WEST VIRGINIA

Division of Environmental Protection

An Ecological Assessment of the

Cheat River Watershed

OFFICE OF WATER RESOURCES

MISSION STATEMENT

To enhance and preserve the physical, chemical and biological integrity of surface and ground waters, considering nature and health, safety, recreational and economic needs of humanity.

WV OWR

VISION STATEMENT

The Office of Water Resources provides leadership on all water issues through effective programs that improve water quality and public safety statewide.

An Ecological Assessment of the Cheat River Watershed 1996

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prepared by:

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AN ECOLOGICAL ASSESSMENT OF THE CHEAT RIVER WATERSHED

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SUMMARY

The West Virginia Division of Environmental Protection – Watershed Assessment Program (the Program) visited 276 sites in the Cheat River Watershed between June 10 and August 8, 1996. Assessments included the collection of benthic macroinvertebrates, fecal coliform bacteria, physico-chemical samples and physical habitat data including instream and riparian zone measures as well as observations of activities and disturbances in the surrounding area. The primary goal of these assessments was to determine the health of selected stream sites in the Cheat River watershed.

Generally, assessment sites in Ecoregion 67 displayed good benthic macroinvertebrate diversity with several pollution sensitive taxa being well represented. Eight of the 10 most frequently occurring taxa were mayflies, stoneflies and caddisflies. The most frequently encountered taxon was the midge family Chironomidae. This family was collected at 203 sites, followed by the stonefly group Capniidae/Leuctridae (190 sites) and the mayfly family Heptageniidae (176 sites).

The health of the benthic community at 209 assessment sites was determined by calculating a bioscore. Bioscores were derived by comparing the benthic sample at reference sites or least disturbed sites with the samples from all other sites. For the purposes of this report, an assessment site with a bioscore less than 50 was considered biologically impaired. Of the total number of biologically assessed sites, 26 (12.4%) received a bioscore less than 50. Among ecoregions, there was a distinct difference in the number of biologically impaired sites. There were only two (1.7 %) assessment sites with bioscores less than 50 in Ecoregion 67. A large portion of the watershed in Ecoregion 67 was undeveloped rural land within the Monongahela National Forest. The overall good water quality

observed in this portion of the watershed is due to the lack of human related disturbances.

In comparison, 24 (25.8 %) biologically assessed sites in Ecoregions 69/70 received bioscores less than 50. An additional 41 sites impaired by mine drainage, where single-kick precursory samples were collected, had no benthic macroinvertebrate life found. If the additional 41 sites are included in the number of biologically impaired sites for Ecoregions 69/70, the percentage would increase to 48.5%. The majority of the assessment sites in Ecoregions 69/70 were located in the northern portion of the Cheat watershed. This region has been extensively mined, which has resulted in severe water quality degradation of many streams.

Concentrations of fecal coliform bacteria ranged from zero colonies/100 ml at eight sites to 60,000 colonies/100 ml at two sites. Considering all assessment sites in the watershed, 29.0% had fecal coliform concentrations exceeding 400 colonies/100 ml. There was a distinct difference between ecoregions in the percentage of sites exceeding 400 colonies/100 ml. Only 14.6% of the assessment sites in Ecoregion 67 exceeded the standard. In contrast, the percentage of sites exceeding the standard in Ecoregions 69/70 was 45.7.

Cherry Run near its headwaters was the only site that violated the state water quality standard (5.0 mg/l) for dissolved oxygen with a value of 3.3 mg/l. A total of 62 (27.1%) sites had values violating the minimum standard for pH (< 6.0 Standard Units). All 62 sites were within Ecoregion 69 (44.9% of the sites in this watershed). The program sampled 61 (26.6%) sites with aluminum concentrations exceeding the standard (acute) of 0.750 mg/l. Aluminum concentrations ranged from 0.23 mg/l at the headwaters of Cherry Run, to 140.0 mg/l at the mouth of Fickey Run. The Program sampled 47 (20.5%) sites with iron concentrations exceeding the standard of 1.5 mg/l. Iron concentrations ranged from 0.20 mg/l at the mouth of Big Sandy Creek, to 680.0 mg/l at the mouth of Fickey Run. All of the iron violations were from sites sampled in Ecoregions 69/70 (34.1%). The program sampled 50 (21.8%) sites that exceeded the standard for manganese (1.0 mg/l). All of the manganese violations were from sites sampled in Ecoregions 69/70.

The most frequently encountered human related disturbances were roads, which were observed at 80.6% of the assessment sites in the watershed. Bridges and culverts were also commonly encountered (50.4% of sites). Other frequently encountered disturbances were residences, lawns, bank stabilization and channelization. The only major difference in disturbances between ecoregions was the presence of coal mining related activities. There were no surface mines, deep mines, or prep plants observed at the assessment sites in Ecoregion 67. In contrast, surface mines were observed at 30.4% of the assessment sites in Ecoregions 69/70. These disturbances and their resultant pollutants were major causes of biological impairment at several assessment sites in Ecoregions 69/70.

Sand and silt were the most frequently encountered sediment deposits in the watershed. Metal hydroxide deposits were more prevalent in Ecoregions 69/70 (16.8% of sites) than in Ecoregion 67 (0.0%). Once again, this is a reflection of the extensive mining activities in the northern portion of the watershed.

Assessment teams evaluated the canopy, understory and ground cover in the area extending the length of a 100 meter stream reach and 18 meters out from each stream bank. In general, small trees and woody shrubs provided the most cover at a majority of the sites.

An important element of each stream assessment was the completion of a two-page Rapid Habitat Assessment, which provided a numerical score (maximum 240 points) of the habitat conditions most likely to affect aquatic life. The lowest individual score for a site was at Smoky Hollow with a score of 44. A site on Otter Creek received the highest score of 225. In general, the watershed as a whole exhibited relatively good habitat with an average total score of 170.6 for non-reference sites. This score is high enough to be in the upper sub-optimal category, which is defined as less than desirable but satisfies expectations in most areas.

Although a sub-optimal rating is basically good, a comparison to the average total score of the reference sites (205.3 = optimal category) indicates a possibility for improvement. The habitat parameters that exhibited the most degradation were riparian vegetation zone width, grazing or other disruptive pressure, sediment deposition and embeddedness.

The top priority actions suggested by the DEP as a result of the assessment of these streams are:

- Continue to preserve the high quality waters present in the Cheat River watershed.
- Continue restoration efforts on streams impaired by acid mine drainage.
- Continue support of the Friends of the Cheat watershed association and similar groups.
- Develop an action plan for the prevention of erosion that includes protecting the natural vegetation along stream corridors and revegetating stream corridors.
- Conduct an intensive study to determine the source(s) of extremely high concentrations of fecal coliform bacteria in some streams in the watershed.
- Conduct a study to validate acid deposition as a pollutant source in

vulnerable areas of the watershed.

BEECH RUN
Photo by Becky Hilton, Friends of the Cheat

ACKNOWLEDGMENTS

Funding for this watershed assessment was provided by the U. S. Environmental Protection Agency's 319 and 104(b)(3) programs and by the West Virginia Division of Environmental Protection.

Mike Arcuri, Jeffrey Bailey, George Constantz, Alvan Gale, Mike Nowlin, Mike Puckett, Charles Surbaugh, Janice Smithson, Mike Whitman, Douglas Wood and several individuals from the Office of Abandoned Mine Lands and Reclamation collected the samples and assessed the sites.

Marshall University Students, Eric Wilhelm and Andrea Henry, under the supervision of Dr. Donald Tarter and Jeffrey Bailey, processed the benthos samples. Jeffrey Bailey, Janice Smithson, Douglas Wood and Alvan Gale identified the benthic macroinvertebrates. Jeffrey Bailey and John Wirts created the tables and figures. Jeffrey Bailey summarized the data and co-authored this report with James Hudson. Patrick Campbell and Michael Arcuri provided help in reviewing the various drafts of this report and bringing it to completion. James Hudson designed the layout and provided finishing touches to the report.

WATERSHEDS AND THEIR ASSESSMENT

In 1959, the West Virginia Legislature created the State Water Commission, predecessor of the Office of Water Resources (OWR). The OWR has since been charged with balancing the human needs of economic development and water consumption with the restoration and maintenance of water quality in the state.

At the federal level, the U.S. Congress enacted the Clean Water Act of 1972 (the Act) plus its amendments to restore the quality of our nation's waters. The Act's National Pollutant Discharge Elimination System (NPDES) has resulted in reductions of pollutants piped to surface waters. There is broad consensus that, because NPDES permits have reduced the amount of contaminants in point sources, the water quality of our nation's streams has improved significantly.

Under the Act, each state had the option of managing NPDES permits within its borders or leaving the federal government in that role. West Virginia assumed primacy over NPDES permits in 1982. At that time the state's Water Resources Board (now the Environmental Quality Board (EQB) began developing water quality criteria (see box) for each type of use

Water Quality Criteria - The levels of water quality parameters or stream conditions that are required to be maintained by the Code of State Regulations, Title 46, Series 1 (Requirements Governing Water Quality Standards).

Designated Uses - For each water body, those uses specified in the water quality standards, whether or not those uses are being attained. Unless otherwise designated by the rules, all waters of the state are designated for:

- **the propagation and maintenance of fish and other aquatic life and**
- **water contact recreation.**

Other types of designated uses include:

- **public water supply,**
- **agriculture and wildlife uses and**
- **industrial uses.**

designated for the state's waters.

In addition the West Virginia Division of Environmental Protection's (DEP) water protection activities are guided by the EQB's anti-degradation policy, which charges the OWR with maintaining surface waters at sufficient quality to support existing uses, whether or not the uses are specifically designated by the EQB.

Even with significant progress, by the early 1990s many streams still did not support their designated uses. Consequently, environmental managers began examining pollutants flushing off the landscape from a broad array of hard-to-control sources. Recognizing the negative impacts of these nonpoint sources (NPS) of pollution, which do not originate at clearly identifiable pipes or other outlets, was a conceptual step that served as a catalyst for today's holistic watershed approach to improving water quality.

Several DEP units, including the Watershed Assessment Program (the Program) are currently implementing a variety of watershed projects. Located within the OWR, the Program's scientists are charged with evaluating the health of selected streams in West Virginia's watersheds. The Program is guided, in part, by the Interagency Watershed Management Steering Committee (see box).

<u>The Interagency Watershed Management Steering Committee</u> consists of representatives from each agency that participates in the Watershed Management Framework. Its function is to coordinate the operations of the existing water quality programs and activities within West Virginia to better achieve shared water resource management goals and objectives.

The Watershed Basin Coordinator serves as the day to day contact for the committee. The responsibilities of this position are to organize and facilitate the Steering Committee meetings, maintain the watershed management schedule, assist with public outreach and to be the primary contact for watershed management related issues.

The Program uses the U.S. Geological Survey's (USGS) scheme of hydrologic units to divide the state into 32 watersheds (Figure 2). Some of these watershed units are entire stream basins bounded by natural hydrologic divides (e.g., Upper Guyandotte River watershed). Two other types of watershed units were devised for manageability: (1) clusters of small tributaries that drain directly into a larger mainstem stream (e.g., Potomac River direct drains watershed) and (2) the West Virginia parts of interstate basins (e.g., Tug Fork watershed). A goal of the Program is to assess each watershed unit every five years, an interval coinciding with the reissuance of National Pollutant Discharge Elimination System (NPDES) permits.

GENERAL WATERSHED ASSESSMENT STRATEGY

A watershed can be envisioned as an aquatic tree, a system of upwardly branching, successively smaller streams. An ideal watershed assessment would document changes in the quantity and quality of water flowing down every stream, at all water levels, in all seasons, from headwater reaches to the exit point of the watershed. Land uses throughout the watershed would also be quantified. Obviously this approach would require more time and resources than are available to any agency.

The Program, therefore, assesses the health of a watershed by evaluating the health of as many of its streams as possible, as close to their mouths as possible. The general sampling strategy can be broken into several steps:

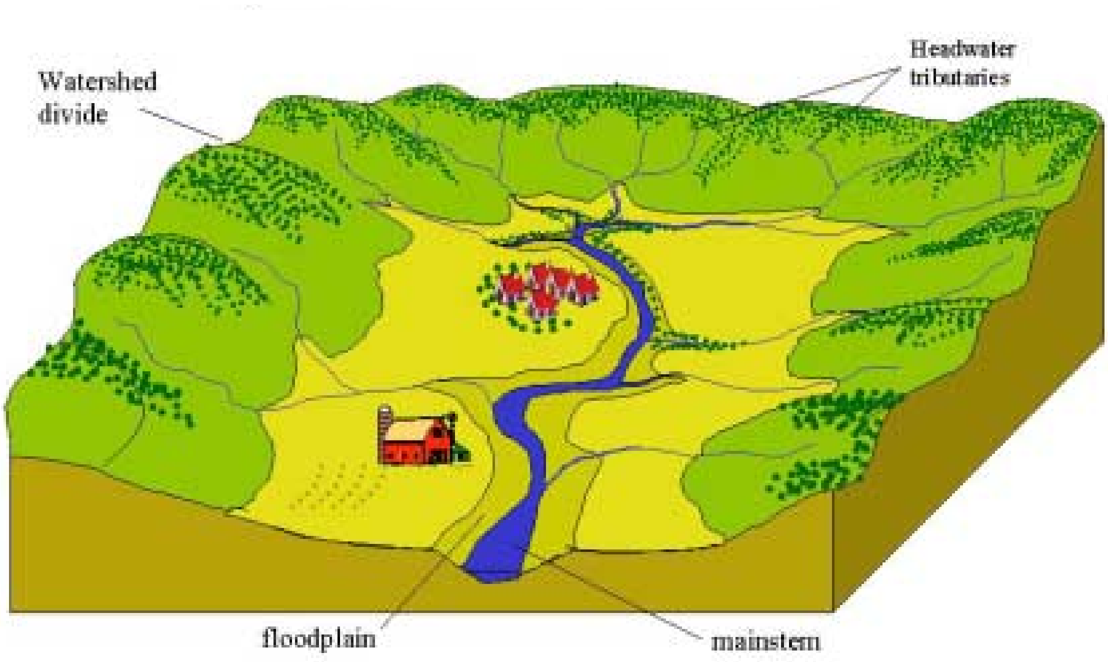
- The names of streams within the watershed are retrieved from the U. S. Environmental Protection Agency's (EPA) water body system database.

- A list of streams is developed that includes several sub-lists. These sub-lists may include:
    1. Severely impaired streams,
    2. Slightly or moderately impaired streams,
    3. Unimpaired streams,
    4. Previously unassessed streams and
    5. Streams of particular concern to stakeholders and permit writers.

- Assessment teams visit as many streams listed as possible and sample as close to the mouths of the streams as allowed by road access and sample site suitability. Longer streams may also be sampled at additional sites further upstream. In general, if a stream is 15 to 30 miles (25 to 50 km) long, two sites are sampled. If a stream is 30 to 50 miles (50 to 89 km) long, three sites are sampled. If a stream is 50 to 100 miles (80 to 160 km) long, four sites are sampled. If a stream is longer than 100 miles (160 km), five sites are sampled. If inaccessible or unsuitable sites are dropped from the list, they are replaced with previously determined alternate sites.

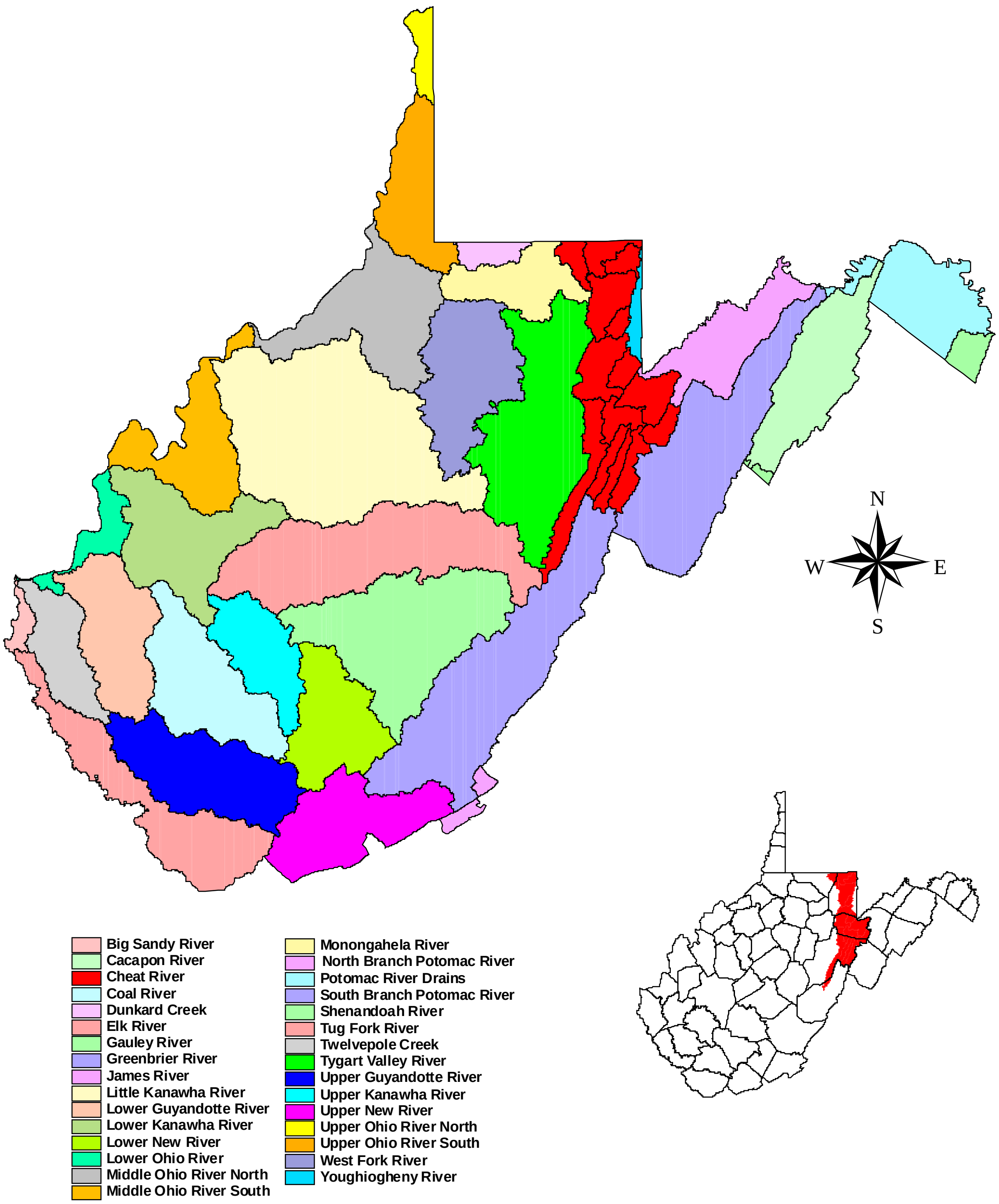
The Program has scheduled the study of each watershed for a specific year of a five-year cycle. Advantages of this pre-set timetable include: a) synchronizing study dates with permit cycles, b) facilitating the addition of stakeholders to the information gathering process, c) ensuring assessment of all watersheds, d) improving the OWR's ability to plan and e) buffering the assessment process against domination by special interests.

Figure 1: A Generalized Watershed



WATERSHED – In several dictionaries, the first definition of watershed is the divide between adjoining drainage areas. In this report, though, watershed is defined as the land surface that drains water to a specific point.

Figure 2: West Virginia's Watersheds



In broad terms, OWR evaluates the streams and the Interagency Watershed Management Steering Committee sets priorities for more detailed study or restoration in each watershed in five phases:

Phase 1 - For an initial cursory view, assessment teams measure or estimate about 50 indicator parameters in as many of each watershed's streams as possible.

Phase 2 - Combining pre-existing information, new Phase 1 data and stakeholders' reports, the Program produces a list of streams of concern.

Phase 3 - From the list of streams of concern, the Interagency Watershed Management Steering Committee develops a smaller list of priority streams for more detailed study.

Phase 4 - Depending on the situation, Program teams or outside teams (e.g., USGS or consultants) intensively study the priority streams.

Phase 5 - The Office of Water Resources issues recommendations for improvement; develops total maximum daily loads (see box on following page), if applicable; and, makes data available to any interested party such as local watershed associations, educators, consultants and citizen monitoring teams.

Only one stream in the Cheat River Watershed, the Upper Blackwater River, has had a TMDL developed as of May 1999. This TMDL was for dissolved oxygen.

This document, which reports Phase 1 findings, has been prepared for a wide variety of users, including elected officials, environmental consultants, educators and natural resources managers.

Total Maximum Daily Load and the 303(d) List - The term total maximum daily load (TMDL) originates in the federal Clean Water Act, which requires that degraded streams be restored to their designated uses.

Every two years, a list of water quality limited streams [called the 303(d) list after the Clean Water Act section number wherein the list is described] is prepared. Prior to adding a stream to the list, technology-based pollution controls must have been implemented or the conclusion must have been reached that even after implementing such controls the stream would not support its designated uses. West Virginia's 303(d) lists include streams affected by a number of stressors including mine drainage, acid rain, metals and siltation.

Mathematically, a TMDL is the sum of the allocations of a particular pollutant (from point and nonpoint sources) into a particular stream, plus a margin of safety. Restoration of a 303(d) stream begins by calculating a TMDL, which involves several steps:

- **define when a water quality problem is occurring, the critical condition, (e.g., at base flow, during the hottest part of the day or throughout the winter ski season),**
- **calculate how much of a particular contaminant must be reduced in a stream in order to meet the appropriate water quality criterion,**
- **calculate the total maximum daily load from flow values during the problem period and the concentration allowed by the criterion,**
- **divide the total load allocation between point and nonpoint sources (e.g., 70% point and 30% nonpoint) and**
- **recommend pollution reduction controls to meet designated uses (e.g., install best management practices, reduce permit limits or prohibit discharges during problem periods). A TMDL cannot be approved, unless the proposed controls are reasonable and implementable.**

The Program was designed in part to determine whether a stream belongs on the 303(d) list. In some cases, this determination can be made readily, for example, if a stream is degraded by acid mine drainage (AMD). However, the determination is more difficult to make for most streams because of a lack of data or data that are conflicting, of questionable quality or too old. Any stream which would not support its designated uses, even after technology based controls were applied, is a candidate for listing.

The Program's Phase 1 screening process provides information for making decisions on listing. A broader interagency process, the West Virginia Watershed Management approach, enables diverse stakeholders to collectively decide which streams should be studied more intensively.

THE CHEAT RIVER WATERSHED

The Cheat River (HUC # 05020004) and many of its larger tributaries generally flow from south to north through the highest mountains of West Virginia. The Cheat River is formed by the confluence of the Black Fork and Shavers Fork at Parsons West Virginia. Although most of the Cheat River is within West Virginia, Big Sandy Creek, a major tributary of the Cheat, drains parts of Pennsylvania. In addition, the Cheat River does not join the Monongahela River until it enters Pennsylvania near the Cheat Lake Dam northeast of Morgantown, West Virginia.

While the Cheat River watershed is roughly 153 kilometers (95 miles) from north to south, the Cheat River flows about 253 kilometers (157 miles) from its headwaters on the Shavers Fork to its mouth. The West Virginia portion of the Cheat River watershed consists of approximately 3,678 square kilometers (1,420 square miles) in Pocahontas, Randolph, Tucker, Preston and Monongalia counties.

Hydrologic Unit Code (HUC)- The U.S. Geological Survey has developed Hydrographic Unit Codes used to identify watersheds throughout the United States. The codes have replaced the older "map code" system of identifying watersheds.

HUC numbers have eight digits. The first two indicate the watershed's region. West Virginia watersheds are located in one of two regions: region 02 designates watersheds that drain to the Atlantic Ocean. Region 05 designates streams that flow to the Gulf of Mexico via the Ohio River.

The next two digits indicate the subregion. All streams that flow into the Ohio River at its beginnings in Pittsburgh are in sub-region 02. Those watersheds that flow into the Ohio between Pittsburgh and the mouth of the Kanawha at Point Pleasant are in sub-region 03. The Kanawha River watershed is sub-region 05. The Mud River and Big Sandy/Tug Fork watersheds are in sub-region 07. TwelvepPole Creek and the scattering of streams between Point Pleasant and the mouth of Mud River are in sub-region 09.

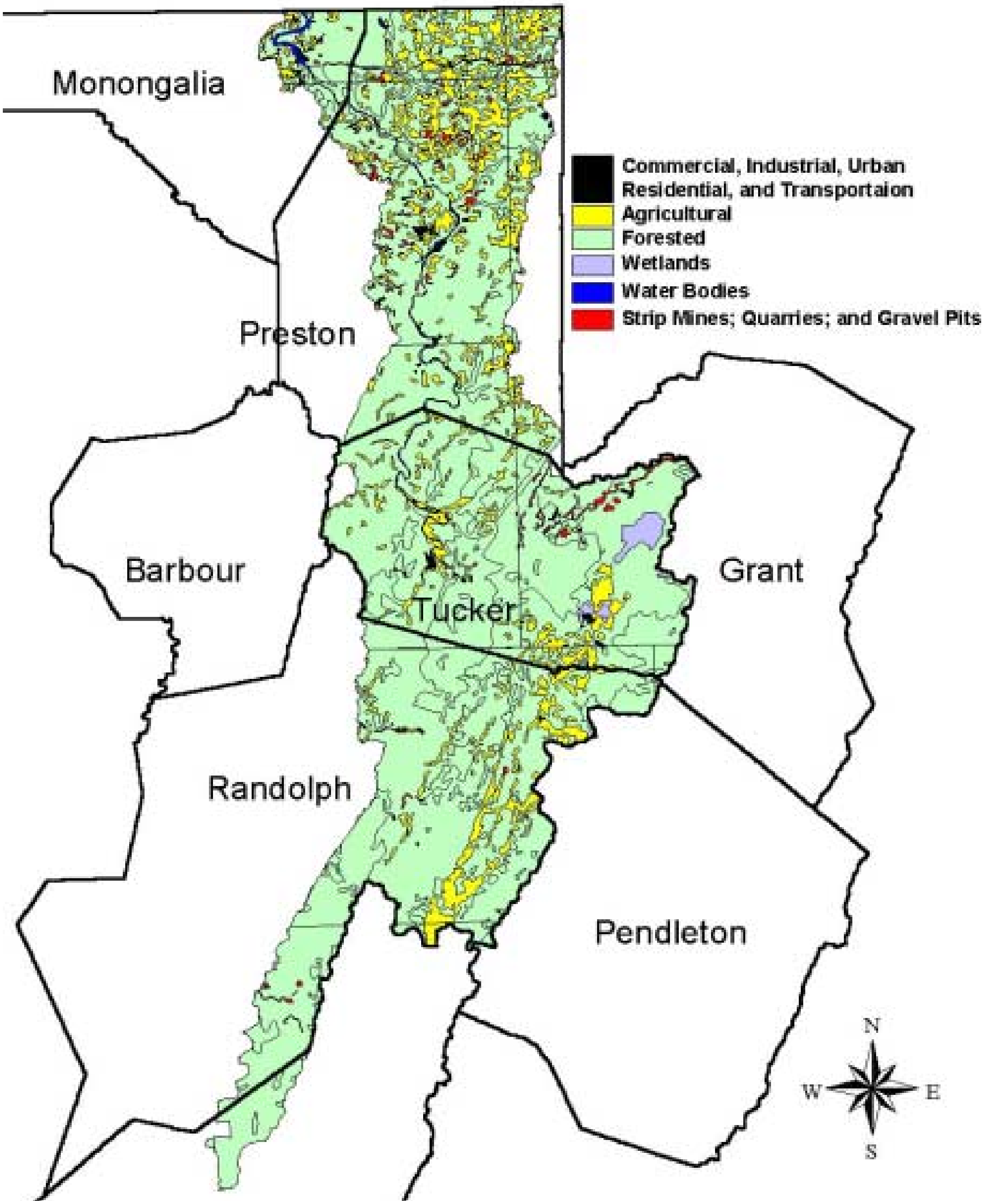
For the Mid-Atlantic Region the Potomac River drainage is sub-region 07. The James River watershed (in Pendleton and Monroe Counties) is sub-region 08. The remaining four digits indicate the accounting and catalog units for the individual watersheds.

The elevation in the Cheat watershed ranges from a high of 1,425 meters (4,670 feet) atop Bald Knob near the old logging town of Spruce in Randolph County, to a low of 248 meters (812 feet) as it crosses the state line below the dam forming Cheat Lake. In general, the streams in the higher elevations of the Cheat watershed have the greatest gradient. The main stem drops an average of 11 feet per mile, Shavers Fork, drops an average of 24 feet per mile while the Blackwater River drops an astonishing 50 feet per mile on average. The short section through the Blackwater gorge drops 136 feet per mile. These extremes make it difficult to describe the area in generalities.

Summer days in the Cheat River watershed are usually warm, but the nights can be cool. Morgantown, near the lower portion of the watershed has recorded a 101° Fahrenheit temperature and a low of minus 20°. Winters can be very cold, especially on the higher ridges and mountaintops. Freezing temperatures often occur as early as September 20 and as late as May 20. There have been freezing temperatures recorded during every month in the higher mountains and in the Canaan Valley area.

The relatively higher peaks in the Ridge and Valley and Central Appalachian ecoregions, as compared to the Western Allegheny ecoregion to the west, cause greater amounts of precipitation. Precipitation occurs on an average of 152 days each year in this watershed. The year of this study, 1996, set the record as the wettest year for West Virginia in more than a century of keeping records. Elkins, just west of the middle Cheat River watershed, recorded more than 70 inches of precipitation in 1996. The higher mountains, which cradle Shavers Fork of the Cheat, probably received even more precipitation.

Figure 3: Landuse Categories in the Cheat River Watershed



AN ECOLOGICAL ASSESSMENT OF THE CHEAT RIVER WATERSHED

Most of the Cheat River watershed consists of forested rural land. South of Preston County, the Cheat River is adjacent to, or within, the Monongahela National Forest. The watershed includes all or parts of four federally designated wilderness areas: Dolly Sods Wilderness Area, Otter Creek Wilderness Area, Laurel Fork North Wilderness Area and Laurel Fork South Wilderness Area.

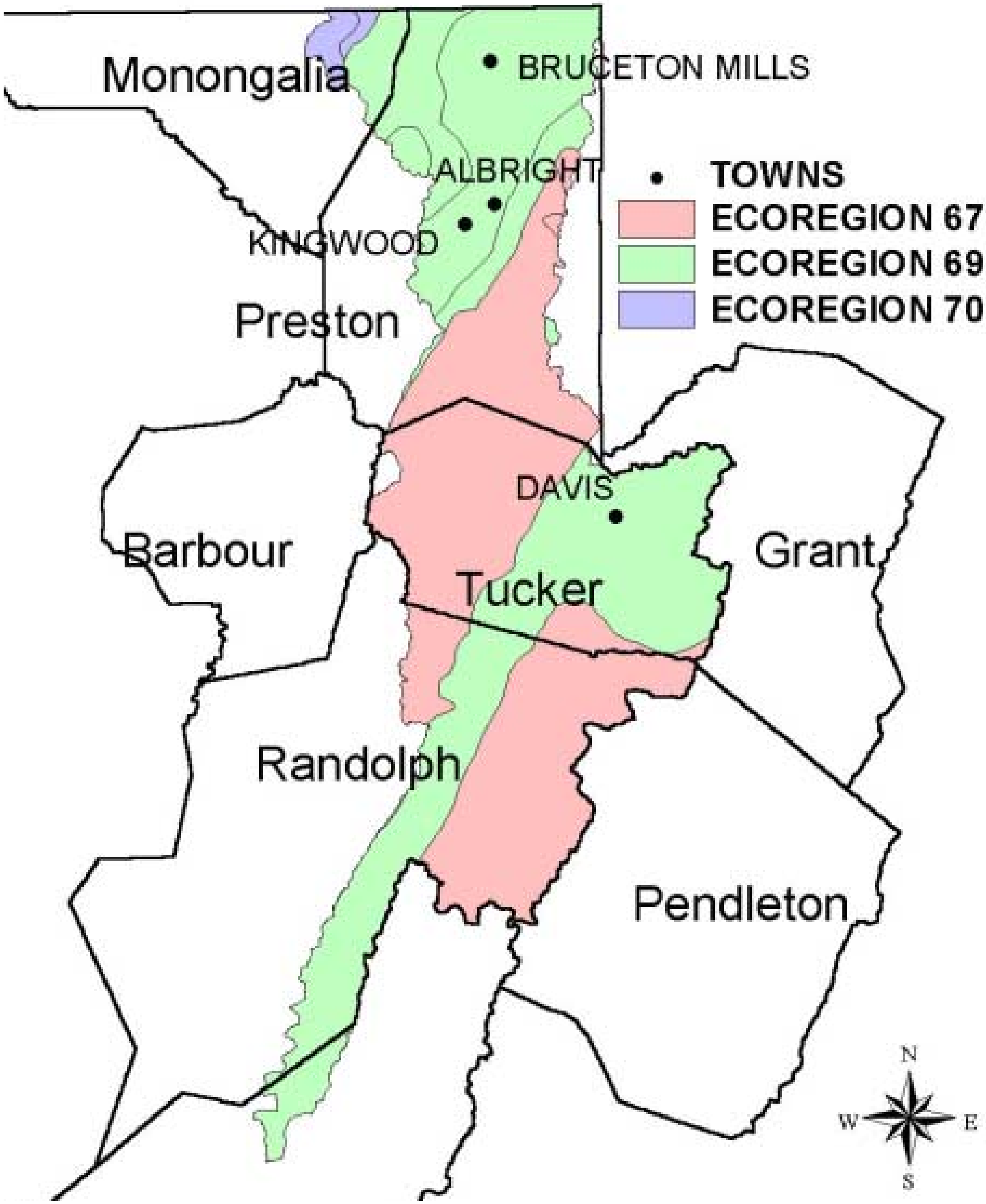
The largest human population centers in the Cheat watershed are Kingwood (population 3,243) and Parsons (population 1,453). Interstate 68 (formerly Route 48) crosses Cheat Lake at the unincorporated community called Cheat Lake in Monongalia County. The interstate has increased development in this area tremendously. It has become a suburb of Morgantown with a concentration of recreational activities, resorts and housing developments.

The Cheat River watershed includes parts of three ecoregions (Figure 4): the Ridge & Valleys (67), the Central Appalachians (69) and a small portion of the Western Allegheny (70) ecoregion near Cheat Lake (Omernik, 1997).

The changing character of the river as it flows from south to north is most evident in reviewing the 1998 list of Water Quality Impaired Streams (303(d) streams. Of the 53 streams in the Cheat watershed listed on the 303(d) list of waterbodies impaired by mine drainage, 45 are downstream of Pringle Run in Preston County [only 60 kilometers (37 miles) above the rivers mouth]. The remaining 8 streams are tributaries of the Blackwater River of the Black Fork. Consequently, the Cheat River's lower 37 miles experience an increasing degradation in water quality from upstream to downstream. This statistic, more than any other, illustrates how the water quality in the northern half of the Cheat River watershed has been more severely impacted by mine drainage than that in the southern half of the watershed. This continual discharge of mine drainage from abandoned surface and deep mines is believed to be the largest water quality problem within the watershed.

CHEAT RIVER
Photo by Lindsay Abraham, WV DEP

Figure 4: Ecoregions in the Cheat River Watershed



Land use in the southern half of the watershed is a mixture of agriculture, coal mining, forestry and recreational activities. As a whole the southern half of the watershed is considered very healthy, although some tributaries are affected by sediment, fecal coliform bacteria, mine drainage and acid precipitation.

The entire Cheat River watershed has been timbered at least once since the War Between the States. Popular thinking is that West Virginia's forests were clear cut by the turn of the century. Rick Landenburg, graduate assistant, WVU School of Forestry, however, has discovered extensive tracts of old-growth trees scattered throughout the mid- and upper elevations of eastern West Virginia, especially in Randolph, Tucker and Pocahontas counties.

Two major power plants are located along the river. A coal-fired steam generating plant is located at Albright in Preston County. It uses 6.4 million gallons of water per day for cooling and raises the temperature of the water an average of 17° Fahrenheit. The other plant is a hydroelectric unit located at Lake Lynn in Pennsylvania. The reservoir for this plant, Cheat Lake, is approximately 21 kilometers (13 miles) long and has a surface area of 700 hectares (1,730 acres).

WATERSHED ASSESSMENT METHODS

In May 1989, the U.S. EPA published a document entitled *Rapid Bioassessment Protocols for Use in Streams and Rivers - Benthic Macroinvertebrates and Fish* (Plafkin et al. 1989). The primary purpose of this document was to provide water quality monitoring programs such as DEP's Watershed Assessment Program (the Program) with a practical technical reference for conducting cost-effective biological assessments of flowing waters. In the beginning, the Rapid Bioassessment Protocols (RBP) were considered to be an inexpensive screening tool for determining if a stream was supporting or not supporting a designated aquatic life use. However, the current consensus is that the RBPs can also be applied to other program areas, such as:

- Characterizing the existence and severity of use impairment
- Helping to identify sources and causes of impairments in watershed studies
- Evaluating the effectiveness of control actions
- Supporting use attainability studies
- Characterizing regional biological components.

The diversity of applications provided by the RBP's was the primary reason the program adopted it for use in assessing watersheds in West Virginia. Specifically, the program used a slightly modified version of the Rapid Bioassessment Protocol II (RBP II). RBP II involves the collection of field data on ambient biological, chemical and physical conditions.

The following sections summarize the procedures used in assessing the streams in the Cheat River watershed. A more detailed description of the

Programs' assessment procedures can be found in the Watershed Assessment Program's *Standard Operating Procedures* (Anonymous, undated working document). This document is available to interested persons.

Biological Monitoring -- Benthic Macroinvertebrates

Benthic macroinvertebrates are small animals living on the bottom of streams, rivers and lakes. Insects comprise the largest diversity of these animals and include mayflies, stoneflies, caddisflies, beetles, midges, crane flies, dragonflies and others. A benthic community can also have snails, mussels, aquatic worms and crayfish. These animals are extremely important in the food web of aquatic environments. They are important players in the processing and cycling of nutrients and are major food sources for fish and other aquatic animals. In general, a clean stream has a diverse array of benthic organisms that occupy a variety of ecological niches. Polluted streams generally are low in diversity and often are devoid of pollution sensitive species.

The use of benthic macroinvertebrate data for biological monitoring of streams has persisted over several decades as an integral tool for conducting ecological assessments. There are many federal, state and private agencies and organizations currently using this group of animals as part of their biological monitoring programs. The advantages are myriad. The most recognized benefit is that benthic macroinvertebrate communities reflect overall ecological integrity (i.e., chemical, physical and biological integrity). They provide a holistic measure of environmental condition by integrating responses to stresses over time and the public better understands them (as opposed to chemical conditions) as measures of environmental health (Plafkin et al. 1989).

The West Virginia Save Our Streams Program (WVSOS) is an excellent example of how benthic macroinvertebrates can be used to monitor the biological health of streams. This program was established by the Izaak Walton of America and adapted by the West Virginia Division of Environmental Protection. It utilizes benthic sampling of local streams as a tool for biological monitoring and instructing the public on collection methods and data interpretation. Figure 5 was adopted from the WVSOS program and provides illustrations of the organisms commonly collected during benthic macroinvertebrate sampling.

Benthic macroinvertebrates can be collected using several techniques. The program utilized EPA's RBP II with some modifications involving the type of sampling device used to make the collections. The two-man kick net procedure of the original RBP was replaced with a kick net modified for use by one person. In streams having adequate riffle/run habitat, the program employed a modified kick net (Surber-on-a-stick) to capture organisms dislodged by kicking the stream bottom substrate and rubbing large rocks and sticks. In small riffle/run streams that would not accommodate the Surber-on-a-stick, a smaller net called a D-frame was used to collect dislodged organisms. Riffle/run streams with low flow that did not have enough water to sample with either net were sampled using a procedure called hand picking. This procedure involved picking and washing stream substrate materials into a bucket of water. Field crews attempted to sample 2 square meters of stream substrate (equal to 8 kicks with a Surber-on-a-stick) regardless of the device or technique employed.

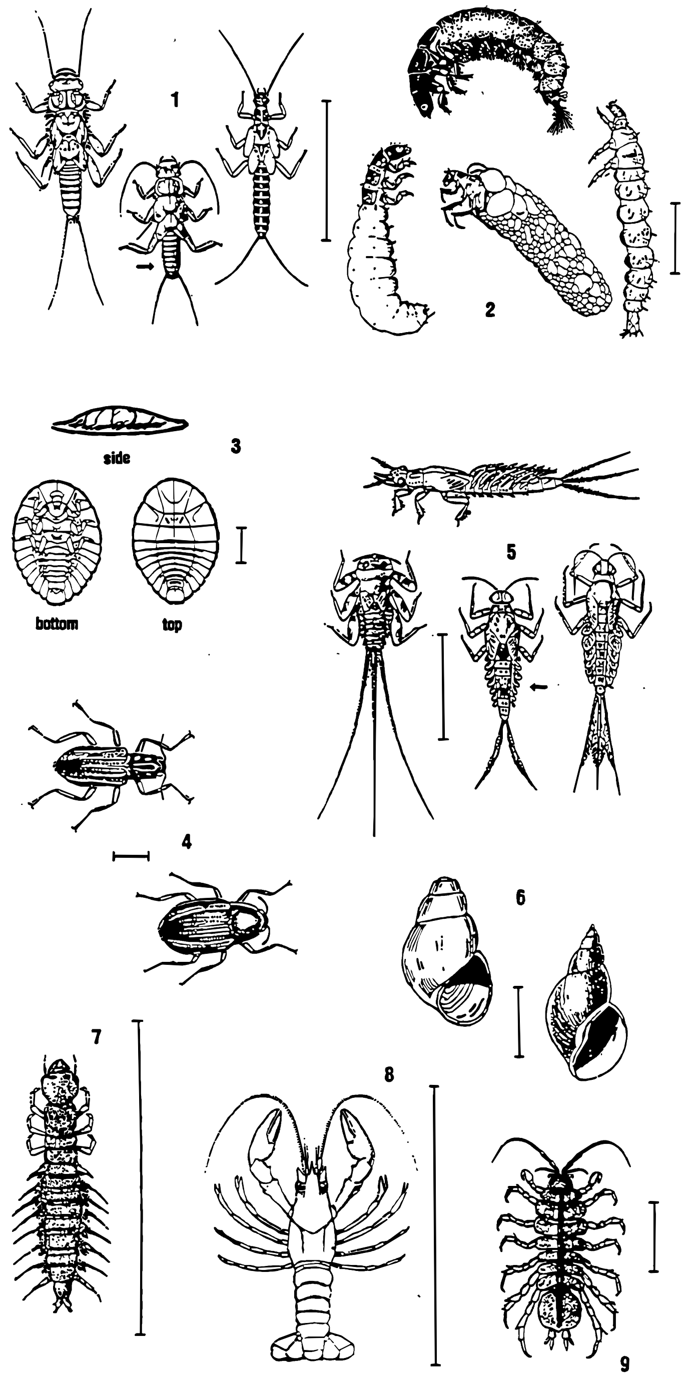
The D-frame net was also used to collect macroinvertebrates in slow flowing (glide/pool dominated) streams that did not have riffle/run habitat. Sampling of macroinvertebrates in glide/pool streams was accomplished using a procedure developed for use in sluggish mid-Atlantic coastal streams. The sampling procedure is called the Mid-Atlantic Coastal Streams technique (MACS) and consists of sampling a variety of habitats (aquatic plants, woody debris, undercut streambanks, etc.) through sweeping and jabbing motions of the net (Maxted 1993).

