Moderate (-1) |
| MF-2 | McFadden Creek | Silt normal (0) | Low (0) |
| MF-3 | Second Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-4 | Fourth Tributary* | Silt normal (0) | Low (0) |
| MF-5 | McFadden Creek | Silt moderate (-1) | Moderate (-1) |
| MF-6 | Fifth Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-7 | McFadden Creek | Silt normal (0) | Low (0) |
| MF-8 | McFadden Creek | Silt moderate (-1) | Moderate (-1) |
| MF-9 | Eleventh Tributary* | Silt moderate (-1) | Moderate (-1) |
| MF-10 | Tenth Tributary* | Silt heavy (-2) | Extensive (-2) |

Harza In-situ water quality data, May 2000

# IN-SITU WATER QUALITY DATA

| Site | Waterbody | Sampling Date | Temp (°C) | Conductivity (umhos/cm) | pH | DO (mg/L) | % DO Saturation |
|---|---|---|---|---|---|---|---|
| MF-1 | McFadden Creek | 5/11/00 | 19.1 | 642 | 7.93 | 14.9 | 164% |
| MF-2 | McFadden Creek | 5/11/00 | 20.1 | 628 | 7.98 | 14.8 | 161% |
| MF-3 | Second Tributary* | 5/11/00 | 21.2 | 534 | 8.08 | 17.8 | 199% |
| MF-4 | Fourth Tributary* | 5/11/00 | 22.4 | 649 | 8.22 | 19.0 | 220% |
| MF-5 | McFadden Creek | 5/13/00 | 22.7 | 599 | 7.90 | 14.0 | 165% |
| MF-6 | Fifth Tributary* | 5/13/00 | 21.6 | 593 | 7.70 | 12.1 | 137% |
| MF-7 | McFadden Creek | 5/13/00 | 23.4 | 617 | 7.94 | 15.0 | 179% |
| MF-8 | McFadden Creek | 5/13/00 | 23.9 | 612 | 8.20 | 18.0 | 220% |
| MF-9 | Eleventh Tributary* | 5/9/00 | 24.6 | 541 | 8.90 | 30.0 | 370% |
| MF-10 | Tenth Tributary* | 5/9/00 | 24.8 | 681 | 8.61 | 33.0 | 400% |

* Tributaries are denoted numerically from downstream to upstream, totaling 13.

# LABORATORY WATER QUALITY DATA

| Site | *E. coli* (cfu/100ml) | Total Kjeldahl Nitrogen (mg/L) | Nitrate (mgN/L) | Ammonia (mgN/L) | Phosphorus (mg/L) | BOD (mg/L) | Total Suspended Solids (mg/L) |
|---|---|---|---|---|---|---|---|
| MF-1 | 300 | 1.5 | 2.2 | 0.11 | 0.39 | <2.5 | 28 |
| MF-2 | 400 | 1.1 | 2.3 | 0.09 | 0.39 | <2.5 | 36 |
| MF-3 | 180 | <1.0 | 1.5 | 0.54 | 0.32 | <2.5 | 16 |
| MF-4 | 1,200 | 3.9 | 4.8 | 0.41 | 0.36 | <2.5 | 6 |
| MF-5 | 380 | 2.1 | 1.6 | 0.34 | 0.38 | <2.5 | 76 |
| MF-6 | 700 | <1.0 | <0.05 | 0.57 | 0.38 | <2.5 | 83 |
| MF-7 | 150 | 2.1 | 1.8 | <0.03 | 0.38 | <2.5 | 68 |
| MF-8 | 240 | 1.8 | 3.3 | 0.15 | 0.41 | <2.5 | 120 |
| MF-9 | 180 | <1.0 | 3.6 | 0.26 | 0.33 | <2.5 | 10 |
| MF-10 | 23 | 1.3 | 3.5 | 0.81 | 0.26 | 3.3 | 3.5 |

Harza Laboratory Water Quality Data, May 2000

Harza Macroinvertebrate Data

## MACROINVERTEBRATE MATRIX SCORES

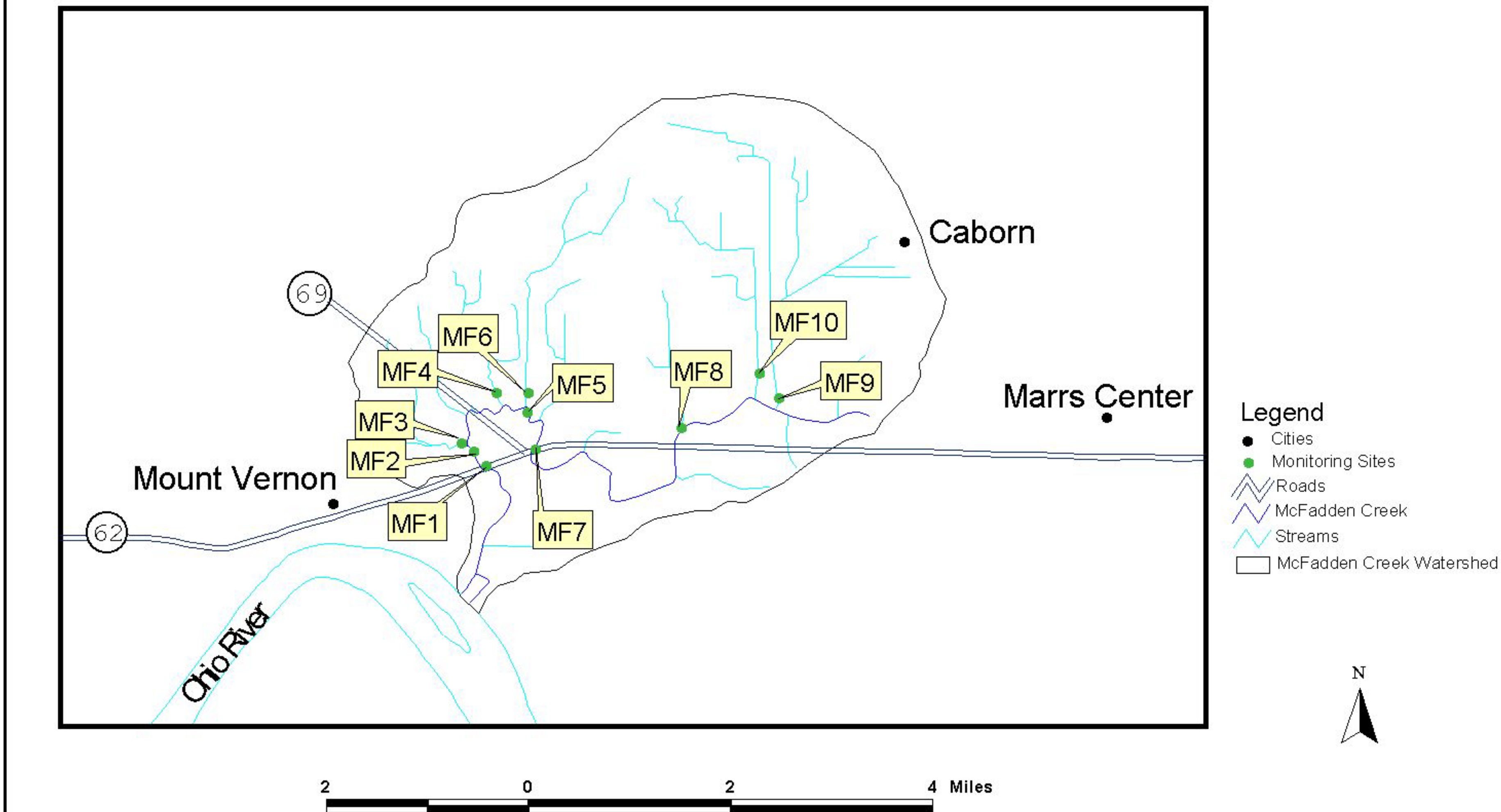
| Parameter | MF-1 | MF-2 | MF-3 | MF-4 | MF-5 | MF-6 | MF-7 | MF-8 | MF-9 | MF-10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Taxon Richness | 9 | 12 | 6 | 5 | 15 | 8 | 12 | 11 | 6 | 8 |
| Family Biotic Index | 7.14 | 7.28 | 7.54 | 6.41 | 7.32 | 7.93 | 6.88 | 7.74 | 7.58 | 7.83 |
| Ratio of Scraper/Filterer | 0.5 | 2.5 | (0/0) | (4/0) | 77 | (29/0) | (44/0) | (105/0) | 35.5 | 5.1 |
| Ratio of EPT/Chironomidae | 0.06 | 0.06 | (0/20) | (0/6) | 0.14 | (0/1) | (0/42) | (0/6) | (0/20) | (0/8) |
| % Contribution Dominant Family | 30 | 49 | 74 | 53 | 46 | 58 | 32 | 62 | 29 | 67 |
| EPT Index | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| Ratio of Shredder/Nonshredder | 0.24 | 0.69 | 1.00 | 0.45 | 0.02 | 0.89 | (0/50) | 0.06 | 0.50 | 0.04 |
| Total Number Collected | 104 | 159 | 145 | 121 | 167 | 151 | 129 | 170 | 124 | 113 |