Benthic macroinvertebrate samples were preserved in 10% formalin and delivered to the Department of Biological Sciences at Marshall University for processing. Processing involved removing a 100-organism subsample from the composite sample following RBP II protocols. The subsample of organisms was returned to Program biologists who counted and identified them to family or the lowest level of classification possible. The samples were kept for future reference and for identification to lower taxonomic levels, if necessary.

Appropriate biological collection permits were obtained before sampling from the WV Division of Natural Resources (DNR). Fish specimens inadvertently collected during macroinvertebrate sampling were transferred to Dan Cincotta at the DNR Office in Elkins, West Virginia where they became part of the permanent fish collection. Salamanders inadvertently collected were donated to the Marshall University Biological Museum in care of Dr. Tom Pauley.

The Program's primary goal in collecting macroinvertebrate data was to determine the biological condition of the selected stream assessment sites in the Cheat River watershed. Determining the biological condition of each site involved calculating and summarizing five community metrics using the benthic macroinvertebrate data.

Figure 5: Stream Insects and Crustaceans (SOS Card)



Bar lines indicate relative size

Stream Insects & Crustaceans

GROUP ONE TAXA

Pollution sensitive organisms found in good quality water.

1 *Stonefly: Order Plecoptera.* 1/2" - 1 1/2", 6 legs with hooked tips, antennae, 2 hair-like tails. Smooth (no gills) on lower half of body. (See arrow.)

2 *Caddisfly: Order Trichoptera.* Up to 1", 6 hooked legs on upper third of body, 2 hooks at back end. May be in a stick, rock or leaf case with its head sticking out. May have fluffy gill tufts on lower half.

3 *Water Penny: Order Coleoptera.* 1/4", flat saucer-shaped body with a raised bump on one side and 6 tiny legs on the other side. Immature beetle. Three views.

4 *Riffle Beetle: Order Coleoptera.* 1/4", oval body covered with tiny hairs, 6 legs, antennae. Walks slowly underwater. Does not swim on surface.

5 *Mayfly: Order Ephemeroptera.* 1/4" - 1", brown, moving, plate-like or feathery gills on sides of lower body (see arrow), 6 large hooked legs, antennae, 2 or 3 long, hair-like tails. Tails may be webbed together.

6 *Gilled Snail: Class Gastropoda.* Shell opening covered by thin plate called operculum. Shell usually opens on right.

7 *Dobsonfly (Hellgrammite): Family Corydalidae.* 3/4" - 4", dark-colored, 6 legs, large pinching jaws, eight pairs feelers on lower half of body with paired cotton-like gill tufts along underside, short antennae, 2 tails and two small hooks hooks at back end.

GROUP TWO TAXA

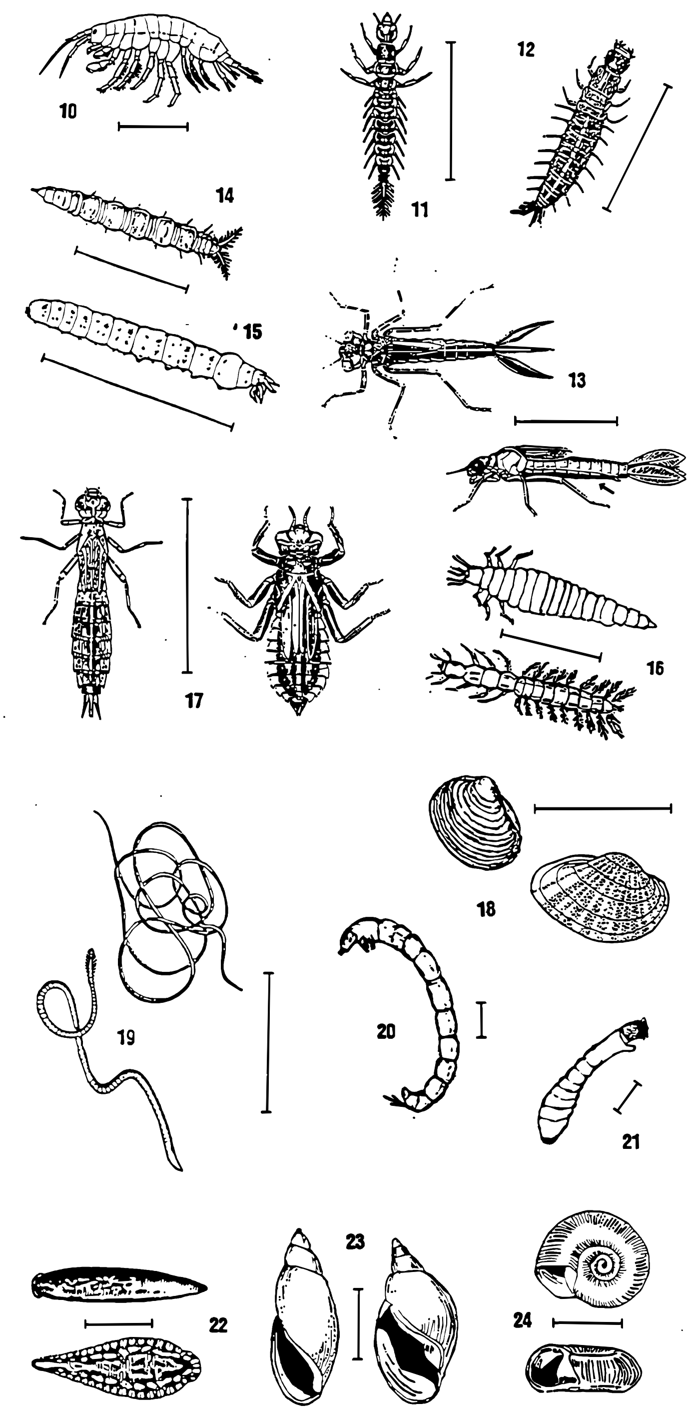
Somewhat pollution tolerant organisms can be in fair quality water.

8 *Crayfish: Order Decapoda.* Up to 6", 2 large claws, 8 legs, resembles small lobster.

9 *Sowbug: Order Isopoda.* 1/4" - 3/4", gray oblong body wider than it is high, more than 6 legs, long antennae.

Save Our Streams

Izaak Walton League of America
1401 Wilson Blvd. Level B
Arlington, VA 22209



Bar lines indicate relative size

GROUP TWO TAXA continued

10 *Scud: Order Amphipoda.* 1/4", white to grey, body higher than it is wide, swims sideways, more than 6 legs, resembles small shrimp.

11 *Alderfly larva: Family Sialidae.* 1" long. Looks like small hellgrammite but has 1 long, thin, branched tail at back end. No gill tufts underneath.

12 *Fishfly larva: Family Corydalidae.* Up to 1 1/2" long. Looks like small hellgrammite but often a lighter reddish-tan color, or with yellowish streaks. No gill tufts underneath.

13 *Damselfly: Suborder Zygoptera.* 1/2" - 1", large eyes, 6 thin hooked legs, 3 broad oar-shaped tails, positioned like a tripod. Smooth (no gills) on sides of lower half of body. (See arrow.)

14 *Watersnipe Fly Larva: Family Athericidae (Atherix).* 1/4" - 1", pale to green, tapered body, many caterpillar-like legs, conical head, feathery "horns" at back end.

15 *Crane Fly: Suborder Nematocera.* 1/3" -2", milky, green, or light brown, plump caterpillar-like segmented body, 4 finger-like lobes at back end.

16 *Beetle Larva: Order Coleoptera.* 1/4" 1", light-colored, 6 legs on upper half of body, feelers, antennae.

17 *Dragon Fly: Suborder Anisoptera.* 1/2" - 2", large eyes, 6 hooked legs. Wide oval to round abdomen.

18 *Clam: Class Bivalvia.*

GROUP THREE TAXA

Pollution tolerant organisms can be in poor quality water.

19 *Aquatic Worm: Class Oligochaeta.* 1/4" - 2", can be very tiny; thin worm- like body.

20 *Midge Fly Larva: Suborder Nematocera.* Up to 1/4", dark head, worm-like segmented body, 2 tiny legs on each side.

21 *Blackfly Larva: Family Simulidae.* Up to 1/4", one end of body wider. Black head, suction pad on end.

22 *Leech: Order Hirudinea.* 1/4" - 2", brown, slimy body, ends with suction pads.

23 *Pouch Snail and Pond Snails: Class Gastropoda.* No operculum. Breathe air. Shell usually opens on left.

24 *Other snails: Class Gastropoda.* No operculum. Breath air. Snail shell coils in one plane.

The following benthic community metrics were calculated for each assessment site:

1. *Taxa richness* - measures the total number of macroinvertebrate taxa (diversity or different kinds) collected in the sample. In general, taxa richness increases with improving water quality.

2. *EPT index* - measures the total number of distinct taxa within the generally pollution sensitive groups Ephemeroptera (mayflies), Plecoptera (stoneflies) and Trichoptera (caddisflies). In general, this index increases with improving water quality.

3. *HBI* (Hilsenhoff's Biotic Index - modified) - summarizes tolerances of the benthic community to organic pollution. Tolerance values range from zero to 10 and generally decrease with improving water quality.

4. *Percent contribution of dominant taxon* - measures the relative dominance of a particular taxon to the total number of organisms in the sample (community balance). Domination by one or a few taxa may indicate environmental stress.

5. *Number of intolerant taxa* - measures the total number of distinct taxa that are known to be generally sensitive to various pollutant sources. In general, this metric increases with improving water quality.

Benthic Community Metrics

Metrics are mathematical calculations that describe or summarize the benthic community of streams. Some metrics are simple summations such as taxa richness, which is a measure of the total number of different kinds of organisms in a sample. Other metrics are slightly more complex such as Hilsenhoff's Biotic Index, which incorporates pollution tolerance values of collected organisms to provide a number that assesses organic pollution in streams. The Watershed Assessment Program used five metrics to determine the health of benthic macroinvertebrate communities. The use of several metrics provides a greater assurance that a valid assesssment of health has been reached since several components of community of structure are measured.

To determine biological condition, the five calculated metrics from each sample station were compared to metric values derived from a set of reference sites located in the same region and sampled during the same time frame. Reference sites are characterized by stream segments that are least impaired by human activities. They can be used to define attainable biological and habitat conditions. The term reference condition is used to describe the characteristics of reference sites in this report.

Reference Condition – Reference conditions describe the characteristics of waterbody segments least impaired by human activities and are used to define attainable biological and habitat conditions. Final selection of reference sites depends on a determination of minimal disturbance, which is derived from physico-chemical and habitat data collected during the assessment of the stream sites. A site must meet least disturbed criteria established by the Program before it is given reference site status. In general, the following parameters are examined: dissolved oxygen, pH, conductivity, fecal coliform bacteria, violations of water quality standards, nonpoint sources (NPS) of pollution, benthic substrate, channel alteration, sediment deposition, streambank vegetation, riparian vegetation, overall habitat condition, human disturbances, point sources of pollution. The information from the sites that meet the defined criteria is used to establish a reference condition for the watershed (or ecoregion). Benthic macroinvertebrate data from each assessment site can then be compared to the reference condition to produce a biological condition score (bioscore) for each site.

Reference conditions were established by comparing the habitat and physico-chemical data of each assessment site to a list of minimum degradation criteria or reference site criteria. Assessment sites that met all of the minimum criteria were given reference site status. The Program developed the degradation criteria with the assumption that sites meeting these criteria would provide a reasonable approximation of the least disturbed conditions.

Benthic metrics were selected to ensure usefulness in discriminating between reference sites and sites with human-induced stressors. The distribution of benthic metric values for the reference sites was used to determine the scoring criteria for each metric. The lower quartile (upper quartile for metrics HBI and %

dominant taxon which have values that increase with increasing perturbation) of the range of each metric data set for the reference sites was used to establish the lower threshold for an optimal score for each metric. The mid-point between this score and zero (or the worst score from all sites for HBI and percent dominant taxon) was the lower threshold for the intermediate score. Each metric at each station was scored following a comparison to the threshold values established by the range of values of the reference sites. The sum of the scores of the five metrics provided a single index value for each site. This value was adjusted to a scale of 100 and is referred to as the biological condition score (bioscore).

For the purposes of this report, an assessment site receiving a bioscore of less than 50 was considered biologically impaired and in need of further investigation and corrective action. This does not mean that an assessment site with a bioscore above 50 is without some degree of impairment. The Program simply felt that 50 was a valid threshold for making important management decisions and steering limited resources to the streams that need them most. This is also the criterion used to place streams on the 303(d) list for biological impairment.

A significant number of streams in the Cheat watershed were known to be impaired by mine drainage before assessments were conducted. In order to conserve time and resources, the Program revised standard operating procedures for benthic macroinvertebrate sampling in streams with mining impacts. If assessment teams encountered a stream with a pH value of less the 4.0 and a conductivity value that was relatively high (>200 µmhos/cm), a single kick sample was collected and carefully examined for macroinvertebrate life. When the single kick sampled failed to produce macroinvertebrate life, sampling was discontinued and the biological condition of the station was considered impaired. If macroinvertebrates were found, a full sample (8 kick samples - 2 square meters) was collected.

Fecal Coliform Bacteria

Released to the environment in feces, disease-causing organisms may accompany fecal coliform bacteria. Thus, the presence of fecal coliform bacteria in a water sample indicates the potential presence of human pathogens.

A fecal coliform bacteria sample was collected at each assessment site unless the pH was less than four Standard Units. U.S. EPA sampling guidelines limit the field holding time for such samples to six hours. Due to the distance to laboratories, personnel limitations and time constraints, 24 hours was the limit utilized during this sampling effort. All bacteria samples were packed in wet ice until delivered to the laboratory for analysis.

Physico-Chemical Sampling

Physico-chemical samples were collected at each site to help determine what types of stressors, if any, were negatively impacting the benthic macroinvertebrate community. They were also helpful in providing clues about the sources of stressors.

Field analyses for pH (standard units), temperature (°C), dissolved oxygen (mg/l) and conductivity (µmhos/cm) were performed utilizing a Hydrolab™ Scout™ and Multiprobe™ assembly. The manufacturer's calibration guidelines were followed with minimal variation except that the instruments were generally not calibrated at the end of each sampling day.

Samples were collected for analysis of specific constituents. A list of these constituents, preservation procedures and analytical methods is included in Table 1, below.

Table 1: Constituents Analyzed By the Program

All numbered references to analytical methods are from EPA: Methods for Chemical Analysis of Water and Wastes; March 1983 unless otherwise noted.

Parameter	Minimum Detection Limit or Instrument Accuracy	Analytical Method	Maximum Holding Time
Acidity	5 mg/l	305.1	14 days
Alkalinity	5 mg/l	310.1	14 days
Sulfate	5 mg/l	375.4	28 days
Iron	200 µg/l	200.7	6 months
Aluminum	100 µg/l	200.7	6 months
Manganese	10 µg/l	200.7	6 months
Fecal Coliform Bacteria	Not Applicable	9222 D[1]	24 hours[2]
Conductance	1% of range[3]	Hydrolab™	Instant
pH	± 0.2 units[3]	Hydrolab™	Instant
Temperature	± 0.15 C[3]	Hydrolab™	Instant
Dissolved Oxygen	± 0.2 mg/l[3]	Hydrolab™	Instant

[1] Standard Methods For The Examination Of Water And Wastewater, 18th Edition, 1992.
[2] U. S. EPA guidelines limit the holding time for these samples to 6 hours. Due to laboratory location, personnel limitations and time constraints, 24 hours was the limit utilized during this sampling effort.
[3] Explanations of and variations in these accuracy's are noted in Hydrolab Corporation's Reporter ™ Water Quality Multiprobe Operating Manual, May 1995, Application Note #109.

In areas where mine drainage was present, assessment teams collected water samples for the analyses of aluminum (Al), iron (Fe) and manganese (Mn). In a few cases, samples were analyzed for hot acidity (mg/l), alkalinity (mg/l) and sulfate (mg/l). Water samples were collected in conjunction with the habitat assessment and benthic macroinvertebrate sampling.

Assessment teams measured stream flow (cfs) when field readings indicated that there was mine drainage impacting the stream. A current meter was used across a stream transect and the discharge was calculated with the sum-of-partial-discharges method.

The collection, handling and analysis of water samples generally followed procedures approved by the U.S. EPA. Field blanks for water sample constituents were prepared on a regular basis by each assessment team. The primary purpose of this procedure was to check for contamination of preservatives, containers and sample water during sampling and transporting. A secondary purpose was to check the precision of analytical procedures.

Habitat Assessment

An eight page Stream Assessment Form was completed at each site. A 100 meter section of stream and the land in its immediate vicinity were qualitatively evaluated for instream and streamside habitat conditions. The assessment team recorded the location of each site, using GPS when possible and provided detailed directions so future researchers may return to the same site. A map was sketched to aid in locating each site. The team recorded stream measurements, erosion potential, possible nonpoint source pollution and any anthropogenic activities and disturbances. They also recorded observational data about the substrate, water and riparian zone.

An important part of each stream assessment was the completion of a two-page rapid habitat assessment (from EPA's EMAP-SW, Klemm and Lazorchak, 1994), which provided a numerical score of the habitat conditions most likely to affect aquatic life. The information from this section provided insight into what macroinvertebrate taxa may be present or expected to be present at the sample site. It also provided information on any physical impairments to the stream habitat that were encountered during the assessment. The following 12 parameters were evaluated:

- Instream cover (fish)
- Benthic substrate
- Embeddedness

- Velocity/depth regimes
- Channel alteration
- Sediment deposition
- Riffle frequency
- Channel flow status
- Bank condition
- Bank vegetative protection
- Bank disruptive pressure (grazing) and
- Riparian vegetation zone width.

A Rapid Habitat Assessment data set is a valuable tool because it provides a means of comparing sites to one another. Each parameter was given a score ranging from zero to 20. The following descriptive categories were used to rate each parameter:

Table 2: Scoring For Rapid Habitat Assessment Parameters

Optimal (score 16-20)	Habitat quality meets natural expectations.
Suboptimal (score 11-15)	Habitat quality is less than desirable but satisfies expectations in most areas.
Marginal (score 6-10)	Habitat quality has a moderate level of degradation; severe degradation at frequent intervals of area.
Poor (score 0-5):	Habitat substantially altered; severe degradation.

The 12 individual scores for each parameter were summed (maximum possible = 240) and this number provided the final habitat condition score for each assessment site. The habitat condition score and biological condition score for each site were plotted on an XY graph (see box on page 36) to simplify interpretation of the results.

FINDINGS -- BENTHIC MACROINVERTEBRATES

The scope of the Cheat River watershed assessment was extensive (i.e., large quantities of data collected) and thus presented some difficulties in interpreting the results. In order to facilitate and simplify discussion of the benthic data, the assessment sites were categorized by ecoregion (see Figure 4). Additionally, the large data set made it impractical to discuss the findings at each assessment site individually. Therefore, simple statistics such as percentages and averages were used to summarize the data.

Currently, the use of ecoregions as a means of classifying streams is widely accepted. This is based on the prediction that natural biological differences exist between two ecoregions as a result of differences in land use, soil conditions, vegetation type, stream morphology, climate, elevation and underlying geology. In order to comply with this prediction, a reference condition was established for Ecoregion 67 and Ecoregions 69/70, respectively (Table 3). Seventeen assessment sites from Ecoregion 67 met the minimum degradation criteria and were used to establish a representative reference condition. Ecoregions 69/70 produced eight reference sites that were utilized for establishing a reference condition. It was impossible to establish a reference condition for Ecoregion 70 since only three sites were assessed. The program considered the defining qualities of all three ecoregions and decided that Ecoregion 70 compared more favorably to Ecoregion 69 than to Ecoregion 67. Therefore, benthic data from the study sites in Ecoregion 70 were compared to the reference condition from Ecoregion 69.

Table 3: Reference Sites And Ecoregions

STREAM NAME	AN-CODE	ECOID
DARNELL HOLLOW	WVMC-2-A	69
SCOTT RUN / CHEAT RIVER	WVMC-7	69
LAUREL RUN / BIG SANDY CREEK ABOVE PATTERSON RUN	WVMC-12-A-{03}	69
ROARING RUN	WVMC-52-A	67
MIKE RUN	WVMC-54-A	67
MAXWELL RUN	WVMC-54-C	67
LAUREL RUN / SHAVERS FORK	WVMCS-8	67
LITTLE LAUREL RUN / SHAVERS FORK	WVMCS-12	67
CLIFTON RUN	WVMCS-14	67
UPPER PONDLICK RUN	WVMCS-28	69
BEAVER CREEK / SHAVERS FORK	WVMCS-53	69
SECOND FORK	WVMCS-54	69
ELKLICK RUN @ FERNOW EXPERIMENTAL FOREST	WVMC-60-C	67
JOHN B. HOLLOW	WVMC-60-C-3	67
HICKMAN SLIDE HOLLOW	WVMC-60-C-4	67
LAUREL RUN / DRY FORK	WVMC-60-E	69
OTTER CREEK	WVMC-60-F	69
MILL RUN / DRY FORK	WVMC-60-I	67
GLADY FORK	WVMC-60-K	67
HOG RUN / PANTHER CAMP RUN	WVMC-60-K-2-A	67
TINGLER RUN / LAUREL FORK	WVMC-60-N-8.5	67
LOWER TWO SPRING RUN	WVMC-60-T-1	67
UPPER TWO SPRING RUN	WVMC-60-T-2	67
SWALLOW ROCK RUN	WVMC-60-T-3	67
BIG RUN / GANDY CREEK NEAR LEADING RIDGE MOUNTAIN	WVMC-60-T-8	67

In the past, the Program classified benthic data based on stream width. Historic information has shown that aquatic communities in small streams are not comparable to those of large streams. The reasons for this fact are numerous, but collectively they can be identified as differences in number and character of ecological niches among various stream sizes. However, recent research has indicated that wadeable streams of orders I to III (Stribling et al. 1993) and stream drainages of less than 500 square miles (PA DEP 1997) with similar habitat may be combined for analysis. In other words, a riffle in a small stream is likely to support a benthic community comparable to that of a large stream as long as all factors, including water quality, are similar. The individual taxa may differ, but the community metrics would be generally comparable. Nearly 90% (193 of 216) of the stream sites assessed in the Cheat River watershed with benthic samples collected had stream width's of ten meters or less. Consequently, the program considered the riffle habitats at these sites to be comparable and did not classify sites based on stream width.

Table 4: Sampling Site Summary

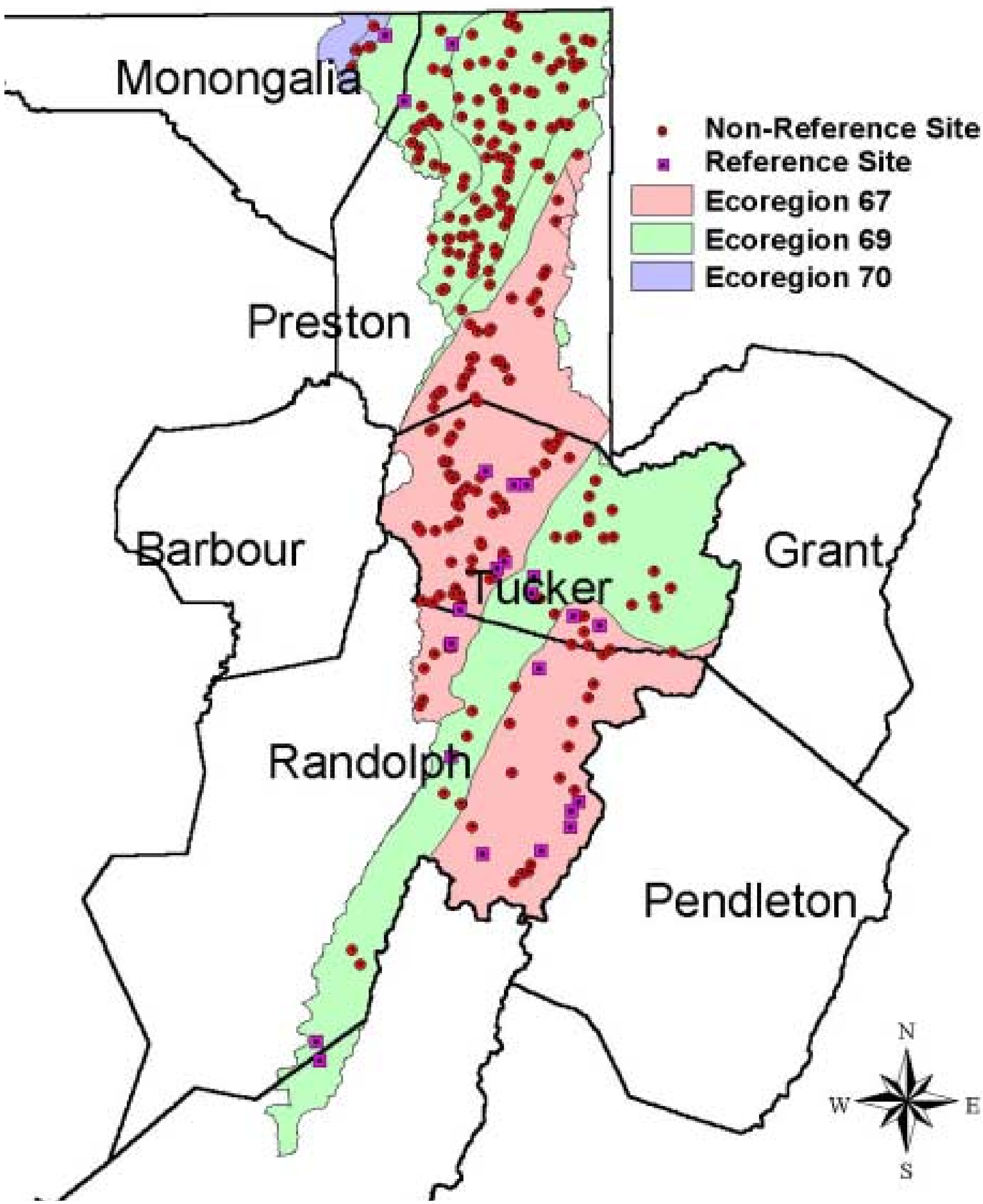
Named streams	431
Streams visited (total)	218
Sites visited (total)	276
Sites visited (Ecoregion 67)	125
Sites visited (Ecoregion 69)	148
Sites visited (Ecoregion 70)	3
Named, not visited	213
Unnamed, visited	13
Rapid habitat assessment	269
Physico-chemical sampled*	270
Benthic macroinvertebrates sampled (total)**	216
Comparable benthic samples (total)	209
Comparable benthic samples (Ecoregion 67)	116
Comparable benthic samples (Ecoregion 69)**	90
Comparable benthic samples (Ecoregion 70)***	3
Fecal coliform bacteria sampled	225

* At least one parameter measured.

** Total does not include 41 sites where no benthic macroinvertebrate life was found after one kick sampling and field examination.

*** Metric comparisons were made against reference condition of Ecoregion 69.

Figure 6: Sample Sites in the Cheat River Watershed



A total of 276 assessment sites were visited during the Cheat River watershed study (Table 6). Figure 6 provides a graphic illustration of the assessment sites. A full benthic macroinvertebrate sample was collected at 216 of these sites (see Table 4 for sampling summary). Seven samples were considered non-comparable because of variations in sampling techniques. For the purposes of this report, comparable means collected from similar habitat, from equal sampling area and using the same sampling technique.

The number of distinct taxa identified from all samples in the watershed was 86. Ecoregion 67 produced 67 taxa, Ecoregions 69/70 produced 75 taxa and Ecoregion 70 produced 24 taxa (Table 10). Generally, the watershed as a whole displayed good benthic diversity with several pollution sensitive taxa being well represented. In fact, eight of the 10 most frequently occurring taxa were mayflies, stoneflies and caddisflies (Capniidae/Leuctridae, Baetidae, Hydropsychidae, Heptageniidae, Leptophlebiidae, Philopotamidae, Chloroperlidae, Perlidae). The most frequently encountered taxon was the midge family Chironomidae. This family was collected at 203 sites (94%), followed by the stonefly group Capniidae/Leuctridae at 190 sites (88%) and the mayfly family Heptageniidae at 176 sites (81.5 %). A list of the benthic macroinvertebrates collected at each assessment site is presented in Table 16.

Table 15 provides the bioscore and benthic community metric results for each site. The bioscore for each benthic sample site is graphically presented in Figures 7, 8, 9, 10 and 11. The program utilized these XY graphs as a means of summarizing the relationship between biological condition and habitat condition. In order to reduce crowding on the graphs, the benthic sampling sites for Ecoregion 67 were divided and presented on three XY graphs. Ecoregions 69/70 was divided into two graphs for illustration (Ecoregion 70 is included with

Ecoregion 69). For each ecoregion, each successive graph presents a group of assessment sites that are located further upstream in the watershed than the sites on the previous graph.

A total of 209 assessment sites with comparable benthic samples (116 sites for Ecoregion 67, 90 sites for Ecoregion 69, & 3 sites for Ecoregion 70) are presented on the five graphs. Considering the entire watershed, a total of 26 (12.8%) sites received a bioscore of less than 50 (Table 15 and Figure 12). For the purposes of this report, an assessment site receiving a biological condition score of less than 50 was considered biologically impaired and in need of further investigation and corrective action.

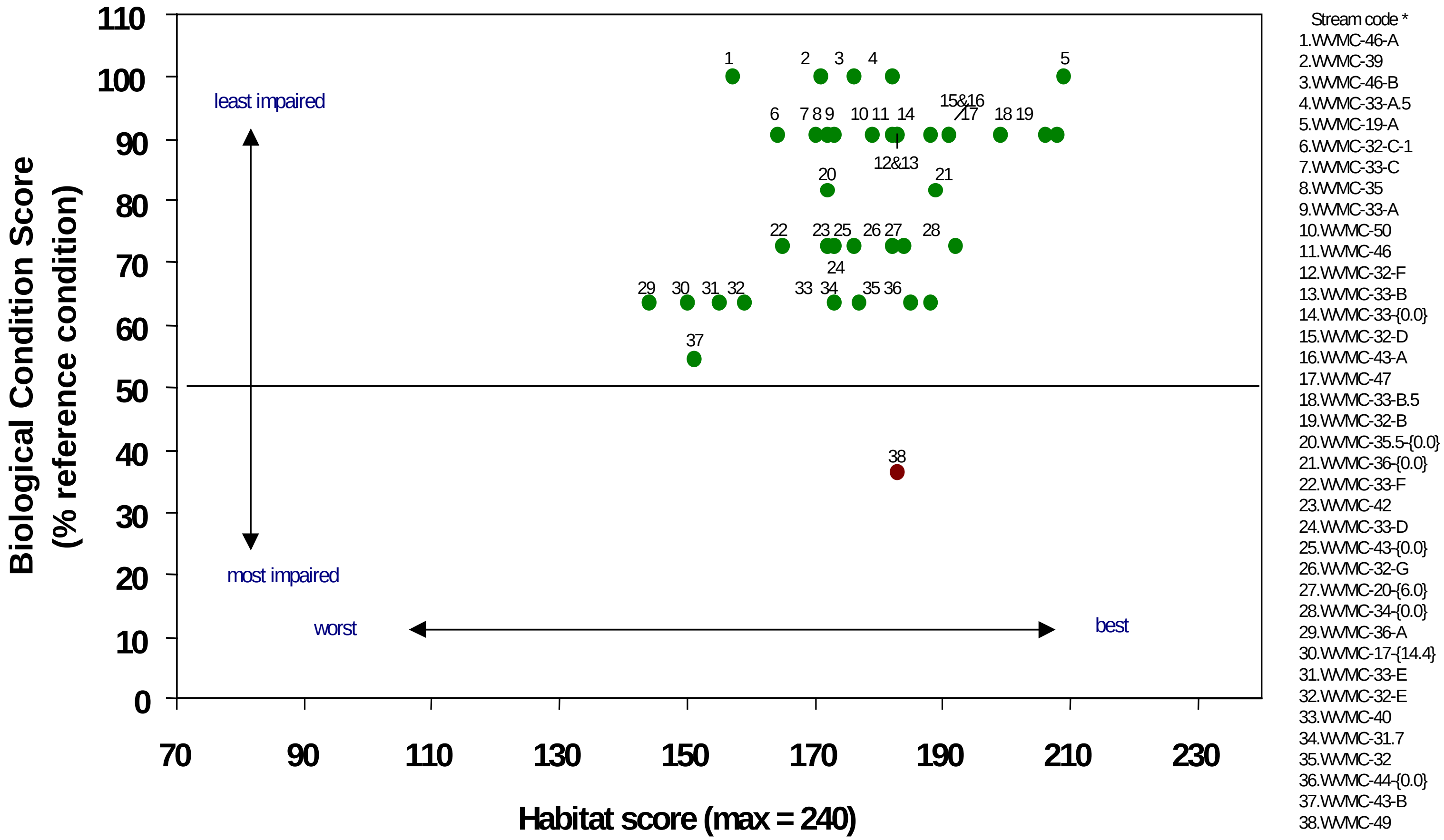
INTERPRETING
X-Y GRAPHS

Habitat quality is an important component of biological surveys because aquatic animals often have specific habitat requirements independent of water quality.

A point on an XY Graph represents two numbers, one for the biological condition score on the Y axis (vertical axis or side axis) and one on the X axis (horizontal axis or bottom axis) for the habitat condition score. The upper right-hand section of the graph is the ideal situation where optimal habitat quality and biological condition exist. The upper left-hand corner of the graph is where optimal biological condition is generally not possible due to severely degraded habitat.

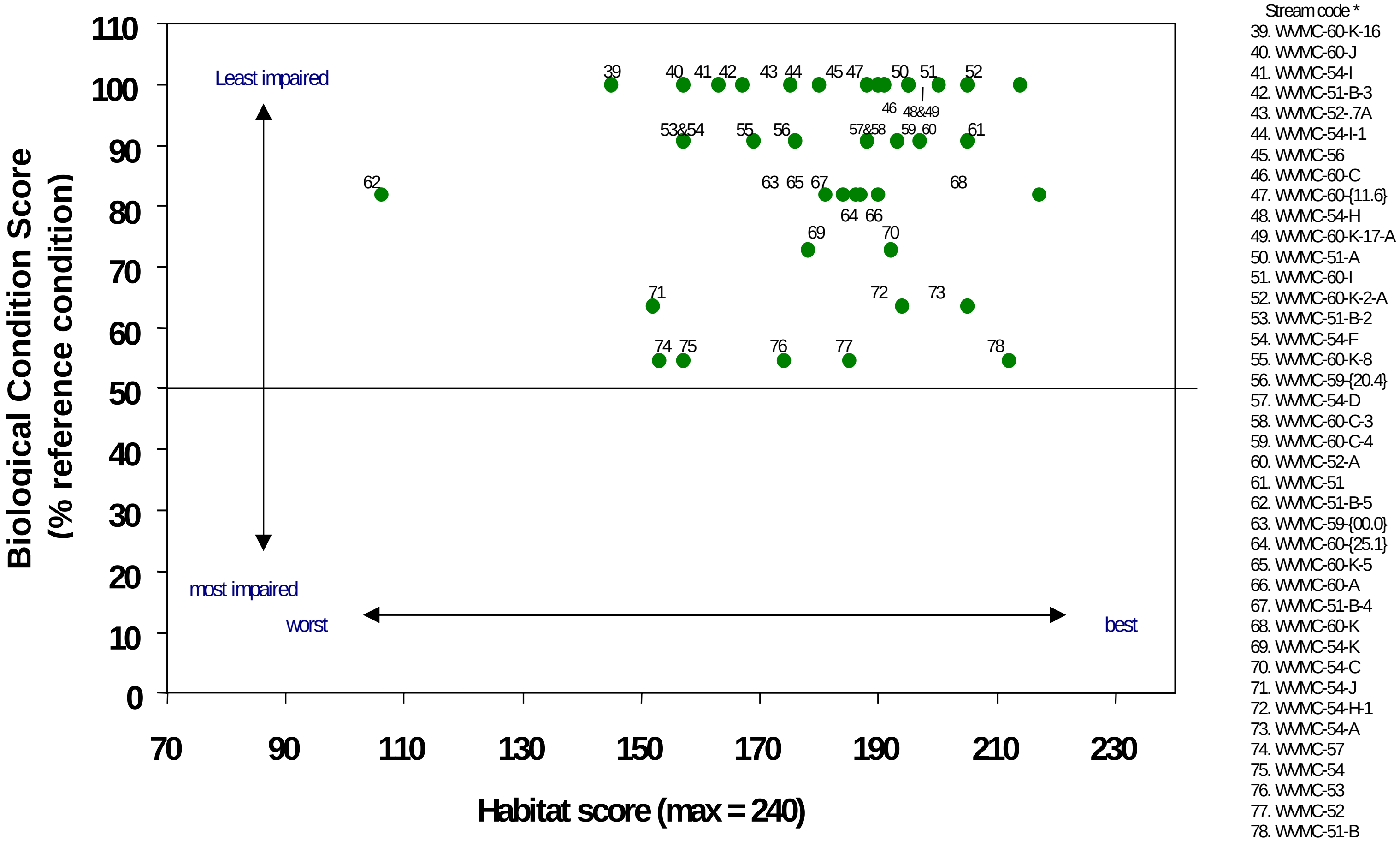
The lower left-hand portion of the graph is where habitat quality is poor and further degradation may result in relatively little difference in biological condition. The lower right-hand corner of the graph is often considered the most important since this is where degraded biological condition can be attributed to something other than habitat quality (i.e., chemical pollutants). (Adopted from Barbour et al. 1997)

Figure 7: Biological and Habitat Summary – Ecoregion 67



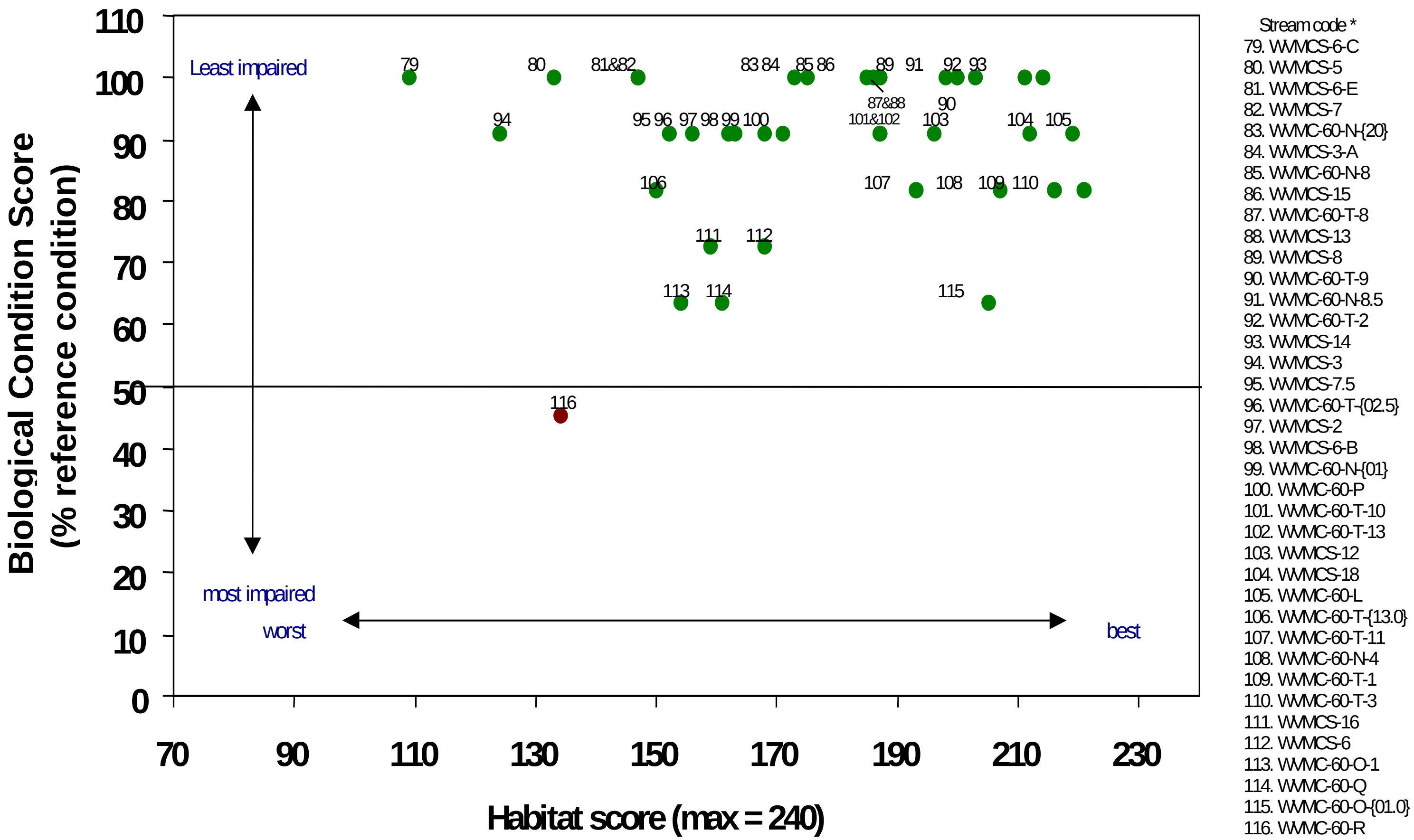
*See "Table 6 in Appendix A for stream name

Figure 8: Biological and Habitat Summary – Ecoregion 67



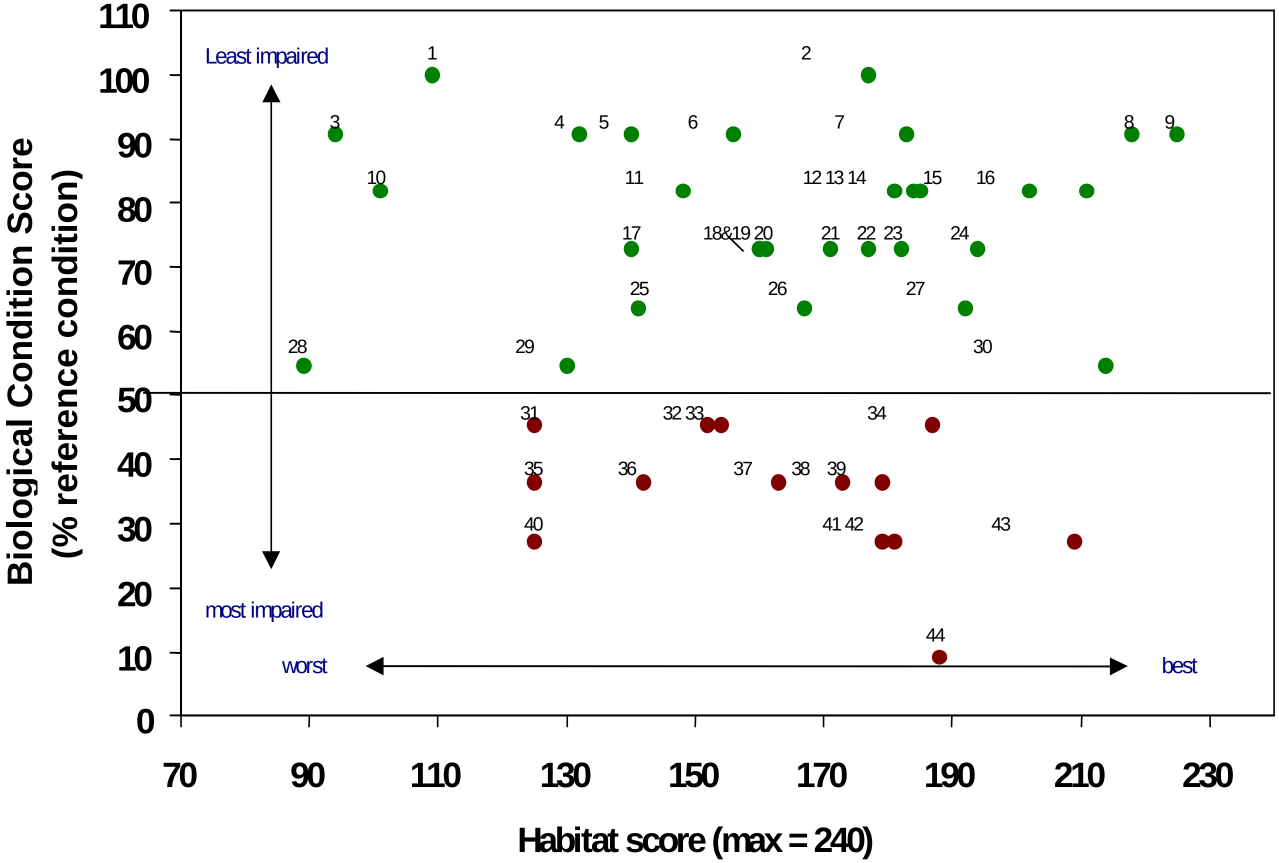
*See "Table 6 in Appendix A for stream name

Figure 9: Biological and Habitat Summary – Ecoregion 67



*See "Table 6 in Appendix A for stream name

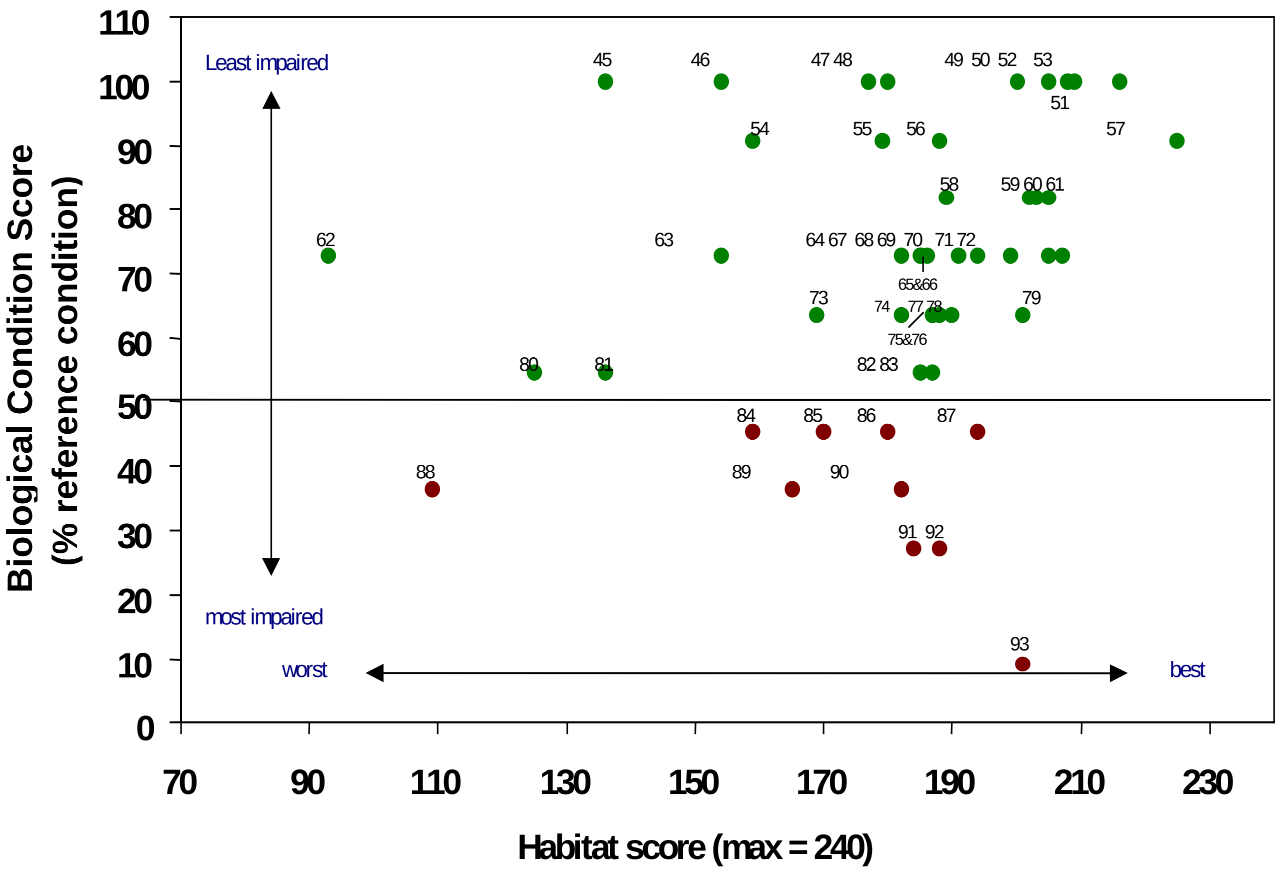
Figure 10: Biological and Habitat Summary – Ecoregions 69/70



Stream code *
1. WVMC-13-{01}
2. WVMC-12-D
3. WVMC-14-{02}
4. WVMC-12-F-{00.0}
5. WVMC-12-B-3-{02}
6. WVMC-15-A
7. WVMC-2-A
8. WVMC-2 (reg 70)
9. WVMC-12-A-{03}
10. WVMC-12-C-{04}
11. WVMC-12-B-4-{02}
12. WVMC-12-F-{01.0}
13. WVMC-10
14. WVMC-12-A-{02.5}
15. WVMC-12-A-1
16. WVMC-15-{01}
17. WVMC-12-B-.5-{02}
18. WVMC-12-.7A
19. WVMC-12-{10}
20. WVMC-12-B-{01}
21. WVMC-12-B-4-{03}
22. WVMC-2.5-A
23. WVMC-12-B-1-{04}
24. WVMC-12-E.1
25. WVMC-11-D-{10}
26. WVMC-12-E
27. WVMC-12-B-{02}
28. WVMC-11-D-{00}
29. WVMC-12-C-{01}
30. WVMC-7
31. WVMC-12-{14}
32. WVMC-2.5
33. WVMC-12-B-5-C
34. WVMC-12-A-2
35. WVMC-12-B-.5-A
36. WVMC-16-A-{0.8}
37. WVMC-4 (reg 70)
38. WVMC-12-B-6
39. WVMC-2.7 (reg 70)
40. WVMC-12-B-{11}
41. WVMC-12-B-1-{01}
42. WVMC-12-B-.5-{00}
43. WVMC-12-.5A-{0}
44. WVMC-12-B-{06}

*See “Table 6 in Appendix A for stream name

Figure 11: Biological and Habitat Summary – Ecoregions 69/70



Stream code *
45. WVMCS-22
46. WVMC-60-K-17
47. WVMCS-25
48. WVMCS-47
49. WVMC-20-{0.0}
50. WVMC-18-{6.0}
51. WVMCS-53
52. WVMCS-28
53. WVMCS-54
54. WVMC-19
55. WVMC-60-D-14
56. WVMC-17-{10.2}
57. WVMC-60-F
58. WVMCS-33
59. WVMC-60-O-{07.0}
60. WVMC-21
61. WVMC-17-C
62. WVMC-18-A
63. WVMC-22-B
64. WVMC-22-{2.0}
65. WVMC-17-A.1
66. WVMC-22-{1.5}
67. WVMC-60-D-4.5
68. WVMC-18-{0.0}
69. WVMC-60-D-1
70. WVMC-60-D-4.7
71. WVMC-60-E
72. WVMC-18-.1A
73. WVMC-26-{0.0}
74. WVMC-60-D-11
75. WVMC-60-D-12
76. WVMC-60-G
77. WVMC-17-.6A
78. WVMC-28
79. WVMC-17-{3.2}
80. WVMC-26-{1.5}
81. WVMC-60-D-3-B
82. WVMC-17-B
83. WVMCS-46
84. WVMC-60-D-3-E
85. WVMC-31-{0.0}
86. WVMC-60-D-3-C
87. WVMC-17-{6.8}
88. WVMC-23-A-{2.9}
89. WVMC-17-A-.5-{0}
90. WVMC-17-{2.6}
91. WVMC-17-A-{0.0}
92. WVMC-17-.7
93. WVMC-17-A-1-{0.0}

*See "Table 6 in Appendix A for stream name

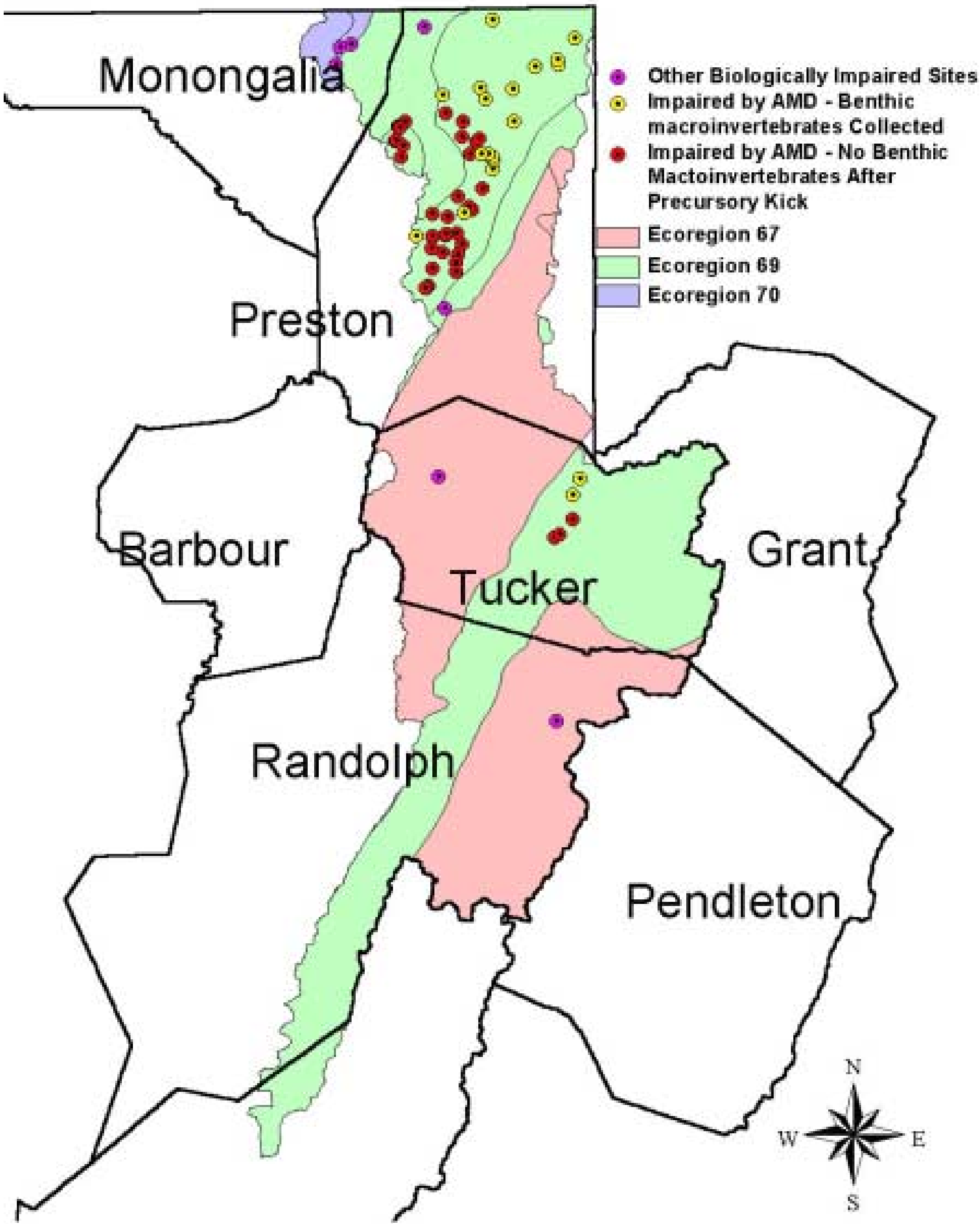
Among ecoregions, there was a distinct difference in the number of biologically impaired sites (Figure 13). There were only two (1.7 %) assessment sites with bioscores less than 50 in Ecoregion 67. A large portion of the watershed in Ecoregion 67 is undeveloped rural land within the Monongahela National Forest. Figure 13 presents a comparison of the average bioscore for non-reference sites and reference sites combined. It is important to note that the biological condition of sites can range from severe impairment to no impairment.

The average bioscore for the non-reference sites (83.3, n = 99) in Ecoregion 67 was only slightly lower than the average for reference sites (90.9, n = 17). The overall good water quality observed in this portion of the watershed appears to be due to the lack of human related disturbances.

In comparison, 24 (25.8%) sites received bioscores less than 50 in Ecoregions 69/70 (this includes two sites from Ecoregion 70). This value does not include the additional 41 sites (Table 12) where benthic macroinvertebrate life was not found as a result of severe impairment by mine drainage (see last paragraph on page 25). If the additional 41 sites were included in the number of biologically impaired sites for Ecoregions 69/70, the percentage would increase to 48.5%. (A bioscore could not be calculated for the 41 sites with no benthic life detected, thus they do not appear on an XY graph.)

The majority of the assessment sites in Ecoregions 69/70 were located in the northern portion of the Cheat watershed. This region has been extensively mined and this has resulted in severe degradation to the water quality of many streams. Consequently, the average bioscore for Ecoregions 69/70 non-reference sites (65.1, n = 85) was notably less than the average for its respective reference sites (87.5, n = 8).

Figure 12: Biologically Impaired Sites



A discussion of the biologically impaired (bioscore < 50) streams is presented below. Data pertaining to this discussion (i.e., benthic metrics, physico-chemical data, rapid habitat data and human disturbances) can be found in corresponding tables of Appendix A.

Figure 13: Percentage of Sites By Biological Impairment

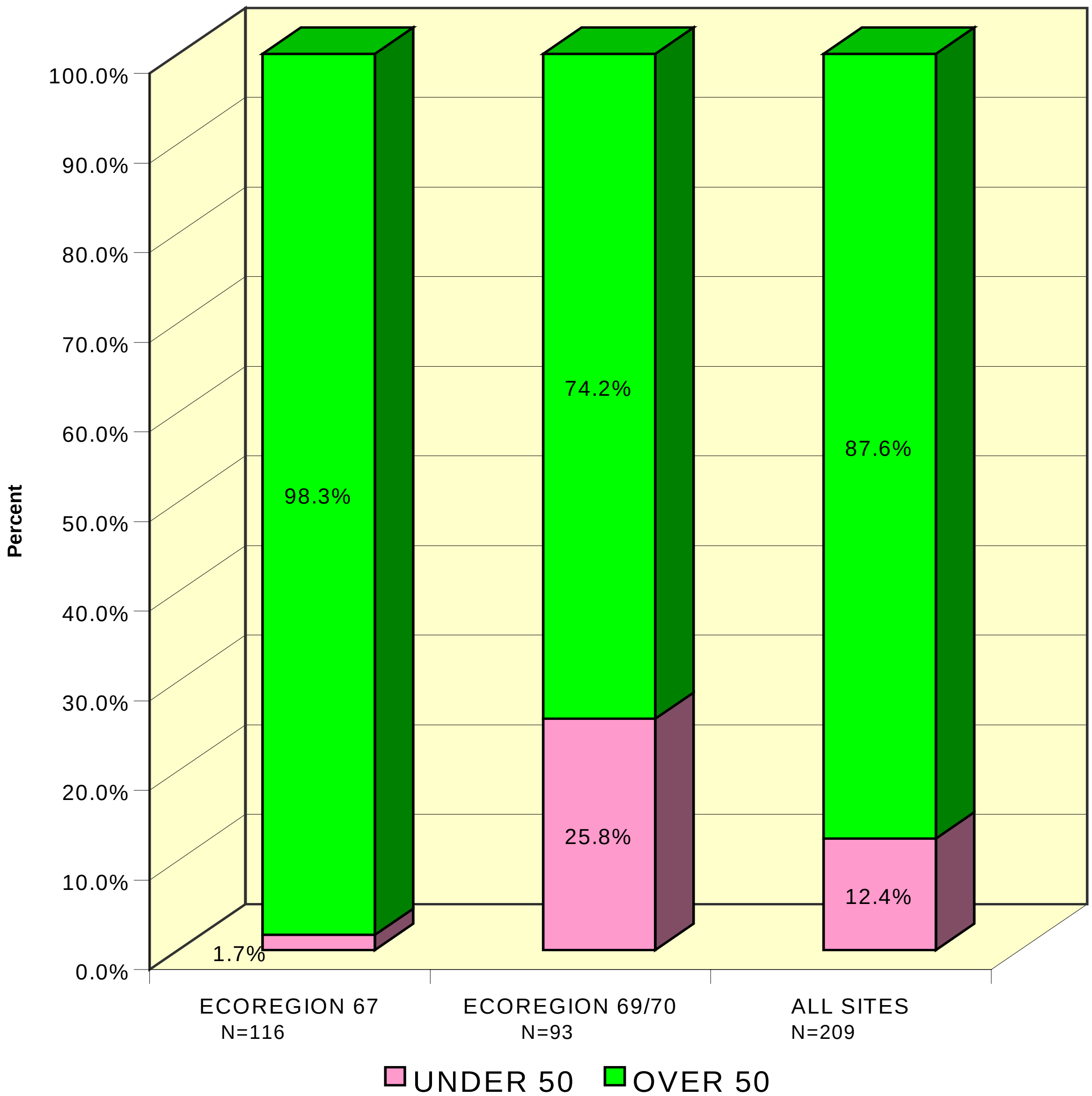
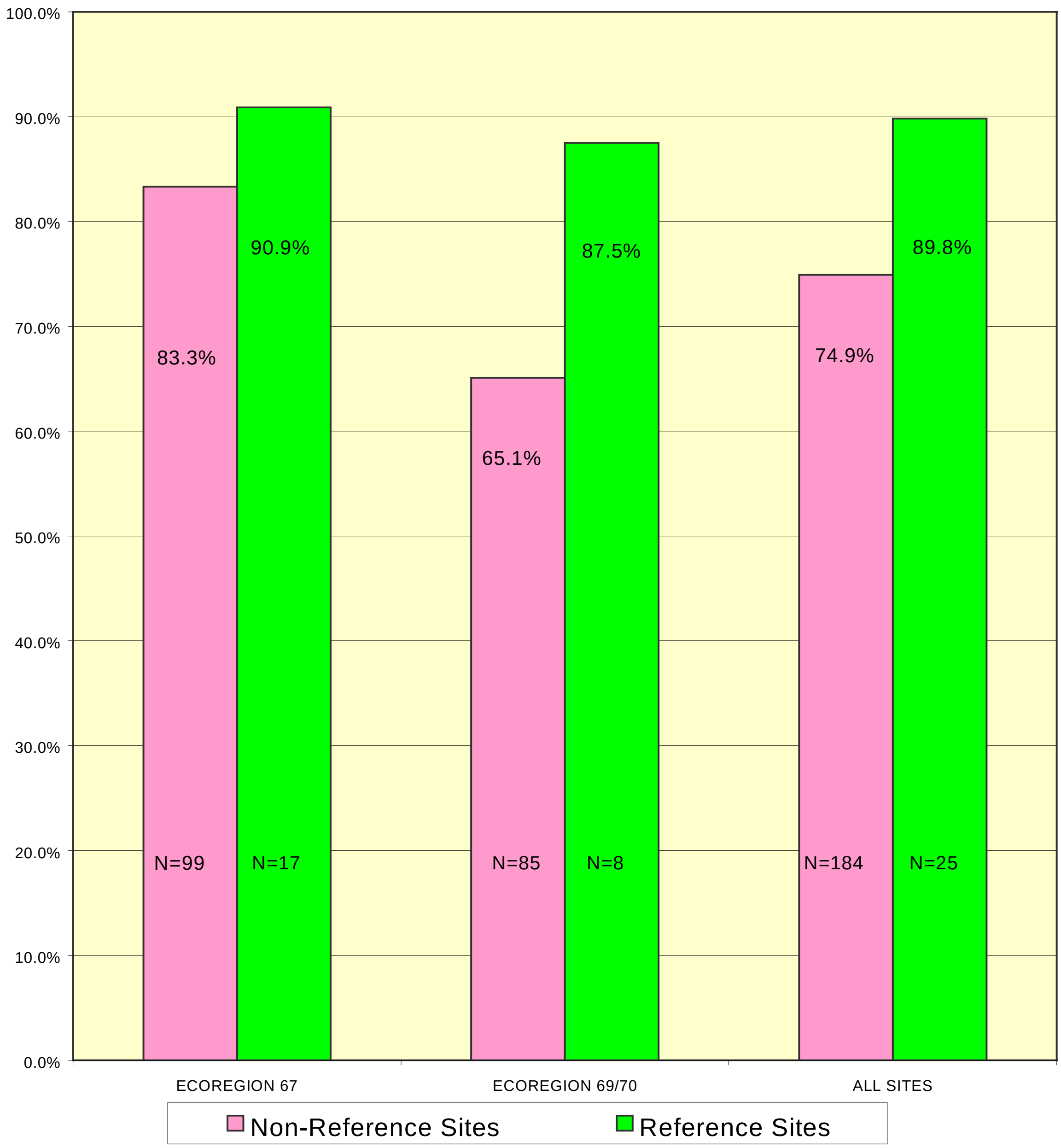


Figure 14: Summary of Average Bioscores



Ecoregion 67

CLAYLICK RUN (WVMC- 49)

Claylick Run (WVMC-49) was one of the two streams in Ecoregion 67 that received a bioscore less than 50 (36.4). Taxa richness was 10 and the EPT index was only 5. These metric values were substantially less than the reference condition values (25th percentile) of 15 for taxa richness and 11 for EPT Index.

The habitat and physico-chemical data collected at the assessment site on Claylick Run failed to offer explicit clues in support of its biological impairment. The rapid habitat score (183) was very good and compared favorably with reference site scores from Ecoregion 67. The assessment team did indicate, however, that a new culvert had been positioned in the stream and was accompanied by some channelization, riprap for bank stabilization and fill. Additionally, the team observed a substance entering the steam and described it as limestone leachate from the road. Also, the watershed characterization and modeling system (WCMS - see glossary) indicated the presence of hay and pastureland upstream of the site. It is possible that one or more of these disturbances and activities caused the biological impairment observed at the assessment site on Claylick Run.

TORY CAMP RUN (WVMC- 60-R)

Instream habitat appears to be partially responsible for the low bioscore (45.5) at the assessment site on Tory Camp Run. The rapid habitat scores for benthic substrate, embeddedness and sediment deposition were marginal to poor.

The site was further described as having a soft substrate with a heavy layer of silt covering the stream bottom. The assessment team noted that there was no obvious source of silt in the assessment area. The recognized effects of sedimentation on benthic macroinvertebrates include the extensive smothering of physical habitat on the stream bottom. This smothering effect reduces the amount of interstitial space (i.e., the living or hiding space) formed by the aggregation of larger particles like boulder, cobble and gravel. Additionally, sedimentation can interfere with respiration if it is severe enough to clog the gills of benthic animals.

Field readings of water quality indicated that the stream was fairly representative of the area. The pH was near neutral at 7.2 and conductivity was 55 µmhos/cm.

Although the final bioscore (45.5) was relatively low for this site, most of the individual community metric scores compared favorably with those of the reference sites (Table 15). The only conspicuous outlier was percent contribution of dominant taxon with a score of 91.0%. The taxon responsible for this score was Gammaridae, which are known commonly as scuds. A total of 324 scuds were identified in the total subsample of 356 individuals. Generally, the excessive dominance by any particular taxon is considered indicative of biological impairment. It appears that the sedimentation problem observed at this site on Tory Camp Run is not having a detrimental effect on the scud population. This site needs to be studied further to verify the cause of its biological impairment.

Ecoregions 69/70

The 24 biologically impaired assessment sites from Ecoregions 69/70 were divided into two groups for discussion. One group includes sites associated with mine drainage. These streams have assessment data indicating possible mine drainage impacts, have WCMS data indicating mining activity within their drainage, or are listed on the 1998 303(d) list as impaired by mine drainage. The remaining sites were classified as miscellaneous due to the variety of possible impacts displayed by the assessment data.

ACID MINE DRAINAGE IMPACTED STREAMS

Streams receiving acid mine drainage (AMD) are usually characterized by elevated concentrations of iron, aluminum, manganese, sulfates, acidity, dissolved solids and sediment. These constituents may also occur naturally in streams. However, mining activity can significantly increase their concentrations and cause extensive damage to aquatic life. One of the most recognized impacts of mine drainage in streams is the dramatic decrease in pH caused by an increase in acidity (sulfuric acid).

The pH scale ranges from zero to 14, with 7 being neutral. The pH of water decreases as it becomes more acidic. The Environmental Quality Board of West Virginia established a minimum pH value of 6.0 for streams in the state. Although many aquatic organisms can survive in pH environments less than 6.0, some species such as brook trout and smallmouth bass are generally unable to survive in streams with pH less than 5.0. Many kinds of benthic macroinvertebrates, especially mayflies, are also known to be intolerant to increased acidity and low pH (Resh and Rosenberg 1984).

The interactions between aquatic life and acidification of streams are extremely complex. Reduction of one or several taxa as a result of acidification can affect the stream's entire ecosystem.

Metals (i.e., iron, aluminum, manganese) associated with mine drainage can damage aquatic life directly. In their dissolved form, metals can be highly toxic since they are free to interact with living organisms. Precipitates, known as metal hydroxides, often coat the stream bottoms. Heavy deposits of metal hydroxides can clog gills and smother the living spaces utilized by macroinvertebrates.

T&T MINE PORTAL
Photo by Julia Lucas, Friends of the Cheat

There are many treatment technologies available for treating waters polluted by AMD. However, the cost of chemicals, equipment and maintenance make the process expensive and nearly impossible to implement continuously on every stream with AMD impacts. Generally, treatment involves the use of some type of alkaline material such as limestone sand (fines), hydrated lime, or sodium hydroxide. These materials are added to raise the water pH and help convert dissolved metals into metal hydroxides that will settle out of the water. The yellowish-orange solid (commonly known as yellow boy) present in many AMD streams in West Virginia is the result of dissolved iron precipitating out and settling on the bottom.

Several streams in the state are currently being treated for AMD including the Blackwater River of the Cheat watershed. The West Virginia Division of Environmental Protection constructed a rotary–drum limestone treatment station on Blackwater River above the mouth of Beaver Creek. Beaver Creek is polluted by abandoned surface and deep mines and is known to contribute heavy loads of acidity to the Blackwater River (DNR 1995).

A significant number of streams in the Cheat watershed were known to be impaired by mine drainage before assessments were conducted. In order to conserve time and resources, the Program revised standard operating procedures for benthic macroinvertebrate sampling in streams with mining impacts. If assessment teams encountered a stream with a pH value of less the 4.0 and a conductivity value that was relatively high (>200 µmhos/cm), a single kick sample was collected and carefully examined for macroinvertebrate life. If the single kick sample failed to produce macroinvertebrate life, sampling was discontinued and the biological condition of the station was considered impaired. If macroinvertebrates were found, a full sample (8 kick samples – 2 square meters) was collected. Assessment teams encountered 41 sites in the watershed that met the pH / conductivity criteria and had an impaired biological condition. Most of these assessment sites had data indicating the presence of iron hydroxide deposits or other evidence of mine related impacts. These sites are presented in Table 5 and are not addressed individually unless referenced during the discussion of associated streams. Also, Figure 12 provides a map of the locations of these sites. Obviously, these stations were not plotted on an XY graph because macroinvertebrates were not collected.

UNTREATED AMD DISCHARGE TO MUDDY CREEK
Photo by Julia Lucas, Friends of the Cheat

Table 5: Assessment Sites With Evidence Of AMD Impairment And No Benthic Life Found After Precursory Kick

(All Are Within Ecoregion 69)

NAME	ANCODE	pH (S.U.)	CONDUCTIVITY (μmhos/cm)	Al (mg/l)	Fe (mg/l)	Mn (mg/l)
BULL RUN @ MOUTH	WVMC-11-{00}	3.2	977	12	5.8	1.7
1ST UNT BULL RUN @ MOUTH	WVMC-11-.1A	3.7	385	4.1	0.24	0.87
MIDDLE RUN @ MOUTH	WVMC-11-A	3.0	952	10	5.9	1.9
BULL RUN ABOVE MIDDLE RUN	WVMC-11-{05}	3.3	996	12	6.7	1.7
MOUNTAIN RUN @ MOUTH	WVMC-11-B	3.4	489	6.8	1.1	0.64
LICK RUN/BULL RUN @ MOUTH	WVMC-11-C	3.1	1139	16	13	0.92
BULL RUN BELOW 2ND UNT	WVMC-11-{07}	3.6	792	11	1.4	4.0
2ND UNT BULL RUN	WVMC-11-C.1	3.0	1171	18	8.9	7.5
RIGHT FORK BULL RUN @ MOUTH	WVMC-11-E	3.7	1113	18	1.8	5.5
SOVERN RUN @ HUDSON	WVMC-12-.5A-{3}	3.5	713	15	1.4	3.0
SOVERN RUN @ HEADWATERS	WVMC-12-.5A-{5}	3.2	1176	28	4.9	4.8
CONNER RUN NEAR HEADWATERS	WVMC-13.5-{2.3}	3.1	920	13	8.4	7.3
GREENS RUN	WVMC-16-{02}	3.3	819	10	25	1.7
SOUTH FORK GREENS RUN @ MOUTH	WVMC-16-A-{0.2}	3.1	1356	19	39	3.0
MIDDLE FORK/GREENS RUN	WVMC-16-A-.1	2.7	1737	26	72	3.6
SOUTH FORK GREENS RUN ABOVE LIMESTONE FINES	WVMC-16-A-{2.5}	2.6	1770	29	110	3.8
SOUTH FORK GREENS RUN NEAR HEADWATERS	WVMC-16-A-{3.9}	3.5	295	1.3	3.6	0.64
GREENS RUN ABOVE SOUTH FORK @ PLEASANTDALE	WVMC-16-{04}	4.0	188	3.8	0.42	1.1
MUDDY CREEK @ MOUTH	WVMC-17-{0.0}	3.2	1239	14	43	3.1
1ST UNT GLADE RUN @ MOUTH	WVMC-17-A-1.1	3.2	2370	38	7.6	21
2ND UNT GLADE RUN NEAR MOUTH	WVMC-17-A-1.2	3.4	2370	40	6.4	29
MARTIN CREEK @ HEADWATERS	WVMC-17-A-{2.1}	3.3	1424	5.5	3.5	12
MORGAN RUN @ MOUTH	WVMC-23-{0.0}	2.4	1398	28	53	2.4
1ST UNT MORGAN RUN	WVMC-23-.2A	4.9	708	2.8	1.0	3.4
CHURCH RUN @ MOUTH	WVMC-23-A-{0.0}	2.6	1475	25	43	1.9
LEFT FORK/UNT CHURCH RUN	WVMC-23-A-.1-A	3.1	413	8.4	1.5	1.9
RIGHT FORK/UNT CHURCH RUN	WVMC-23-A-.1-B	2.5	1255	23	14	6.0
MORGAN RUN BELOW CHURCH RUN	WVMC-23-{1.8}	2.6	1590	40	87	3.1
MORGAN RUN ABOVE CHURCH RUN	WVMC-23-{2.0}	2.8	925	14	16	2.6
HEATHER RUN @ MOUTH	WVMC-24-{0.0}	2.4	949	17	15	1.5
1ST UNT /HEATHER RUN	WVMC-24-A	2.2	1710	42	80	3.6
HEATHER RUN ABOVE 2ND UNT	WVMC-24-{2.7}	2.4	1600	20	25	2.1
LICK RUN NEAR MOUTH	WVMC-25-{0.0}	2.4	2240	53	130	1.9
LICK RUN/CHEAT RIVER ABOVE 1ST UNT	WVMC-25-{2.3}	2.3	1304	20	35	1.5
PRINGLE RUN @ MOUTH	WVMC-27-{0.0}	3.1	723	8.9	2.0	2.0
PRINGLE RUN BELOW FORKS	WVMC-27-{2.7}	2.8	713	11	5.1	1.8
LEFT FORK/PRINGLE RUN @ MOUTH	WVMC-27-A	2.7	843	16	10	1.7
RIGHT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-B	3.0	679	9.9	4.7	1.9
TUB RUN	WVMC-60-D-2	4.0	89	2.1000	2.2400	0.3200
FINLEY RUN	WVMC-60-D-2.7	3.2	456			
LONG RUN	WVMC-60-D-3-A	3.0	681	14.5000	10.0000	0.4800

A discussion of the following biologically impaired sites (sites with calculated bioscores) is presented below:

Sovern Run (WVMC-12-.5A-{0})
UT of Webster Run (WVMC-12-B-.5-A)
Little Sandy Creek (WVMC-12-B-{06})
Mill Run (WVMC-12-B-6)
Big Sandy Creek (WVMC-12-{14})
Crab Orchard Creek (WVMC-17-.7)
Martin Creek (WVMC-17-A-{0.0})
Glade Run (WVMC-17-A-1-{0.0})
Church Run (WVMC-23-A-{2.9})
Sand Run (WVMC-60-D-3-E).
Webster Run (WVMC-12-B-.5-{00})
Beaver Creek (WVMC-12-B-1-{01})
Little Sandy Creek (WVMC-12-B-{11})
3rd UNT Cherry Run (WVMC-12-B-5-C)
South Fork/Greens Run (WVMC-16-A-{0.8})
Muddy Creek (WVMC-17-{2.6})
Fickey Run (WVMC-17-A-.5-{0})
Muddy Creek (WVMC-17-{6.8})
Snyder Run (WVMC-60-D-3-C)

While all of these streams have mining related activities within their drainages, the degree of impairment caused by AMD varied from severe to apparently none. In cases where little or no AMD impacts were obvious, other problems such as habitat degradation were noted as possibly influencing biological condition. Although impairment resulting from acid deposition is sometimes difficult to verify, the physico-chemical data (slightly acidic pH values and low conductivities) collected at some of these sites suggest that it should be considered as a possible source of pollution. Also, some streams may have had biological impairment as a result of periodic flushes of AMD or acid deposition that might have resulted from high flow events or interrupted treatment activities. In these instances, the physico-chemical constituents of the water may not have been indicative of the potential causes since sampling may not have coincided with the flush of pollutants.

BIG SANDY CREEK ABOVE LITTLE SANDY CREEK (WVMC-12- {14})

Big Sandy Creek is considered the largest and most important recreational tributary to the Cheat River in Preston County. The primary industry is mining (DNR 1982 Monongahela River Basin Plan). There are many abandoned mines, particularly in the Little Sandy Creek (WVMC-12-B) drainage, which are known to present acid mine drainage problems. Big Sandy Creek is listed on the 1998 303(d) list for mine drainage impairment.

There are two tributaries of Big Sandy Creek named Little Sandy Creek. The first Little Sandy Creek (WVMC-12-B) encountered going upstream from the mouth of Big Sandy Creek has its drainage totally within West Virginia and has many AMD problems. The second Little Sandy Creek (WVMC-12-F) is located further upstream in the Big Sandy watershed near mile-point fourteen. Although its lower reaches are within West Virginia, this stream (WVMC-12-F) drains primarily forested land within Forbes State Forest of Pennsylvania.

The Program conducted assessments at three locations on Big Sandy Creek and found one of them to be biologically impaired. The site (WVMC-12-{14}) located just above Little Sandy Creek (WVMC-12-F) had a bioscore of 45.5. There were only 17 individuals from 8 taxa identified in the sample. Four taxa were in the EPT group. Based on data from past assessments (DNR 1982), biological impairment at this site was not expected. The West Virginia Department of Natural Resources conducted a macroinvertebrate survey in 1982 at a similar location and found 21 taxa with 11 taxa from the EPT group.

Although AMD is well documented in the Big Sandy watershed, results of physico-chemical data collected during the assessment (pH = 6.5, conductivity = 67 µmhos/cm, Al = 0.24 mg/l, Fe = 0.35 mg/l, Mn = 0.042mg/l) were not indicative of severe mine drainage impacts. However, the Watershed Characterization and Modeling System (WCMS) indicated the presence of a surface mine inventory site upstream of the assessment site. In addition, the data suggest the stream has a limited capacity for buffering acidic inputs. This limited buffering capacity might make it susceptible to acid pollution.

Habitat appeared to be the limiting factor at this location on Big Sandy Creek. The overall rapid habitat was marginal, with a score of 125. Benthic substrate and embeddedness were poor with scores of 4 and 5, respectively. Additionally, sediment deposition was in the low marginal range with a score of 6. Assessment data did not reveal the exact cause of the habitat perturbations. However, the site was located near a road. A house and lawn were also present at the assessment site. Finally, the WCMS indicated the presence of agricultural activities upstream of the site in the form of pastureland, hay production and row crops.

The Program conducted an assessment on Big Sandy Creek at Bruceton Mills dam (WVMC-12-{10}) and found the benthic macroinvertebrate community to be in good condition with a bioscore of 72.7. Compared to the site above Little Sandy Creek, there were twice as many total taxa (16) and twice as many EPT taxa (8) collected.

An assessment site also was established at the mouth of Big Sandy Creek. However, a benthic sample was not collected due to deep and swift water.

SOVERN RUN AT MOUTH (WVMC-12-.5A- {0})

Sovern Run is a tributary of Big Sandy Creek with numerous sources of AMD. Deep mine discharges and unreclaimed land and refuse piles are known to degrade the quality of water in Sovern Run. Consequently, it is listed on the 1998 303(d) list for AMD impairment.

The Program conducted an assessment at three locations from the mouth to the headwaters of Sovern Run. The site located at the mouth of Sovern Run (WVMC-12-.5A-{0}) was the only one where benthic macroinvertebrate life was found. There was no benthic life found in the single precursory kick in Sovern Run at Hudson (WVMC-12-.5A-{3}), or at the site near the headwaters of Sovern Run (WVMC-12-.5A-{5}). These two sites were severely impaired by AMD.

The bioscore at the mouth of Sovern Run was 27.3. The sample contained 38 individuals representing only 3 taxa. The EPT Index score was 1. No mayflies were found. The majority of the sample consisted of the stonefly group Capniidae/Leuctridae (79.0%). Based on the data collected by the Program, nearly the entire length of Sovern Run was severely impaired by mine drainage.

A project to improve the water quality of Sovern Run was initiated by a watershed association known as Friends of the Cheat. This group of stakeholders coordinated the development of the River of Promise Shared Commitment, an organization of federal and state agencies, conservation groups and industry. The organization’s focus was set to restore and manage the natural resources of the Cheat River watershed in harmony with and to the benefit of the area’s human resources. Much attention has been focused on AMD problems in the Cheat watershed as a result of the formation of this organization.

Treatment began in 1995 on Sovern Run by sealing a deep mine portal with limestone. This portal was identified as discharging heavy loads of acid, sulfate and metals. Additional projects include the construction of a new pond to flood the mine portal and the installation of an open limestone channel. Hopefully, the benefits of this restoration project will be realized when the Program revisits Sovern Run in the future.

LITTLE SANDY CREEK BELOW HOG RUN (WVMC-12-B-{06}) and

LITTLE SANDY CREEK BELOW CHERRY RUN (WVMC-12-B-{11})

Little Sandy Creek (WVMC-12-B) is a major tributary of Big Sandy Creek (WVMC-12) and is listed on the 1998 303(d) list for mine drainage impairment. Extensive areas of its watershed are severely impacted by mining activities. The Program conducted assessments at four locations on Little Sandy Creek and found two to be biologically impaired. In general, the lowermost reach of the stream appeared healthier than the upper reaches.

Little Sandy Creek below Hog Run (WVMC-12-B-{06}) appeared to be impaired the most with a bioscore of 9.1. A total of 41 individuals from 6 taxa were collected at this site. One mayfly taxon (Baetidae) was collected. The midge family Chironomidae dominated the sample (75.6%).

In general, water samples did not indicate severe impairment by mine drainage at this location. A pH value of 6.0 indicated the water was slightly acidic and concentrations of metals were elevated but not exceptionally so (Al = 0.34 mg/l, Fe = 0.84 mg/l, Mn = 0.40 mg/l).

Overall, rapid habitat (188) was optimal with the exception of embeddedness and sediment deposition, both of which were rated as marginal. The abundance of fine sediment may have been a factor in this site receiving an impaired bioscore. The assessment area was located in a forested area and the only disturbance noted was an old bridge.

Although habitat was good and water quality impacts from AMD appeared less than severe, the benthic sample collected below Hog Run was indicative of AMD impairment. Macroinvertebrate abundance was notably decreased, taxa richness was low and mayfly diversity was low. The WCMS did indicate the presence of mining upstream of the site in the form of abandoned mine lands, bond forfeiture sites and surface mine inventory sites. Impacts from these mining activities may be periodic in nature and may not have been captured in the single water sample collected on the assessment date.

Benthic data collected by DNR in 1982 suggested little or no improvement in water quality at this location on Little Sandy Creek (DNR 1982). The biological condition at this site was rated as poor. A total of 24 individuals from 7 taxa were collected. Mayflies were absent from their sample.

During the Program's 1996 survey, Little Sandy Creek below Cherry Run (WVMC-12-B-{11}) was also biologically impaired with a bioscore of 27.3. Taxa richness was low (6) and there were no mayfly representatives in the sample. The stonefly group Capniidae/Leuctridae dominated the sample (78.8%). Although stoneflies are generally intolerant to many pollutants, these particular stoneflies are commonly found in AMD streams and often dominate the sample.