Harza Flow Data

## STREAMFLOW MEASUREMENTS

| Site | Water body | Discharge ($ft^3$/sec) |
|---|---|---|
| MF-1 | McFadden Creek | 2.4 |
| MF-2 | McFadden Creek | 2.3 |
| MF-3 | Second Tributary* | 0.4 |
| MF-4 | Fourth Tributary* | 0.2 |
| MF-5 | McFadden Creek | Too deep to wade |
| MF-6 | Fifth Tributary* | 0.8 |
| MF-7 | McFadden Creek | 1.6 |
| MF-8 | McFadden Creek | 1.8 |
| MF-9 | Eleventh Tributary* | 0.7 |
| MF-10 | Tenth Tributary* | 0.2 |

* Tributaries are denoted numerically from downstream to upstream




HARZA ENGINEERING COMPANY
WATER & ENVIRONMENT

**SAMPLING SITES**
MCFADDEN CREEK WATERSHED DIAGNOSTIC STUDY

**EXHIBIT 3**

## MCFADDEN CREEK BIOASSESSMENT SAMPLING SITES

| STATION | DESCRIPTION | RATIONALE |
|---|---|---|
| MF-1 | McFadden Creek at SR62 | Most downstream most site |
| MF-2 | McFadden Creek at unnamed trestle bridge | Historic fly dumping site |
| MF-3 | Second (unnamed) tributary | Tributary mouth; drains agricultural and subdivision areas |
| MF-4 | Fourth (unnamed) tributary | Large agricultural subbasin |
| MF-5 | McFadden Creek at 350 East Bridge | Downstream of NPDES discharge |
| MF-6 | Fifth (unnamed) tributary | Large agricultural subbasin |
| MF-7 | McFadden Creek at SR62 | Upstream of NPDES discharge |
| MF-8 | McFadden Creek at 500 East Bridge | Channelized reach |
| MF-9 | Eleventh (unnamed) tributary, at 600 East Bridge | Channelized reach; agricultural drainage with numerous oil wells |
| MF-10 | Tenth (unnamed) tributary | Agricultural drainage; numerous oil wells |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12:00 PM | 1/26/2001 | Overcast | Overcast | 24 | | 1 | 1 | | | | | | 1 | 1 | 1 | | 1 | | | | 1 | 1 | | 1 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/2/2001 | Clear/Sunny | Clear/Sunny | 17 | 1 | | 1 | | | | | | 1 | | | | 1 | | | | 1 | 1 | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/19/2001 | Overcast | Clear/Sunny | 25 | | | | | 1 | | 1 | | 1 | 1 | 1 | | 1 | | | | 1 | 1 | 1 | 1 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12pm | 4/20/2001 | Clear/Sunny | Clear/Sunny | 21 | | | | | x | | | | x | x | x | | x | | | x | x | x | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 6/4/2001 | Overcast | Showers | 13 | | | | | x | | | | x | | | | x | | | | x | x | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/21/2001 | Overcast | Stormy | 11 | | | | | 8 | | | | 12 | | | | 7 | | | | | 6 | | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 10 | | | | | 1 | | | | | 50 | 25 | | | | | | | | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 15 | | | | | | | | | 4 | 12 | 12 | | 1 | | | | 3 | 12 | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 12 | | | | | 40 | | | | 1 | | | | 3 | | | | | 24 | | 11 | |
| 280 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Gun Club Rd. | 2:30 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 11 | | | | | 24 | | | | 12 | | | | 2 | | | | | 30 | | | |

Biological Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 2/6/2002 | Overcast | Clear/Sunny | 6 | | | | | | | | | | 8 | 5 | | | | | | | | | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 3/6/2002 | Clear/Sunny | Showers | 12 | | | | | | | | | | 24 | 20 | | 12 | | | | 6 | 4 | | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 2:15 PM | 3/6/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | | | | | | | 3 | 4 | | | | | | 1 | | | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 1:00 PM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 9 | | | | | | | | | | 10 | 10 | | | | | | | | 3 | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 17 | | | | | | | 2 | 1 | | 10 | 10 | | | | | | 3 | 8 | 4 | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 11 | | | | | | | | | | 20 | 8 | | 3 | | | | | 1 | 8 | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:45 PM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 6 | | | | | | | | | | 15 | 10 | | | | | | | | | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 3:00 PM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 8 | | | | | | | | | | 10 | 2 | | | | | | | 2 | | 3 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 13 | | | | | 1 | | 1 | | | 10 | | | | | | | | 15 | | 15 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 9/26/2002 | Clear/Sunny | Clear/Sunny | 5 | | | | | | | | | | | | | | | | | 2 | 12 | 6 | 1 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 10/17/2002 | Clear/Sunny | Overcast | 13 | | | | | | | | | | 10 | 4 | 2 | | | 1 | | | 50 | 4 | | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 3:00 PM | 11/7/2002 | Clear/Sunny | Showers | 10 | | | | | | | | | | 11 | | 1 | | | | | 2 | 20 | 4 | | |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:30 PM | 11/7/2002 | Clear/Sunny | Showers | 5 | | | | | | | | | | 3 | | | | | | | | 10 | | 5 | |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12:00 PM | 1/26/2001 | Overcast | Overcast | 66.26 | 9 | 66 | 384 | 6.3 | 5 | | | 0 | 0.1 | 18 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/2/2001 | Clear/Sunny | Clear/Sunny | 64.46 | 8 | 70 | 200 | 6.8 | 4 | | | 0.4 | 1.5 | 40 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/19/2001 | Overcast | Clear/Sunny | 56.4 | 10 | 75 | 282 | 5.8 | 5 | | | 9 | 0.3 | 13 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12:00 PM | 4/20/2001 | Clear/Sunny | Clear/Sunny | 62.03 | 18 | Greater Th | 78 | 6.3 | 8 | -1 | 22 | 0 | 4 | 33 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:30 PM | 6/4/2001 | Overcast | Showers | 52.65 | 7 | 80 | 1000 | 9 | | 0 | 20 | 5 | 17.5 | |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/21/2001 | Overcast | Stormy | 65.79 | 7 | 80 | 1200 | 8.4 | 3 | | | 0.2 | 0.5 | 65 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00pm | 8/14/2001 | Clear/Sunny | Clear/Sunny | 66.44 | 8 | 92 | 2100 | 7.7 | 3 | | | | 0 | 58 |
| 280 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Gun Club Rd. | 2:30 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 63.85 | 8 | 92 | 1200 | 8 | 6 | | | | 0 | 58 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 59.98 | 9 | 75 | 3700 | 7.9 | 3 | | | 0.5 | 11 | 20 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 70.62 | 14 | 115 | 500 | 7.9 | 2 | | | 0.1 | 0.9 | 71 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 2/6/2002 | Overcast | Clear/Sunny | 71.55 | 4 | 31 | 0 | 7.9 | 2 | | | 0.4 | 2.5 | 10 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 3/6/2002 | Clear/Sunny | Showers | 81.48 | 13 | 120 | 31 | 7.9 | 0 | 1 | 12 | 0.3 | 2.5 | 18 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 2:15 PM | 3/6/2002 | Clear/Sunny | Clear/Sunny | 69.89 | 12 | 92 | 500 | 8.2 | 2 | | | 0.4 | 4 | 15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 78.43 | 11 | 100 | 198 | 7.6 | 2 | | | 0.2 | 0.9 | Less Than 15 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 1:00 PM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 62.17 | 10 | 110 | 594 | 8.2 | 2 | | | 1 | 15 | 15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 73.36 | 10 | 95 | 264 | 7.6 | 1 | | | 0.6 | 0.85 | 20 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:45 PM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 63.71 | 9 | 90 | 330 | 8 | 3 | | | 1 | 9 | Less Than 15 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 3:00 PM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 60.97 | 9 | 105 | 957 | 7.9 | 2 | | | 2 | 13 | 18 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 76.42 | 9 | 98 | 66 | 7.9 | 1 | | | 0.5 | 3 | Less Than 15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 9/26/2002 | Clear/Sunny | Clear/Sunny | 76.19 | 9 | 95 | 67 | 7.8 | 1 | | | 0.8 | 0.1 | Less Than 15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 10/17/2002 | Clear/Sunny | Overcast | 79.17 | 10 | 88 | 66 | 6.97 | 1 | | | 0.3 | 0 | 19.33 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 3:00 PM | 11/7/2002 | Clear/Sunny | Showers | 75.58 | 11 | 100 | 33 | 7.5 | 2 | | | 0.9 | 1.5 | Less Than 15 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:30 PM | 11/7/2002 | Clear/Sunny | Showers | 65.79 | 9 | 80 | 133 | 7.9 | 2 | | | 2 | 2 | 25 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 12/20/2002 | Clear/Sunny | Stormy | 68.76 | 6 | 80 | 67 | 7.2 | 1 | | | 0.7 | 13 | 18 |

Advanced Chemical Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Water Quality Score | DO(ppm) | DO(%Saturation) | E-coli(colonies/100mg/L) | pH | BOD 5(mg/L) | Temp Change (c) | Temp (c) | Total Phosphate(mg/L) | Nitrate NO3(mg/l) | Turbidity(NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 2/20/2003 | Clear/Sunny | Showers | 65.56 | 10 | 80 | 233 | 7 | 2 | | | 0.5 | 10.5 | 16 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 2/27/2003 | Showers | Clear/Sunny | 73.01 | 11 | 83 | 67 | 7.2 | 3 | | | 0.4 | 4.5 | Less Than 15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 3/20/2003 | Clear/Sunny | Stormy | 71.94 | 11 | 95 | 130 | 7.5 | 1 | | | 0.6 | 6 | 17 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 3/25/2003 | Clear/Sunny | Clear/Sunny | 63.07 | 14 | 130 | 134 | 8.3 | 2 | | | 0.8 | 17.5 | 20 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 4/17/2003 | Showers | Overcast | 65.12 | 6 | 55 | 34 | 7.8 | 1 | | | 0.4 | 5.5 | 36 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 2:30 PM | 4/17/2003 | Overcast | Showers | 62.71 | 9 | 79 | 200 | 8 | 2 | | | 0.85 | 13.5 | Less Than 15 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12:00 PM | 1/26/2001 | Overcast | Overcast | 0 | 2 | 12 | 4 | 6 | 4 | 28 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/2/2001 | Clear/Sunny | Clear/Sunny | 0 | 2 | 12 | 4 | 6 | 4 | 28 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 3/19/2001 | Overcast | Clear/Sunny | 0 | 2 | 12 | 4 | 6 | 4 | 28 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 12:00 PM | 4/20/2001 | Clear/Sunny | Clear/Sunny | 0 | 4 | 12 | 4 | 1 | 4 | 25 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 6/4/2001 | Overcast | Showers | 0 | 2 | 12 | 5 | 6 | 4 | 29 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/21/2001 | Overcast | Stormy | 0 | 4 | 15 | 5 | 6 | 0 | 30 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 0 | 2 | 12 | 3 | 1 | 0 | 18 |
| 280 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Gun Club Rd. | 2:30 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 3 | 4 | 0 | 10 | 1 | 4 | 22 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 3 | 12 | 12 | 13 | 6 | 4 | 50 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 0 | 2 | 0 | 1 | 2 | 0 | 5 |

Habitat Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 2/6/2002 | Overcast | Clear/Sunny | 3 | 12 | 12 | 11 | 6 | 4 | 48 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 3/6/2002 | Clear/Sunny | Showers | 0 | 2 | 3 | 3 | 8 | 8 | 24 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 2:15 PM | 3/6/2002 | Clear/Sunny | Clear/Sunny | 7 | 12 | 12 | 10 | 6 | 8 | 55 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 1:00 PM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 3 | 14 | 12 | 11 | 9 | 4 | 53 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 3 | 6 | 0 | 3 | 9 | 8 | 29 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 5 | 8 | 0 | 3 | 6 | 8 | 30 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:45 PM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 3 | 12 | 12 | 11 | 6 | 8 | 52 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 3:00 PM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 3 | 14 | 12 | 11 | 6 | 0 | 46 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 0 | 3 | 9 | 6 | 25 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 9/26/2002 | Clear/Sunny | Clear/Sunny | 3 | 4 | 0 | 3 | 1 | 0 | 11 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 10/17/2002 | Clear/Sunny | Overcast | 3 | 6 | 0 | 6 | 2 | 4 | 21 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 3:00 PM | 11/7/2002 | Clear/Sunny | Showers | 3 | 4 | 0 | 6 | 2 | 0 | 15 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:30 PM | 11/7/2002 | Clear/Sunny | Showers | 3 | 8 | 12 | 10 | 2 | 0 | 35 |