Similar to the water quality measurements at the site below Hog Run, those at the site below Cherry Run did not indicate severe impairment by AMD. The pH reading at this site was 6.1 and conductivity was 73 µmhos/cm. Concentrations of metals were not substantially elevated (Al = 0.38 mg/l, Fe = 0.39 mg/l, Mn = 0.25 mg/l) and assessment notes did not report the presence of metal hydroxides. Cherry Run (WVMC-12-B-5-{0.3}) had violations of the iron and manganese water quality standards. This indicates Cherry Run may be the source of these pollutants.

The rapid habitat assessment (125) revealed a moderate level of degradation at this location on Little Sandy Creek below Cherry Run. Channel alteration was rated as poor with a score of 2. Several areas of the stream bottom were sandy which resulted in a sediment deposition score of 8 (marginal). Disturbances in the area of the assessment included roads (north side of I-68), bridge/culvert and bank stabilization.

The overall health of Little Sandy Creek at this site below Cherry Run appeared to be similar to that found below Hog Run. Water sample analyses did not indicate severe impairment by mine drainage. However, the character of the benthic sample was suggestive of some impairment by mine drainage since taxa richness was low, no mayflies were present and the community was dominated by taxa with some tolerance to mine drainage pollution. The WCMS indicated the presence of mining (abandoned mine lands) upstream of the assessment site.

A site located approximately one mile above the mouth of Little Sandy Creek received a bioscore of 72.7. The bioscore was lower (63.6) about one mile further upstream at a location below Beaver Creek. For the purposes of this report, these two sites were not considered biologically impaired (bioscores were not less than

50). However, taxa richness, EPT Index and number of intolerant taxa were noticeably lower when compared to benthic data collected from reference sites. Also, only one mayfly taxon (Baetidae) was found at each station. The characteristics of the benthic samples at these sites suggested at least some impairment by mine drainage.

WEBSTER RUN AT MOUTH (WVMC-12-B-.5-{00}) and

UNNAMED TRIBUTARY OF WEBSTER RUN (WVMC-12-B-.5-A)

Webster Run is a tributary of Little Sandy Creek (WVMC-12-B) and is listed on the 1998 303(d) list for mine drainage impairment. The program conducted an assessment at two locations (mouth and headwaters) on Webster Run and found the site located at the mouth to be biologically impaired with a bioscore of 27.3. Only 10 individuals from 3 taxa were collected at the site. There were no mayflies collected in the sample. In comparison, a site located at the headwaters of Webster Run received a bioscore of 72.7 and had a relatively diverse assemblage of macroinvertebrates with a taxa richness of 13 and an EPT index of 8.

Analysis of water samples did not indicate severe impairment by mine drainage. The pH was above neutral with a value of 7.2 and conductivity was slightly elevated (260 µmhos/cm). Concentrations of metals were only slightly elevated (Al = 0.60 mg/l, Fe = 0.75 mg/l, Mn = 1.2 mg/l) with manganese exhibiting the most notable concentration. However, the team indicated the presence of a strip mine near the assessment site. Also noted was the presence of one or more residences, lawns, roads and bridges/culverts.

Overall, benthic habitat was good and rated in the high sub-optimal range with a score of 181. Consequently, the point location on the XY graph (Figure 10) is the lower right-hand corner. This is the area of the graph where degraded biological condition can be attributed to something other than habitat quality.

The Program also assessed an unnamed tributary of Webster Run (WVMC-12-B-.5-A). Several indicators of AMD impairment were detected at the site including a low pH of 4.6, a high conductivity of 865 µmhos/cm and elevated concentrations of metals, particularly Al and Mn (Al = 6.6 mg/l, Fe = 0.94 mg/l, Mn = 3.4 mg/l).

Overall habitat was marginal with a rapid habitat score of 125. Embeddedness and sediment deposition were given a low marginal score of 6. Sand and silt were both present in heavy amounts. Assessment data indicated the presence of a residence, lawn, road and bridge/culvert in the vicinity of the site. A sewage odor was detected and the pools were described as having a dark gray sewer color. The WCMS indicated the presence of mining and a toxic release inventory site upstream of the assessment site.

The bioscore at this site was 36.4 and only 5 individuals representing 3 taxa were found in the sample. It appeared that a variety of impacts including AMD, sewage and sedimentation were associated with the observed biological impairment at this site.

BEAVER CREEK NEAR MOUTH (WVMC-12-B-1- {01})

Beaver Creek, a tributary of Little Sandy Creek (WVMC-12-B), is listed on the 1998 303(d) list for mine drainage impairment. Mining disturbances are numerous throughout much of its drainage. The Program conducted an assessment at two locations (mouth and headwaters) on Beaver Creek and found the biological condition near the mouth to be impaired with a bioscore of 27.3.

There were 6 taxa collected with 2 of them in the EPT group. No mayflies were found in the sample. The dominant taxon was the stonefly group Capniidae/Leuctridae that comprised 80% of the sample. In comparison, the site located near the headwaters of Beaver Creek received a bioscore of 72.7 and had 12 taxa with 6 of them in the EPT group. The mayfly family Ephemerellidae was present and the stonefly group Capniidae/Leuctridae was the most common taxon (53.4%).

Water samples indicated moderate impairment by mine drainage at the mouth of Beaver Creek. A pH value of 5.9 indicated the water was somewhat acidic. Concentrations of metals were not extremely high (Al = 0.73 mg/l, Fe = 0.65 mg/l, Mn = 0.52 mg/l). Benthic habitat did not appear to be a limiting factor with the rapid habitat evaluation registering a sub-optimal score of 179.

Although habitat was not a limiting factor and impacts from AMD appeared less than severe, the benthic sample collected at the mouth of Beaver Creek was representative of an AMD impaired stream. Diversity was low, mayfly taxa were absent and the sample was dominated by organisms that are somewhat tolerant of AMD pollution.

MILL RUN NEAR MOUTH (WVMC-12-B-6)

Mill Run converges with Little Sandy Creek below Cherry Run (WVMC-12-B-5) in disagreement with the AN-Code which suggests that it enters upstream of Cherry Run. Although there is some mining related activity (abandoned mine lands) within its drainage, it is not listed on the 1998 303(d) list for mine drainage impairment.

Assessment data collected by the Program indicated biological impairment at the mouth of Mill Run (WVMC-12-B-6). The bioscore was 36.4. There were only 8 taxa collected with one mayfly family represented (Baetidae). The stonefly group Capniidae/Leuctridae (72.7%) dominated the sample.

Results of water sample data collected at the assessment site failed to offer definitive clues in support of its biological impairment. The pH value was slightly acidic (5.8) and conductivity was relatively low (53 umhos/cm). Concentrations of metals were not significantly elevated (Al = 0.47 mg/l, Fe = 0.34 mg/l, Mn = 0.22 mg/l) and assessment notes did not report the presence of metal hydroxides.

Benthic habitat did not appear to be a limiting factor since the rapid habitat evaluation produced a high sub-optimal score of 173. Several disturbances were documented by the assessment team and included a residence, lawn, road, bridge/culvert, garden, bank stabilization and some channelization.

Considering the water quality data collected for this study, AMD appeared to have had little or no impact on Mill Run at this site. However, the character of the benthic macroinvertebrate community did suggest impairment by AMD since the sample was low in diversity, only one mayfly taxon was present and the community was dominated by relatively AMD tolerant taxa. It should be kept in mind that impacts from mining activities may have been periodic in nature and may not have been captured in the sample collected on the assessment date.

This stream appeared to be relatively infertile with a limited ability for neutralizing acids, making it susceptible to acid impacts from AMD or possibly acid rain.

THIRD UNNAMED TRIBUTARY OF CHERRY RUN NEAR HEADWATERS (WVMC-12-B-5-C)

An unnamed tributary of Cherry Run (WVMC-12-B-5) was assessed by the Program near its headwaters and found to be biologically impaired. This small stream is a tributary of Cherry Run which is listed on the 1998 303(d) list for mine drainage impairment. The WCMS indicated the presence of a surface mine site upstream of the assessment site.

The bioscore of this station was 45.5. A total of 237 individuals representing 9 taxa were collected. The EPT index was 3 and mayflies were absent. The stonefly group Capniidae/Leuctridae was dominant, comprising 95.4% of the sample.

The physico-chemical properties of this stream were similar to other streams of the Little Sandy Creek drainage. The pH was acidic (4.6) and the conductivity reading of 50 µmhos/cm was relatively low. Also, concentrations of metals were not substantially elevated (Al = 0.49 mg/l, Fe = 1.2 mg/l, Mn = 0.19 mg/l). This stream appeared to be relatively infertile with a limited ability for neutralizing acids, making it susceptible to acid impacts from AMD or acid rain.

The rapid habitat evaluation resulted in a final score of 154 out of 240. This placed the site in the mid-suboptimal range. One problem area was sediment deposition, which scored (10) in the marginal category. The team indicated the presence of sand in moderate amounts within the assessment area. Local disturbances included a pasture, road and bridge/culvert.

This site is similar to other streams assessed in the area. Water sample data suggest that negative impacts ranged from moderate to severe. The benthic sample displayed characteristics of acid impairment (low diversity, no mayfly taxa, dominance by Capniidae). As stated previously, these negative impairments could have been due to either mining or acid precipitation.

SOUTH FORK/GREENS RUN ABOVE MIDDLE FORK (WVMC-16-A-{0.8})

The Program conducted assessments at four locations on South Fork/Greens Run and found all four of them to be biologically impaired. The site located above Middle Fork (WVMC-16-A-{0.8}) was the only one where macroinvertebrate life was found using the single-kick precursory check procedure. The assessment team evaluated this site and found severe AMD impacts (pH = 4.1, Al = 17.0 mg/l, Fe = 41.0 mg/l, Mn = 2.8 mg/l). Additionally, the team noted that the stream was being treated with limestone fines. The color of the water was orange and it was described as extremely turbid. The team assumed the turbidity was the result of iron precipitating to the bottom as it reacted with the limestone fines.

The bioscore at this site was 36.4. A total of 5 individuals representing 4 taxa were found. Mayflies were absent from the sample.

The overall rapid habitat score (142) was high enough to rate as suboptimal. Embeddedness was given a marginal score (9) and sediment deposition was rated as poor (5). It did not appear that the limestone treatment was providing a significant measure of recovery to the benthic macroinvertebrate community at the assessment site. However, this was the only site on this stream fully sampled for benthic macroinvertebrates. Benthic macroinvertebrate sampling at the other sites was discontinued after the single precursory kick. This could indicate that the site was benefiting from the treatment.

An assessment also was conducted at the mouth of South Fork/Greens Run (WVMC-16-A-{0.2}). Benefits of the limestone treatment to the benthic community were not apparent at this site either because no macroinvertebrates were found after a single precursory kick and examination. South Fork of Greens Run is listed on the 1998 303(d) list for mine drainage impairment.

CRAB ORCHARD CREEK AT MOUTH (WVMC-17-.7)

Crab Orchard Creek is a tributary of Muddy Creek (WVMC-17) that has mining disturbances located within its drainage. Although there was no indication of mining activities within the assessment reach, the team did note the presence of a refuse pile restoration project approximately 0.2 miles upstream.

Field readings of pH (8.3) and conductivity (977 µmhos/cm) suggested some type of mine drainage treatment activity upstream, possibly associated with the refuse pile restoration. Although the concentration of iron (1.4 mg/l) nearly exceeded the state water quality standard of 1.5 mg/l, in general, metals concentrations were not substantially elevated (Al = 0.25 mg/l, Mn = 0.21 mg/).

Habitat at this site was nearly optimal with a rapid habitat score of 188. The low bioscore (27.3) reported for this site was most likely associated with mining related activities located along the stream's drainage. Nine taxa were collected with 1 mayfly family represented (Baetidae) in the sample.

MUDDY CREEK BELOW MARTIN CREEK (WVMC-17- {2.6}) and

MUDDY CREEK AT BRANDONVILLE TURNPIKE (WVMC-17- {6.8})

The Program conducted assessments at six locations on Muddy Creek. Three were found to be biologically impaired. The site below Martin Creek (WVMC-17- {2.6}) exhibited strong evidence of mine related impacts. The pH was low (3.2) and metal concentrations were high (Al = 15.0 mg/l, Fe = 48.0 mg/l, Mn = 3.7 mg/l). Heavy deposits of iron hydroxide covered the substrate and the color of the water was described as orange. The WCMS indicated there were mining activities upstream of the assessment site.

These impacts contributed to a low bioscore of 36.4. There were only 11 individuals from 6 taxa collected from the site. One mayfly taxon (Baetidae) was present. Benthic habitat did not appear to be a limiting factor as the rapid habitat score (182) was nearly optimal. Mine drainage pollutants from Martin Creek appeared to be a major contributor to the biological impairment observed at this site on Muddy Creek.

Muddy Creek at Brandonville Turnpike (WVMC-17-{6.8}) is located approximately 4.2 miles upstream of the site located below Martin Creek. Obvious AMD impacts that were present below Martin Creek were not apparent at this site. The pH was neutral (7.0) and concentrations of metals were not substantially elevated (Al = 0.70 mg/l, Fe = 0.31 mg/l, Mn = 0.22 mg/l). A small amount of iron hydroxide was observed entering the stream via a small ditch. The assessment team indicated the presence of a surface mine near the sampling area.

Benthic habitat was good and received an optimal score of 194. Although mine related impacts appeared less obvious at this site, the biological condition

(Bioscore = 45.5) was only slightly better than the bioscore at the site below Martin Creek. The benthic sample was indicative of acid impairment with a low diversity (6 taxa) and low total numbers of individuals (31). One metric that showed improvement over the site below Martin Creek was the EPT Index, which increased from zero below Martin Creek to four at the Brandonville Turnpike location.

An assessment was also conducted at the mouth of Muddy Creek (WVMC-17-{0.0}). Heavy AMD impacts were documented. No macroinvertebrate life was found in the single precursory kick sample.

Muddy Creek is listed on the 1998 303(d) list for mine drainage impairments. However, before mining began, native trout populations were known to exist in this stream. The water quality to support these populations still exists in some areas of the watershed. The Program conducted an assessment at a location approximately 10.2 miles upstream from the mouth of Muddy Creek (3.4 miles upstream from Brandonville Turnpike site) and found the biological health to be exceptional (90.9). Twenty taxa were identified from the sample with an EPT index of 14. Furthermore, there were 5 mayfly taxa in the sample. Obviously, these numbers are significantly better than those of the impaired sites on Muddy Creek.

MARTIN CREEK AT MOUTH (WVMC-17-A- {0.0})

Assessment data collected during this study supported the listing of Martin Creek on the 1998 303(d) list for mine drainage. Water quality data collected at the mouth revealed obvious mine drainage impacts (pH = 3.0, Al = 49.0 mg/l, Fe = 170.0 mg/l, Mn = 13.0 mg/l, heavy deposits of iron on substrate). The assessment team noted the existence of a coal preparation facility and a deep mine near the sampling site. The substrate was described as fused as a result of heavy iron deposits. The WCMS indicated the presence of abandoned mine lands, bond forfeiture sites and surface mine sites within the Martin Creek drainage.

The impacts observed at this site, possibly combined with impacts upstream of the site, impaired the macroinvertebrate community severely (bioscore = 27.3). There were only two organisms (1 Chironomidae, 1 Corydalidae) identified from the entire sample.

The overall rapid habitat assessment score for this site was high enough to place it in the optimal category. Consequently, the point location on the XY graph (Figure 11) is the lower right-hand corner. This is the area of the graph where degraded a biological condition can be attributed to something other than habitat quality, in this case, AMD.

An assessment also was conducted in the headwaters of Martin Creek (WVMC-17-A-{2.1}). Heavy AMD impacts were documented. No macroinvertebrate life was found. Nearly the entire length of Martin Creek appeared to be impaired by mine drainage. Martin Creek is listed on the 1998 303(d) list as impaired by mine drainage.

FICKEY RUN AT MOUTH (WVMC-17-A-.5- {0})

Although its bioscore (36.4) wasn't the lowest, the mouth of Fickey Run appeared to have the most degraded water quality with a very low pH of 2.8, a high conductivity (3920 µmhos/cm) and extremely high levels of aluminum (140.0 mg/l), iron (680.0 mg/l) and manganese (18.0 mg/l). The assessment team described the substrate as fused from heavy iron and sand deposits, making it difficult to collect a benthic sample. Additionally, the stream water was described as red in color. The team also noted the existence of a surface mine in the vicinity of the assessment site.

Considering the numerous impacts, the bioscore at this site was higher than expected. However, an examination of the macroinvertebrate data collected at this site revealed a low macroinvertebrate abundance (25), low taxa richness (7), low EPT Index (0) and the absence of mayflies.

An assessment site in the headwaters of Fickey Run (WVMC-17-A-.5-{3}) also was sampled for benthic macroinvertebrates. However, the team encountered heavy sediment loads of sand and silt, which prevented them from performing standard kick samples. As a result, the sample was collected using the hand pick method, which rendered it non-comparable to the sample collected at the mouth of Fickey Run. Organisms collected in the hand picked sample did suggest that water quality was better at the headwater site. Two mayfly taxa (Heptageniidae, Baetidae), one stonefly (Nemouridae) and one caddisfly (Limnephilidae) were found. Fickey Run is on the 1998 303(d) list for mine drainage impairment.

GLADE RUN AT MOUTH (WVMC-17-A-1- {0.0})

The assessment site on Glade Run near the mouth received the lowest bioscore (9.1). The pH of this site was low (3.2) and the conductivity was elevated (1960 µmhos/cm). Concentrations of aluminum (31.0 mg/l), iron (7.8 mg/l) and manganese (13.0 mg/l) were substantially elevated. The assessment team indicated the presence of a surface mine near the sample area. The WCMS indicated that abandoned mine lands, bond forfeiture sites and surface mine inventory sites are located within the Glade Run drainage.

Macroinvertebrate abundance was low (43) and taxa richness was only 5. There were no mayflies, stoneflies, or caddisflies in the sample.

Although the water quality impacts at this station were extreme, the overall rapid habitat score (201) placed it in the optimal category. It is important to note that the point location for Glade Run is in the lower right-hand corner of the XY graph (Figure 11). This is the area of the graph where degraded biological condition can be attributed to something other than habitat quality, in this case, AMD. Glade Run is listed as impaired by mine drainage on the 1998 303(d) list.

CHURCH RUN AT HEADWATERS (WVMC-23-A- {2.9})

Church Run is listed on the 1998 303(d) list for mine drainage impairment. The program conducted an assessment at two locations (mouth and headwaters) on Church Run and found both sites to be biologically impaired. The site located near the mouth (WVMC-23-A-{0.0}) exhibited severe mine related impacts to both water quality and habitat. Consequently, there were no benthic macroinvertebrates found at this location on Church Run in the single precursory kick sample.

Although benthic life was found at a site near the headwaters of Church Run (WVMC-23-A-{2.9}), the bioscore was 36.4 and the site was considered impaired. Only 6 taxa were collected and no mayfly representatives were found. The stonefly group Capniidae/Leuctridae comprised 61.3% of the sample. The skewed abundance of this group often characterizes AMD impaired streams.

The assessment data exhibited a low pH value of 3.1 and high concentrations of aluminum (14.0 mg/l), iron (4.2 mg/l) and manganese (2.4 mg/l) at the mouth of Church Run. The assessment team indicated that stones in the stream were red with iron on their undersides.

Rapid habitat at the headwaters was marginal (109). Several nearby disturbances were noted including a house, lawn, road and bridge/culvert. The stream had also been channelized in the assessment area. Considering the data collected during this study, the biological condition of Church Run appeared to be degraded by AMD throughout most of its length.

SAND RUN (WVMC-60-D-3-E) and
SNYDER RUN (WVMC-60-D-3-C)

Sand Run and Snyder Run are tributaries of the North Fork of the Blackwater River. This sub-watershed of the Cheat has a long history of mining with many AMD impacted streams. Sand Run and Snyder Run are no exception since both streams have mining disturbances in their headwaters. The assessment team noted the presence of a reclaimed strip mine near the sampling site on Snyder Run. The WCMS indicated the presence of a sand production operation (Seneca Sand) and a barren quarry area within the Snyder Run drainage, while Sand Run had a surface mine inventory site, Pierce Landfill and barren quarry areas within its watershed.

Although possible mining impacts were documented at these sites, the water sample analyses did not provide conclusive evidence that this activity was the cause of impairment. The pH and conductivity readings for Sand Run (pH=6.5, conductivity=73 µmhos/cm) and Snyder Run (pH=6.3, conductivity 58 µmhos/cm) were not indicative of AMD. Although water samples were not analyzed for metals, the low conductivity values suggest that concentrations of aluminum, iron and manganese were probably not substantially elevated. Also, there was no indication of metal hydroxides on the substrate at either site.

The rapid habitat score for Sand Run was relatively high (159), which placed it in the sub-optimal category. However, individual scores for embeddedness and sediment deposition were marginal. The assessment team noted the site was heavily embedded with sand, an impact often associated with surface mining or other earth disturbing activities. There were also one or more lawns, roads and bridges near the assessment site.

The rapid habitat score at the site on Snyder Run (score=180) was nearly optimal and sedimentation didn't appear to be a limiting factor to the benthic macroinvertebrate community. Snyder Run did appear to have a problem with fecal coliform bacteria. The concentration of fecal coliform bacteria was 5,440 colonies/100ml. This is substantially above the level set by the state water quality board, which designated 400 colonies/100ml as the criterion for primary contact recreation. The exact cause of the abundance in fecal coliform bacteria at the site on Snyder Run was not determined. However, the site was located downstream of a small town called Benbush. Failing septic systems or poorly treated sewage may have been the cause of increased bacteria levels.

In some cases, untreated sewage in a stream can result in recognized changes to the structure of the benthic macroinvertebrate community. Typically, when overall taxa richness is reduced, richness of sensitive taxa such as mayflies, stoneflies and caddisflies is reduced. Consequently, pollution tolerant forms such as midges and worms may become excessively dominant in the community as a result of a nutrient increase from the sewage and an increase in living space brought on by the absence of the sensitive taxa. This did not appear to be the situation with Snyder Run. Taxa richness was reduced (8 taxa) and the number of intolerant forms was low (2 taxa), however, there was no characteristic dominance by the taxa that are tolerant to organic pollutants such as sewage. Therefore, the source of the fecal coliform bacteria contamination did not appear to be degrading the benthic community at the assessment site.

In summary, the causes of the low bioscores observed on Sand Run (45.5) and Snyder Run (45.5) were difficult to determine using the water quality data collected during this study. Sedimentation may be at least partially responsible for the observed impairment on Sand Run. The cause of biological impairment on Snyder Run was less obvious even though it is listed on the 303(d) list for mine drainage impairment and was assessed near a surface mine. Benthic samples at both sites were characteristic of AMD impairment or possibly, acid deposition. Taxa richness was low. Each site had only one mayfly taxon in the sample. Both sites were dominated by acid tolerant taxa. Both sites are in need of further investigation.

ACID DEPOSTION

Mine drainage is not the only cause of pH problems in streams. Acid deposition (commonly called acid rain) is listed as a primary pollutant affecting the aquatic life of 14 streams in the Cheat watershed (1998 303(d) list). Acid deposition is caused by the emissions of sulfur dioxide and nitrogen oxides, which arise primarily from the burning of fossil fuels such as coal at power plants and fuel in automobiles (US EPA Acid Rain Program -web site). Once released into the atmosphere, they can be chemically converted into sulfuric acid and nitric acid, both of which dissolve easily in water. The effects of acid deposition are primarily seen in streams with low buffering capacities (low alkalinity), that is, those surrounded by parent materials (bedrock, soils, etc.) with limited abilities to neutralize acids. Some regions of the Cheat watershed have low buffering capacities and thus are more sensitive to acid deposition than others. Shavers Fork, a well-known trout fishery of the Cheat River is listed on the 1998 303(d) list as impaired by acid deposition. Similar to AMD streams, treatment technologies exist for streams impaired by acid deposition. Generally, a limestone base material is used to treat waters affected by acid deposition.

The macroinvertebrate community in streams affected by acid deposition is often similar to that found in streams subjected to AMD. Compared to non-acidic conditions, acidic waters generally have fewer taxa, a lower abundance and reduced biomass of benthic macroinvertebrates (Resh and Rosenberg. 1984).

MISCELLANEOUS IMPAIRMENTS

The Program used three essential elements in assessing streams in the Cheat River watershed: biological, chemical and physical (habitat) measurements. Consequently, identifying a variety of disturbances and or stressors was possible. The following biologically impaired sites were classified as miscellaneous due to the variety of possible impacts displayed by the assessment data: Coles Run (WVMC-2.5), Kelly Run (WVMC-2.7), Whites Run (WVMC-4), Patterson Run (WVMC-12-A-2) and Buckhorn Run (WVMC-31-{0.0}).

Although the impairment observed at some of the sites may have been mine related, the assessment data did not provide conclusive evidence (i. e., low pH, high conductivity, high concentrations of metals, yellow boy, etc.) supporting AMD as the principal cause of the impairment.

COLES RUN (WVMC-2.5),

KELLY RUN (WVMC-2.7) and

WHITES RUN (WVMC-4)

Coles Run, Kelly Run and Whites Run are direct tributaries to Cheat River. The mouths of all three streams are located on the Cheat Lake section of the river in the vicinity of the Interstate 68 bridge. Apparently, the biological impairment observed at these sites was due to the numerous disturbances observed at the assessment sites and within each watershed in general.

Coles Run flows into the lake at an area called Sunset Beach on the northeast side of the lake. Field readings of basic water quality parameters were not indicative of a major pollution problem at the site (pH = 7.4, Conductivity = 208). However, the low bioscore (45.5) obtained at the site indicated that something was stressing the biological component of the stream. Although taxa richness was moderate (11), the number of mayflies, stoneflies, caddisflies and other intolerant taxa was low (EPT index = 3, Number of intolerant taxa = 2). Additionally, the benthic sample was dominated by two taxa, the caddisfly family Hydropsychidae and aquatic worms (Nematoda). These two taxa accounted for 68.0% of the sample and are generally considered tolerant to many sources of pollution. Also, no mayfly taxa were present.

The rapid habitat score (152) was categorized as low suboptimal with sediment deposition registering a marginal score (10) and riparian vegetation zone width scoring (5) in the poor category. The assessment team observed numerous activities and disturbances near the site that included residences, lawns, pipes/drains, roads, bridges/culverts, riprap/bank stabilization and channelization. The team also noted that roadway gravel was abundant in the stream. A surface mine inventory site was present upstream of the assessment site (WCMS). The numerous disturbances on this stream appear to be at least partially responsible for the observed biological impairment.

Impairment of the benthic community on Kelly Run was more severe than that reported on Coles Run. The bioscore was only 36.4. The individual metrics showed that taxa richness (7) and the EPT Index (2) were very low. There were no intolerant taxa found in the subsample. Additionally, the community was dominated by two taxa (Hydropsychidae and Simuliidae) which comprised 95.5% of the entire subsample. Dominance by these two filter feeding taxa may indicate organic enrichment upstream, possibly from a failing septic system or overloaded sewage treatment plant. The fecal coliform bacteria concentration was only 150 colonies /100 ml.

Although the rapid habitat score (179) was high suboptimal, the assessment team documented several activities and disturbances near the site including one or more residences, lawns, roads, bridges/culverts and parking lots. Major disturbances located upstream of the assessment site include two Interstate 68 crossings, strip mining near the headwaters and some agricultural disturbances. A slightly elevated conductivity reading (300 µmhos/cm) suggested the possible presence of pollutants.

Whites Run enters the lake just upstream of the I-68 bridge from the southwest side of the lake. Similar to Coles Run and Kelly Run, the biological impairment on Whites Run appeared to be closely associated with numerous disturbances observed at the assessment site as well as disturbances located upstream. The team noted the presence of one or more residences, lawns, pipes/drains, roads, bridges/culverts and bank stabilization. An unidentified (by the assessment team) industrial structure was located within the assessment area and local watershed erosion was described as heavy. Additionally, construction activities were apparent on both sides of the stream with riparian vegetation being heavily disturbed. Disturbances located upstream of the assessment site included several bridges, residences and abandoned mine lands near the headwaters. The low bioscore (36.4) at this site was likely associated with these disturbances. A slightly elevated conductivity reading (379 µmhos/cm) suggested the potential presence of pollutants.

PATTERSON RUN (WVMC-12-A-2)

The habitat and physico-chemical data collected at the assessment site on Patterson Run failed to offer distinct clues in support of its biological impairment. The overall rapid habitat score of 187 was good and high enough to classify the site near optimal. The assessment team noted that the sample site on Patterson Run was located downstream of a nearby impoundment in a residential area called Lake O' Woods. The impoundment of a free-flowing stream by damming may alter the aquatic environment downstream of the dam in several ways. Changes in water temperature, dissolved oxygen and food concentrations as a result of damming are known to alter benthic macroinvertebrate communities (Resh and Rosenberg 1984). Dense populations of filter feeding insects such as Simuliidae (blackflies) and Hydropsychidae (caddisflies) often develop in streams below dams as a result of large plankton populations released from the upstream reservoir.

The low bioscore (45.5) at this site appeared to be associated with the dam. Simuliidae and Hydropsychidae together comprised 77% of the benthic macroinvertebrate sample for this site. Additionally, taxa richness was relatively low (8 taxa) and there were no intolerant taxa in the sample. It is possible that several taxa expected to be present at this site were absent due to environmental changes caused by the dam.

BUCKHORN RUN (WVMC-31-{0.0})

The bioscore for the site on Buckhorn Run was 45.5. There were only 8 different taxa identified from a total sample of 16 organisms. The EPT index was 1 and there were no mayflies in the sample.

Field readings of water quality suggested that this stream was generally infertile. The conductivity reading (30 µmhos/cm) was low which suggested an insignificant concentration of calcium carbonate and other minerals as well as metals. A pH value was not recorded because of complications with the probe on the Hydrolab instrument.

Overall, the rapid habitat score (170) was high and classified in the upper suboptimal range. However, several disturbances were observed at the assessment site. An old limestone mine was adjacent to the site with associated roads and bridges. The assessment team noted the presence of riprap/bank stabilization, channelization and fill. It was noted that these disturbances may have occurred many years ago and probably were not influencing the water quality at the assessment site. Other disturbances and possible pollutant sources in the Buckhorn Run drainage were abandoned mine lands and the Tunnelton landfill (WCMS).

Based on the information gathered during this study, there was no well-defined cause of biological impairment determined for Buckhorn Run. However, the value for conductivity suggested the stream had a low alkalinity, which could make it more susceptible to impacts by AMD or acid deposition. Finally, the assessment team noted that sampling for benthic macroinvertebrates was difficult due to the abundance of boulder-sized particles and the lack of small substrate particles such as cobble and gravel. It is possible the benthic collection techniques employed at this site did not effectively sample the macroinvertebrate community. This site needs further investigation.

STATIONS WITHOUT BENTHIC MACROINVERTEBRATE SAMPLES

Although the collection of benthic macroinvertebrates was an important component of the Program's protocol for assessing streams in the Cheat watershed, there were numerous circumstances that prevented assessment teams from complying with this protocol at all stations. Assessment teams were unable to collect benthic samples at 19 sites (Table 13). This does not include 41 sites where benthic life was not found during the one kick precursory sample (see last paragraph on page 25). The following is a breakdown of the reasons or circumstances that prevented benthic sampling at these 19 stations:

- 5 sites were too deep to safely collect samples,
- 5 sites did not have adequate riffle/run areas,
- 1 station was described as a swamp,
- 1 station had inadequate flow from which to collect a sample,
- 4 stations were described as ephemeral,
- 2 stations were not physically accessible and
- 1 station was located on a study stream in Fernow Experimental Forest where the Program did not have approval to sample.

NON-COMPARABLE BENTHIC SAMPLES

Comparing benthic data that were obtained using different sampling techniques is not appropriate within the Program's current analysis procedure. Therefore, assessment sites with non-riffle/run (kick sampled) benthic data or incomplete sampling data must be analyzed separately.

The majority of the streams sampled were riffle/run type. As a result, reference conditions were developed for this habitat type. Assessment sites with glide/pool habitat were not frequently encountered during the study. Therefore, reference conditions for glide/pool habitat streams were not established and bioscores were not calculated.

In general, the biological condition of these streams was determined using best professional judgement after carefully considering benthic macroinvertebrate, physico-chemical and habitat data. Seven stations were sampled using non-riffle/run kick net techniques (Table 14). Five had a predominance of glide/pool habitat and were sampled using the MACS technique. One had a partial kick sample performed and one was sampled using the hand pick method.

Analysis of assessment data indicated that all seven sites had some degree of biological impairment. Most of the samples had unbalanced benthic communities with very few sensitive taxa.

Barnes Run (WVMC-12-B-2) had poor instream benthic habitat with heavy deposits of sand and silt. Habitat at Cherry Run (WVMC-12-B-5-{03}) was generally good, however, the dissolved oxygen was low (3.34 mg/l) and an anaerobic odor was detected. Little Lick Run (WVMC-18-A-1) and Pendleton Creek (WVMC-60-D-4) had good rapid habitat scores, but were heavily embedded with sand and silt, respectively. The site on North Branch of Blackwater River (WVMC-60-D-9) received a sub-optimal score for macroinvertebrate habitat. However, the assessment team noted an abundance of sand on the stream bottom. Fickey Run (WVMC-17-A-.5- {3}) was sampled using the hand pick method in a riffle/run area of the stream. Heavy deposits of sand and silt were noted. This site also exhibited a relatively high concentration of fecal coliform bacteria (4,500 colonies/100 ml) along with a high conductivity value of 1,137 µmhos/cm. Smoky Hollow (WVMCS-.5) had severe habitat degradations with a rapid habitat score of 44. Only three kicks were obtained from Smoky Hollow.

At all of these sites field teams reported large quantities of sand and silt. Assessment teams described the Pendleton Creek site and the North Branch of Blackwater River site as slow moving streams with wetland-like attributes. Sediment moves slowly from low-gradient streams. Consequently, heavy sediment deposits are typical in many wetland-like streams. Therefore, it is reasonable to conclude that these sites had an abundance of sediment covering their substrates.

Assessment notes did not reveal the character (wetland-like or not) of the other glide/pool sites (Barnes Run, Cherry Run, Little Lick Run). Therefore, it is unknown if the sediment loads reported at these sites are the result of long term deposition in slow moving streams or recent disturbances upstream that embedded the riffle/run substrate and prevented the collection of benthic macroinvertebrates with the standard kick net technique.

FINDINGS -- FECAL COLIFORM BACTERIA

The West Virginia water quality standards state that for primary contact recreation (e.g., swimming, boating, fishing), the fecal coliform bacteria concentration is not to exceed 400 colonies/100 ml in more than 10% of all samples taken during a month. In other words, streams with a count greater than 400 are considered to be potentially unsafe.

FECAL COLIFORM BACTERIA

Fecal Coliform Bacteria are organisms that naturally live in the intestines of birds and mammals, including man. Released to the environment in feces, disease-causing organisms may accompany fecal coliform. Thus, the presence of fecal coliform in a water sample indicates the potential presence of human pathogens. A stream could have a high concentration of fecal coliform due to a variety of sources, including failing septic systems, wildlife that concentrates along a stream, livestock herds with free access to the stream and field applied manure that washed into the stream. Therefore, understanding local land uses is important for inferring the reasons for a high count at any particular site.

Results of fecal coliform bacteria sampling for all assessment sites are presented in Table 18. Assessment sites with fecal coliform concentrations exceeding the standard of 400 colonies / 100 ml are presented in Table 20. Figure 15 presents a location map of sites exceeding the fecal coliform bacteria standard of 400 colonies.

Concentrations of fecal coliform bacteria ranged from zero colonies / 100 ml at eight sites to 60,000 colonies /100 ml at two sites (Hazel Run at headwaters, Hackelbarney Run near headwaters).

Figure 15: Violations of the Fecal Coliform Bacteria Standard

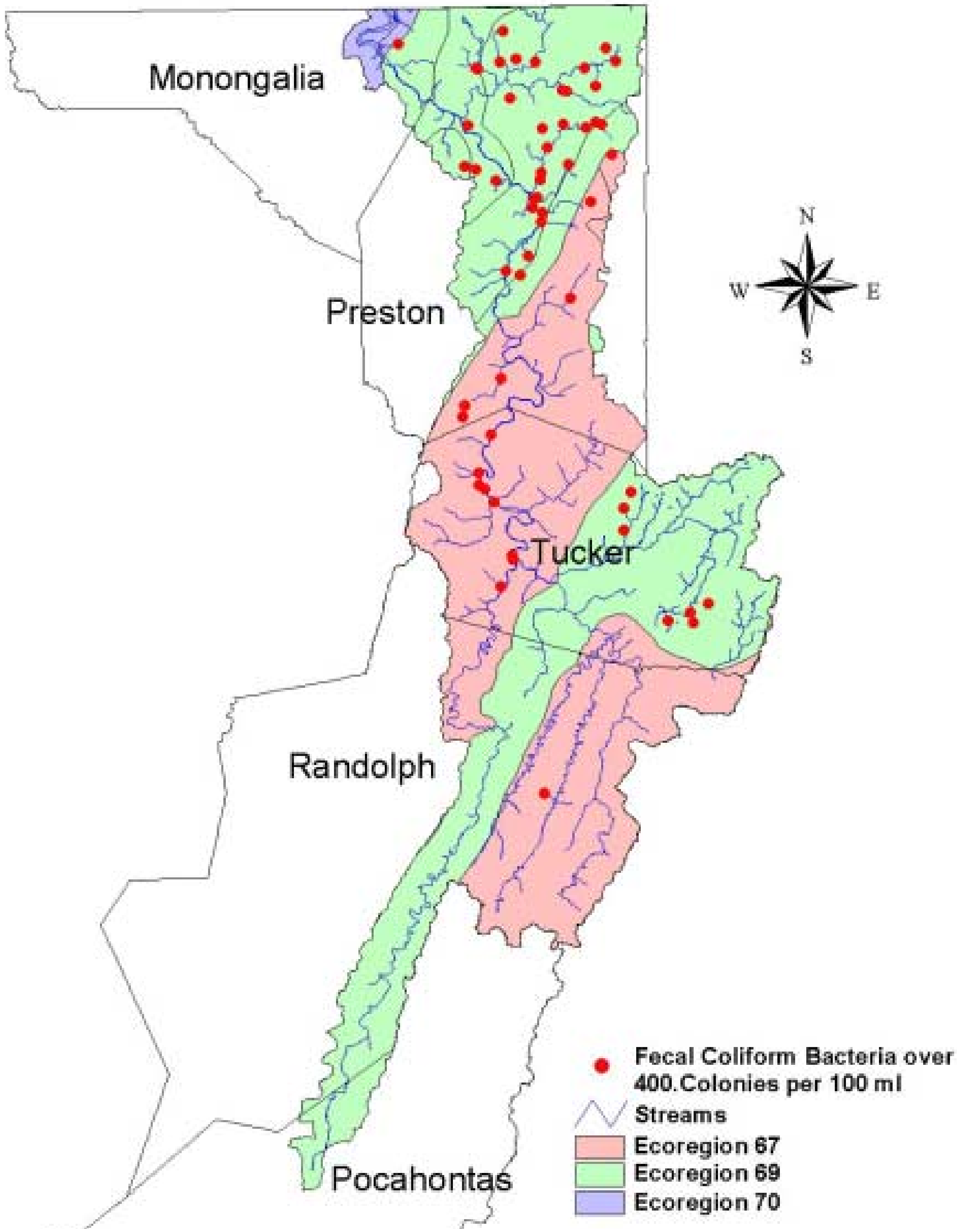
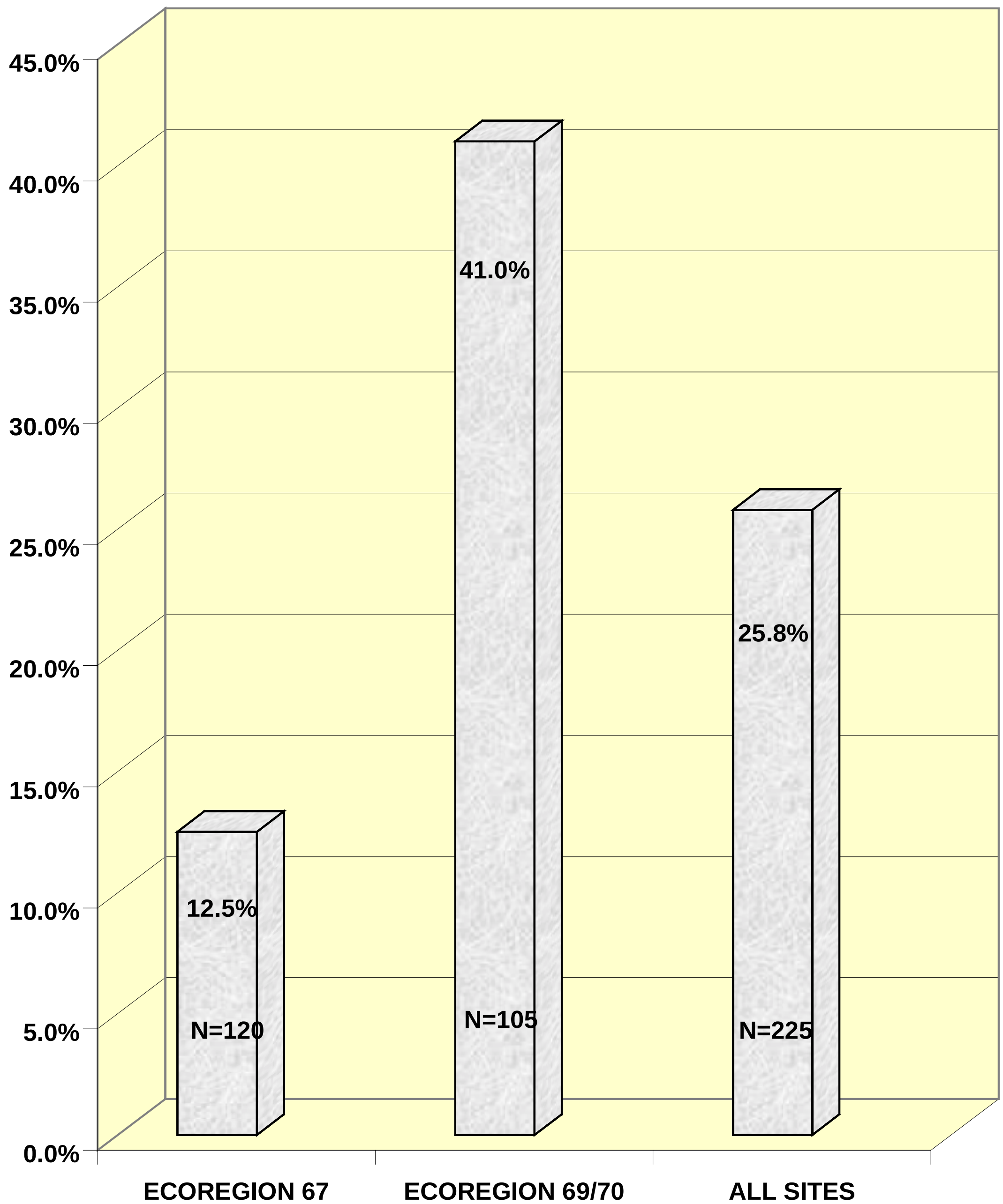


Figure 16: Percentage of Sites with Fecal Coliform Bacteria Violation

(> 400 colonies / 100 ml)



Considering all assessment sites sampled for fecal coliform bacteria in the watershed, 25.8% (n = 225) had fecal coliform concentrations exceeding 400 colonies/100ml (Figure 16). There was a distinct difference between ecoregions in the percentage of sites exceeding the standard for fecal coliform bacteria. Only 12.5% (n = 120) of the assessment sites in Ecoregion 67 exceeded the standard. In contrast, the percentage of sites exceeding the standard in Ecoregions 69/70 was 41.0 (n = 105, includes 3 Ecoregion 70 sites).