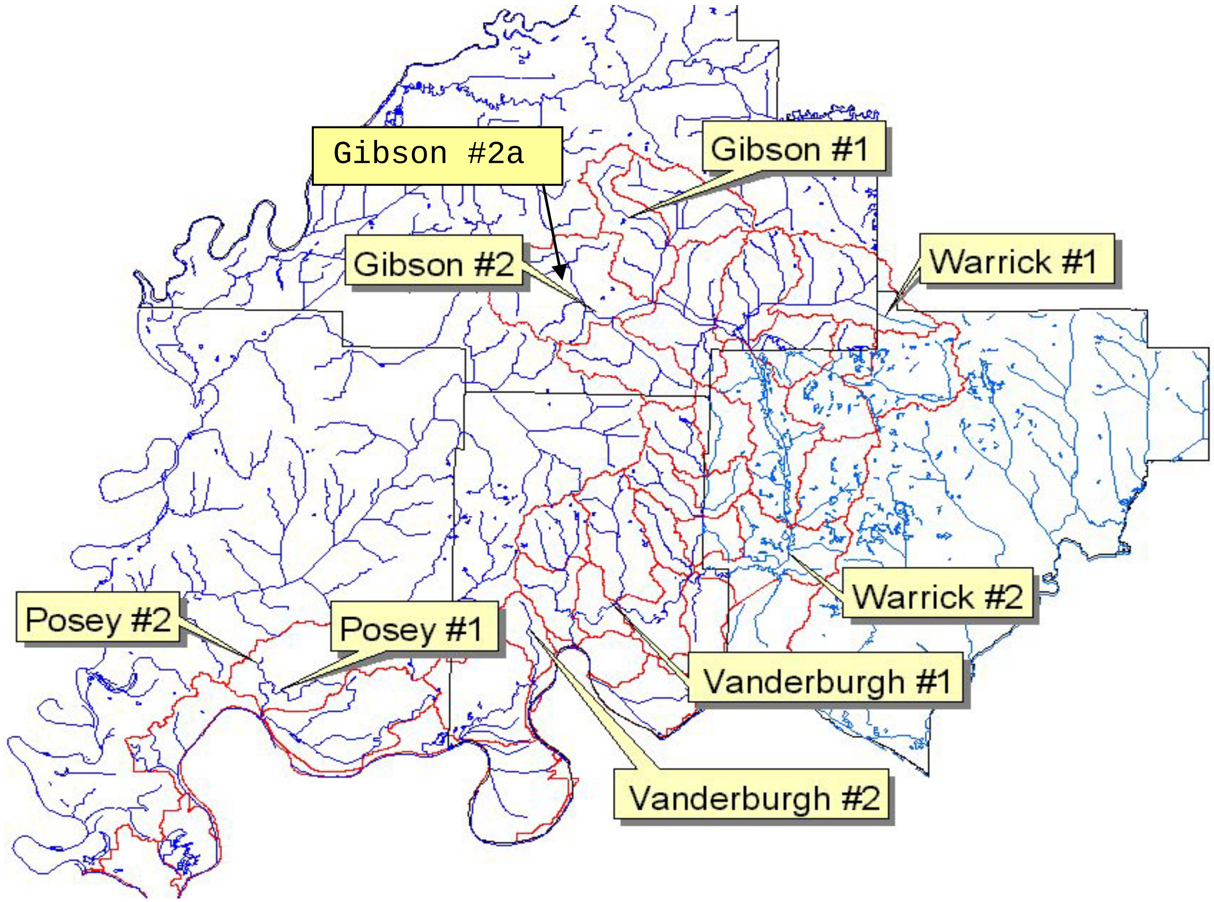
Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth(ft) | Ave Width(ft) | Ave Velocity(ft/sec) | n value | Discharge (cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 0.23 | 2.5 | 0.33 | 0.9 | 0.17 |
| 280 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Gun Club Rd. | 2:30 PM | 8/14/2001 | Clear/Sunny | Clear/Sunny | 0.35 | 2.5 | 0.25 | 0.9 | 0.2 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 0.34 | 4 | 0.12 | 0.9 | 0.15 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 11/12/2001 | Clear/Sunny | Clear/Sunny | 0.61 | 4 | 0.33 | 0.9 | 0.72 |

Stream Flow Data

| Site ID | WaterShed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth | Ave Width | Ave Veloci | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 11:00 AM | 2/6/2002 | Overcast | Clear/Sunny | 0.74 | 8 | 0.39 | 0.9 | 2.08 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 1:00 PM | 3/6/2002 | Clear/Sunny | Showers | 0.53 | 5.53 | 0.5 | 0.9 | 1.32 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 2:15 PM | 3/6/2002 | Clear/Sunny | Clear/Sunny | 0.6 | 8 | 0.25 | 0.9 | 1.08 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 0.41 | 4.5 | 0.93 | 0.9 | 1.54 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 1:00 PM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 0.29 | 7 | 1.73 | 0.9 | 3.16 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 4/17/2002 | Clear/Sunny | Clear/Sunny | 0.34 | 6.5 | 1.46 | 0.9 | 2.9 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:45 PM | 5/22/2002 | Clear/Sunny | Clear/Sunny | 0.41 | 5.5 | 1.07 | 0.9 | 2.17 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 3:00 PM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 0.36 | 6.5 | 0.42 | 0.9 | 0.88 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 9:00 AM | 6/18/2002 | Clear/Sunny | Clear/Sunny | 0.42 | 5.5 | 1 | 0.9 | 2.08 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 10:00 AM | 9/26/2002 | Clear/Sunny | Clear/Sunny | 0.14 | 3 | 0.22 | 0.9 | 0.08 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 8:30 AM | 10/17/2002 | Clear/Sunny | Overcast | 0.24 | 3.35 | 0.1 | 0.9 | 0.07 |
| 65 | Highland-Pigeon 05140202 | McFadden Creek | Approx. 1/2 mile N of SR62 on SR69 Bypass | 3:00 PM | 11/7/2002 | Clear/Sunny | Showers | 0.38 | 4 | 0.2 | 0.9 | 0.27 |
| 279 | Highland-Pigeon 05140202 | McFadden Creek | bridge on Seibert Rd. | 12:30 PM | 11/7/2002 | Clear/Sunny | Showers | 0.37 | 5.5 | 0.67 | 0.9 | 1.23 |

Sample Site Locations: Pigeon-Highland Watershed Steering Committee Data, November 2001 to April 2003.

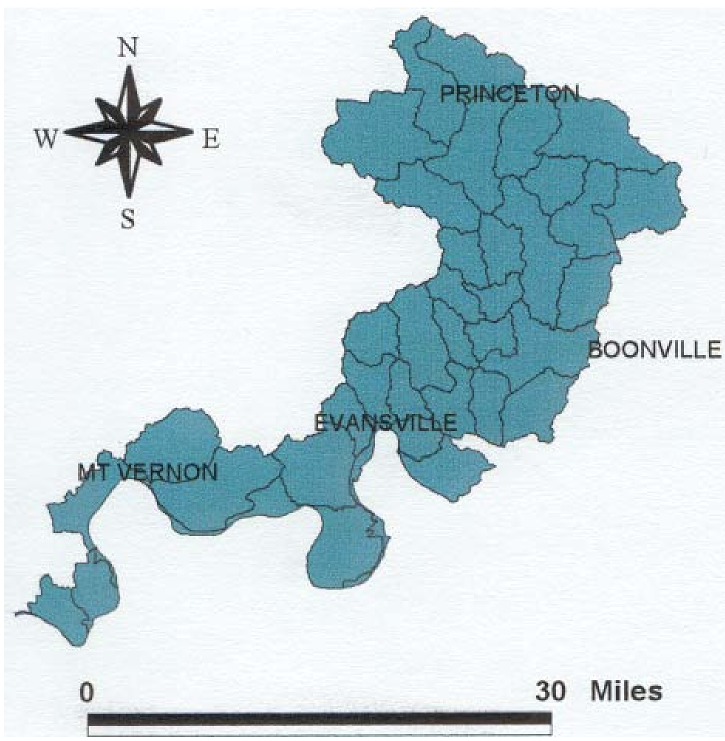



Gibson #1 = Pigeon Creek-Clear Fork, Hoosier Riverwatch Site #165
Gibson #2 = Pigeon Creek-West Fork, HW Site #281
Gibson #2a = Pigeon Creek-West Fork, HW Site #402
Warrick #1 = Smith Fork, HW Site #278
Warrick #2 = Pigeon Creek-Heim Rd., HW Site #66
Vanderburgh #1 = Pigeon Creek-Heidelbach, HW Site #75
Vanderburgh #2 = Carpentier Creek, HW Site #221
Posey #1 = trib. of McFadden Cr. At SR69 bypass, HW Site #65
Posey #2 = trib. of Mcfadden Cr. At Seibert Rd, HW Site #279

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**<u>Appendix E</u>: Data from SOLE and IDEM Assessment Branch for Bayou Creek**

**Advanced Chemical Data**

**Stream Flow Data**

| Site ID | Watershed Name | River Name | Description | Time | Date | Weather | Past Weather | Ave Depth(ft) | Ave Width(ft) | Ave Velocity (ft/sec) | n value | Discharge(cfs) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:00pm | 6/18/2002 | Clear/Sunny | Clear/Sunny | 2.08 | 1.5 | 0.5 | 0.9 | 1.4 |

**Biological Data**

| Site ID | Watershed Name | River Name | Description | Time | Date | Weather | Past Weather | Pollution Tollerance Score | Stonefly Larvae | Mayfly Larvae | Caddis Fly Larve | Dobsonfly Larvae | Riffle Beetle | Water Penny | Right handed Snail |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:15pm | ######## | Clear/Sunny | Clear/Sunny | 6 | | | | | | | |
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:00pm | 6/18/2002 | Clear/Sunny | Clear/Sunny | 14 | | | | | | | |

| Site ID | Damsel Fly Nymph | Dragonfly Nymph | Sowbug | Scud | Crane Fly Larvae | Clams/Mussels | Midge Larvae | Black Fly Larvae | Planaria | Leech | Left Handed Snail | Aquatic Worms | Blood Midge | Rat-Tailed Maggot |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | | | 2 | 20 | | | | | | | | | | |
| 338 | | 1 | 6 | 100+ | | | | | | 1 | | 4 | | |

**Standard Chemical Data**

| Site ID | d Name | Name | on | Time | Date | Weather | Weather | Score | Saturatio | (mg/l) | (ppm) | pH | Phosphat | Change(c | (NTU) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:15pm | ######## | Clear/Sunny | Clear/Sunny | 2.86 | <50 | '6-8 | 0 | 7 | 4 | | 0 |
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | | 6/18/2002 | Clear/Sunny | Clear/Sunny | 3 | 90-71 | '6-8 | 0 | 6 or 8 | 4 | '0-2 | 0-40 |

| Site ID | Fecal Coliform(Colonies/100ml) |
|---|---|
| 338 | 1-300 |
| 338 | 1-300 |

**Habitat Data**

| Site ID | Watershed Name | River Name | Description | Time | Date | Weather | Past Weather | I | II | III | IV | V | VI | CQHEI |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:15pm | ######## | Clear/Sunny | Clear/Sunny | 5 | 2 | 12 | 12 | 1 | 4 | 36 |
| 338 | Highland-Pigeon 05140202 | Wilson Branch of Bayou Creek | 100 feet south of intersection of Vanderburgh-Posey Co. Line Rd and Broadway | 1:00pm | 6/18/2002 | Clear/Sunny | Clear/Sunny | 10 | 2 | 15 | 10 | 1 | 4 | 42 |

| Project ID | Stream Name | Description | 14-Digit HUC | County | LatDeg | LatMin | LatSec | LongDeg | LongMin | LongSec |
|---|---|---|---|---|---|---|---|---|---|---|
| 2000 USGS E | Bayou Cr | Burdette Park near Evansville, IN | 5140202070020 | Vanderburg | 37 | 56 | 40 | -87 | 38 | 21 |

| Sample Date | LSite | Sample Number | E_ Coli (CFU/100mL) |
|---|---|---|---|
| 7/11/2000 | OHP070-0003 | AA08063 | 84 (QJ) |
| 7/18/2000 | OHP070-0003 | AA08091 | 170 |
| 7/25/2000 | OHP070-0003 | AA08119 | 47 (QJ) |
| 8/1/2000 | OHP070-0003 | AA08188 | 43 (QJ) |
| 8/8/2000 | OHP070-0003 | AA08216 | 73 |

| Project Name | Stream | Description | Site Name | County | 14-Digit HUC |
|---|---|---|---|---|---|
| 2000 USGS E coli | Bayou Cr | Burdette Park near Evansville, IN | OHP070-0003 | Vanderburg | 5140202070020 |

| LatDeg | LatMin | LatSec | LongDeg | LongMin | LongSec | Northing | Easting |
|---|---|---|---|---|---|---|---|
| 37 | 56 | 40 | -87 | 38 | 21 | 4199843.665 | 443840.2793 |