Given the variety of potential sources of fecal coliform bacteria, it is sometimes difficult to pinpoint the cause of high concentrations in streams. For example, Hackelbarney Run near its headwaters had a fecal coliform bacteria concentration of 60,000 colonies / 100 ml. Assessment teams indicated the presence of several disturbances/activities near the site including a residence, open pipe/drain, pasture and poultry. All of these are potential sources of fecal coliform bacteria. Since this site was located near the upper reaches of Hackelbarney Run where few sources of pollution could exist upstream, one or a combination of these sources was most likely the cause of the high concentration of fecal coliform bacteria in this stream.

While the site on Hackelbarney Run had several potential sources noted, a site located near the headwaters of Hazel Run had only one disturbance/activity documented. This site had a fecal coliform bacteria concentration of 60,000 colonies /100 ml and the only disturbance noted was a surface mine. Hazel Run also was sampled about one mile above the mouth. The fecal coliform bacteria concentration was also extremely high with a value of 30,000 colonies /100 ml at this site. A residential road was the only noted disturbance. There were some agricultural related activities in this portion of the watershed including livestock farms. Several residences were also noted in the Hazel Run drainage. An intensive study is needed to determine the source of the extremely high levels of fecal coliform bacteria in this stream and all others exceeding the standard.

FINDINGS --PHYSICO-CHEMICAL SAMPLING

The results of field readings for temperature, dissolved oxygen, pH and conductivity are presented in Table 18. The results for aluminum, iron, manganese, hot acidity, alkalinity and sulfate are given in Tables 20 and 21.

The water quality standard for dissolved oxygen is 5.0 mg/l. Cherry Run near its headwaters was the only site that violate the standard with a value of 3.3 mg/l. This site was located in a pasture and was assessed as a glide / pool stream. Assessment data indicated heavy deposits of sand. Several factors may have contributed to the low dissolved oxygen concentration at this site. Glide / pool streams are generally slow moving with very little surface action, thus, low levels of dissolved oxygen can be expected. Heavy sand deposits cover larger substrate materials such as boulders and can effectively eliminate the riffle/run areas that increase dissolved oxygen via surface agitation. Also, this site was located in a pasture where livestock wastes may be entering the stream and causing a decrease in dissolved oxygen via decomposition by bacteria. Finally, this site was sampled relatively early in the day (9:30 am). The absence of light reduces the amount of photosynthesis and causes a reduction in dissolved oxygen. It sometimes takes hours to recover from this nightly reduction in dissolved oxygen.

The minimum water quality standard for pH is 6.0 standard units. The Program sampled 65 (25.6%, n = 254) sites with pH values below 6.0 (Table 22).

There were no sites exceeding the maximum standard of 9.0. Figure 17 presents a location map of the sites violating the minimum pH standard. The pH ranged from 2.2 in an unnamed tributary of Heather Run (WVMC-24-A), to 8.7 in Horse Camp Run (WVMC-60-Q). It is important to note that all violations of the minimum standard were from sites in Ecoregions 69/70 (44.5% of sites, n = 146), which implicates mining impacts that are generally not found in Ecoregion 67.

Conductivity readings ranged from 13 µmhos/cm in Warner Run (WVMC-60-T-11) to 3,920 near the mouth of Fickey Run (WVMC-17-A-.5-{0}). Fickey Run was severely degraded by mining impacts, including high concentrations of metals. The high conductivity reading at this site was a reflection of the elevated metals.

The state water quality standard (acute) for aluminum is 0.750 mg/l. The Program sampled 62 (54.9%, n = 113) sites with aluminum concentrations exceeding the standard (Table 23). All violations were from sites sampled in Ecoregions 69/70 (56.9% of sites, n = 109). Figure 18 presents a location map of the sites violating the acute standard for aluminum. Aluminum concentrations ranged from 0.23 mg/l at the headwaters of Cherry Run (WVMC-12-B-5-{03}), to 140.0 mg/l at the mouth of Fickey Run (WVMC-17-A-.5-{0}). Mining activities appeared to be the primary causes of increased aluminum concentrations in the watershed.

Figure 17: Sites Violating the Water Quality Standard for pH

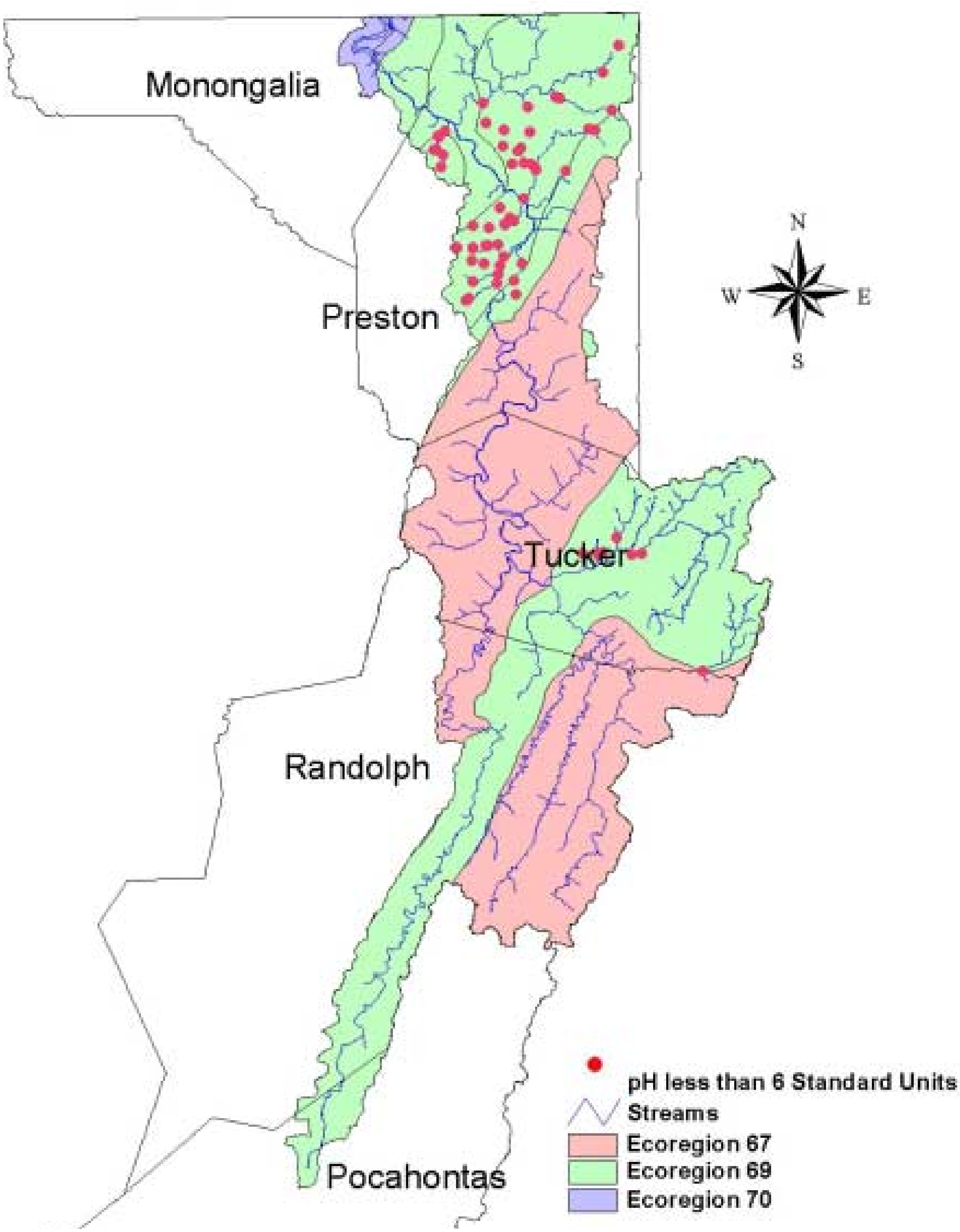


Figure 18: Sites Violating the Water Quality Standard for Aluminum

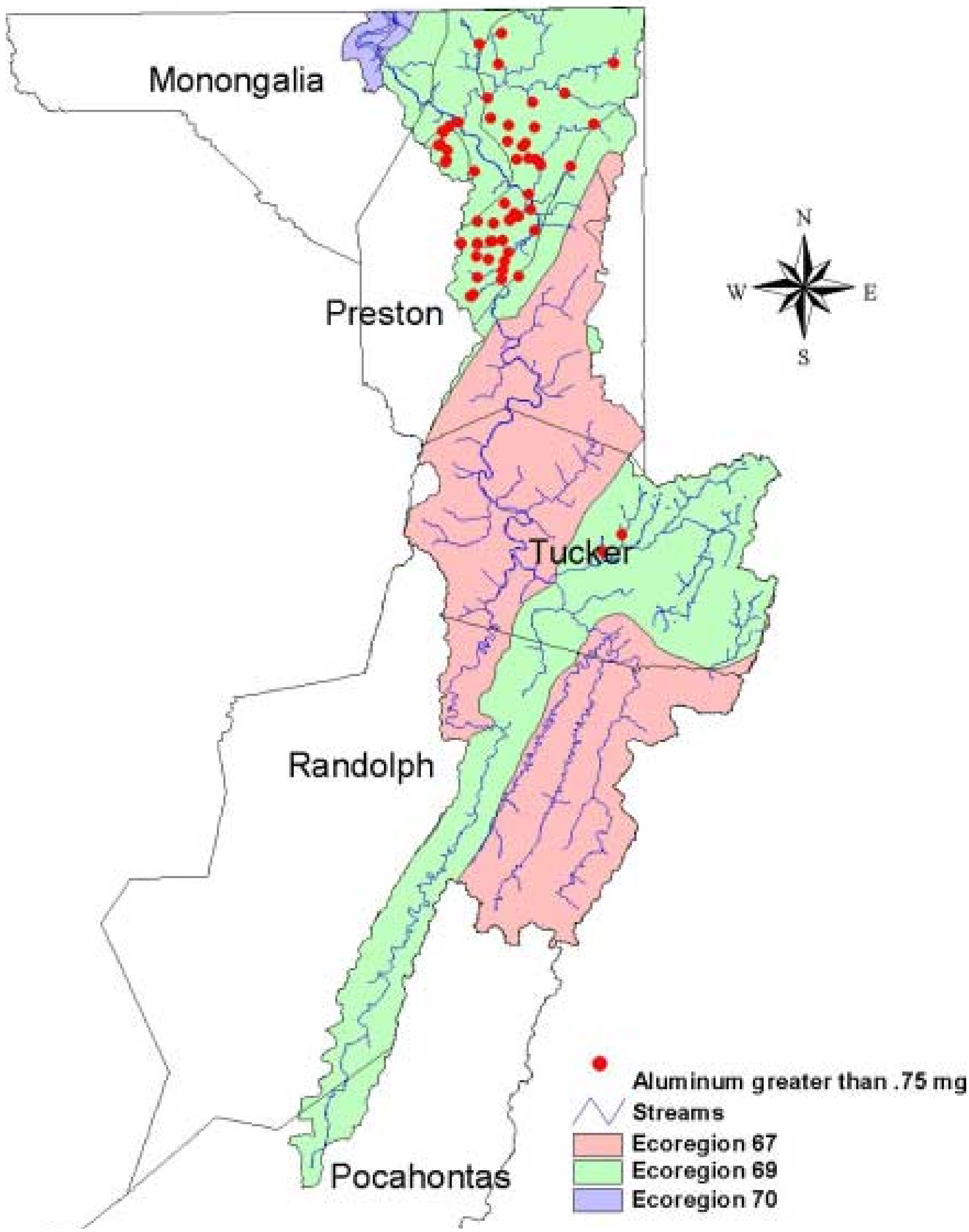


Figure 19: Sites Violating the Water Quality Standard for Iron

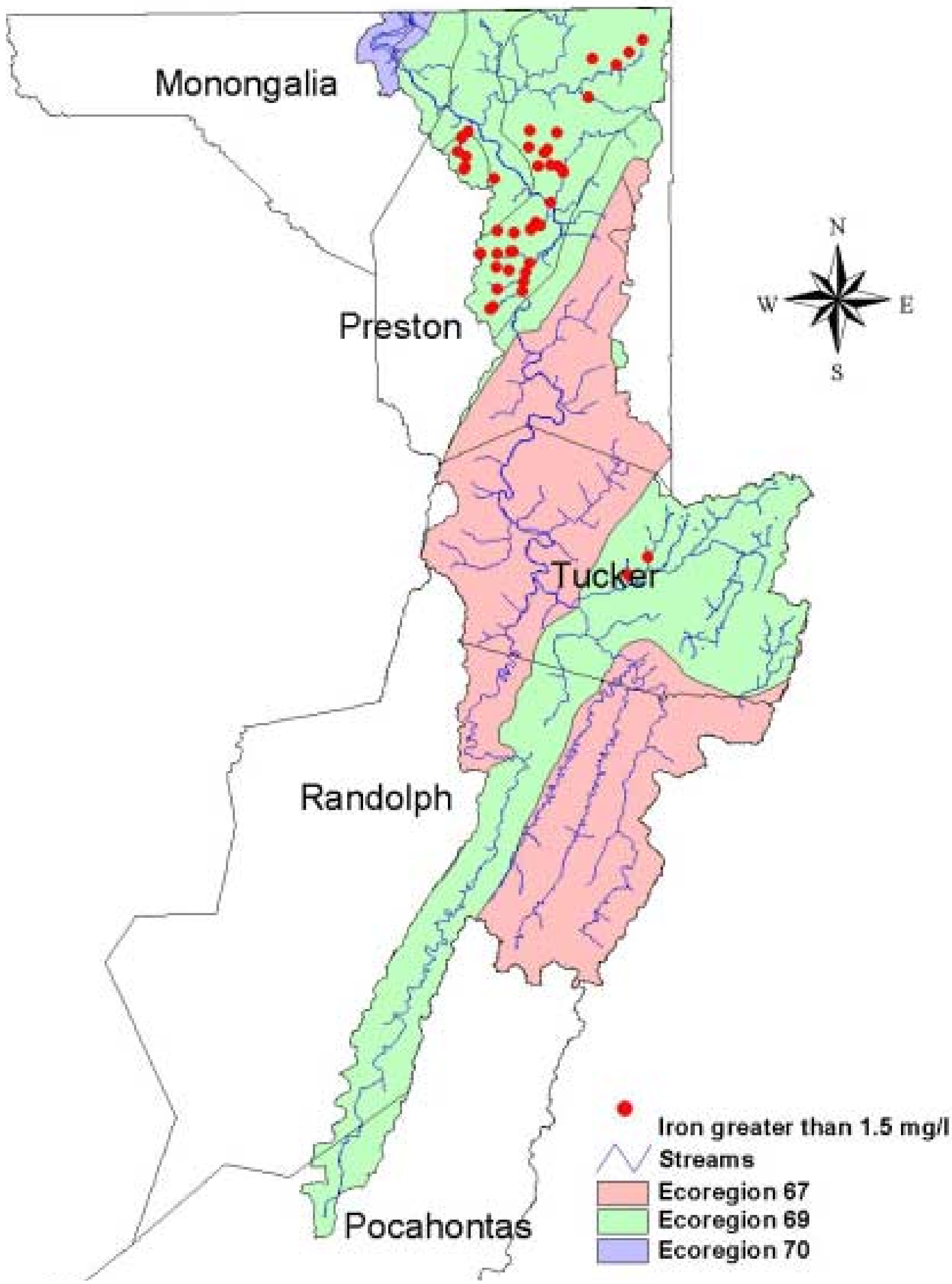
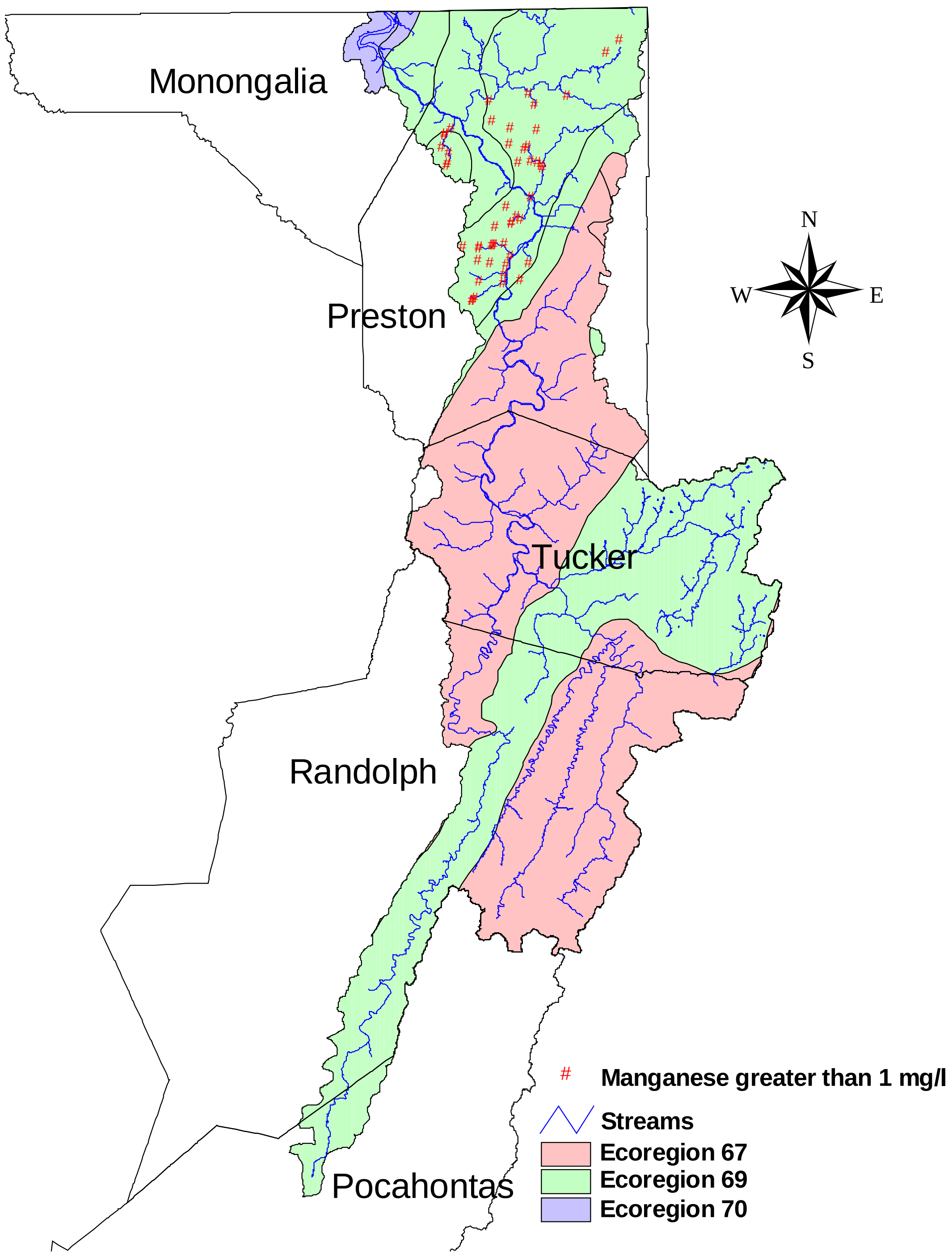


Figure 20: Sites Violating the Water Quality Standard for Manganese



The water quality standard (chronic) for iron is 1.5 mg/l. The Program sampled 47 (41.2%, n = 114) sites with iron concentrations exceeding the standard (Table 23). All violations were from sites sampled in Ecoregions 69/70 (43.1% of sites, n = 109). Figure 19 presents a location map of the sites violating the standard for iron. Iron concentrations ranged from 0.20 mg/l at the mouth of Big Sandy Creek (WVMC-12- {00}), to 680.0 mg/l at the mouth of Fickey Run (WVMC-17-A-.5- {0}). Fickey Run at the mouth was one of the most severely impaired sites encountered (sampled for benthic macroinvertebrates) during the study that supported at least some benthic macroinvertebrates. In addition to a low pH and high concentrations of metals, other mining related impacts were documented. The assessment team described the substrate as fused from heavy iron and sand deposits. The stream water was described as red in color. The team also noted the existence of a surface mine in the vicinity of the assessment site.

The water quality standard for manganese is 1.0 mg/l. The program sampled 50 (43.9%, n = 114) sites that exceeded this standard (Table 23). All of the violations were from sites sampled in Ecoregions 69/70 (45.9%, n = 109). Figure 20 presents a location map of the sites violating the standard for manganese. Manganese concentrations ranged from 0.012 mg/l at Ashpole Run (WVMC-21), to 29.0 mg/l at the mouth of an unnamed tributary of Glade Run (WVMC-17-A-1.2). Once again, mining activities appeared to be the cause of increased manganese levels at these sites.

Four sites were sampled for hot acidity, alkalinity and sulfate (Table 21). These parameters are sometimes measured when AMD is suspected. There are no water quality standards for these parameters. Three of the four sites had low pH values. Tub Run (WVMC-60-D-2) had a pH of 4.0, a hot acidity of 30.0 mg/l, an alkalinity of less than 1.0 mg/l, a sulfate result of 28.0 mg/l and violations of the iron and aluminum standards. Although the value for sulfate was not extremely elevated, the net acidity of approximately 30.0 mg/l indicated that it may have been impaired by AMD or acid deposition. No aquatic life was found in the single precursory kick. A surface mine was located near the site.

Long Run (WVMC-60-D-3-A) also was impaired by AMD with a pH of 3.0, a net acidity of approximately 150.0 mg/l and a sulfate reading of 230.0 mg/l. Metal concentrations were elevated and the team indicated that the stream was severely degraded by AMD. No aquatic life was found in the single precursory kick.

Big Run (WVMC-60-D-1) was slightly impaired by AMD or acid deposition. The pH (4.0) was low and the site produced a net acidity of approximately 76.0 mg/l. Metal concentrations, sulfate concentrations and conductivity, however, were not elevated and the assessment team did not note the presence of mining activities in the area. The team did note that the water appeared to have a slight tannic color. This stream appeared to be relatively infertile with a low acid neutralizing capacity, making it susceptible to impairment by acid deposition.

A site on the Cheat River near St. George was also sampled for hot acidity (<1.0 mg/l), alkalinity (17.0 mg/l) and sulfate (10.0 mg/l). The results were not indicative of AMD.

FINDINGS -- HABITAT ASSESSMENT

Habitat quality assessment is an important component of biological surveys because aquatic animals often have specific habitat requirements independent of water quality. The Program evaluated habitat quality by assessing a variety of parameters such as sediment deposition, riffle frequency, bank condition, proximity to roads, local watershed erosion, etc. These assessments were useful in determining causes of water quality degradation and impairment to benthic communities. They also provided insight into the type and degree of human influences as well as the site's potential for reference status. Additionally, program managers can use this information when prioritizing areas for restoration.

The eight-page stream assessment form involved an evaluation of habitat within and around each 100-meter stream reach. Table 7 presents the physical measurements of the stream. The average stream width, riffle depth, run depth and pool depth are presented. Stream width ranged from 0.2 meters (8 inches) wide at Jump Rock Run to an estimated 80.0 meters (88 yards) wide at Cheat River near Albright. The majority of the streams sampled were relatively small, with nearly 90% being less than or equal to 10 meters wide.

Human related activities and disturbances observed near the assessment sites are recorded in Tables 24-27. The most frequently encountered disturbances were roads, which were observed at 80.6% (n = 269) of the assessment sites in the watershed. Bridges / culverts were also commonly encountered (50.4% of sites, n = 269). The frequency of these disturbances was a reflection of the assessment strategy used by the Program, which dictated that streams be assessed at or as near the mouth as possible. These locations were often near a bridge or culvert, where access to the stream was generally less difficult than at other locations. Other frequently encountered disturbances were residences, lawns, bank stabilization and channelization. The only major difference in disturbances between ecoregions was the presence of surface mines, deep mines and coal preparation plants. There were no surface mines, deep mines, or preperation plants observed at the assessment sites in Ecoregion 67. In contrast, surface mines were observed at 30.3% (n = 148, includes 3 Ecoregion 70 sites) of the assessment sites in Ecoregions 69/70. These disturbances and their resultant pollutants were a major cause of biological impairment at several assessment sites in Ecoregion 69.

Observations were made on the sediment and substrate at the assessment sites. Assessment teams examined the sediment for the presence of odors and oils. They recorded the types of sediment deposits and the percent composition of the inorganic substrate such as cobble, gravel and sand. Information collected on sediment is found in Tables 8 and 9. Sand and silt were the most frequently encountered sediment deposit in the watershed. Sand was found at 69.1 % (n = 269) of the sites, while silt was documented at 64.7% of these sites. Metal hydroxide deposits were more prevalent in Ecoregions 69/70 (16.8% of sites, n = 148) than in Ecoregion 67 (0.0%, n = 121). Once again, these metal deposits were a reflection of the extensive mining activities in the northern portion of the watershed.

Assessment teams recorded observations on the water at each site. Table 17 summarizes observations on water odor, surface oils and turbidity. Most sites had normal or no (90.0 %, n = 269) water odor and none had surface oils. A sewage odor and an anaerobic odor were detected at a few sites.

An important factor in maintaining the quality of habitat of streams is the intactness of the stream bank and the riparian vegetation buffer zone (i.e., the vegetation in the area closest to the stream). Stream bank vegetation performs a vital role in the control of erosion in streams. Trees and woody shrubs produce deeper and more permanent root systems than grasses and herbaceous plants. Thus, these woody plants are more effective in reducing erosion throughout the year. A forested riparian zone buffers a stream from runoff pollution, controls erosion and provides instream habitat and nutrients to the stream.

At each site assessment teams evaluated the canopy, understory and ground cover in the area extending along each stream for 100 meters and 18 meters out from each stream bank. Results from this evaluation are presented in Tables 28-30. In general, small trees and woody shrubs provided the most cover at most of the sites.

An important element of each stream assessment was the completion of a two page rapid habitat assessment (from EPA's EMAP-SW, Klemm and Lazorchak, 1994). The form provided a numerical score of the habitat conditions most likely to affect aquatic life. The information from this section provided insight into what macroinvertebrate taxa might have been present, or might have been expected to be present at the sample site. It also provided information on physical impairments to the stream habitat that were encountered during the assessment.

A rapid habitat assessment data set is a valuable tool because it provides a means of comparing sites to one another. The 12 parameters are scored zero to 20 for a total possible score of 240. It is this total score that is used in the biological and habitat data summary graphs, or XY graphs (Figures 7 to 11). Results of the rapid habitat assessment for each site are presented in Table 31.

The lowest individual score for a site was at Smoky Hollow with a score of 44. A site on Otter Creek received the highest score of 225.

In general, the watershed as a whole exhibited relatively good habitat with an average total score of 170.6 for non-reference sites. This score is high enough to be in the upper sub-optimal category, which is defined as less than desirable but satisfies expectations in most areas.

Although a sub-optimal rating is basically good, a comparison to the average total score of the reference sites (205.3 = optimal category) indicated a possibility for improvement (Figure 21). The habitat parameters that exhibited the most degradation were riparian vegetation zone width, grazing or other disruptive pressure, dediment deposition and embeddedness.

Considering the entire watershed, 65.8% of the sites received a marginal or poor score for riparian vegetation zone width. A total of 38.3% received a poor score for this parameter. The grazing or other disruptive pressure category also scored low at several sites with 29.2% in the marginal or poor category. These two parameters are good indicators of human disturbance. In part, the low scores for these parameters are a reflection of the easy access (near bridges, beside roads) sampling strategy employed by the Program. Regardless, of this strategy, a narrow riparian zone is less effective at buffering pollutants from runoff, is less effective at controlling erosion and does not provide ample stream habitat and appropriate nutrient input into the stream.

In both Ecoregions 67 and 69/70, the habitat category showing the most degradation (percent of sites with marginal or poor scores) was riparian vegetation zone width" (75.7% in Ecoregion 67 and 58.4% in Ecoregions 69/70). However, some differences were observed between ecoregions. The parameters showing the second and third highest levels of degradation in Ecoregion 67 were grazing or other disruptive pressure" (37.9 %) and bank vegetative protection (20.4 %). In contrast to this, in Ecoregions 69/70 these positions were held by sediment depostion (41.6 %) and embeddedness (40.1 %).

Figure 21: Degraded Stream Habitat Parameters

(See Ecoregion Map on Page 14)

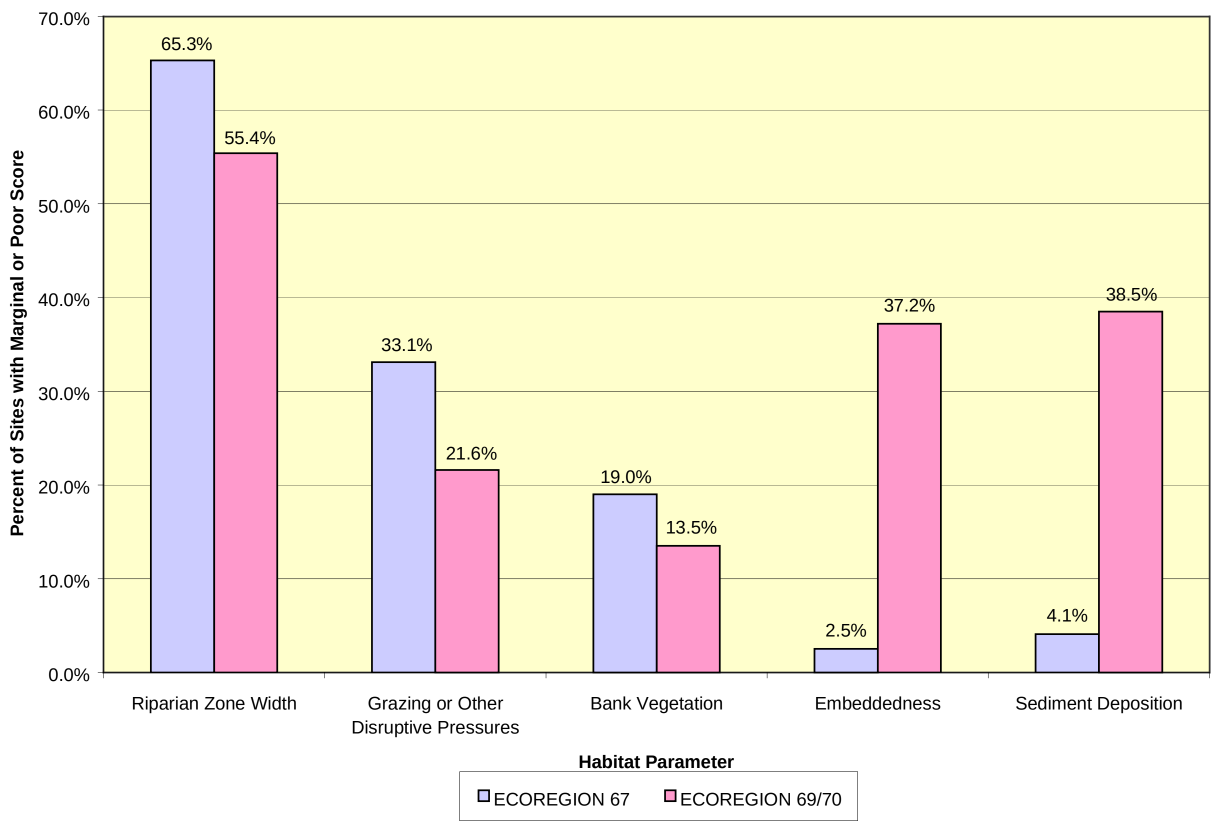
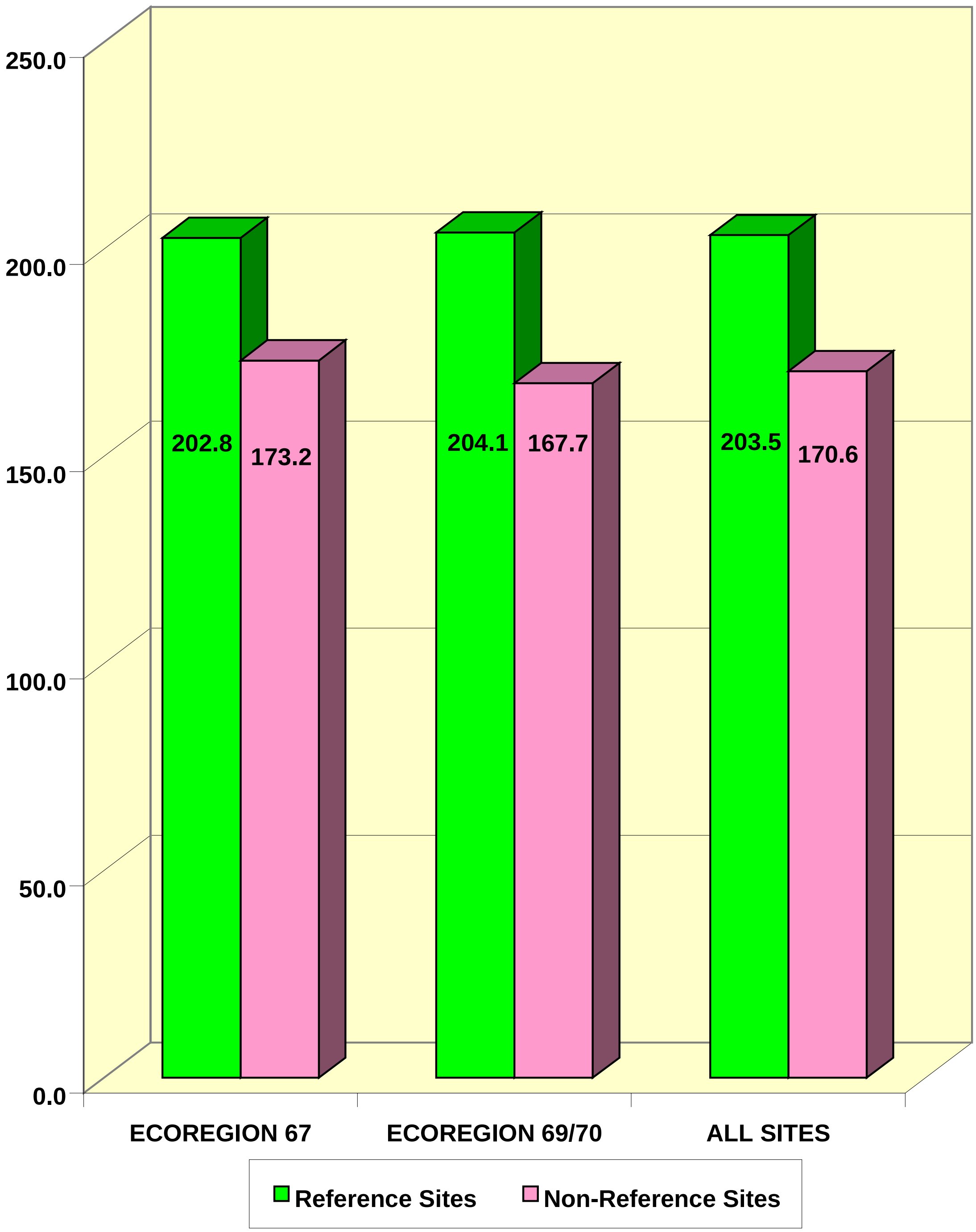


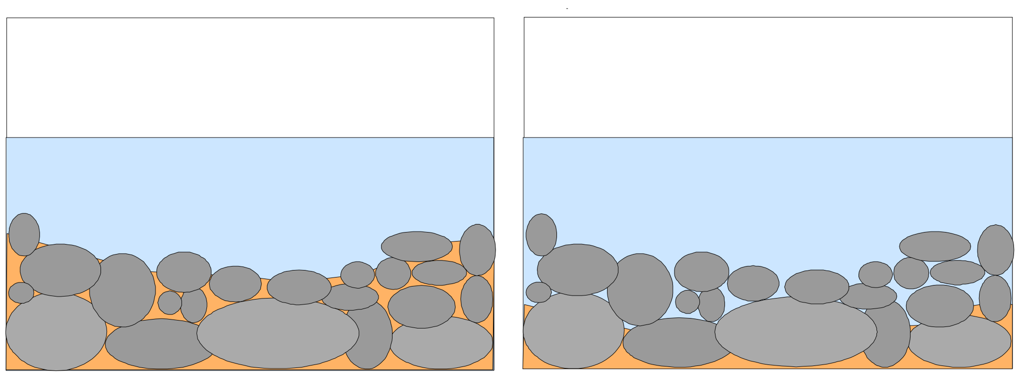
Figure 22: Summary of Average Rapid Habitat Scores



Marginal or poor scores for sediment deposition and embeddedness were given much less frequently in Ecoregion 67. For embeddedness only 4.9 % of the assessment sites in Ecoregion 67 received marginal or poor scores while only 2.9% of the sites received marginal or poor scores for sediment deposition. The disparity in these parameters may be attributed to the extensive mining activities in Ecoregions 69/70. The major earth disturbing activities associated with mining activities overwhelm streams with sediment and metal hydroxides. High levels of sediment deposition create unstable and continually changing environments that become unsuitable for many benthic macroinvertebrates. Embeddedness refers to the extent to which rocks (boulders, cobble or gravel) are covered or sunken into the silt, sand or mud of the stream bottom. Generally, as rocks become more embedded, the surface area (living spaces) available to macroinvertebrates is decreased (see Figure 23).

Figure 23. Illustration of Embeddedness

The view on the left is heavily embedded with sand and silt. Notice the different amounts of interstitial space (the space between rocks and gravel).



Heavily Embedded   Lightly Embedded

An examination of average habitat scores showed that the non-reference sites in Ecoregion 67 were less degraded than the non-reference in Ecoregions 69/70 (Figure 21). The average score for Ecoregion 67 was 173.2, 30 points less than its respective reference site average of 202.8. The average score for Ecoregions 69/70 was 167.7, 36 points less than its respective reference site average of 204.1.

BIG SANDY CREEK
(Intact Riparian Zone)
Photo by Julia Lucas, Friends of the Cheat

IMPLICATIONS

The restoration of highly degraded streams and the preservation of high quality streams presents great challenges to the Program and other concerned agencies, as well as the citizens of West Virginia. The mission of the West Virginia Division of Environmental Protection's Office of Water Resources is to address these challenges by enhancing and preserving the physical, chemical and biological integrity of surface and ground waters, considering nature and the health, safety, recreational and economic needs of humanity. The following implications attempt to address the charges of restoration and preservation of streams assessed by the Program in the Cheat River watershed. Ideally, a discussion of the status of each stream would be presented. However, due to the extensive scope of the study, implications are given in generalities with citations of specific examples provided for illustration.

IMPLICATIONS - ACID MINE DRAINAGE IMPACTED STREAMS

A significant number of streams in the watershed were biologically impaired by AMD. Several of these are currently listed on the 1998 303(d) list. The majority were located in the northern portion of the watershed where extensive mining activities have degraded the water quality of several streams for many years. Although there are many treatment technologies available for treating AMD, the cost of chemicals, equipment and continuous maintenance make the treatment of all affected streams impossible. Consequently, successful treatment of even one stream should be viewed as a tremendous accomplishment. Restoration efforts have been implemented on many streams in the Cheat River watershed. A limestone treatment station on the Blackwater River has been in operation since the early 1990s. This station has stabilized the pH in the Blackwater River and has allowed for brown trout reproduction in the vicinity of Blackwater Falls State Park.

The restoration activities on Sovern Run provide an example of what can be done to improve the water quality of streams degraded by AMD. Sovern Run is a small tributary of Big Sandy Creek, which flows into the Cheat River near the Preston -Monongalia County border. Mining activities date back to the 1940s in this watershed. Consequently, the watershed receives runoff from many surface mines and water discharges from numerous deep mines.

Some restoration activities in the Sovern Run watershed occurred long before the recent efforts initiated by the Friends of the Cheat watershed association. Their recent efforts were in response to the recognition that sustainable environmental health for the watershed could only be achieved through a broad base of stakeholders.

The first effort to remediate the water quality in Sovern Run involved a pneumatic stowing device used to seal a deep mine portal with 120 tons of limestone. A primary purpose of this activity was to reduce the amount of acid water discharged from the mine. Water quality improvements were recognized for a brief period as pH increased from 2.8 (pre-treatment) to 5.3 and acidity decreased from an average 458 mg/l to 42 mg/l and alkalinity increased from zero mg/l to 57 mg/l, after adding the limestone. The limestone used to seal the mine portal became armoured with metal precipatates and ceased to be effective. From this and other early projects it was discovered that using limestone fines instead of larger boulders in passive mine restoration projects was more effective over longer periods.

Other remedial activities for Sovern Run include the reconstruction of a pond to flood the mine, the installation of a 650 foot open limestone channel, the construction of a catchment basin for collecting metal precipitates and the reclamation of refuse piles. The Friends of the Cheat association should be commended for their efforts in establishing partnership organizations and securing the resources necessary to restore Sovern Run. Their efforts set an example for other AMD restoration projects, which might include projects on some of the streams identified by the Program in its study of the Cheat River watershed. Restoration plans should be developed for the AMD streams not currently being treated.

Additional information on restoration of streams impacted by acid mine drainage may be obtained from the Office of Abandoned Mine Lands and Reclamation at (304) 759-0521.

TREATMENT ON SOVERN RUN
Photo by Julia Lucas, Friends of the Cheat

IMPLICATIONS - ACID DEPOSITION

The 1998 303(d) list contains 14 streams in the Cheat River Watershed with impairment due to acid deposition. The primary data source used to develop the list was the Division of Natural Resources' infertile streams database. If the long-term average pH of a particular stream was less than 6.0 standard units, the stream was listed. If long-term data were not available, professional judgement was used to list the stream with consideration given to pH, conductivity, biology and prior knowledge of the watershed. Streams treated with limestone were not included on the list, provided the pH was being maintained at or above 6.0 standard units.