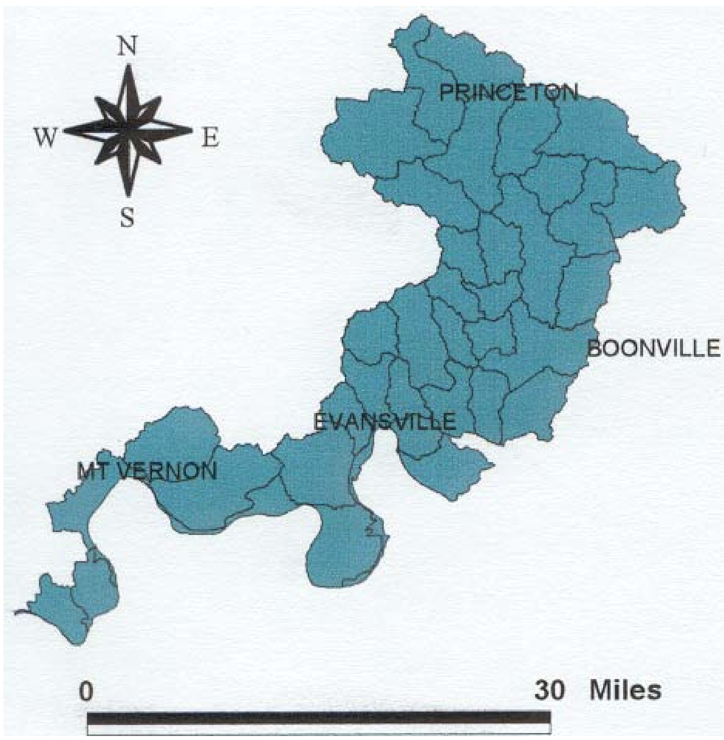
| Sample Date | Sample Time | Sample Number | Dissolved O2 (mg/L) | Water Temp - C | SaturationPct | pH | Specific Conductivity (umhos/cm) |
|---|---|---|---|---|---|---|---|
| 7/11/2000 | 9:42 | AA08063 | 0.37 | 27.82 | | 7.01 | 412 |
| 7/18/2000 | 9:00 | AA08091 | 0.6 | 26.24 | | 6.99 | 463 |
| 7/25/2000 | 10:10 | AA08119 | 1.23 | 23.18 | | 7.16 | 489 |
| 8/1/2000 | 9:50 | AA08188 | 1.94 | 24.45 | | 7.06 | 479 |
| 8/8/2000 | 9:40 | AA08216 | 1.72 | 26.73 | | 7 | 449 |

| Turbidity (ntu) | Comments |
|---|---|
| 4.32 | Barometric Pressure 739 |
| 4.14 | Barometric Pressure 737 |
| 5.41 | Barometric Pressure 751 |
| 9.9 | Barometric Pressure 744 |
| 9.12 | Barometric Pressure 749 |

# Watershed Management Plan

# For

# Highland-Pigeon Watershed




**<u>Appendix F:</u> Goals and Timeline**

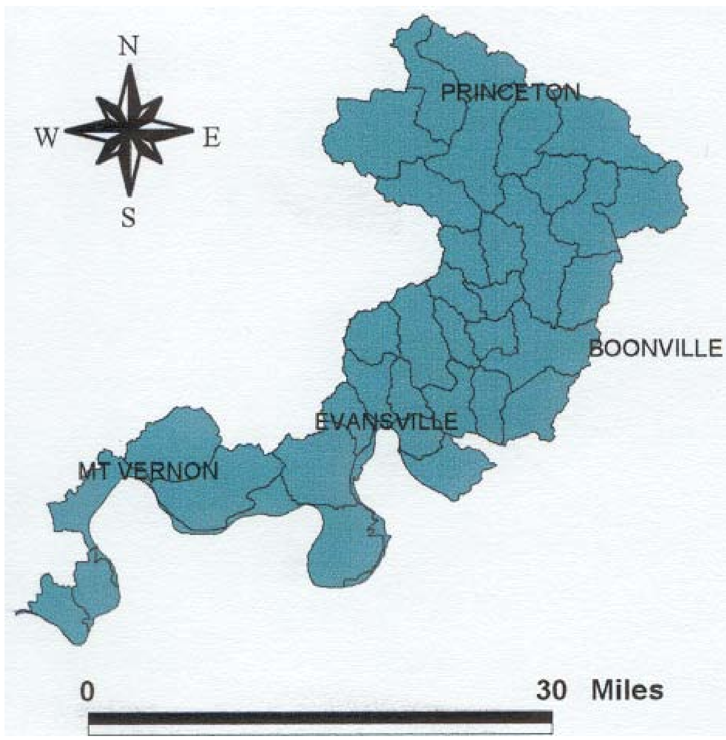
## Appendix F: Prioritized Goals and Timeline

| What | Where | Will be changed How | New level | By (timeline) |
|---|---|---|---|---|
| Sedimentation from erosion on agricultural land. | Subwatersheds 16,17,18,23,24,2526; reaches MF4,MF8,MF9,MF10. | Reduced. | By 50% or to “T” levels- whichever is greater. | 5 to 10 years. |
| Runoff from livestock operations. | Subwatershed 20; reaches MF4,MF8,MF9. | Eliminated. | Levels of E. coli bacteria below 235 col/100 ml, nutrient levels at or below background concentrations. | 3 to 5 years. |
| Educational opportunities. | Entire watershed. | Increased. | Ongoing, regular programs: annual field days, monthly school programs, quarterly news releases, etc. | Ongoing and continuous. |
| Discharges of raw or inadequately treated sewage. | Entire watershed. | Eliminated. | Levels of E. coli bacteria below 235 col/100 ml. | 5 to 25 years. |
| High phosphorous levels. | Subwatersheds 16,17,18,24,25. | Reduced. | By 50%. | 5 to 10 years. |
| Illegal solid waste disposal. | Subwatersheds 7,15,16;reach MF2 | Cleaned up. | Existing sites will be cleaned up- signs posted. | 5 to 10 years. |
| Streams impaired for ALUS/aesthetics. | Subwatersheds 23,24,25,26; reaches MF8,MF9,MF10. | Riparian zones improved with buffers. | Targeted streams afford some ALUS- appear to be creeks rather than “ditches”. | 5 to 15 years. |
| Only 6% of watershed is wetlands. | Subwatersheds 16,25,33. | Increased. | 100 acres of restored or created wetlands enrolled in WRP. | 5 to 15 years. |
| Urban erosion control. | Developing areas. | Increased. | Rules & ordinances are enforced with more vigilance. | Ongoing. |

# Watershed Management Plan

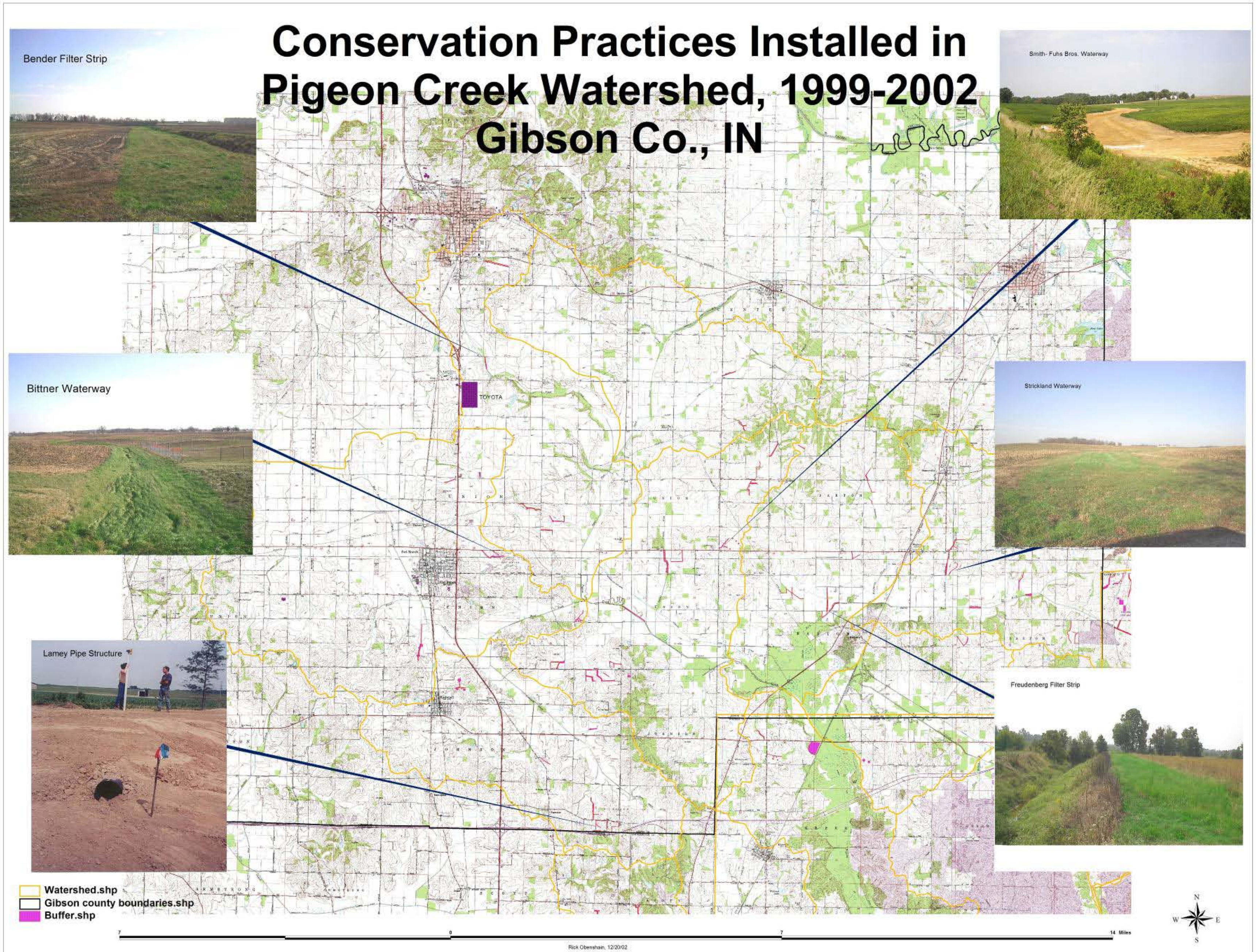
# For

# Highland-Pigeon Watershed




**<u>Appendix G</u> : Past Conservation Efforts in the Watershed**

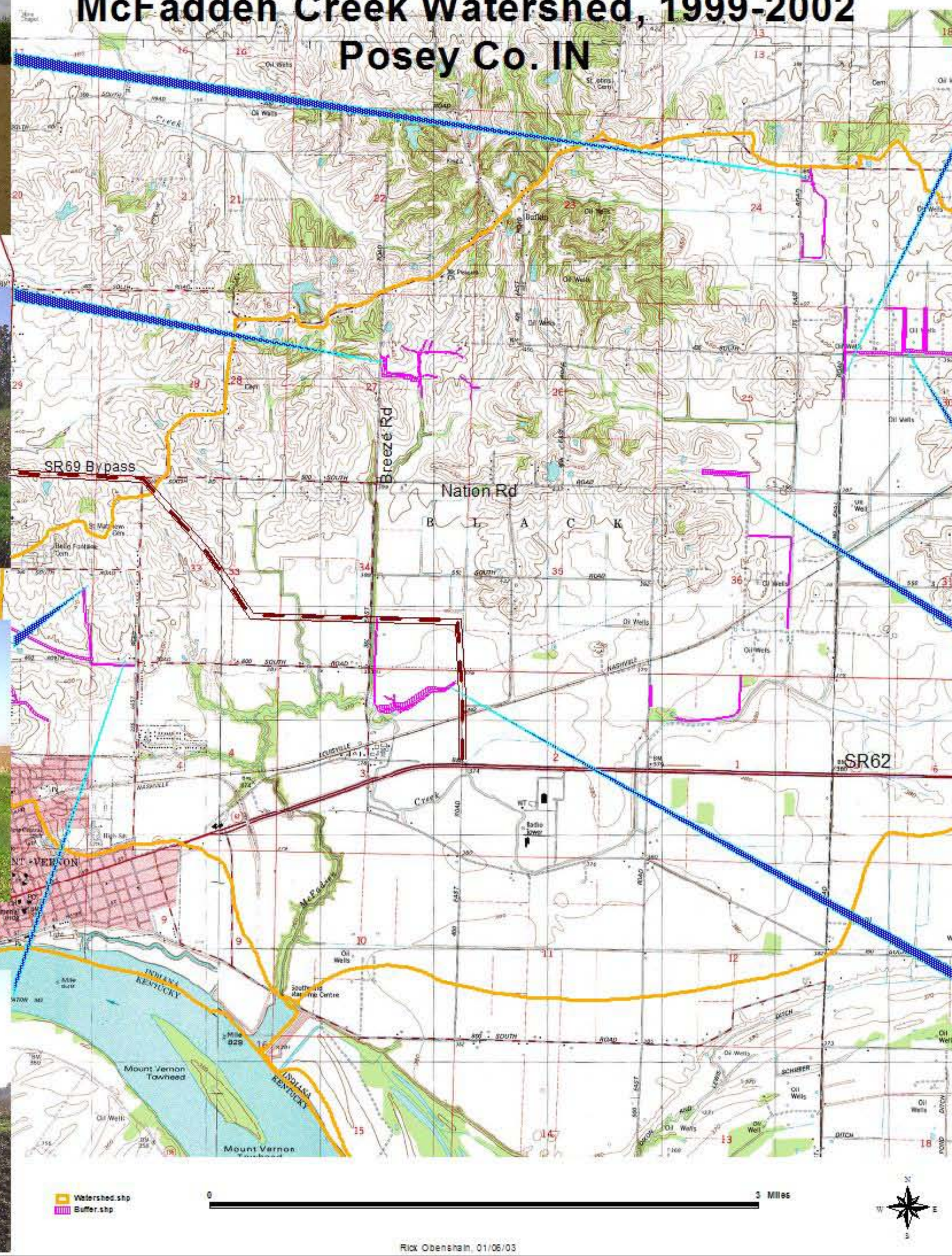
# Conservation Practices Installed in Pigeon Creek Watershed, 1999-2002 Gibson Co., IN