The effects of acid deposition are seen primarily in streams with low buffering capacities (low alkalinity), that is, those surrounded by parent materials (bedrock, soils, etc.) with limited abilities to neutralize acids. Some regions of the Cheat watershed have low buffering capacities and thus are more sensitive to acid deposition than others. Shavers Fork, a well-known trout fishery and tributary of the Cheat River, is currently listed on the 1998 303(d) list as impaired by acid deposition along with several of its tributaries.

Although impairment resulting from acid deposition was difficult to verify in this study, certain physico-chemical data (slightly acidic pH values and low conductivity readings) collected at some of the assessment sites suggested that it should not be discounted as a possible pollutant. The streams in the Cheat River watershed which this study indicated might be impacted by acid deposition but are not on the 303(d) list for acid deposition include: Sand Run (WVMC-60-D-3-E), Snyder Run (WVMC-60-D-3-C), Big Run (WVMC-60-D-1) and Tub Run (WVMC-60-D-2). All are tributaries of the Blackwater River. Other streams not assessed in this study also may be impacted by acid deposition. Because many of these streams were assessed for the first time, long-term pH data do not exist. Therefore, an intensive study is needed to validate acid deposition as a pollutant source.

Similar to AMD streams, treatment technologies exist for streams impaired by acid deposition. Generally, a limestone base material is used to treat waters affected by acid deposition. The Division of Natural Resources has demonstrated positive results on several streams in the past decade, including Otter Creek of the Cheat watershed.

IMPLICATIONS - FECAL COLIFORM BACTERIA

The West Virginia water quality standards state that for primary contact recreation (e.g., swimming, boating, fishing), the fecal coliform bacteria concentration is not to exceed 400 colonies/100 ml in more than 10% of all samples taken during a month. Of the total number of sites analyzed for fecal coliform bacteria, 25.8% had concentrations exceeding the criterion. A notable finding was the distinct difference between ecoregions in the percentage of sites violating the criterion of 400 colonies /100 ml. Only 12.5% of the assessment sites in Ecoregion 67 exceeded the standard. In contrast, the percentage of sites exceeding the standard in Ecoregions 69/70 was 41.0.

Since Ecoregions 69/70 was generally more developed (it had more people and more agriculture with livestock) it seems reasonable to assume that sources of fecal coliform bacteria would have been more numerous. It is likely that many small towns and residential areas had no sewage disposal or depended on septic tanks, which include a pump-and-dump management procedure. When properly maintained, septic systems can provide adequate sewage treatment. However, neglected ones can lead to malfunctioning systems that can introduce fecal contamination into ground and surface waters. Agricultural activities that permit livestock to access streams for watering can be a significant source of fecal coliform bacteria contamination. Also, feed lots located too close to streams can contribute fecal coliform bacteria via runoff during precipitation events.

Given the variety of potential sources of fecal coliform bacteria, it is sometimes difficult to pinpoint the causes of high concentrations in streams. An intensive study is needed to determine the sources of the extremely high levels of fecal coliform bacteria in streams exceeding the standard. This study would include identifying what type of sewage treatment the local communities and residences are using, as well as determining the adequacy of the treatment. Also, it would include determining the contribution that livestock have on the concentrations of fecal coliform bacteria in streams.

HABITAT DEGRADATION

The habitat parameters that exhibited the most degradation in this study of the Cheat watershed were riparian vegetation zone width, grazing or other disruptive pressure, sediment deposition and embeddedness. Riparian vegetation zone width and grazing or other disruptive pressure are good indicators of human disturbance. They are both measures of the type and amount of vegetation associated with stream corridors. In part, the low scores for these parameters are a reflection of the easy access (near bridges, beside roads) sampling strategy employed by the Program. In other instances, vegetation was removed from stream corridors to provide land for development activities such as residential areas, businesses, industry and agriculture. Additionally, riparian vegetation was often removed in futile efforts to curb flooding. A narrow riparian zone with significant disruptions is less effective at buffering pollutants from runoff, less effective at controlling erosion and does not provide ample stream habitat and appropriate nutrient input into the stream.

Sediment deposition and embeddedness can be good indicators of human disturbance. Results of this study implicated mining and other human disturbances as the primary cause of sediment deposition and embeddedness in Ecoregions 69/70, where nearly one half of the streams scored marginal or poor for both parameters. Surface mines were observed at 30.4% of the assessment sites in this ecoregion.

Suggested Action List

- Continue to preserve and enhance the high quality waters present in this watershed and other watersheds.
- Continue restoration efforts on streams impaired by acid mine drainage.
- Continue support of the Friends of the Cheat watershed association and similar groups in West Virginia.
- Develop an action plan for the prevention of erosion that includes protecting the natural vegetation along stream corridors and revegetating stream corridors where necessary.
- Conduct a detailed investigation of Buckhorn Run (WVMC-31) to determine the cause and origin of the impairment of this stream.
- Conduct an intensive study to determine the source(s) of extremely high concentrations of fecal coliform bacteria in some streams in the watershed
- Conduct a study to validate acid deposition as a pollutant source.

The association between these four parameters is important to consider. Severely disturbed riparian zones with little or no vegetation are highly erodable and can contribute significantly to stream sedimentation. Therefore, an action plan for the prevention of erosion should include protecting the natural vegetation of the stream corridor. An action plan to restore highly eroded areas may include revegetation with natural or exotic plants.

HIGH QUALITY STREAMS

High quality streams with minimal human disturbances provide significant and even irreplaceable wildlife habitat. They also provide tremendous scientific, educational and recreational resources. During this study, the Program assessed several high quality streams. A total of 25 assessment sites met the minimum criteria for reference site status. Several others were close to meeting the criteria. Since reference sites reflect least-degraded conditions, it is vital that DEP do its part to preserve the high quality of these important streams.

HIGH FALLS OF CHEAT, SHAVERS FORK
Photo by Greg Green

ADDITIONAL RESOURCES

The watershed movement in West Virginia includes a wide variety of federal, state and non-governmental organizations that are available to help improve the health of the streams in this watershed. Several agencies have established the West Virginia Watershed Management Framework. A basin coordinator has been employed to coordinate the activities of these agencies. The basin coordinator may be contacted at (304) 558-2108. In addition the DEP's Stream Partners Program coordinator, available at (800) 556-8181, serves as a clearinghouse for these and other resources.

CHEAT RIVER
Photo by Lindsay Abraham, WV DEP

REFERENCES

Barbour, M.T., J. B. Stribling, J. Gerritsen and J. R. Karr. 1996. Biological criteria, technical guidance for streams and small rivers. United States Environmental Protection Agency. EPA 822-B-96-001: pp 27-34.

Hughes, R. M., D. P. Larsen and J. M. Omernik. 1986. Regional reference sites: a method for assessing stream potentials. *Environmental Management* 10(5): pp 629-635.

Hilsenhoff, W.L. 1988. Rapid field assessment of organic pollution with a family-level biotic index. *Journal of the North American Benthological Society* 7(1): pp 65-68.

Klemm, D. J. and J. M. Lazorchak (eds.) 1994 . Environmental Monitoring and Assessment Program, Surface Waters and Region III Regional Environmental Monitoring and Assessment Program: *1994 Pilot Field Operations and Methods Manual for Streams*. US EPA, Cincinnati, OH. EPA/620/R-94/004.

Maxted, J. R. 1993. Macroinvertebrate collection and habitat assessment for low gradient, nontidal streams. Standard operating procedures and technical basis (Draft). Delaware Division of Natural Resources. Dover, DE.

Merritt, R.W. and K.W. Cummins, eds. 1984. Introduction to the aquatic insects of North America. Second edition. Kendall/Hunt Publishing Co., Dubuque, Iowa.

Omernik, J. M., D. D. Brown, C. W. Kiilsgaard and S. M. Pierson. 1992. (Map) Draft ecoregions and subregions of the Blue Ridge Mountains, Central Appalachian Ridges and Valleys and Central Appalachians of EPA Region 3. United States Environmental Protection Agency. ERL-C, 8/26/92.

Pennsylvania Department of Environmental Protection. 1997. Application of the rapid bioassessment protocol multimetric approach to Pennsylvania's water quality network sites (Draft). Pennsylvania Department of Environmental Protection, Bureau of Watershed Conservation.

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross and R. M. Hughes. 1989. Rapid bioassessment protocols for use in streams and rivers: Benthic macro invertebrates and fish. United States Environmental Protection Agency. EPA/444/4-89-00.

Resh and Rosenberg. 1984. The ecology of aquatic insects. New York: Praeger Publishers. 625 pp.

Ross, R. D. And G. E. Lewis, 1969. Stream Survey of District II, West Virginia. D-J Project F-10-R-(1-11). West Virginia Department of Natural Resources, Charleston, WV.

Skousen, J., M. Burnett, D. Bassage, C. Black, P. Ziemkiewicz and D. Zucker. 1999. The watershed approach of acid mine drainage abatement: Sovern Run. Center for Agricultural and Natural Resources Development, West Virginia University Extension Service. http://www.wvu.edu/~agexten/landrec/sovrnrun.htm

Smithson, Janice. 1997. *Watershed Assessment Program Standard Operating Procedures*. West Virginia Division of Environmental Protection, Office of Water Resources, Watershed Assessment Program.

Stribling, J., M. Barbour and C. Gerardi. March 1993. Habitat assessment variability and spatiotemporal factors affecting biological metrics. Tetra Tech, Inc., Owings Mills, Maryland.

US Environmental Protection Agency. 1999. Environmental effects of acid rain. United States Environmental Protection Agency, Acid Rain Program. http://www.epa.gov/ardpublc/

West Virginia Department of Natural Resources . 1982. Monongahela River Basin Plan. West Virginia Department of Natural Resources, Division of Water Resources.

West Virginia Department of Natural Resources. 1982. Inter-Office Memorandum: Report on benthic study of Big Sandy Creek in Preston County. West Virginia Department of Natural Resources, Division of Water Resources.

West Virginia Department of Natural Resources. 1986. West Virginia High Quality Streams. Fifth edition. West Virginia Department of Natural Resources, Wildlife Resources Division.

West Virginia Division of Environmental Protection. 1996. State of West Virginia 1993-1995 305(b) Report. West Virginia Division of Environmental Protection, Office of Water Resources.

West Virginia Division of Environmental Protection and US Environmental Protection Agency, 1997. Dissolved Oxygen TMDL Development for Upper Blackwater River, West Virginia. (Draft). West Virginia Division of Environmental Protection and US Environmental Protection Agency.

West Virginia Division of Natural Resources. 1995. Studies of limestone treatment of acid mine drainage affected streams. West Virginia Division of Natural Resources, Wildlife Resources Section.

APPENDIX A: TABLES

Table 6: Sites Sampled In The Cheat River Watershed

Streams are listed in order from mouth to headwaters
Reference site rows are shaded.
Significant tributaries (those with four or more sample sites) are in BOLD TYPE.

Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
MORGAN RUN	WVMC-2	7/23/96	39	42	18.81	79	49	51.51	70	MONO
DARNELL HOLLOW	WVMC-2-A	7/29/96	39	41	37.00	79	49	0.00	69	MONO
COLES RUN	WVMC-2.5	7/23/96	39	40	51.26	79	50	24.64	69	MONO
BIRCH HOLLOW	WVMC-2.5-A	7/23/96	39	40	51.26	79	50	12.29	69	MONO
KELLY RUN	WVMC-2.7	7/23/96	39	40	40.91	79	51	26.83	70	MONO
WHITES RUN	WVMC-4	7/23/96	39	39	31.70	79	51	50.78	70	MONO
SCOTT RUN / CHEAT RIVER	WVMC-7	7/23/96	39	36	58.03	79	47	19.86	69	PRES
BIG RUN NEAR PISGAH	WVMC-10	7/23/96	39	36	39.77	79	45	42.05	69	PRES
BULL RUN @ MOUTH	WVMC-11-{00}	6/18/96	39	35	26.00	79	45	42.01	69	PRES
1ST UNT BULL RUN @ MOUTH	WVMC-11-.1A	6/18/96	39	35	6.00	79	46	20.01	69	PRES
MIDDLE RUN @ MOUTH	WVMC-11-A	6/18/96	39	35	2.00	79	46	17.01	69	PRES
BULL RUN ABOVE MIDDLE RUN	WVMC-11-{05}	6/18/96	39	35	3.00	79	46	13.00	69	PRES
MOUNTAIN RUN @ MOUTH	WVMC-11-B	6/18/96	39	34	8.00	79	46	41.01	69	PRES
LICK RUN/BULL RUN @ MOUTH	WVMC-11-C	6/18/96	39	34	7.00	79	46	37.01	69	PRES
BULL RUN BELOW 2ND UNT	WVMC-11-{07}	6/18/96	39	34	11.00	79	46	32.01	69	PRES
2ND UNT / BULL RUN	WVMC-11-C.1	6/18/96	39	33	47.00	79	45	55.01	69	PRES
LEFT FORK BULL RUN @ MOUTH	WVMC-11-D-{00}	6/18/96	39	33	6.00	79	46	0.01	69	PRES
LEFT FORK BULL RUN @ HEADWATERS	WVMC-11-D-{10}	6/19/96	39	32	34.00	79	44	35.01	69	PRES
RIGHT FORK BULL RUN @ MOUTH	WVMC-11-E	6/18/96	39	32	59.00	79	46	6.01	69	PRES
BIG SANDY CREEK @ MOUTH	WVMC-12-{00}	6/17/96	39	35	50.00	79	44	52.01	69	PRES
SOVERN RUN @ MOUTH	WVMC-12-.5A-{0}	6/17/96	39	37	15.00	79	42	20.01	69	PRES
SOVERN RUN @ HUDSON	WVMC-12-.5A-{3}	6/17/96	39	35	56.00	79	42	6.01	69	PRES
SOVERN RUN @ HEADWATERS	WVMC-12-.5A-{5}	6/17/96	39	35	24.00	79	40	31.00	69	PRES
PARKER RUN / BIG SANDY CREEK	WVMC-12-.7A	7/24/96	39	37	4.74	79	40	31.60	69	PRES
LAUREL RUN / BIG SANDY CREEK NEAR MOUTH	WVMC-12-A-{02.5}	6/19/96	39	39	5.00	79	43	19.01	69	PRES
LITTLE LAUREL RUN	WVMC-12-A-1	6/19/96	39	39	10.00	79	43	26.01	69	PRES
LICK RUN / LITTLE LAUREL RUN	WVMC-12-A-1-A	7/29/96	39	39	19.34	79	44	37.02	69	PRES
PATTERSON RUN	WVMC-12-A-2	7/24/96	39	41	56.96	79	43	54.41	69	PRES
LAUREL RUN ABOVE PATTERSON RUN	WVMC-12-A-{03}	6/19/96	39	40	55.00	79	42	58.01	69	PRES
LITTLE SANDY CREEK NEAR MOUTH	WVMC-12-B-{01}	6/18/96	39	37	46.00	79	39	1.00	69	PRES
WEBSTER RUN @ MOUTH	WVMC-12-B-.5-{00}	6/18/96	39	37	41.00	79	38	57.01	69	PRES
UNT / WEBSTER RUN	WVMC-12-B-.5-A	6/18/96	39	36	55.00	79	38	27.01	69	PRES
WEBSTER RUN @ HEADWATERS	WVMC-12-B-.5-{02}	6/18/96	39	36	29.00	79	38	24.01	69	PRES
LITTLE SANDY CREEK BELOW BEAVER CREEK	WVMC-12-B-{02}	6/19/96	39	37	49.00	79	37	14.01	69	PRES
BEAVER CREEK NEAR MOUTH	WVMC-12-B-1-{01}	6/19/96	39	37	37.00	79	35	58.01	69	PRES
1ST UNT / BEAVER CREEK	WVMC-12-B-1-B	6/19/96	39	37	33.00	79	35	35.01	69	PRES

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed

Streams are listed in order from mouth to headwaters
Reference site rows are shaded.
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Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
BEAVER CREEK NEAR HEADWATERS	WVMC-12-B-1-{04}	6/19/96	39	36	41.00	79	31	5.01	69	PRES
BARNES RUN	WVMC-12-B-2	6/17/96	39	40	44.00	79	35	12.01	69	PRES
LITTLE SANDY CREEK BELOW HOG RUN	WVMC-12-B-{06}	6/19/96	39	39	5.00	79	33	59.01	69	PRES
HOG RUN @ MOUTH	WVMC-12-B-3-{00}	6/19/96	39	39	35.00	79	33	12.01	69	PRES
HOG RUN @ HEADWATERS	WVMC-12-B-3-{02}	6/18/96	39	41	15.00	79	32	43.01	69	PRES
ELK RUN NEAR MOUTH	WVMC-12-B-4-{02}	6/19/96	39	37	52.00	79	32	56.01	69	PRES
ELK RUN ABOVE UNTS	WVMC-12-B-4-{03}	6/19/96	39	37	52.00	79	33	2.01	69	PRES
PINEY RUN @ MOUTH	WVMC-12-B-4.5	6/19/96	39	40	23.00	79	32	9.01	69	PRES
MILL RUN / LITTLE SANDY NEAR MOUTH	WVMC-12-B-6	6/19/96	39	39	13.00	79	31	50.01	69	PRES
LITTLE SANDY CREEK BELOW CHERRY RUN	WVMC-12-B-{11}	6/18/96	39	39	34.00	79	31	55.01	69	PRES
3RD UNT CHERRY RUN NEAR HEADWATERS	WVMC-12-B-5-C	6/18/96	39	41	2.00	79	30	20.01	69	PRES
CHERRY RUN NEAR HEADWATERS	WVMC-12-B-5-{03}	6/18/96	39	41	10.00	79	30	56.01	69	PRES
LITTLE SANDY ABOVE CHERRY RUN	WVMC-12-B-{12}	6/19/96	39	39	29.00	79	31	16.01	69	PRES
HAZEL RUN NEAR MOUTH	WVMC-12-C-{01}	6/19/96	39	39	35.00	79	41	21.01	69	PRES
HAZEL RUN @ HEADWATERS	WVMC-12-C-{04}	6/19/96	39	41	41.00	79	41	2.01	69	PRES
GLADE RUN WEST OF BRUCETON MILLS	WVMC-12-D	6/19/96	39	39	44.00	79	39	57.01	69	PRES
BIG SANDY CREEK @ BRUCETON MILLS FALL	WVMC-12-{10}	6/17/96	39	39	33.00	79	38	19.01	69	PRES
GLADE RUN NORTH OF BRANDONVILLE	WVMC-12-E	6/17/96	39	40	22.00	79	37	33.01	69	PRES
UNT / BIG SANDY CREEK NEAR CLIFTON MILLS	WVMC-12-E.1	6/17/96	39	42	5.00	79	37	0.01	69	PRES
LITTLE SANDY CREEK @ MOUTH	WVMC-12-F-{00.0}	6/17/96	39	42	26.00	79	37	35.01	69	PRES
LITTLE SANDY CREEK NEAR CLIFTON MILLS	WVMC-12-F-{01.0}	7/24/96	39	42	54.61	79	37	26.99	69	PRES
BIG SANDY CREEK ABOVE LITTLE SANDY CREEK	WVMC-12-{14}	6/17/96	39	42	23.00	79	37	42.01	69	PRES
CHEAT RIVER ABOVE BIG SANDY	WVMC-00-{18.3}	6/17/96	39	35	40.00	79	44	56.01	69	PRES
GIBSON RUN	WVMC-13-{01}	6/17/96	39	35	20.00	79	44	14.00	69	PRES
CONNER RUN NEAR HEADWATERS	WVMC-13.5-{2.3}	6/17/96	39	34	18.00	79	40	40.00	69	PRES
HACKELBARNEY RUN NEAR HEADWATERS	WVMC-14-{02}	6/19/96	39	32	19.00	79	43	38.00	69	PRES
LAUREL RUN ABOVE HOGBACK RUN	WVMC-15-{01}	6/19/96	39	31	6.00	79	41	20.00	69	PRES
LONG HOLLOW	WVMC-15-A	7/29/96	39	31	1.66	79	42	6.99	69	PRES
CHEAT RIVER @ ALBRIGHT	WVMC-00-{28.8}	6/18/96	39	29	42.00	79	38	42.00	69	PRES
GREENS RUN	WVMC-16-{02}	6/17/96	39	29	14.00	79	39	48.00	69	PRES

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed

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Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
SOUTH FORK / GREENS RUN @ MOUTH	WVMC-16-A-{0.2}	6/17/96	39	29	25.00	79	40	7.00	69	PRES
MIDDLE FORK / GREENS RUN	WVMC-16-A-.1	6/17/96	39	29	3.00	79	40	33.00	69	PRES
SOUTH FORK / GREENS RUN ABOVE MIDDLE FK	WVMC-16-A-{0.8}	6/17/96	39	29	0.00	79	40	33.00	69	PRES
SOUTH FORK / GREENS RUN ABOVE LIME. FINES	WVMC-16-A-{2.5}	6/17/96	39	28	45.00	79	41	59.00	69	PRES
SOUTH FORK / GREENS RUN NEAR HEADWATERS	WVMC-16-A-{3.9}	6/18/96	39	28	58.00	79	43	21.00	69	PRES
GREENS RUN @ PLEASANTDALE	WVMC-16-{04}	6/19/96	39	30	8.00	79	41	53.00	69	PRES
MUDDY CREEK @ MOUTH	WVMC-17-{0.0}	6/19/96	39	30	42.00	79	38	52.01	69	PRES
2ND UNT / MUDDY CREEK	WVMC-17-.6A	6/17/96	39	31	35.00	79	38	2.01	69	PRES
CRAB ORCHARD CREEK @ MOUTH	WVMC-17-.7	6/17/96	39	32	3.00	79	37	55.01	69	PRES
MUDDY CREEK BELOW MARTIN CREEK	WVMC-17-{2.6}	6/17/96	39	32	39.00	79	37	50.01	69	PRES
MARTIN CREEK @ MOUTH	WVMC-17-A-{0.0}	6/17/96	39	32	54.00	79	37	54.01	69	PRES
FICKEY RUN @ MOUTH	WVMC-17-A-.5-{0}	6/17/96	39	33	4.00	79	38	16.01	69	PRES
FICKEY RUN NEAR HEADWATERS	WVMC-17-A-.5-{3}	6/18/96	39	35	2.00	79	37	43.01	69	PRES
GLADE RUN @ MOUTH	WVMC-17-A-1-{0.0}	6/17/96	39	33	8.00	79	38	53.01	69	PRES
1ST UNT GLADE RUN @ MOUTH	WVMC-17-A-1.1	6/18/96	39	33	57.00	79	39	23.01	69	PRES
2ND UNT GLADE RUN NEAR MOUTH	WVMC-17-A-1.2	6/18/96	39	34	10.00	79	39	7.01	69	PRES
GLADE RUN NEAR HEADWATERS	WVMC-17-A-1-{3.2}	6/18/96	39	35	17.00	79	38	19.01	69	PRES
MARTIN CREEK @ HEADWATERS	WVMC-17-A-{2.1}	6/19/96	39	33	5.00	79	39	56.01	69	PRES
MUDDY CREEK ABOVE MARTIN CREEK	WVMC-17-{3.2}	6/17/96	39	33	43.00	79	37	19.01	69	PRES
UNT MUDDY CREEK @ MOUTH	WVMC-17-A.1	6/18/96	39	35	3.00	79	34	0.01	69	PRES
MUDDY CREEK @ BRANDONVILLE TURNPIKE	WVMC-17-{6.8}	6/18/96	39	35	18.00	79	35	55.01	69	PRES
JUMP ROCK RUN @ MOUTH	WVMC-17-B	6/19/96	39	35	24.00	79	33	8.01	69	PRES
SUGARCAMP RUN / MUDDY CREEK	WVMC-17-C	7/24/96	39	35	18.00	79	32	33.00	69	PRES
MUDDY CREEK ABOVE SUGARCAMP RUN	WVMC-17-{10.2}	6/19/96	39	35	15.00	79	32	35.01	69	PRES
MUDDY CREEK NEAR HEADWATERS	WVMC-17-{14.4}	6/19/96	39	33	12.00	79	31	43.01	69	PRES
ROARING CREEK @ MOUTH	WVMC-18-{0.0}	6/19/96	39	30	19.00	79	38	31.00	69	PRES
1ST UNT ROARING CREEK @ MOUTH	WVMC-18-.1A	6/19/96	39	30	22.00	79	38	19.00	69	PRES
LITTLE LICK RUN	WVMC-18-A-1	6/19/96	39	32	36.00	79	35	30.00	69	PRES
LICK RUN ABOVE LITTLE LICK RUN	WVMC-18-A	6/19/96	39	32	34.00	79	35	13.00	69	PRES
ROARING CREEK @ HEADWATERS	WVMC-18-{6.0}	6/19/96	39	31	34.00	79	34	15.00	69	PRES
DAUGHERTY RUN	WVMC-19	6/18/96	39	29	20.00	79	37	54.00	69	PRES
DORITY RUN @ MOUTH	WVMC-19-A	6/19/96	39	30	2.00	79	33	37.01	69	PRES
ELSEY RUN	WVMC-20-{0.0}	6/18/96	39	28	43.00	79	37	59.00	69	PRES

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed

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Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
ELSEY RUN NEAR HEADWATERS	WVMC-20-{6.0}	6/19/96	39	28	32.00	79	33	47.00	69	PRES
ASHPOLE RUN	WVMC-21	6/18/96	39	28	17.00	79	38	24.00	69	PRES
BUFFALO RUN BELOW 1ST UNT	WVMC-22-{1.5}	6/17/96	39	26	42.00	79	39	18.00	69	PRES
2ND UNT / BUFFALO RUN	WVMC-22-B	6/18/96	39	26	25.00	79	39	7.00	69	PRES
BUFFALO RUN ABOVE 2ND UNT	WVMC-22-{2.0}	6/17/96	39	26	18.00	79	39	10.00	69	PRES
MORGAN RUN @ MOUTH	WVMC-23-{0.0}	6/18/96	39	26	50.00	79	40	44.00	69	PRES
1ST UNT / MORGAN RUN	WVMC-23-.2A	6/17/96	39	27	36.00	79	41	13.00	69	PRES
CHURCH RUN @ MOUTH	WVMC-23-A-{0.0}	6/17/96	39	27	32.00	79	42	12.00	69	PRES
LEFT FORK UNT CHURCH RUN	WVMC-23-A-.1-A	6/17/96	39	27	24.00	79	43	26.00	69	PRES
RIGHT FORK UNT CHURCH RUN	WVMC-23-A-.1-B	6/17/96	39	27	25.00	79	43	23.00	69	PRES
CHURCH RUN NEAR HEADWATERS	WVMC-23-A-{2.9}	6/18/96	39	27	27.00	79	44	51.00	69	PRES
MORGAN RUN BELOW CHURCH RUN	WVMC-23-{1.8}	6/17/96	39	27	33.00	79	42	6.00	69	PRES
MORGAN RUN ABOVE CHURCH RUN	WVMC-23-{2.0}	6/17/96	39	27	34.00	79	42	15.00	69	PRES
HEATHER RUN AT MOUTH	WVMC-24-{0.0}	6/18/96	39	26	10.00	79	41	7.00	69	PRES
1ST UNT / HEATHER RUN	WVMC-24-A	6/18/96	39	26	19.00	79	42	29.00	69	PRES
HEATHER RUN ABOVE 2ND UNT	WVMC-24-{2.7}	6/17/96	39	26	34.00	79	43	30.00	69	PRES
LICK RUN NEAR MOUTH	WVMC-25-{0.0}	6/18/96	39	25	36.00	79	41	18.00	69	PRES
LICK RUN / CHEAT RIV ABOVE 1ST UNT	WVMC-25-{2.3}	6/18/96	39	25	10.00	79	43	25.00	69	PRES
JOES RUN NEAR MOUTH	WVMC-26-{0.0}	6/18/96	39	29	27.00	79	41	9.00	69	PRES
JOES RUN ABOVE 1ST UNT	WVMC-26-{1.5}	6/18/96	39	25	9.00	79	39	53.00	69	PRES
PRINGLE RUN @ MOUTH	WVMC-27-{0.0}	6/18/96	39	24	59.00	79	41	20.00	69	PRES
PRINGLE RUN BELOW FORKS	WVMC-27-{2.7}	6/19/96	39	23	58.00	79	43	52.00	69	PRES
LEFT FORK/PRINGLE RUN @ MOUTH	WVMC-27-A	6/19/96	39	23	50.00	79	44	1.00	69	PRES
RIGHT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-B	6/19/96	39	23	52.00	79	44	5.00	69	PRES
STAMPING GROUND RUN	WVMC-28	7/24/96	39	24	12.51	79	39	44.63	69	PRES
BUCKHORN RUN	WVMC-31-{0.0}	7/25/96	39	22	27.00	79	42	22.00	67	PRES
TRAY RUN	WVMC-31.5	7/30/96	39	21	28.00	79	41	38.00	67	PRES
FILL HOLLOW	WVMC-31.7	7/24/96	39	20	55.19	79	41	0.08	67	PRES
SALTLICK CREEK	WVMC-32	7/24/96	39	21	6.49	79	39	46.48	67	PRES
SPRUCE RUN / SALTLICK RUN	WVMC-32-B	7/25/96	39	23	12.99	79	37	51.28	67	PRES
CABBAGE RUN	WVMC-32-C-1	7/25/96	39	22	15.98	79	35	23.62	67	PRES
WOLF RUN / SALTLICK CREEK	WVMC-32-D	7/25/96	39	23	2.52	79	36	2.96	67	PRES
BUCKLICK RUN / SALTLICK CREEK	WVMC-32-E	7/25/96	39	23	34.69	79	36	45.97	67	PRES
LITTLE BUCKLICK RUN	WVMC-32-F	7/25/96	39	24	48.18	79	34	58.87	67	PRES
IRISH RUN	WVMC-32-G	7/25/96	39	25	7.73	79	34	42.43	67	PRES
CHEAT RIVER @ ROWLESBURG	WVMC-00-{43}	6/18/96	39	20	54.00	79	39	56.01	67	PRES
BUFFALO CREEK @ MOUTH	WVMC-33-{0.0}	7/25/96	39	19	7.00	79	41	19.00	67	PRES
FLAGG RUN	WVMC-33-A	7/24/96	39	19	0.00	79	41	34.00	67	PRES
BELL HOLLOW	WVMC-33-A.5	7/24/96	39	18	13.00	79	41	38.00	67	PRES
WILDCAT RUN	WVMC-33-B	7/24/96	39	17	40.00	79	42	14.00	67	PRES
DOG RUN	WVMC-33-B.5	7/23/96	39	17	9.00	79	42	25.00	67	PRES

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed
Streams are listed in order from mouth to headwaters
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Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
BIRCHROOT RUN	WVMC-33-C	7/23/96	39	16	49.49	79	44	15.54	67	PRES
LITTLE BUFFALO CREEK	WVMC-33-D	7/23/96	39	16	45.21	79	44	26.15	67	PRES
BUCKLICK RUN / BUFFALO CREEK	WVMC-33-E	7/23/96	39	16	26.11	79	44	49.22	67	PRES
SUGARCAMP RUN / BUFFALO CREEK	WVMC-33-F	7/23/96	39	15	38.24	79	45	0.54	67	PRES
SCOTT RUN NEAR MACOMBER	WVMC-34-{0.0}	7/24/96	39	18	42.00	79	39	20.00	67	PRES
MADISON RUN	WVMC-35	7/24/96	39	18	50.74	79	38	58.68	67	PRES
KEYSER RUN	WVMC-35.5-{0.0}	7/24/96	39	18	23.00	79	38	33.00	67	PRES
WOLF CREEK	WVMC-36-{0.0}	7/24/96	39	17	33.00	79	38	7.00	67	PRES
LITTLE WOLF CREEK	WVMC-36-A	7/24/96	39	17	32.00	79	38	13.00	67	PRES
MUDDY RUN	WVMC-39	7/23/96	39	16	50.74	79	41	15.09	67	PRES
FORD RUN	WVMC-40	7/23/96	39	16	2.57	79	41	2.05	67	TUCK
LOUSE CAMP RUN	WVMC-42	7/23/96	39	14	26.44	79	42	38.38	67	TUCK
LICKING CREEK	WVMC-43-{0.0}	7/25/96	39	13	42.00	79	43	19.00	67	TUCK
BEARPEN HOLLOW	WVMC-43-A	7/25/96	39	14	11.00	79	45	3.00	67	TUCK
JACOBS RUN	WVMC-43-B	7/25/96	39	14	4.00	79	45	18.00	67	TUCK
BEARWALLOW RUN	WVMC-44-{0.0}	7/26/96	39	13	18.00	79	43	38.00	67	TUCK
BULL RUN	WVMC-46	7/30/96	39	11	50.59	79	43	43.70	67	TUCK
LEFT FORK BULL RUN	WVMC-46-A	7/26/96	39	11	51.00	79	44	9.00	67	TUCK
RIGHT FORK BULL RUN	WVMC-46-B	7/26/96	39	11	54.00	79	44	7.00	67	TUCK
JOHNATHAN RUN	WVMC-47	7/30/96	39	11	0.36	79	43	42.84	67	TUCK
LAUREL RUN / CHEAT RIVER NEAR AUVIL	WVMC-48	7/30/96	39	10	49.00	79	43	13.00	67	TUCK
CLAY LICK RUN	WVMC-49	7/30/96	39	10	45.00	79	43	12.00	67	TUCK
UPPER JOHNATHAN RUN	WVMC-50	7/30/96	39	10	40.21	79	43	25.69	67	TUCK
CLOVER RUN	WVMC-51	7/30/96	39	9	32.66	79	42	51.48	67	TUCK
RIGHT FORK CLOVER RUN	WVMC-51-A	7/30/96	39	8	54.39	79	43	4.68	67	TUCK
LEFT FORK / CLOVER RUN	WVMC-51-B	7/30/96	39	8	47.63	79	42	49.27	67	TUCK
JOHNSON RUN	WVMC-51-B-1	7/30/96	39	7	44.00	79	42	57.00	67	TUCK
MILL RUN / LEFT FORK	WVMC-51-B-2	7/30/96	39	7	19.84	79	43	42.65	67	TUCK
BEAR RUN	WVMC-51-B-3	7/30/96	39	7	3.06	79	44	55.99	67	TUCK
VALLEY FORK	WVMC-51-B-4	7/30/96	39	7	6.54	79	46	14.92	67	TUCK
INDIAN RUN	WVMC-51-B-5	7/30/96	39	7	20.83	79	46	31.69	67	TUCK
CHEAT RIVER @ ST. GEORGE	WVMC-00-{71.0}	7/30/96	39	9	50.96	79	42	23.66	67	TUCK
MINEAR RUN	WVMC-52	7/29/96	39	10	5.78	79	42	5.86	67	TUCK
BRIDGE RUN	WVMC-52-.7A	7/29/96	39	10	42.69	79	40	51.94	67	TUCK
ROARING RUN	WVMC-52-A	7/29/96	39	11	5.96	79	40	27.97	67	TUCK
DRY RUN NEAR ST. GEORGE	WVMC-53	7/30/96	39	9	45.49	79	41	17.99	67	TUCK
HORSESHOE RUN	WVMC-54	7/30/96	39	9	18.42	79	39	32.95	67	TUCK
MIKE RUN	WVMC-54-A	8/7/96	39	10	6.42	79	37	58.43	67	TUCK
MAXWELL RUN	WVMC-54-C	7/30/96	39	10	5.79	79	36	54.05	67	TUCK
HYLE RUN	WVMC-54-D	7/30/96	39	11	4.15	79	36	0.65	67	TUCK
LAUREL RUN / HORSESHOE RUN	WVMC-54-F	7/30/96	39	11	36.87	79	35	5.69	67	TUCK
THUNDERSTRUCK RUN	WVMC-54-H	8/7/96	39	12	46.57	79	34	40.57	67	TUCK
WALNUT HOLLOW RUN	WVMC-54-H-1	8/7/96	39	12	57.39	79	34	51.88	67	TUCK
LEADMINE RUN	WVMC-54-I	7/30/96	39	12	39.80	79	34	21.45	67	TUCK

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed

Streams are listed in order from mouth to headwaters
Reference site rows are shaded.
Significant tributaries (those with four or more sample sites) are in BOLD TYPE.

Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
LIME HOLLOW RUN	WVMC-54-I-1	7/30/96	39	12	0.06	79	32	55.83	67	TUCK
WOLF RUN / HORSESHOE RUN	WVMC-54-J	7/30/96	39	13	9.43	79	34	2.34	67	TUCK
TWELVEMILE RUN	WVMC-54-K	7/30/96	39	13	35.75	79	33	38.10	67	TUCK
DRY RUN	WVMC-55	8/8/96	39	8	53.64	79	38	59.32	67	TUCK
MILL RUN/CHEAT RIVER	WVMC-56	8/8/96	39	8	33.34	79	38	48.77	67	TUCK
WOLF RUN / CHEAT RIVER	WVMC-57	8/8/96	39	8	13.52	79	39	50.32	67	TUCK
SHAVERS FORK @ PARSONS	WVMC-59-{00.0}	6/12/96	39	6	0.41	79	40	50.34	67	TUCK
SMOKY HOLLOW	WVMCS-.5	6/12/96	39	6	14.54	79	40	57.27	67	TUCK
HAWK RUN	WVMCS-2	6/12/96	39	4	59.09	79	41	42.99	67	TUCK
HADDIX RUN	WVMCS-3	6/12/96	39	4	11.81	79	41	53.22	67	TUCK
SOUTH BRANCH / HADDIX RUN	WVMCS-3-A	8/7/96	39	19	52.62	79	30	33.54	67	TUCK
LAUREL RUN / SHAVERS FORK @ MOUTH	WVMCS-5	6/12/96	39	3	1.44	79	43	14.21	67	TUCK
PLEASANT RUN	WVMCS-6	6/12/96	39	2	37.06	79	43	25.81	67	TUCK
AARONS RUN / PLEASANT RUN	WVMCS-6-B	6/13/96	39	2	33.38	79	44	38.74	67	TUCK
SLABCAMP RUN	WVMCS-6-C	8/7/96	39	2	4.24	79	45	21.41	67	TUCK
CHOKE TRAP RUN	WVMCS-6-E	6/13/96	39	2	12.00	79	46	16.00	67	TUCK
STONELICK RUN	WVMCS-7	6/12/96	39	2	36.25	79	42	54.20	67	TUCK
CANOE RUN	WVMCS-7.5	6/12/96	39	1	59.27	79	42	41.37	67	TUCK
LAUREL RUN / SHAVERS FORK	WVMCS-8	8/8/96	39	1	28.00	79	43	3.00	67	TUCK
LITTLE LAUREL RUN / SHAVERS FORK	WVMCS-12	7/29/96	38	59	9.00	79	43	49.00	67	RAND
LITTLE BLACK FORK	WVMCS-13	7/29/96	38	58	56.00	79	43	48.00	67	RAND
CLIFTON RUN	WVMCS-14	6/12/96	38	58	57.21	79	43	54.86	67	RAND
RATTLESNAKE RUN	WVMCS-15	6/12/96	38	58	26.77	79	45	10.91	67	RAND
JOHNS RUN	WVMCS-16	7/30/96	38	57	26.42	79	46	11.22	67	RAND
WOLF RUN / SHAVERS FORK	WVMCS-18	6/11/96	38	54	50.99	79	46	32.93	67	RAND
SHAVERS FORK @ STEWART PARK	WVMC-59-{20.4}	6/11/96	38	55	16.93	79	46	18.17	69	RAND
TAYLOR RUN	WVMCS-22	6/11/96	38	54	24.45	79	41	58.24	67	RAND
COLLETT GAP RUN	WVMCS-25	6/12/96	38	52	43.12	79	42	27.66	67	RAND
UPPER PONDLICK RUN	WVMCS-28	6/11/96	39	51	12.00	79	43	54.00	67	RAND
FISHING HAWK CREEK	WVMCS-33	6/11/96	38	48	45.00	79	44	32.00	69	RAND
RED RUN / SHAVERS FORK	WVMCS-46	6/10/96	38	37	52.00	79	52	52.00	69	RAND
BLISTER RUN	WVMCS-47	6/10/96	38	36	52.00	79	52	9.00	69	RAND
BEAVER CREEK / SHAVERS FORK	WVMCS-53	7/30/96	38	31	25.72	79	56	16.65	69	RAND
SECOND FORK	WVMCS-54	6/10/96	38	30	9.00	79	55	58.00	69	POCA
BLACK FORK (DRY FORK)										
ROARING FORK	WVMC-60-A	6/11/96	39	5	27.00	79	38	54.00	67	TUCK
ELKLICK RUN @ FERNOW EXP. FOREST	WVMC-60-C	6/11/96	39	3	35.00	79	38	57.00	67	TUCK
JOHN B. HOLLOW	WVMC-60-C-3	6/11/96	39	4	18.00	79	39	38.00	67	TUCK
HICKMAN SLIDE HOLLOW	WVMC-60-C-4	6/11/96	39	3	46.00	79	39	53.00	67	TUCK
WILSON HOLLOW / ELKLICK RUN	WVMC-60-C-5	6/11/96	39	3	38.00	79	40	10.00	67	TUCK
BLACKWATER RIVER										
BIG RUN / BLACKWATER RIVER	WVMC-60-D-1	7/17/96	39	6	32.02	79	34	15.10	69	TUCK
TUB RUN	WVMC-60-D-2	7/17/96	39	6	24.13	79	32	56.07	69	TUCK

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed

Streams are listed in order from mouth to headwaters
Reference site rows are shaded.
Significant tributaries (those with four or more sample sites) are in BOLD TYPE.

Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
FINLEY RUN	WVMC-60-D-2.7	7/17/96	39	6	32.91	79	31	57.95	69	TUCK
LONG RUN	WVMC-60-D-3-A	7/16/96	39	7	35.15	79	31	16.09	69	TUCK
MIDDLE RUN	WVMC-60-D-3-B	7/16/96	39	7	51.38	79	31	15.76	69	TUCK
SNYDER RUN	WVMC-60-D-3-C	7/16/96	39	9	18.12	79	31	13.98	69	TUCK
SAND RUN	WVMC-60-D-3-E	7/17/96	39	10	24.73	79	30	36.19	69	TUCK
PENDLETON CREEK	WVMC-60-D-4	7/17/96	39	8	20.46	79	29	7.31	69	TUCK
SHAYS RUN	WVMC-60-D-4.5	7/17/96	39	6	21.63	79	29	56.29	69	TUCK
ENGINE RUN NEAR ELK	WVMC-60-D-4.7	7/17/96	39	6	25.17	79	29	5.75	69	TUCK
NORTH BRANCH OF BLACKWATER RIVER	WVMC-60-D-9	8/7/96	39	3	59.72	79	25	32.74	67	RAND
YOOKUM RUN	WVMC-60-D-11	7/16/96	39	2	47.23	79	24	0.29	67	TUCK
FREELAND RUN	WVMC-60-D-12	7/16/96	39	1	29.82	79	25	21.93	67	TUCK
MILL RUN / BLACKWATER RIVER	WVMC-60-D-14	7/16/96	39	1	39.69	79	27	30.05	67	TUCK
BLACKWATER RIVER BELOW CANAAN VALLEY STATE PARK	WVMC-60-D-{25.0}	7/17/96	39	2	11.70	79	25	34.58	67	TUCK
LAUREL RUN / DRY FORK	WVMC-60-E	6/11/96	39	3	40.00	79	36	23.00	67	TUCK
OTTER CREEK	WVMC-60-F	6/11/96	39	2	30.00	79	36	36.00	67	TUCK
RED RUN / DRY FORK	WVMC-60-G	6/11/96	39	2	14.00	79	35	43.00	67	TUCK
CAVE RUN	WVMC-60-H.5	6/11/96	39	1	6.00	79	34	28.00	67	TUCK
MILL RUN / DRY FORK	WVMC-60-I	6/11/96	39	0	54.00	79	32	51.00	67	TUCK
ELKLICK RUN NEAR ELK	WVMC-60-J	6/11/96	39	0	57.00	79	31	52.00	67	TUCK
GLADY FORK	WVMC-60-K	6/13/96	39	0	12.00	79	30	34.00	67	TUCK
HOG RUN / PANTHER CAMP RUN	WVMC-60-K-2-A	7/29/96	38	57	17.00	79	35	58.00	67	RAND
WOODFORD RUN	WVMC-60-K-5	7/29/96	38	56	4.08	79	38	4.30	67	RAND
FLANNIGAN RUN	WVMC-60-K-8	6/12/96	38	53	32.00	79	38	33.00	67	RAND
WEST FORK / GLADY CREEK	WVMC-60-K-16	6/12/96	38	47	57.00	79	48	7.00	67	RAND
EAST FORK / GLADY CREEK	WVMC-60-K-17	6/12/96	38	47	59.00	79	42	59.00	67	RAND
LOUK RUN	WVMC-60-K-17-A	6/12/96	38	46	24.00	79	42	6.00	67	RAND
BIG RUN / DRY FORK	WVMC-60-L	6/10/96	38	59	51.00	79	31	51.00	67	TUCK
LAUREL FORK / DRY FORK NEAR MOUTH	WVMC-60-N-{01}	6/13/96	39	58	39.00	79	32	58.00	67	RAND
BEAVERDAM RUN	WVMC-60-N-4	6/12/96	38	50	8.00	79	38	27.00	67	RAND
FIVE LICK RUN / LAUREL FORK / DRY FORK	WVMC-60-N-8	6/11/96	38	44	33.00	79	41	8.00	67	RAND
TINGLER RUN / LAUREL FORK	WVMC-60-N-8.5	6/12/96	38	44	25.00	79	41	17.00	67	RAND
LAUREL FORK @ LAUREL FORK CAMPGROUND	WVMC-60-N-{20}	6/11/96	38	44	28.00	79	41	4.00	67	RAND
DRY FORK NEAR CANAAN VALLEY	WVMC-60-{11.6}	6/10/96	38	58	56.23	79	31	32.14	67	TUCK
RED CREEK NEAR MOUTH	WVMC-60-O-{01.0}	7/17/96	38	58	12.27	79	30	11.94	67	TUCK
BIG RUN / RED CREEK	WVMC-60-O-1	7/17/96	38	58	35.42	79	29	34.82	67	RAND
RED CREEK NEAR LANEVILLE	WVMC-60-O-{07.0}	7/17/96	38	58	23.84	79	23	58.78	69	TUCK
SPRUCE RUN / DRY FORK	WVMC-60-P	6/10/96	38	56	14.22	79	31	6.64	67	RAND
HORSE CAMP RUN	WVMC-60-Q	6/10/96	38	55	16.42	79	31	32.82	67	RAND
TORY CAMP RUN	WVMC-60-R	8/7/96	38	53	36.97	79	32	59.71	67	RAND
STINKING RUN	WVMC-60-S	6/10/96	38	51	50.00	79	33	26.00	67	RAND
DRY FORK ABOVE JOB	WVMC-60-{25.1}	6/10/96	38	49	42.66	79	34	13.93	67	RAND
GANDY CREEK @ WHITMER	WVMC-60-T-{02.5}	6/10/96	38	48	49.00	79	32	57.00	67	RAND

Table 6: (Continued)
Sites Sampled In The Cheat River Watershed
Streams are listed in order from mouth to headwaters
Reference site rows are shaded.
Significant tributaries (those with four or more sample sites) are in BOLD TYPE.

Stream Name	Ancode	Date	Latitude			Longitude			Ecoid	County
LOWER TWO SPRING RUN	WVMC-60-T-1	6/10/96	38	47	55.00	79	32	40.00	67	RAND
UPPER TWO SPRING RUN	WVMC-60-T-2	6/10/96	38	47	15.00	79	33	20.00	67	RAND
SWALLOW ROCK RUN	WVMC-60-T-3	7/30/96	38	46	12.48	79	33	24.32	67	RAND
BIG RUN NEAR LEADING RIDGE MOUNTAIN	WVMC-60-T-8	6/10/96	38	44	34.00	79	36	2.00	67	RAND
GRANTS BRANCH	WVMC-60-T-9	7/30/96	38	43	40.00	79	36	53.00	67	RAND
NARROW RIDGE RUN	WVMC-60-T-10	6/10/96	38	43	13.00	79	37	9.00	67	RAND
WARNER RUN	WVMC-60-T-11	6/11/96	38	43	1.00	79	37	44.00	67	RAND
BIG RUN NEAR SINKS OF GANDY	WVMC-60-T-13	6/11/96	38	42	27.00	79	38	26.00	67	RAND
GANDY CREEK BELOW SINKS OF GANDY	WVMC-60-T-{13.0}	6/11/96	38	43	2.00	79	37	39.00	67	RAND

ECOID = US EPA'S LEVEL III ECOREGIONS (OMERNIK, 1997)

67 = Ridge and Valley
69 = Central Appalachians
70 = Western Allegheny Plateau

COUNTIES

MONO = Monongalia
PRES = Preston
TUCK = Tucker
RAND = Randolph
POCA = Pocahontas

Table 7: Physical Characteristics Of 100 Meter Stream Reach				
STREAM CODE	**AVERAGE STREAM WIDTH (m)**	**AVERAGE RIFFLE DEPTH (m)**	**AVERAGE RUN DEPTH (m)**	**AVERAGE POOL DEPTH (m)**
WVMC-2	12.00	0.20	0.20	
WVMC-2-A	5.00	0.10	0.20	0.70
WVMC-2.5	4.50	0.10	0.20	0.35
WVMC-2.5-A	3.00	0.10	0.10	0.20
WVMC-2.7	3.00	0.10	0.10	0.30
WVMC-4	3.00	0.10	0.20	0.00
WVMC-7	12.00	0.20	0.20	0.50
WVMC-10	2.00	0.10	0.10	0.20
WVMC-11-{00}	10.00	0.10	0.10	0.40
WVMC-11-.1A	2.00	0.10	0.30	0.30
WVMC-11-A	3.00	0.10	0.10	0.10
WVMC-11-{05}	18.00	0.30	0.40	0.50
WVMC-11-B	3.00	0.05	0.10	0.10
WVMC-11-C	5.00	0.10	0.20	0.70
WVMC-11-{07}	6.00	0.10	0.10	0.20
WVMC-11-C.1	1.50	0.00	0.00	0.00
WVMC-11-D-{00}	2.00	0.20	0.20	0.20
WVMC-11-D-{10}	2.00	0.10	0.10	0.20
WVMC-11-E	1.50	0.20	0.20	0.00
WVMC-12-{00}	25.00	0.50	0.50	0.00
WVMC-12-.5A-{0}	4.00	0.20	0.30	0.50
WVMC-12-.5A-{3}	2.00	0.10	0.20	0.20
WVMC-12-.5A-{5}	1.00	0.10	0.20	0.50
WVMC-12-.7A	5.00	0.10	0.10	0.00
WVMC-12-A-{02.5}	15.00	0.20	0.70	1.50
WVMC-12-A-1	10.00	0.18	0.60	0.00
WVMC-12-A-1-A	4.00	0.10	0.20	0.00
WVMC-12-A-2	10.00	0.20	0.30	0.00
WVMC-12-A-{03}	10.00	0.10	0.50	1.50
WVMC-12-B-{01}	17.50	0.20	0.50	0.00
WVMC-12-B-.5-{00}	4.50	0.11		0.50
WVMC-12-B-.5-A	3.00	0.05	0.10	0.60
WVMC-12-B-.5-{02}	1.75	0.05	0.15	1.50
WVMC-12-B-{02}	10.00	0.11	0.30	1.00
WVMC-12-B-1-{01}	6.00	0.10	0.50	
WVMC-12-B-1-B	50.00	0.00	0.00	0.00
WVMC-12-B-1-{04}	3.00	0.10	0.80	
WVMC-12-B-2	3.00			0.40

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMC-12-B-{06}	20.00	0.20	1.20	0.00
WVMC-12-B-3-{00}	9.00			1.00
WVMC-12-B-3-{02}	3.00	0.10	0.15	
WVMC-12-B-4-{02}	3.00	0.10	0.30	
WVMC-12-B-4-{03}	2.00	0.10	0.20	
WVMC-12-B-4.5	1.00	0.10	0.30	
WVMC-12-B-6	5.00	0.10	0.50	
WVMC-12-B-{11}	3.00	0.10	0.50	
WVMC-12-B-5-C	3.00	0.10	0.25	0.00
WVMC-12-B-5-{03}	3.00			1.50
WVMC-12-B-{12}	0.50	0.03		
WVMC-12-C-{01}	20.00	0.15		1.00
WVMC-12-C-{04}	1.50	0.13		0.50
WVMC-12-D	4.00	0.15	0.30	
WVMC-12-{10}	20.00	0.20	0.50	1.00
WVMC-12-E	4.00	0.10	0.20	
WVMC-12-E.1	5.00	0.10	0.25	
WVMC-12-F-{00.0}	10.00	0.20	0.50	1.00
WVMC-12-F-{01.0}	20.00	0.10	0.10	
WVMC-12-{14}	27.00	0.20	0.90	1.30
WVMC-00-{18.3}	50.00	1.00	3.00	
WVMC-13-{01}	1.00	0.10	0.10	0.20
WVMC-13.5-{2.3}	2.00	0.10	0.20	0.30
WVMC-14-{02}	1.00	0.10	0.10	
WVMC-15-{01}	8.00	0.10	0.20	0.40
WVMC-15-A	3.00	0.10	0.10	0.20
WVMC-16-{02}	5.00	0.20	0.30	0.30
WVMC-16-A-{0.2}	3.00	0.10	0.30	0.30
WVMC-16-A-.1	2.50	0.10	0.20	0.30
WVMC-16-A-{0.8}	2.50	0.10	0.20	0.30
WVMC-16-A-{2.5}	3.00	0.10	0.20	0.25
WVMC-16-A-{3.9}	0.75	0.05	0.08	0.10
WVMC-16-{04}	4.00	0.10	0.10	
WVMC-17-{0.0}	9.00	0.90		
WVMC-17-.6A	0.30	0.05		0.10
WVMC-17-.7	4.00	0.08		0.30
WVMC-17-{2.6}	9.00	0.23		
WVMC-17-A-{0.0}	4.00	0.08		0.30
WVMC-17-A-.5-{0}	6.00	0.06		0.50
WVMC-17-A-.5-{3}	1.00	0.03	0.20	0.30

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMC-17-A-1-{0.0}	3.50	0.08		0.50
WVMC-17-A-1.1	1.30	0.05	0.15	0.60
WVMC-17-A-1.2	1.50	0.15	0.30	0.60
WVMC-17-A-1-{3.2}	1.30		0.10	0.30
WVMC-17-A-{2.1}	1.50	0.10	0.30	0.50
WVMC-17-{3.2}	20.00	0.13	0.30	0.60
WVMC-17-A.1	8.00	0.20	0.50	1.00
WVMC-17-{6.8}	8.00	0.10	0.30	1.50
WVMC-17-B	0.20	0.10	0.70	
WVMC-17-C	4.50	0.10	0.10	
WVMC-17-{10.2}	7.00	0.10	0.50	
WVMC-17-{14.4}	4.00	0.10	0.15	1.00
WVMC-18-{0.0}	5.00	0.10	0.20	
WVMC-18-.1A	3.00	0.20	0.40	
WVMC-18-A-1	2.00	0.20	0.50	1.00
WVMC-18-A	4.00	0.10	0.30	
WVMC-18-{6.0}	10.00	0.10	0.40	0.80
WVMC-19	6.00	0.30	0.40	0.50
WVMC-19-A	3.00	0.20	0.30	0.30
WVMC-20-{0.0}	5.00	0.20	0.40	0.50
WVMC-20-{6.0}	2.50	0.10	0.10	
WVMC-21	4.00	0.10	0.25	1.00
WVMC-22-{1.5}	6.00	0.30	0.30	0.70
WVMC-22-B	3.00	0.10	0.30	0.30
WVMC-22-{2.0}	3.50	0.10	0.30	0.80
WVMC-23-{0.0}	6.00	0.10	0.20	0.30
WVMC-23-.2A	2.00	0.10	0.20	0.30
WVMC-23-A-{0.0}	3.00	0.10	0.20	0.80
WVMC-23-A-.1-A	3.00	0.20	0.10	
WVMC-23-A-.1-B	2.00	0.05	0.10	0.20
WVMC-23-A-{2.9}	2.00	0.10	0.20	0.30
WVMC-23-{1.8}	4.00	0.10	0.20	0.40
WVMC-23-{2.0}	5.00	0.10	0.20	0.30
WVMC-24-{0.0}	4.00	0.10	0.20	0.30
WVMC-24-A	3.00	0.10	0.20	0.40
WVMC-24-{2.7}	2.00	0.05	0.10	0.20
WVMC-25-{0.0}	6.00	0.20	0.40	0.60
WVMC-25-{2.3}	4.00	0.10	0.20	0.70
WVMC-26-{0.0}	3.00	0.10	0.30	0.30
WVMC-26-{1.5}	1.00	0.10	0.30	0.30

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMC-27-{0.0}	6.00	0.20	0.40	0.80
WVMC-27-{2.7}	7.00	0.10	0.25	0.50
WVMC-27-A	2.50	0.10	0.20	0.30
WVMC-27-B	4.00	0.10	0.20	0.40
WVMC-28	3.50	0.10	0.10	
WVMC-31-{0.0}	2.00	0.10	0.20	
WVMC-31.7	5.00	0.10	0.20	
WVMC-32	28.00	0.20	0.40	1.00
WVMC-32-B	8.00	0.10	0.10	0.00
WVMC-32-C-1	2.50	0.10	0.10	0.50
WVMC-32-D	0.00	0.10	0.30	0.40
WVMC-32-E	4.00	0.10	0.20	
WVMC-32-F	1.50	0.10	0.10	
WVMC-32-G	2.50	0.20	0.20	
WVMC-00-{43}	35.00			1.50
WVMC-33-{0.0}	7.00	0.20	0.40	0.80
WVMC-33-A	5.00	0.10	0.30	
WVMC-33-A.5	1.00	0.10	0.20	
WVMC-33-B	2.00	0.10	0.20	
WVMC-33-B.5	3.50	0.10	0.20	0.30
WVMC-33-C	3.00	0.10	0.20	0.30
WVMC-33-D	4.50	0.20	0.30	0.40
WVMC-33-E	1.50	0.10	0.10	0.20
WVMC-33-F	0.80	0.10	0.10	0.20
WVMC-34-{0.0}	1.00	0.10	0.20	
WVMC-35	2.00	0.10	0.20	
WVMC-35.5-{0.0}	0.00	0.00	0.00	0.00
WVMC-36-{0.0}	10.00	0.20	0.40	0.60
WVMC-36-A	5.00	0.10	0.30	
WVMC-39	2.50	0.10	0.30	
WVMC-40	2.00	0.10	0.20	
WVMC-42	3.00	0.20	0.30	0.40
WVMC-43-{0.0}	6.00	0.10	0.30	0.40
WVMC-43-A	3.00	0.10	0.10	0.30
WVMC-43-B	2.50	0.10	0.10	0.10
WVMC-44-{0.0}	5.00	0.10	0.10	0.40
WVMC-46	17.00	0.20	0.20	
WVMC-46-A	5.00	0.10	0.20	
WVMC-46-B	6.00	0.10	0.20	
WVMC-47	4.50	0.10	0.10	

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMC-49	4.00	0.10	0.10	0.50
WVMC-50	3.00	0.10	0.10	
WVMC-51	16.00	0.20	0.30	
WVMC-51-A	7.00	0.10	0.10	
WVMC-51-B	16.00	0.20	0.20	
WVMC-51-B-2	2.00	0.10	0.10	0.20
WVMC-51-B-3	3.00	0.10	0.20	0.00
WVMC-51-B-4	3.50	0.10	0.20	0.60
WVMC-51-B-5	3.50	0.20	0.20	1.00
WVMC-00-{71.0}	80.00	0.00	0.00	0.00
WVMC-52	5.00	0.10	0.20	
WVMC-52-.7A	0.00	0.00	0.00	
WVMC-52-A	2.00	0.10	0.20	
WVMC-53	1.00	0.10	0.15	
WVMC-54	7.00	0.20	0.50	
WVMC-54-A	4.00	0.10	0.10	
WVMC-54-C	2.00	0.10	0.20	
WVMC-54-D	2.00	0.10	0.30	
WVMC-54-F	5.00	0.10	0.20	
WVMC-54-H	6.00	0.10	0.20	
WVMC-54-H-1	2.00	0.10	0.10	
WVMC-54-I	3.00	0.10	0.20	
WVMC-54-I-1	3.00	0.10	0.20	
WVMC-54-J	3.00	0.10	0.30	
WVMC-54-K	2.00	0.10	0.20	
WVMC-55	5.00	0.10	0.10	
WVMC-56	8.00	0.20	0.30	0.40
WVMC-57	1.50	0.10	0.20	
WVMC-59-{00.0}	50.00	0.30	0.25	
WVMCS-.5	3.00	0.10	0.20	
WVMCS-2	2.00	0.10	0.10	0.20
WVMCS-3	6.00	0.10	0.10	0.20
WVMCS-3-A	2.50	0.75	0.15	0.30
WVMCS-5	5.00	0.10	0.20	0.50
WVMCS-6	5.00	0.20	0.30	0.50
WVMCS-6-B	4.00	0.10	0.20	0.30
WVMCS-6-C	2.50	0.10		
WVMCS-6-E	2.00	0.05	0.10	0.10
WVMCS-7	1.00	0.10	0.10	0.20
WVMCS-7.5	1.50	0.10	0.20	0.30

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMCS-8	1.50	0.10	0.10	0.00
WVMCS-12	4.00	0.10	0.70	0.30
WVMCS-13	6.00	0.20	0.30	0.70
WVMCS-14	2.00	0.10	0.20	0.60
WVMCS-15	4.00	0.10	0.20	0.20
WVMCS-16	5.00	0.10	0.30	0.20
WVMCS-18	2.00	0.10	0.20	0.20
WVMC-59-{20.4}	75.00	0.20	0.30	0.00
WVMCS-22	3.00	0.10	0.30	0.20
WVMCS-25	1.00	0.05	0.20	0.30
WVMCS-28	2.00	0.10	0.20	0.30
WVMCS-33	4.00	0.20	0.30	0.30
WVMCS-46	2.00	0.20	0.30	0.50
WVMCS-47	3.00	0.20	0.70	0.50
WVMCS-53	5.00	0.20	0.30	0.30
WVMCS-54	8.00	0.10	0.20	0.00
WVMC-60-A	5.00	0.10	0.10	0.30
WVMC-60-C	4.00	0.10	0.10	0.20
WVMC-60-C-3	1.00	0.02	0.02	0.00
WVMC-60-C-4	1.50	0.10	0.10	0.30
WVMC-60-D-1	3.00	0.10	0.40	
WVMC-60-D-2	1.00	0.10	0.20	
WVMC-60-D-3-A	5.00	0.10	0.20	
WVMC-60-D-3-B	1.00	0.10	0.10	
WVMC-60-D-3-C	3.00	0.10	0.20	
WVMC-60-D-3-E	2.00	0.10	0.30	
WVMC-60-D-4	3.00			0.80
WVMC-60-D-4.5	2.00	0.10	0.20	
WVMC-60-D-4.7	1.00	0.10	0.20	
WVMC-60-D-9	3.00			0.58
WVMC-60-D-11	1.20	1.00	1.00	
WVMC-60-D-12	6.00	0.10	0.20	
WVMC-60-D-14	3.50	0.10	0.20	0.30
WVMC-60-D-{25.0}	6.00			2.00
WVMC-60-E	3.50	0.10	0.40	0.40
WVMC-60-F	15.00	0.30	0.30	1.00
WVMC-60-G	8.00	0.10	0.20	0.60
WVMC-60-I	4.00	0.25	0.20	1.00
WVMC-60-J	3.00	0.10	0.20	1.00
WVMC-60-K	24.00	0.20	0.30	0.40

Table 7: (Continued)
Physical Characteristics Of 100 Meter Stream Reach

STREAM CODE	AVERAGE STREAM WIDTH (m)	AVERAGE RIFFLE DEPTH (m)	AVERAGE RUN DEPTH (m)	AVERAGE POOL DEPTH (m)
WVMC-60-K-2-A	2.50	0.10	0.30	0.30
WVMC-60-K-5	3.00	0.10	0.30	0.30
WVMC-60-K-8	1.50	0.10	0.15	
WVMC-60-K-16	8.00	0.10	0.35	0.75
WVMC-60-K-17	10.00	0.10	0.30	2.00
WVMC-60-K-17-A	2.00	0.10	0.35	
WVMC-60-L	4.00	0.10	0.10	1.00
WVMC-60-N-{01}	27.00	0.30	0.60	0.80
WVMC-60-N-4	3.00	0.10	0.30	
WVMC-60-N-8	3.00	0.10	0.15	0.60
WVMC-60-N-8.5	2.00	0.10	0.20	
WVMC-60-N-{20}	6.00	0.20	0.40	
WVMC-60-{11.6}	40.00	0.80	0.60	1.00
WVMC-60-O-{01.0}	28.00	0.20	0.20	
WVMC-60-O-1	3.00	0.10	0.20	
WVMC-60-O-{07.0}	12.00	0.20	0.35	1.50
WVMC-60-P	4.00	0.10	0.10	0.20
WVMC-60-Q	6.00	0.20	0.20	0.30
WVMC-60-R	3.00	0.13	0.10	0.20
WVMC-60-S	4.00	0.00	0.00	0.00
WVMC-60-{25.1}	8.00	0.10	0.10	1.00
WVMC-60-T-{02.5}	20.00	0.30	1.50	
WVMC-60-T-1	3.00	0.10	0.25	
WVMC-60-T-2	4.00	0.10	0.25	
WVMC-60-T-3	3.50	0.20	0.30	1.00
WVMC-60-T-8	7.00	0.10	0.30	
WVMC-60-T-9	4.00	0.10	0.30	0.30
WVMC-60-T-10	5.00	0.10	0.25	
WVMC-60-T-11	2.00	0.10	0.20	1.50
WVMC-60-T-13	3.50	0.10	0.30	1.00
WVMC-60-T-{13.0}	8.00	0.10	0.50	1.30

Blanks indicate that the habitat type was not present within the 100-meter stream reach.

Table 8: Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-2	normal	absent	sand / silt
WVMC-2-A	normal	absent	sand / silt
WVMC-2.5	normal	absent	sand / silt
WVMC-2.5-A	normal	absent	sand / silt
WVMC-2.7	normal	absent	sand / silt
WVMC-4	normal	absent	sand / silt
WVMC-7	normal	absent	sand / silt
WVMC-10	normal	absent	sand / silt
WVMC-11-{00}	normal	absent	silt
WVMC-11-.1A	normal	absent	sand / silt
WVMC-11-A	normal	absent	sand / silt
WVMC-11-{05}	normal	absent	sand / silt
WVMC-11-B	normal	absent	sand / silt
WVMC-11-C	normal	absent	sand / silt
WVMC-11-{07}	normal	absent	sand / silt
WVMC-11-C.1	normal	absent	sand / silt
WVMC-11-D-{00}	normal	absent	sand / silt
WVMC-11-D-{10}	normal	absent	sand / silt
WVMC-11-E	normal	absent	sand / silt
WVMC-12-{00}	normal	absent	sand / silt
WVMC-12-.5A-{0}	normal	absent	sand / silt
WVMC-12-.5A-{3}	normal	absent	sand / silt
WVMC-12-.5A-{5}	normal	absent	sand, silt, iron stain
WVMC-12-.7A	normal	absent	sand, silt, black tar on rock
WVMC-12-A-{02.5}	normal	absent	sand / silt
WVMC-12-A-1	normal	absent	sand / silt
WVMC-12-A-1-A	normal	absent	sand / silt
WVMC-12-A-2	normal	absent	sand / silt
WVMC-12-A-{03}	normal	absent	sand / silt
WVMC-12-B-{01}	normal	absent	sand / silt
WVMC-12-B-.5-{00}	normal	absent	sand / silt
WVMC-12-B-.5-A	sewage /anaerobic	absent	sand / silt
WVMC-12-B-.5-{02}	normal	absent	sand / silt
WVMC-12-B-{02}	normal	absent	sand / silt
WVMC-12-B-1-{01}	normal	absent	sand
WVMC-12-B-1-B	anaerobic	absent	sand
WVMC-12-B-1-{04}	normal	absent	sand
WVMC-12-B-2	anaerobic	absent	sand / silt

Table 8: (Continued)
Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-12-B-{06}	normal	absent	sand
WVMC-12-B-3-{00}	normal	absent	sand / silt
WVMC-12-B-3-{02}	anaerobic	absent	sand / silt
WVMC-12-B-4-{02}	normal	absent	sand
WVMC-12-B-4-{03}	normal	absent	sand
WVMC-12-B-4.5	normal	absent	sand / silt
WVMC-12-B-6	normal	absent	sand
WVMC-12-B-{11}	normal	absent	sand
WVMC-12-B-5-C	normal	absent	sand
WVMC-12-B-5-{03}	anaerobic	absent	sand
WVMC-12-B-{12}	sewage	absent	sand / silt
WVMC-12-C-{01}	normal	absent	sand / silt
WVMC-12-C-{04}	normal	absent	sand / silt
WVMC-12-D	normal	absent	sand / silt
WVMC-12-{10}	normal	absent	sand
WVMC-12-E	normal	absent	sand
WVMC-12-E.1	normal	slight	sand
WVMC-12-F-{00.0}	anaerobic	slight	sand
WVMC-12-F-{01.0}	normal	absent	sand / silt
WVMC-12-{14}	anaerobic	absent	sand
WVMC-00-{18.3}	normal	absent	sand / silt
WVMC-13-{01}	normal	absent	sand / silt
WVMC-13.5-{2.3}	normal	absent	sand / silt
WVMC-14-{02}	normal	absent	sand / silt
WVMC-15-{01}	normal	absent	sand / silt
WVMC-15-A	normal	absent	sand, silt, some black, some orange stains on rocks
WVMC-16-{02}	normal	absent	metal hydroxides
WVMC-16-A-{0.2}	normal	absent	metal hydroxides
WVMC-16-A-.1	normal	absent	metal hydroxides
WVMC-16-A-{0.8}	normal	absent	metal hydroxides
WVMC-16-A-{2.5}	normal	absent	sand
WVMC-16-A-{3.9}	normal	absent	silt
WVMC-16-{04}	normal	absent	sand / silt
WVMC-17-{0.0}	normal	absent	metal hydroxides
WVMC-17-.6A	normal	absent	sand
WVMC-17-.7	normal	absent	silt
WVMC-17-{2.6}	normal	absent	silt, metal hydroxides
WVMC-17-A-{0.0}	normal	absent	silt, metal hydroxides
WVMC-17-A-.5-{0}	normal	absent	metal hydroxides
WVMC-17-A-.5-{3}	normal	absent	sand / silt

Table 8: (Continued)
Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-17-A-1-{0.0}	normal	absent	silt
WVMC-17-A-1.1	normal	absent	metal hydroxides
WVMC-17-A-1.2	normal	absent	sand, silt, metal hydroxides
WVMC-17-A-1-{3.2}	normal	slight	sand / silt
WVMC-17-A-{2.1}	normal	absent	silt, metal hydroxides
WVMC-17-{3.2}	normal	absent	sand / silt
WVMC-17-A.1	normal	absent	silt
WVMC-17-{6.8}	normal	absent	metal hydroxides
WVMC-17-B	normal	absent	sand
WVMC-17-C	normal	absent	sand / silt
WVMC-17-{10.2}	normal	absent	sand
WVMC-17-{14.4}	normal	absent	silt
WVMC-18-{0.0}	normal	absent	
WVMC-18-.1A	normal	absent	sand / silt
WVMC-18-A-1	normal	absent	silt
WVMC-18-A	normal	absent	sand, silt, household trash
WVMC-18-{6.0}	normal	absent	sand
WVMC-19	normal	absent	silt, possible fly ash
WVMC-19-A	normal	absent	sand, silt
WVMC-20-{0.0}	normal	absent	none
WVMC-20-{6.0}	normal	absent	sand, silt
WVMC-21	normal	absent	silt
WVMC-22-{1.5}	normal	absent	sand
WVMC-22-B	normal	absent	silt
WVMC-22-{2.0}	normal	absent	sand
WVMC-23-{0.0}	normal	absent	sand, silt, metal hydroxides, algae (thin coat everywhere)
WVMC-23-.2A	normal	absent	metal hydroxides
WVMC-23-A-{0.0}	normal	absent	sand, silt, metal hydroxides
WVMC-23-A-.1-A	normal	absent	silt
WVMC-23-A-.1-B	normal	absent	metal hydroxides, unprocessed CPOM
WVMC-23-A-{2.9}	normal	absent	silt
WVMC-23-{1.8}	normal	absent	metal hydroxides, trash in stream and along banks
WVMC-23-{2.0}	normal	moderate	sludge, sand, silt, metal hydroxides, organic debris, undercoat of ochre
WVMC-24-{0.0}	normal	absent	sand, silt, ochre on underside of rocks
WVMC-24-A	normal	absent	sand, silt, dead algae
WVMC-24-{2.7}	normal	absent	sand, silt, coal cobble- gravel - sand
WVMC-25-{0.0}	normal	absent	sand, silt, metal hydroxides
WVMC-25-{2.3}	normal	absent	silt, metal hydroxides

Table 8: (Continued)
Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-26-{0.0}	normal	absent	silt
WVMC-26-{1.5}	normal	absent	silt
WVMC-27-{0.0}	normal	absent	sand, silt, metal hydroxides
WVMC-27-{2.7}	sewage	absent	silt, metal hydroxides, a few snags
WVMC-27-A	sewage	absent	sand, silt, metal hydroxides
WVMC-27-B	normal	absent	sand, silt, metal hydroxides
WVMC-28	normal	absent	sand, silt
WVMC-31-{0.0}	normal	absent	none
WVMC-31.7	normal	absent	sand, silt
WVMC-32	normal	absent	sand, silt
WVMC-32-B	normal	absent	sand, silt
WVMC-32-C-1	normal	absent	sand, silt
WVMC-32-D	normal	absent	sand, silt
WVMC-32-E	normal	absent	sand, silt
WVMC-32-F	normal	absent	sand, silt
WVMC-32-G	normal	absent	sand, silt
WVMC-00-{43}	normal	absent	silt
WVMC-33-{0.0}	normal	absent	
WVMC-33-A	normal	absent	sand
WVMC-33-A.5	normal	absent	sand, silt
WVMC-33-B	normal	absent	sand, silt
WVMC-33-B.5	normal	absent	none
WVMC-33-C	normal	absent	none
WVMC-33-D	normal	absent	none
WVMC-33-E	normal	absent	none
WVMC-33-F	normal	absent	none
WVMC-34-{0.0}	normal	absent	sand
WVMC-35	normal	absent	
WVMC-35.5-{0.0}	normal	absent	sand, silt
WVMC-36-{0.0}	normal	absent	
WVMC-36-A	normal	absent	sand
WVMC-39	normal	absent	sand, silt
WVMC-40	normal	absent	none
WVMC-42	normal	absent	sand
WVMC-43-{0.0}	normal	absent	none
WVMC-43-A	normal	absent	none
WVMC-43-B	normal	absent	none
WVMC-44-{0.0}	normal	absent	sand, silt
WVMC-46	normal	absent	sand, silt
WVMC-46-A	normal	absent	none

Table 8: (Continued)
Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-46-B	normal	absent	none
WVMC-47	normal	absent	sand / silt
WVMC-49	normal	absent	sand / silt
WVMC-50	normal	absent	sand / silt
WVMC-51	normal	absent	sand / silt
WVMC-51-A	normal	absent	sand / silt
WVMC-51-B	normal	absent	sand / silt
WVMC-51-B-2	normal	absent	sand / silt
WVMC-51-B-3	normal	absent	sand / silt
WVMC-51-B-4	normal	absent	sand / silt
WVMC-51-B-5	normal	absent	sand, silt
WVMC-00-{71.0}	normal	absent	sand, silt
WVMC-52	normal	absent	sand
WVMC-52-.7A	normal	absent	sand, silt
WVMC-52-A	normal	absent	sand, silt
WVMC-53	normal	absent	clay (slight)
WVMC-54	normal	absent	
WVMC-54-A	normal	absent	sand, silt
WVMC-54-C	normal	absent	sand
WVMC-54-D	normal	absent	sand
WVMC-54-F	normal	absent	
WVMC-54-H	normal	absent	sand, silt
WVMC-54-H-1	normal	absent	sand, silt
WVMC-54-I	normal	absent	sand
WVMC-54-I-1	normal	absent	sand, silt
WVMC-54-J	normal	absent	sand, silt
WVMC-54-K	normal	absent	sand
WVMC-55	normal	absent	sand, silt
WVMC-56	normal	absent	sand, silt
WVMC-57	normal	absent	sand, silt
WVMC-59-{00.0}	normal	absent	sand, silt
WVMCS-.5	normal	absent	sand, silt, red /brown precipitate
WVMCS-2	normal	absent	sand, silt
WVMCS-3	normal	absent	sand, silt
WVMCS-3-A	normal	absent	sand, silt, gravel
WVMCS-5	normal	absent	sand, silt
WVMCS-6	normal	absent	sand, silt
WVMCS-6-B	normal	absent	silt
WVMCS-6-C	normal	absent	dredging in process upstream
WVMCS-6-E	normal	absent	none

Table 8: (Continued)
Observed Sediment Characteristics

STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMCS-7	normal	absent	silt
WVMCS-7.5	normal	absent	silt
WVMCS-8	normal	absent	sand, silt
WVMCS-12	normal	absent	silt
WVMCS-13	normal	absent	none
WVMCS-14	normal	absent	silt
WVMCS-15	normal	absent	silt
WVMCS-16	normal	absent	none
WVMCS-18	normal	absent	silt
WVMC-59-{20.4}	normal	absent	sand, silt
WVMCS-22	normal	absent	sand
WVMCS-25	normal	absent	silt
WVMCS-28	normal	absent	
WVMCS-33	normal	absent	none
WVMCS-46	normal	absent	sand
WVMCS-47	normal	absent	sand
WVMCS-53	normal	absent	none
WVMCS-54	normal	absent	none
WVMC-60-A	normal	absent	sand, silt
WVMC-60-C	normal	absent	sand, silt
WVMC-60-C-3	normal	absent	sand, silt
WVMC-60-C-4	normal	absent	sand, silt
WVMC-60-D-1	normal	absent	sand
WVMC-60-D-2	normal	absent	sand
WVMC-60-D-3-A	normal	absent	
WVMC-60-D-3-B	normal	absent	sand
WVMC-60-D-3-C	normal	absent	sand
WVMC-60-D-3-E	normal	absent	sludge, sand, silt
WVMC-60-D-4	anaerobic	absent	sludge, sand, silt, clay (heavy)
WVMC-60-D-4.5	normal	absent	sand
WVMC-60-D-4.7	normal	absent	sand
WVMC-60-D-9	normal	absent	sand, marl, silt
WVMC-60-D-11	normal	absent	sand, silt
WVMC-60-D-12	normal	absent	sand, silt
WVMC-60-D-14	normal	absent	sand, silt
WVMC-60-D-{25.0}	normal	absent	sand, silt
WVMC-60-E	normal	absent	sand, silt
WVMC-60-F	normal	absent	sand, silt
WVMC-60-G	normal	absent	sand, silt
WVMC-60-I	normal	absent	sand, silt

Table 8: (Continued) Observed Sediment Characteristics			
STREAM CODE	SEDIMENT ODOR	SEDIMENT OILS	SEDIMENT DEPOSITS
WVMC-60-J	normal	absent	sand, silt
WVMC-60-K	normal	absent	none
WVMC-60-K-2-A	normal	absent	none
WVMC-60-K-5	normal	absent	sand, silt
WVMC-60-K-8	sewage	absent	sand
WVMC-60-K-16	normal	absent	sand, silt
WVMC-60-K-17	normal	absent	sand
WVMC-60-K-17-A	normal	absent	silt
WVMC-60-L	normal	absent	sand, silt
WVMC-60-N-{01}	normal	absent	
WVMC-60-N-4	normal	absent	silt
WVMC-60-N-8	normal	absent	none
WVMC-60-N-8.5	normal	absent	sand
WVMC-60-N-{20}	normal	absent	silt
WVMC-60-{11.6}	normal	absent	sand, silt
WVMC-60-O-{01.0}	normal	absent	sand, silt
WVMC-60-O-1	normal	absent	sand, silt
WVMC-60-O-{07.0}	normal	absent	sand, silt
WVMC-60-P	normal	absent	sand, silt
WVMC-60-Q	normal	absent	sand, silt
WVMC-60-R	normal	absent	sand, silt
WVMC-60-S	normal	absent	sand, silt
WVMC-60-{25.1}	normal	absent	sand, silt
WVMC-60-T-{02.5}	sewage	absent	
WVMC-60-T-1	normal	absent	none
WVMC-60-T-2	normal	absent	none
WVMC-60-T-3	normal	absent	none
WVMC-60-T-8	normal	absent	sand
WVMC-60-T-9	normal	absent	none
WVMC-60-T-10	normal	absent	
WVMC-60-T-11	normal	absent	none
WVMC-60-T-13	normal	absent	sand, silt
WVMC-60-T-{13.0}	normal	absent	silt

Table 9: Substrate Composition (In Area Of Benthic Sample)							
STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-2	15	10	50	20	3	2	0
WVMC-2-A	80	3	5	4	3	5	0
WVMC-2.5	0	20	45	20	10	5	0

Table 9: Substrate Composition
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-2.5-A	0	10	40	35	10	5	0
WVMC-2.7	0	2	50	28	10	10	0
WVMC-4	15	10	30	20	15	10	0
WVMC-7	15	35	25	10	10	5	0
WVMC-10	0	10	25	25	25	15	0
WVMC-11-{00}	92	3	1	1	0	4	0
WVMC-11-.1A	20	20	20	20	15	5	0
WVMC-11-A	0	0	20	50	20	10	0
WVMC-11-{05}	5	25	25	25	15	5	0
WVMC-11-B	0	20	30	30	15	5	0
WVMC-11-C	0	10	55	25	5	5	0
WVMC-11-{07}	10	15	25	25	15	10	0
WVMC-11-C.1	0	30	35	20	10	5	0
WVMC-11-D-{00}	0	0	25	25	20	30	0
WVMC-11-D-{10}	10	10	20	20	25	15	0
WVMC-11-E	0	0	20	20	30	30	0
WVMC-12-{00}	35	25	20	10	5	5	0
WVMC-12-.5A-{0}	20	40	20	10	5	5	0
WVMC-12-.5A-{3}	0	30	40	15	5	10	0
WVMC-12-.5A-{5}	0	0	0	10	60	30	0
WVMC-12-.7A	0	10	40	25	10	15	0
WVMC-12-A-{02.5}	0	15	45	20	15	5	0
WVMC-12-A-1	0	20	50	10	10	10	0
WVMC-12-A-1-A	30	50	2	1	15	2	0
WVMC-12-A-2	5	15	35	25	10	5	0
WVMC-12-A-{03}	0	5	55	15	15	10	0
WVMC-12-B-{01}	0	5	40	25	15	15	0
WVMC-12-B-.5-{00}	0	20	40	10	20	10	0
WVMC-12-B-.5-A	0	0	0	35	40	25	0
WVMC-12-B-.5-{02}	0	5	15	40	30	10	0
WVMC-12-B-{02}	0	20	40	20	15	5	0
WVMC-12-B-1-{01}	10	20	30	25	15	0	0
WVMC-12-B-1-B	0	5	5	5	70	10	5
WVMC-12-B-1-{04}	0	35	15	20	30	0	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-12-B-2	0	0	0	0	70	20	10
WVMC-12-B-{06}	15	25	25	15	20	0	0
WVMC-12-B-3-{00}	0	0	10	0	50	30	10