# Conservation Practices Installed in McFadden Creek Watershed, 1999-2002 Posey Co. IN

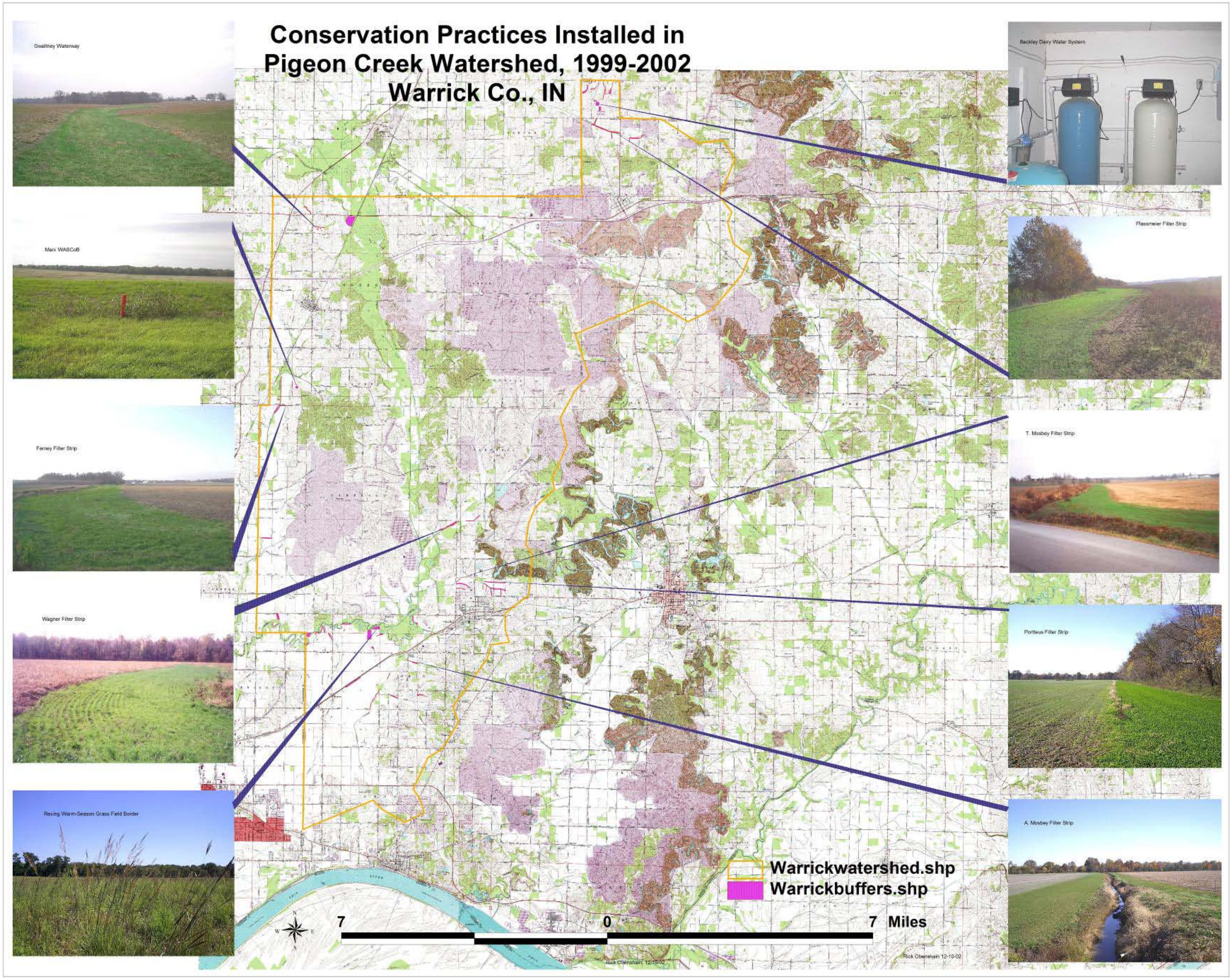






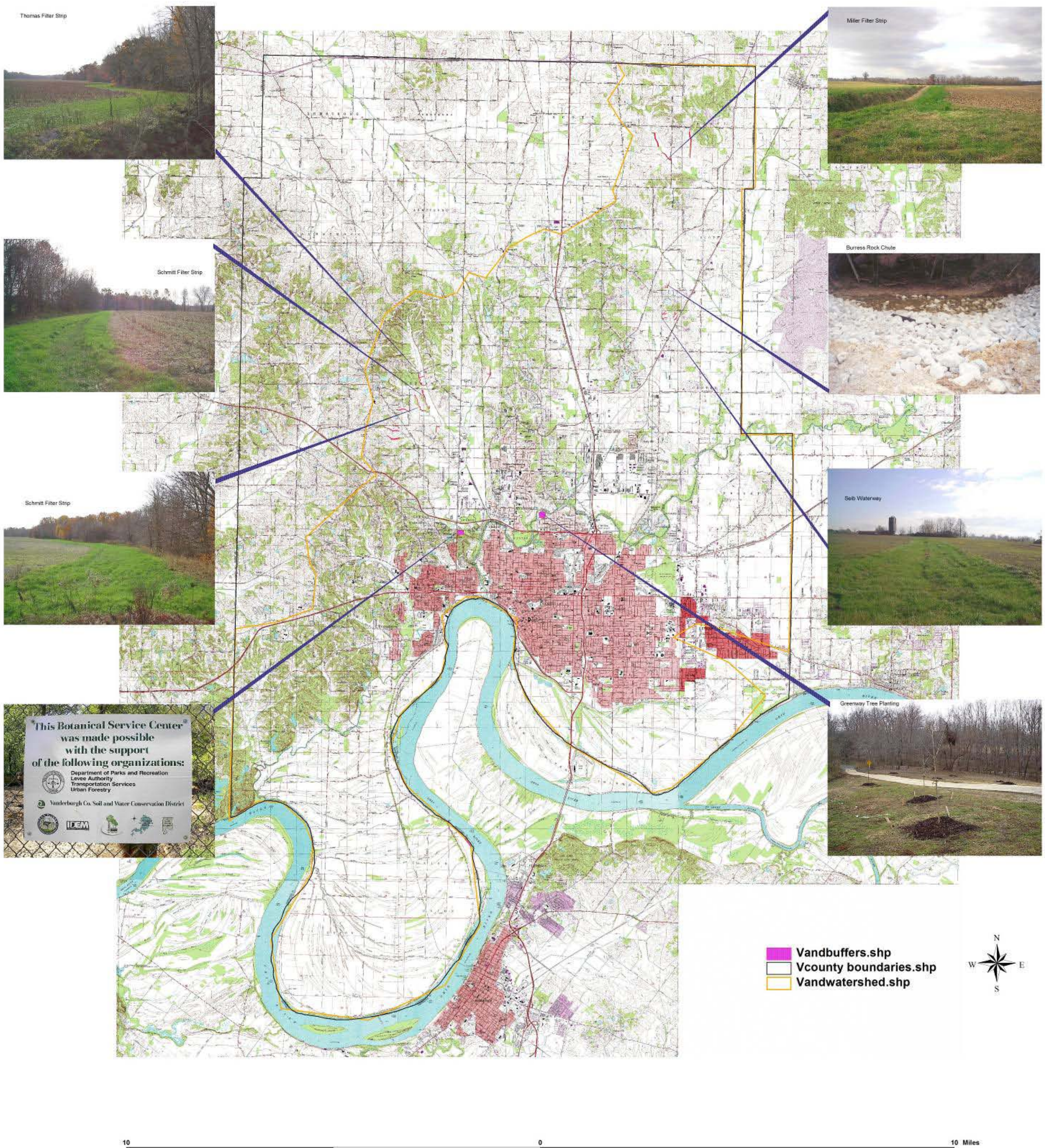






Conservation Practices Installed in
Pigeon Creek Watershed, 1999-2002
Warrick Co., IN
Gwaltney Waterway
Marx WASCoB
Farney Filter Strip
Wagner Filter Strip
Rexing Warm-Season Grass Field Border
Beckley Dairy Water System
Plassmeier Filter Strip
T. Mosbey Filter Strip
Porteus Filter Strip
A. Mosbey Filter Strip
Warrickwatershed.shp
Warrickbuffers.shp
7
0
7 Miles
Rick Obenshain 12-10-02

# Conservation Practices Installed in Pigeon Creek Watershed, 1999-2002 Vanderburgh Co., IN




Rick Obenshain, 12/13/02