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-12-B-3-{02}	0	25	15	20	25	10	5
WVMC-12-B-4-{02}	0	5	20	55	25	5	0
WVMC-12-B-4-{03}	0	15	30	35	15	0	5
WVMC-12-B-4.5	0	5	0	0	55	40	0
WVMC-12-B-6	25	58	10	5	10	0	0
WVMC-12-B-{11}	0	25	10	30	35	0	0
WVMC-12-B-5-C	0	10	25	40	25	0	0
WVMC-12-B-5-{03}	0	0	10	20	50	20	10
WVMC-12-B-{12}	0	0	0	25	50	25	0
WVMC-12-C-{01}	0	0	10	15	50	25	0
WVMC-12-C-{04}	0	0	0	0	75	25	0
WVMC-12-D	0	20	40	20	10	10	0
WVMC-12-{10}	0	15	60	15	10	0	0
WVMC-12-E	0	20	50	15	15	0	0
WVMC-12-E.1	0	25	45	20	10	0	0
WVMC-12-F-{00.0}	0	0	20	10	60	10	0
WVMC-12-F-{01.0}	0	5	40	30	15	10	0
WVMC-12-{14}	5	25	5	15	45	5	0
WVMC-00-{18.3}	10	20	20	10	20	20	0
WVMC-13-{01}	0	0	0	20	50	20	10
WVMC-13.5-{2.3}	0	0	0	0	20	40	40
WVMC-14-{02}	0	5	15	25	35	20	0
WVMC-15-{01}	5	30	30	20	10	5	0
WVMC-15-A	0	5	30	30	25	10	0
WVMC-16-{02}	30	30	25	5	5	10	0
WVMC-16-A-{0.2}	0	20	60	10	5	5	0
WVMC-16-A-.1	0	3	50	20	5	22	0
WVMC-16-A-{0.8}	0	0	35	45	15	5	0
WVMC-16-A-{2.5}	0	70	15	5	10	0	0
WVMC-16-A-{3.9}	0	0	5	0	0	95	0
WVMC-16-{04}	0	25	30	25	15	5	0
WVMC-17-{0.0}	0	20	60	20	0	0	0
WVMC-17-.6A	0	35	35	10	20	0	0
WVMC-17-.7	0	30	25	20	15	10	0
WVMC-17-{2.6}	0	35	35	10	10	10	0
WVMC-17-A-{0.0}	0	35	35	10	10	10	0
WVMC-17-A-.5-{0}	0	25	25	15	25	10	0
WVMC-17-A-.5-{3}	0	0	15	10	60	25	0
WVMC-17-A-1-{0.0}	30	30	20	10	5	5	0
WVMC-17-A-1.1	0	0	0	30	40	30	0
WVMC-17-A-1.2	0	0	5	0	70	25	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-17-A-1-{3.2}	0	0	0	0	80	20	0
WVMC-17-A-{2.1}	0	20	35	15	10	20	0
WVMC-17-{3.2}	0	30	30	25	15	10	0
WVMC-17-A.1	0	25	40	15	15	5	0
WVMC-17-{6.8}	0	30	30	20	10	10	0
WVMC-17-B	0	35	15	20	30	0	0
WVMC-17-C	0	15	40	30	10	5	0
WVMC-17-{10.2}	5	15	20	25	35	0	0
WVMC-17-{14.4}	0	25	30	20	15	10	0
WVMC-18-{0.0}	0	10	70	10	5	5	0
WVMC-18-.1A	0	10	50	20	15	5	0
WVMC-18-A-1	0	2	5	3	5	85	0
WVMC-18-A	0	20	15	30	30	5	0
WVMC-18-{6.0}	0	5	75	10	10	0	0
WVMC-19	0	10	50	20	10	10	0
WVMC-19-A	0	20	25	25	20	10	0
WVMC-20-{0.0}	0	12	70	15	3	0	0
WVMC-20-{6.0}	0	20	25	25	20	10	0
WVMC-21	0	5	60	20	5	10	0
WVMC-22-{1.5}	0	7	50	30	13	0	0
WVMC-22-B	50	5	15	10	15	5	0
WVMC-22-{2.0}	0	50	25	15	10	0	0
WVMC-23-{0.0}	5	65	10	10	5	5	0
WVMC-23-.2A	20	65	5	10	0	0	0
WVMC-23-A-{0.0}	0	30	30	20	10	10	0
WVMC-23-A-.1-A	0	50	30	10	5	5	0
WVMC-23-A-.1-B	0	15	60	5	15	3	0
WVMC-23-A-{2.9}	0	10	40	10	10	20	0
WVMC-23-{1.8}	0	50	20	10	10	0	0
WVMC-23-{2.0}	0	5	15	5	15	60	0
WVMC-24-{0.0}	0	60	10	15	10	5	0
WVMC-24-A	0	60	20	10	10	0	0
WVMC-24-{2.7}	0	10	20	30	30	10	0
WVMC-25-{0.0}	5	65	15	10	5	0	0
WVMC-25-{2.3}	20	50	15	10	5	0	0
WVMC-26-{0.0}	0	5	50	30	5	10	0
WVMC-26-{1.5}	0	0	25	30	30	15	0
WVMC-27-{0.0}	5	70	10	10	5	0	0
WVMC-27-{2.7}	0	15	30	15	20	20	0
WVMC-27-A	0	25	15	20	15	25	0
WVMC-27-B	0	10	40	20	20	10	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-28	0	15	50	20	10	5	0
WVMC-31-{0.0}	15	40	30	10	5	0	0
WVMC-31.7	35	23	17	12	8	5	0
WVMC-32	5	20	30	30	10	5	0
WVMC-32-B	0	15	40	30	10	5	0
WVMC-32-C-1	0	5	40	30	15	10	0
WVMC-32-D	30	15	25	20	5	5	0
WVMC-32-E	0	10	50	25	10	5	0
WVMC-32-F	0	5	45	25	15	10	0
WVMC-32-G	0	5	45	35	10	5	0
WVMC-00-{43}	0	60	20	15	5	0	0
WVMC-33-{0.0}	0	10	45	40	5	0	0
WVMC-33-A	0	35	45	15	5	0	0
WVMC-33-A.5	0	35	40	15	5	5	0
WVMC-33-B	5	35	35	15	5	5	0
WVMC-33-B.5	25	30	35	9	1	0	0
WVMC-33-C	0	10	45	35	10	0	0
WVMC-33-D	0	10	35	40	10	5	0
WVMC-33-E	0	5	50	35	10	0	0
WVMC-33-F	0	0	50	30	10	0	0
WVMC-34-{0.0}	30	40	15	10	5	0	0
WVMC-35	0	10	50	35	5	0	0
WVMC-35.5-{0.0}	0	10	50	25	10	5	0
WVMC-36-{0.0}	5	15	50	30	0	0	0
WVMC-36-A	0	10	70	15	5	0	0
WVMC-39	0	30	30	25	10	5	0
WVMC-40	0	30	40	20	8	2	0
WVMC-42	0	30	40	25	4	1	0
WVMC-43-{0.0}	10	20	50	15	5	0	0
WVMC-43-A	0	5	50	35	10	0	0
WVMC-43-B	0	5	45	35	10	5	0
WVMC-44-{0.0}	10	15	40	20	5	5	0
WVMC-46	0	20	35	25	15	5	0
WVMC-46-A	0	20	45	25	10	0	0
WVMC-46-B	0	30	35	20	10	5	0
WVMC-47	0	35	30	20	10	5	0
WVMC-49	0	15	25	35	15	10	0
WVMC-50	0	45	30	12	8	5	0
WVMC-51	0	20	45	20	10	5	0
WVMC-51-A	0	30	25	20	15	10	0
WVMC-51-B	5	20	35	25	10	5	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-51-B-2	0	5	15	30	35	15	0
WVMC-51-B-3	0	11	35	25	22	7	0
WVMC-51-B-4	45	5	20	15	10	5	0
WVMC-51-B-5	0	5	35	25	25	10	0
WVMC-52	0	15	60	20	5	0	0
WVMC-52-.7A	10	10	20	40	10	5	5
WVMC-52-A	10	20	40	20	5	5	0
WVMC-53	0	10	50	30	5	0	2
WVMC-54	0	5	60	30	5	0	0
WVMC-54-A	0	20	38	38	2	2	0
WVMC-54-C	0	10	50	30	10	0	0
WVMC-54-D	0	5	50	40	5	0	0
WVMC-54-F	15	10	50	20	5	0	0
WVMC-54-H	0	15	55	20	8	2	0
WVMC-54-H-1	0	15	40	25	15	5	0
WVMC-54-I	0	15	60	20	5	0	0
WVMC-54-I-1	20	20	25	20	10	5	0
WVMC-54-J	10	20	30	30	5	5	0
WVMC-54-K	0	15	40	30	5	0	0
WVMC-55	0	15	30	25	20	10	0
WVMC-56	0	35	35	20	8	2	0
WVMC-57	0	5	25	40	20	10	0
WVMC-59-{00.0}	0	22	35	23	10	10	0
WVMCS-.5	0	0	10	15	10	50	15
WVMCS-2	45	10	12	13	5	15	0
WVMCS-3	0	30	30	20	10	10	0
WVMCS-3-A	0	10	65	20	10	5	0
WVMCS-5	65	5	10	10	5	5	0
WVMCS-6	10	2	20	60	5	3	0
WVMCS-6-B	0	0	20	65	5	10	0
WVMCS-6-C	0	10	50	20	10	10	0
WVMCS-6-E	0	0	3	60	10	0	0
WVMCS-7	0	0	45	50	3	2	0
WVMCS-7.5	0	5	45	45	0	5	0
WVMCS-8	0	15	20	30	20	15	0
WVMCS-12	0	35	35	25	2	3	0
WVMCS-13	0	15	70	10	5	0	0
WVMCS-14	0	5	60	25	5	5	0
WVMCS-15	0	5	80	10	2	3	0
WVMCS-16	0	1	60	35	4	0	0
WVMCS-18	0	15	60	15	5	5	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-59-{20.4}	0	0	65	25	5	5	0
WVMCS-22	0	5	35	40	20	0	0
WVMCS-25	0	15	35	35	10	5	0
WVMCS-28	0	35	45	15	5	0	0
WVMCS-33	0	50	30	15	5	0	0
WVMCS-46	25	5	50	10	10	0	0
WVMCS-47	0	0	70	20	10	0	0
WVMCS-53	0	2	60	35	3	0	0
WVMCS-54	0	0	85	10	5	0	0
WVMC-60-A	5	25	20	25	10	15	0
WVMC-60-C	10	5	45	20	10	10	0
WVMC-60-C-3	5	20	40	15	10	10	0
WVMC-60-C-4	45	15	10	10	10	10	0
WVMC-60-D-1	20	50	20	8	2	0	0
WVMC-60-D-2	0	20	10	50	15	5	0
WVMC-60-D-3-A	85	5	5	5	0	0	0
WVMC-60-D-3-B	0	85	5	5	5	0	0
WVMC-60-D-3-C	0	10	30	50	10	0	0
WVMC-60-D-3-E	0	5	10	10	50	10	5
WVMC-60-D-4	0	10	0	0	80	5	5
WVMC-60-D-4.5	10	40	35	10	5	0	0
WVMC-60-D-4.7	10	60	5	10	15	0	0
WVMC-60-D-9	0	0	15	10	65	10	0
WVMC-60-D-11	0	3	45	23	17	12	0
WVMC-60-D-12	0	8	30	30	20	12	0
WVMC-60-D-14	0	10	30	20	10	30	0
WVMC-60-D-{25.0}	0	0	5	5	30	60	0
WVMC-60-E	0	35	25	0	25	15	0
WVMC-60-F	10	30	20	20	10	10	0
WVMC-60-G	30	20	35	5	5	5	0
WVMC-60-I	45	10	20	15	5	5	0
WVMC-60-J	25	20	15	10	10	20	0
WVMC-60-K	1	55	40	4	0	1	0
WVMC-60-K-2-A	0	20	60	15	5	0	0
WVMC-60-K-5	0	0	40	40	15	5	0
WVMC-60-K-8	0	50	35	10	5	0	0
WVMC-60-K-16	0	0	75	20	10	5	0
WVMC-60-K-17	0	0	60	30	10	0	0
WVMC-60-K-17-A	0	10	70	15	0	5	0
WVMC-60-L	20	20	25	15	10	10	0
WVMC-60-N-{01}	15	45	38	2	1	1	0

Table 9: Substrate Composition (Continued)
(In Area Of Benthic Sample)

STREAM CODE	% BEDROCK	% BOULDER	% COBBLE	% GRAVEL	% SAND	% SILT	% CLAY
WVMC-60-N-4	0	10	60	20	0	10	0
WVMC-60-N-8	5	25	35	30	4	1	0
WVMC-60-N-8.5	0	30	55	10	5	0	0
WVMC-60-N-{20}	1	15	40	35	7	2	0
WVMC-60-{11.6}	0	10	20	20	10	10	0
WVMC-60-O-{01.0}	0	60	20	10	7	3	0
WVMC-60-O-1	0	35	20	20	10	15	0
WVMC-60-O-{07.0}	30	30	20	12	5	3	0
WVMC-60-P	0	30	30	20	10	10	0
WVMC-60-Q	0	30	30	25	8	7	0
WVMC-60-R	0	5	30	10	10	45	0
WVMC-60-S	0	40	30	25	3	2	0
WVMC-60-{25.1}	0	25	45	25	2	3	0
WVMC-60-T-{02.5}	0	30	50	15	5	0	0
WVMC-60-T-1	0	40	50	10	0	0	0
WVMC-60-T-2	15	35	40	10	0	0	0
WVMC-60-T-3	0	0	75	25	0	0	0
WVMC-60-T-8	0	15	60	20	5	0	0
WVMC-60-T-9	0	0	70	25	5	0	0
WVMC-60-T-10	0	30	50	10	5	5	0
WVMC-60-T-11	0	20	20	40	19	1	0
WVMC-60-T-13	0	4	35	30	15	15	1
WVMC-60-T-{13.0}	0	2	58	25	10	5	0

Table 10: Summary Of Benthic Macroinvertebrate Taxa Collected
(Number Of Sites With Taxon - Top 10 In Parentheses)

TAXA	ENTIRE WATERSHED	ECOREGION 67	ECOREGION 69	ECOREGION 70
Chironomidae	203 (1)	115 (1)	85 (1)	3
Capniidae/Leuctridae	190 (2)	110 (3)	79 (2)	1
Baetidae	176 (3)	114 (2)	60 (4)	2
Hydropsychidae	166 (4)	109 (4)	54 (6)	3
Tipulidae	153 (5)	89 (8)	62 (3)	2
Heptageniidae	152 (6)	114 (2)	36	2
Leptophlebiidae	132 (7)	98 (5)	34	0
Philopotamidae	128 (8)	93 (6)	34	1
Oligochaeta	124 (9)	62	60 (4)	2
Chloroperlidae	123 (10)	85 (9)	38 (10)	0
Perlidae	123 (10)	90 (7)	32	1
Peltoperlidae	111	79 (10)	31	1
Perlodidae	107	74	32	1
Simuliidae	95	54	39 (9)	2
Elmidae	86	49	35	2
Nemouridae	83	32	51 (7)	0
Pteronarcyidae	82	71	11	0
Cambaridae	78	37	40 (8)	1
Ephemerellidae	72	57	15	0
Rhyacophilidae	70	36	33	1
Corydalidae	67	30	36	1
Psephenidae	42	33	9	0
Isonychiidae	41	34	7	0
Gammaridae	39	31	7	1
Lepidostomatidae	37	19	18	0
Polycentropodidae	30	16	14	0
Athericidae	27	22	5	0
Asellidae	26	1	23	2
Limnephilidae	21	8	13	0
Gomphidae	19	12	6	1
Ameletidae	17	7	10	0
Caenidae	14	7	6	1
Sialidae	14	1	12	1
Glossosomatidae	12	10	2	0
Hirudinidae	12	12	0	0
Tabanidae	12	3	9	0
Ephemeridae	11	8	2	1
Empididae	9	6	3	0
Curculionidae	8	2	5	1
Ceratopogonidae	7	1	6	0
Brachycentridae	6	5	1	0
Aeshnidae	5	1	4	0
Haliplidae	5	2	3	0

Table 10: (Continued)
Summary Of Benthic Macroinvertebrate Taxa Collected
(Number Of Sites With Taxon - Top 10 In Parentheses)

TAXA	ENTIRE WATERSHED	ECOREGION 67	ECOREGION 69	ECOREGION 70
Odontoceridae	5	3	2	0
Siphlonuridae	5	3	2	0
Sphaeriidae	5	1	3	1
Turbellaria	5	3	2	0
Blephariceridae	4	4	0	0
Cossidae	4	2	2	0
Dixidae	4	3	1	0
Dryopidae	4	3	1	0
Nemertea	4	3	1	0
Physidae	4	1	3	0
Psycomyiidae	4	3	1	0
Pyralidae	4	0	4	0
Talitridae	4	2	2	0
Carabidae	3	2	1	0
Cordulegastridae	3	0	3	0
Corixidae	3	0	3	0
Dytiscidae	3	0	3	0
Planorbidae	3	0	3	0
Chrysomelidae	2	1	1	0
Hydroptilidae	2	1	1	0
Leptoceridae	2	0	2	0
Libellulidae	2	0	2	0
Nematoda	2	0	2	0
Sciomyzidae	2	2	2	0
Staphylinidae	2	0	0	0
Calopterygidae	1	1	1	0
Coenagrionidae	1	1	1	0
Corbiculidae	1	1	1	0
Crangonyctidae	1	0	0	0
Dolichopodidae	1	1	1	0
Georyssidae	1	0	0	0
Gerridae	1	0	0	0
Gyrinidae	1	1	1	0
Heliophoridae	1	0	0	0
Hydrophilidae	1	0	0	0
Lymnaeidae	1	1	1	0
Neoephemeridae	1	0	0	0
Oligoneuriidae	1	0	0	0
Ptilodactylidae	1	1	1	0
Saldidae	1	1	1	0
Stratiomyidae	1	1	1	0
Tenebrionidae	1	0	0	0
Tricorythidae	1	1	1	0

Table 11: Comparable Sites With Impaired Biological Condition (Bioscore < 50)

STREAM CODE	BIOSCORE	ECOID
WVMC-2.5	45.5	69
WVMC-2.7	36.4	70
WVMC-4	36.4	70
WVMC-12-.5A-{0}	27.3	69
WVMC-12-A-2	45.5	69
WVMC-12-B-.5-{00}	27.3	69
WVMC-12-B-.5-A	36.4	69
WVMC-12-B-1-{01}	27.3	69
WVMC-12-B-{06}	9.1	69
WVMC-12-B-6	36.4	69
WVMC-12-B-{11}	27.3	69
WVMC-12-B-5-C	45.5	69
WVMC-12-{14}	45.5	69
WVMC-16-A-{0.8}	36.4	69
WVMC-17-.7	27.3	69
WVMC-17-{2.6}	36.4	69
WVMC-17-A-{0.0}	27.3	69
WVMC-17-A-.5-{0}	36.4	69
WVMC-17-A-1-{0.0}	9.1	69
WVMC-17-{6.8}	45.5	69
WVMC-23-A-{2.9}	36.4	69
WVMC-31-{0.0}	45.5	69
WVMC-49	36.4	67
WVMC-60-D-3-C	45.5	69
WVMC-60-D-3-E	45.5	69
WVMC-60-R	45.5	67

Table 12: Sites With No Benthic Life Found In Single Precursory Kick And Evidence Of AMD Impairment

STREAM CODE	pH (S.U.)	CONDUCT (μMHOS/CM)	Al (mg/l)	*Fe (mg/l)*	Mn (mg/l)	ECOID
WVMC-11-{00}	3.2	977	12	5.8	1.7	69
WVMC-11-.1A	3.7	385	4.1	0.24	0.87	69
WVMC-11-A	3.0	952	10	5.9	1.9	69
WVMC-11-{05}	3.3	996	12	6.7	1.7	69
WVMC-11-B	3.4	489	6.8	1.1	0.64	69
WVMC-11-C	3.1	1139	16	13	0.92	69
WVMC-11-{07}	3.6	792	11	1.4	4.0	69
WVMC-11-C.1	3.0	1171	18	8.9	7.5	69
WVMC-11-E	3.7	1113	18	1.8	5.5	69
WVMC-12-.5A-{3}	3.5	713	15	1.4	3.0	69
WVMC-12-.5A-{5}	3.2	1176	28	4.9	4.8	69
WVMC-13.5-{2.3}	3.1	920	13	8.4	7.3	69
WVMC-16-{02}	3.3	819	10	25	1.7	69
WVMC-16-A-{0.2}	3.1	1356	19	39	3.0	69
WVMC-16-A-.1	2.7	1737	26	72	3.6	69
WVMC-16-A-{2.5}	2.6	1770	29	110	3.8	69
WVMC-16-A-{3.9}	3.5	295	1.3	3.6	0.64	69
WVMC-16-{04}	4.0	188	3.8	0.42	1.1	69
WVMC-17-{0.0}	3.2	1239	14	43	3.1	69
WVMC-17-A-1.1	3.2	2370	38	7.6	21	69
WVMC-17-A-1.2	3.4	2370	40	6.4	29	69
WVMC-17-A-{2.1}	3.3	1424	5.5	3.5	12	69
WVMC-23-{0.0}	2.4	1398	28	53	2.4	69
WVMC-23-.2A	4.9	708	2.8	1.0	3.4	69
WVMC-23-A-{0.0}	2.6	1475	25	43	1.9	69
WVMC-23-A-.1-A	3.1	413	8.4	1.5	1.9	69
WVMC-23-A-.1-B	2.5	1255	23	14	6.0	69
WVMC-23-{1.8}	2.6	1590	40	87	3.1	69
WVMC-23-{2.0}	2.8	925	14	16	2.6	69
WVMC-24-{0.0}	2.4	949	17	15	1.5	69
WVMC-24-A	2.2	1710	42	80	3.6	69
WVMC-24-{2.7}	2.4	1600	20	25	2.1	69
WVMC-25-{0.0}	2.4	2240	53	130	1.9	69
WVMC-25-{2.3}	2.3	1304	20	35	1.5	69
WVMC-27-{0.0}	3.1	723	8.9	2.0	2.0	69
WVMC-27-{2.7}	2.8	713	11	5.1	1.8	69
WVMC-27-A	2.7	843	16	10	1.7	69
WVMC-27-B	3.0	679	9.9	4.7	1.9	69
WVMC-60-D-2	4.0	89	2.1000	2.2400	0.3200	69
WVMC-60-D-2.7	3.2	456				69
WVMC-60-D-3-A	3.0	681	14.5000	10.0000	0.4800	69

Table 13: Sites With No Biological Samples Collected

NAME	STREAM CODE	REASON
BIG SANDY CREEK @ MOUTH	WVMC-12-{00}	TOO DEEP
LICK RUN OF LITTLE LAUREL RUN	WVMC-12-A-1-A	NO RIFFLE
1ST UNT OF BEAVER CREEK	WVMC-12-B-1-B	NO RIFFLE
HOG RUN AT MOUTH	WVMC-12-B-3-{00}	NO RIFFLE
PINEY RUN AT MOUTH	WVMC-12-B-4.5	SWAMP
LITTLE SANDY ABOVE CHERRY RUN	WVMC-12-B-{12}	LOW FLOW
CHEAT RIVER ABOVE BIG SANDY	WVMC-00-{18.3}	TOO DEEP
CHEAT RIVER @ ALBRIGHT	WVMC-00-{28.8}	TOO DEEP
GLADE RUN NEAR HEADWATERS	WVMC-17-A-1-{3.2}	NO RIFFLE
TRAY RUN	WVMC-31.5	EPHEMERAL
CHEAT RIVER @ ROWLESBURG	WVMC-00-{43}	NO RIFFLE
LAUREL RUN OF CHEAT RIVER NEAR AUVIL	WVMC-48	EPHEMERAL
JOHNSON RUN	WVMC-51-B-1	EPHEMERAL
CHEAT RIVER @ ST. GEORGE	WVMC-00-{71.0}	TOO DEEP
DRY RUN	WVMC-55	NO ACCESS
WILSON HOLLOW OF ELKLICK RUN	WVMC-60-C-5	EXPERIMENTAL STREAM
BLACKWATER RIVER BELOW CANAAN VALLEY STATE PARK	WVMC-60-D-{25.0}	TOO DEEP
CAVE RUN	WVMC-60-H.5	NO ACCESS
STINKING RUN	WVMC-60-S	EPHEMERAL

Table 14: Sites With Non-Comparable Benthic Macroinvertebrate Samples And Observed Impairment

NAME	STREAM CODE	SAMPLE DEVICE	HABITAT TYPE	OBSERVED IMPAIRMENT
BARNES RUN	WVMC-12-B-2	D-NET	GLIDE / POOL	RAPID HABITAT, EMBEDDED
CHERRY RUN NEAR HEADWATERS	WVMC-12-B-5-{03}	D-NET	GLIDE / POOL	LOW DISSOLVED OXYGEN, ANAEROBIC ODOR
FICKEY RUN NEAR HEADWATERS	WVMC-17-A-.5-{3}	HAND PICKED	RIFFLE / RUN	EMBEDDED, HIGH FECAL BACTERIA, HIGH CONDUCTIVITY
LITTLE LICK RUN	WVMC-18-A-1	D-NET	GLIDE / POOL	EMBEDDED
SMOKY HOLLOW	WVMCS-.5	SURBER	RIFFLE/ RUN	RAPID HABITAT, EMBEDDED
PENDLETON CREEK	WVMC-60-D-4	D-NET	GLIDE / POOL	EMBEDDED
NORTH BRANCH OF BLACKWATER RIVER	WVMC-60-D-9	D-NET	GLIDE / POOL	EMBEDDED

Table 15: Benthic Macroinvertebrate Community Metrics

STREAM CODE	TOTAL TAXA	EPT	HBI	% DOMINANT TAXA	# INTOLERANT TAXA	BIOSCORE
WVMC-2	19	10	4.6	25.4	6	90.9
WVMC-2-A	18	12	4.0	24.5	7	90.9
WVMC-2.5	11	3	5.2	39.5	2	45.5
WVMC-2.5-A	18	7	5.3	23.0	3	72.7
WVMC-2.7	7	2	5.4	53.6	0	36.4
WVMC-4	9	3	5.4	56.7	0	36.4
WVMC-7	10	1	5.5	35.3	4	54.5
WVMC-10	20	8	4.4	17.4	6	81.8
WVMC-11-D-{00}	9	3	2.3	67.8	4	54.5
WVMC-11-D-{10}	9	6	2.7	64.5	3	63.6
WVMC-12-.5A-{0}	3	1	2.9	78.9	2	27.3
WVMC-12-.7A	16	8	4.0	16.5	4	72.7
WVMC-12-A-{02.5}	15	11	2.5	72.6	7	81.8
WVMC-12-A-1	12	5	3.2	39.4	5	81.8
WVMC-12-A-2	8	3	5.5	41.9	0	45.5
WVMC-12-A-{03}	15	11	3.3	45.7	6	90.9
WVMC-12-B-{01}	8	5	3.7	38.5	3	72.7
WVMC-12-B-.5-{00}	3	2	4.5	70.0	1	27.3
WVMC-12-B-.5-A	3	2	2.8	50.0	1	36.4
WVMC-12-B-.5-{02}	13	8	4.2	17.9	4	72.7
WVMC-12-B-{02}	11	7	3.6	48.4	3	63.6
WVMC-12-B-1-{01}	6	2	2.5	80.6	2	27.3
WVMC-12-B-1-{04}	12	6	2.8	53.4	5	72.7
WVMC-12-B-2	*6*	*2*	*7.9*	*46.7*	*0*	*18.2*
WVMC-12-B-{06}	6	3	6.5	75.6	1	9.1
WVMC-12-B-3-{02}	16	9	4.5	29.8	7	90.9
WVMC-12-B-4-{02}	11	7	2.9	39.1	5	81.8
WVMC-12-B-4-{03}	11	7	3.2	54.4	6	72.7
WVMC-12-B-6	8	4	3.2	72.7	2	36.4
WVMC-12-B-{11}	6	2	2.7	78.8	1	27.3
WVMC-12-B-5-C	9	3	2.2	95.4	4	45.5
WVMC-12-B-5-{03}	*3*	*0*	*6.9*	*92.7*	*0*	*9.1*
WVMC-12-C-{01}	11	4	3.3	50.0	4	54.5
WVMC-12-C-{04}	12	8	2.2	38.2	6	81.8
WVMC-12-D	13	10	3.8	35.0	6	100.0
WVMC-12-{10}	16	8	5.2	34.4	4	72.7
WVMC-12-E	11	7	3.3	73.3	5	63.6
WVMC-12-E.1	14	8	5.1	47.5	5	72.7
WVMC-12-F-{00.0}	18	10	5.0	17.9	5	90.9
WVMC-12-F-{01.0}	16	10	4.1	20.0	4	81.8
WVMC-12-{14}	8	4	5.1	29.4	1	45.5
WVMC-13-{01}	18	10	3.5	30.9	6	100.0
WVMC-14-{02}	15	9	4.1	38.6	7	90.9
WVMC-15-{01}	13	8	3.3	29.2	3	81.8
WVMC-15-A	16	9	4.4	22.3	6	90.9
WVMC-16-A-{0.8}	4	2	5.8	40.0	1	36.4
WVMC-17-.6A	10	7	2.4	80.6	6	63.6

Table 15: (Continued)
Benthic Macroinvertebrate Community Metrics

STREAM CODE	TOTAL TAXA	EPT	HBI	% DOMINANT TAXA	# INTOLERANT TAXA	BIOSCORE
WVMC-17-.7	9	4	4.2	91.0	2	27.3
WVMC-17-{2.6}	6	2	5.0	36.4	0	36.4
WVMC-17-A-{0.0}	2	0	4.5	50.0	1	27.3
WVMC-17-A-.5-{0}	7	0	5.7	40.0	0	36.4
WVMC-17-A-.5-{3}	*4*	*4*	*2.9*	*55.6*	*1*	*65.75*
WVMC-17-A-1-{0.0}	5	0	6.6	83.7	0	9.1
WVMC-17-{3.2}	11	7	5.0	41.7	4	63.6
WVMC-17-A.1	13	7	4.6	32.4	4	72.7
WVMC-17-{6.8}	6	4	2.3	71.0	4	45.5
WVMC-17-B	9	4	2.5	65.7	4	54.5
WVMC-17-C	15	7	3.1	53.9	6	81.8
WVMC-17-{10.2}	20	14	4.2	39.8	9	90.9
WVMC-17-{14.4}	18	9	5.2	53.2	5	63.6
WVMC-18-{0.0}	12	7	4.0	25.0	7	72.7
WVMC-18-.1A	15	7	4.5	47.8	6	72.7
WVMC-18-A-1	*7*	*3*	*2.8*	*63.7*	*2*	*45.5*
WVMC-18-A	12	5	3.5	58.4	6	72.7
WVMC-18-{6.0}	24	17	3.7	26.5	11	100.0
WVMC-19	17	10	4.5	43.8	8	90.9
WVMC-19-A	18	12	3.3	15.2	8	100.0
WVMC-20-{0.0}	16	13	3.8	34.4	9	100.0
WVMC-20-{6.0}	17	9	4.5	33.3	4	72.7
WVMC-21	14	8	4.9	30.6	5	81.8
WVMC-22-{1.5}	12	8	2.7	53.1	6	72.7
WVMC-22-B	17	8	5.7	67.9	6	72.7
WVMC-22-{2.0}	12	8	2.3	51.0	7	72.7
WVMC-23-A-{2.9}	6	1	3.5	61.3	2	36.4
WVMC-26-{0.0}	8	6	4.1	44.3	3	63.6
WVMC-26-{1.5}	7	1	2.2	50.8	4	54.5
WVMC-28	11	7	5.0	29.8	4	63.6
WVMC-31-{0.0}	8	1	4.4	31.3	1	45.5
WVMC-31.7	14	10	5.1	29.8	5	63.6
WVMC-32	11	9	4.1	33.0	5	63.6
WVMC-32-B	18	11	4.1	33.1	8	90.9
WVMC-32-C-1	16	10	2.7	16.7	6	90.9
WVMC-32-D	18	11	3.8	28.7	6	90.9
WVMC-32-E	15	10	4.8	45.1	4	63.6
WVMC-32-F	18	12	4.2	26.3	7	90.9
WVMC-32-G	14	9	2.8	30.8	5	72.7
WVMC-33-{0.0}	19	12	4.9	25.4	6	90.9
WVMC-33-A	20	13	4.3	24.9	8	90.9
WVMC-33-A.5	15	11	3.5	19.8	6	100.0
WVMC-33-B	15	11	2.7	46.0	8	90.9
WVMC-33-B.5	16	11	3.2	28.9	5	90.9
WVMC-33-C	17	12	4.1	19.5	6	90.9
WVMC-33-D	15	10	3.9	29.9	5	72.7
WVMC-33-E	13	7	4.1	21.5	4	63.6
WVMC-33-F	16	10	4.2	23.3	5	72.7
WVMC-34-{0.0}	15	9	4.1	35.5	4	72.7
WVMC-35	20	15	3.8	19.4	8	90.9

Table 15: (Continued)
Benthic Macroinvertebrate Community Metrics

STREAM CODE	TOTAL TAXA	EPT	HBI	% DOMINANT TAXA	# INTOLERANT TAXA	BIOSCORE
WVMC-35.5-{0.0}	15	9	3.5	21.3	5	81.8
WVMC-36-{0.0}	17	10	3.7	37.4	6	81.8
WVMC-36-A	15	10	4.8	39.0	5	63.6
WVMC-39	15	11	2.9	23.8	6	100.0
WVMC-40	12	9	4.8	31.1	5	63.6
WVMC-42	14	11	3.9	26.8	4	72.7
WVMC-43-{0.0}	15	10	4.0	35.2	4	72.7
WVMC-43-A	14	11	3.6	22.4	6	90.9
WVMC-43-B	11	8	4.4	57.7	5	54.5
WVMC-44-{0.0}	13	9	4.5	25.8	5	63.6
WVMC-46	18	11	3.9	16.7	7	90.9
WVMC-46-A	15	12	3.2	29.3	8	100.0
WVMC-46-B	16	11	3.4	19.9	7	100.0
WVMC-47	15	11	4.1	32.3	6	90.9
WVMC-49	10	5	5.4	28.6	2	36.4
WVMC-50	16	11	3.9	16.1	6	90.9
WVMC-51	18	11	4.2	23.9	7	90.9
WVMC-51-A	18	12	3.5	16.4	8	100.0
WVMC-51-B	14	9	4.5	43.3	5	54.5
WVMC-51-B-2	15	10	3.2	20.8	6	90.9
WVMC-51-B-3	16	12	3.7	20.2	7	100.0
WVMC-51-B-4	12	9	2.6	25.6	6	81.8
WVMC-51-B-5	18	10	4.4	33.9	7	81.8
WVMC-52	14	9	4.1	37.9	5	54.5
WVMC-52-.7A	18	13	3.0	16.1	9	100.0
WVMC-52-A	18	12	2.7	38.5	7	90.9
WVMC-53	14	10	4.2	43.3	5	54.5
WVMC-54	14	9	4.2	38.9	5	54.5
WVMC-54-A	13	9	3.6	38.4	5	63.6
WVMC-54-C	14	11	4.0	45.7	6	72.7
WVMC-54-D	23	13	4.1	12.9	9	90.9
WVMC-54-F	18	12	3.9	26.7	9	90.9
WVMC-54-H	18	12	3.3	21.7	9	100.0
WVMC-54-H-1	12	10	3.9	28.6	5	63.6
WVMC-54-I	16	12	3.7	35.6	8	100.0
WVMC-54-I-1	15	12	3.6	19.8	7	100.0
WVMC-54-J	13	10	4.5	33.0	5	63.6
WVMC-54-K	14	9	2.9	23.4	5	72.7
WVMC-56	18	12	3.5	27.3	8	100.0
WVMC-57	12	8	5.2	69.2	5	54.5
WVMC-59-{00.0}	17	13	5.1	42.6	7	81.8
WVMCS-.5	8	3	4.8	30.8	2	45.5
WVMCS-2	18	13	3.9	31.4	8	90.9
WVMCS-3	16	11	3.9	22.4	6	90.9
WVMCS-3-A	16	11	2.9	22.2	7	100.0
WVMCS-5	*17*	*11*	*3.1*	*27.0*	*6*	*100.0*
WVMCS-6	13	9	3.2	25.4	3	72.7
WVMCS-6-B	17	12	3.1	53.2	7	90.9
WVMCS-6-C	19	12	3.1	22.9	7	100.0
WVMCS-6-E	20	12	3.5	31.1	9	100.0

Table 15: (Continued)
Benthic Macroinvertebrate Community Metrics

STREAM CODE	TOTAL TAXA	EPT	HBI	% DOMINANT TAXA	# INTOLERANT TAXA	BIOSCORE
WVMCS-7	22	16	3.2	13.2	11	100.0
WVMCS-7.5	18	14	3.7	16.3	9	90.9
WVMCS-8	15	11	2.9	21.6	7	100.0
WVMCS-12	13	11	3.7	24.8	6	90.9
WVMCS-13	18	13	3.3	18.0	8	100.0
WVMCS-14	18	14	3.6	22.8	9	100.0
WVMCS-15	16	13	3.7	15.3	8	100.0
WVMCS-16	14	10	3.5	28.0	5	72.7
WVMCS-18	18	14	3.5	51.0	9	90.9
WVMC-59-{20.4}	19	12	4.3	20.2	7	90.9
WVMCS-22	18	14	3.0	22.1	9	100.0
WVMCS-25	19	15	2.9	33.0	9	100.0
WVMCS-28	17	12	2.3	19.3	8	100.0
WVMCS-33	10	8	2.1	36.1	8	81.8
WVMCS-46	9	6	2.4	75.8	3	54.5
WVMCS-47	17	12	3.1	30.9	7	100.0
WVMCS-53	19	11	3.2	25.0	6	100.0
WVMCS-54	13	9	2.6	44.9	5	100.0
WVMC-60-A	14	11	3.6	46.0	6	81.8
WVMC-60-C	18	14	3.3	24.0	9	100.0
WVMC-60-C-3	14	13	2.6	24.8	8	90.9
WVMC-60-C-4	23	14	3.8	26.1	9	90.9
WVMC-60-D-1	10	7	2.3	65.3	5	72.7
WVMC-60-D-3-B	11	4	4.0	40.0	3	54.5
WVMC-60-D-3-C	8	4	3.3	63.8	2	45.5
WVMC-60-D-3-E	9	5	4.3	49.6	2	45.5
WVMC-60-D-4	*13*	*4*	*7.1*	*47.6*	*1*	*36.4*
WVMC-60-D-4.5	10	7	4.0	37.1	6	72.7
WVMC-60-D-4.7	11	6	3.4	53.3	5	72.7
WVMC-60-D-9	*13*	*2*	*6.7*	*21.1*	*1*	*45.5*
WVMC-60-D-11	12	8	5.3	39.8	3	63.6
WVMC-60-D-12	14	8	6.1	65.6	5	63.6
WVMC-60-D-14	24	12	5.6	34.7	6	90.9
WVMC-60-E	12	8	2.5	66.3	5	72.7
WVMC-60-F	17	11	3.9	26.7	7	90.9
WVMC-60-G	10	7	4.2	47.7	5	63.6
WVMC-60-I	21	13	3.3	19.1	9	100.0
WVMC-60-J	18	13	3.3	22.7	8	100.0
WVMC-60-K	16	10	4.0	22.3	6	81.8
WVMC-60-K-2-A	15	11	3.4	19.3	7	100.0
WVMC-60-K-5	18	13	3.7	39.9	9	81.8
WVMC-60-K-8	14	11	3.3	30.1	7	90.9
WVMC-60-K-16	23	14	3.6	31.6	10	100.0
WVMC-60-K-17	15	11	3.1	29.0	8	100.0
WVMC-60-K-17-A	22	15	3.5	22.0	11	100.0
WVMC-60-L	14	12	3.6	28.2	7	90.9
WVMC-60-N-{01}	17	13	4.3	23.2	9	90.9
WVMC-60-N-4	17	10	4.4	27.2	6	81.8
WVMC-60-N-8	18	13	3.1	32.9	7	100.0
WVMC-60-N-8.5	16	13	2.7	25.4	8	100.0
WVMC-60-N-{20}	22	14	3.0	19.2	10	100.0

Table 15: (Continued)
Benthic Macroinvertebrate Community Metrics

STREAM CODE	TOTAL TAXA	EPT	HBI	% DOMINANT TAXA	# INTOLERANT TAXA	BIOSCORE
WVMC-60-{11.6}	17	12	3.2	23.5	8	100.0
WVMC-60-O-{01.0}	14	9	4.4	31.4	5	63.6
WVMC-60-O-1	13	8	5.0	25.6	5	63.6
WVMC-60-O-{07.0}	13	8	5.3	35.4	6	81.8
WVMC-60-P	15	11	4.0	25.6	7	90.9
WVMC-60-Q	10	7	4.2	30.3	5	63.6
WVMC-60-R	14	7	4.0	91.0	4	45.5
WVMC-60-{25.1}	15	10	4.1	33.3	7	81.8
WVMC-60-T-{02.5}	16	10	3.4	35.5	6	90.9
WVMC-60-T-1	19	14	3.9	55.6	10	81.8
WVMC-60-T-2	16	14	3.7	37.0	9	100.0
WVMC-60-T-3	15	8	3.7	22.4	6	81.8
WVMC-60-T-8	17	12	3.1	35.9	8	100.0
WVMC-60-T-9	16	11	2.6	23.4	7	100.0
WVMC-60-T-10	16	11	3.6	44.9	7	90.9
WVMC-60-T-11	16	10	3.8	36.0	7	81.8
WVMC-60-T-13	20	14	3.8	24.5	9	90.9
WVMC-60-T-{13.0}	15	10	4.0	32.8	7	81.8

Reference sites
Sites are not comparable to reference set – different collection method or partial sample
Total taxa = total number of different macroinvertebrate families collected
EPT = number of Ephemeropteran (mayfly), Plecopteran (stonefly) and Tricopteran caddisfly) families collected, which are generally considered sensitive to pollution.
HBI = Hilsenhoff Biotic Integrity - an index indicating relative pollution tolerance of macrobenthos collected
% Dominant taxa. = percent of total number of organisms which are of the numerically dominant family
# intolerant taxa = number of taxa which have tolerance values of zero, one, or two.
Bioscore = an index value determined by the sum of the scores for each of the five metrics used. (see text for more detailed description)

Table 16: Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-2	Oligochaeta	10	1	Capniidae/Leuctridae	1	4
	Cambaridae	5	2	Perlidae	1	2
	Asellidae	8	1	Perlodidae	2	2
	Gammaridae	4	5	Peltoperlidae	2	2
	Baetidae	4	2	Gomphidae	1	1
	Caenidae	4	1	Elmidae	4	1
	Ephemeridae	4	3	Corydalidae	5	2
	Heptageniidae	4	4	Sialidae	4	1
	Hydropsychidae	6	15	Chironomidae	6	9
	Rhyacophilidae	0	1			
WVMC-2-A	Oligochaeta	10	6	Pteronarcyidae	0	1
	Cambaridae	5	1	Chloroperlidae	1	3
	Asellidae	8	1	Capniidae/Leuctridae	1	3
	Baetidae	4	3	Perlidae	1	6
	Heptageniidae	4	19	Perlodidae	2	3
	Leptophlebiidae	2	2	Peltoperlidae	2	15
	Hydropsychidae	6	26	Elmidae	4	1
	Philopotamidae	3	1	Chironomidae	6	7
	Rhyacophilidae	0	2	Tipulidae	3	6
WVMC-2.5	Nematoda	5	22	Nemouridae	2	1
	Oligochaeta	10	3	Elmidae	4	5
	Physidae	8	1	Psephenidae	4	1
	Asellidae	8	1	Chironomidae	6	6
	Hydropsychidae	6	30	Tipulidae	3	5
	Rhyacophilidae	0	1			
WVMC-2.5-A	Nematoda	5	1	Perlidae	1	8
	Oligochaeta	10	12	Gomphidae	1	1
	Cambaridae	5	2	Aeshnidae	3	1
	Baetidae	4	4	Elmidae	4	2
	Heptageniidae	4	4	Psephenidae	4	13
	Leptophlebiidae	2	1	Corydalidae	5	2
	Hydropsychidae	6	13	Sialidae	4	2
	Philopotamidae	3	1	Chironomidae	6	23
	Chloroperlidae	1	1	Tipulidae	3	9
WVMC-2.7	Oligochaeta	10	1	Chironomidae	6	1
	Hydropsychidae	6	60	Tipulidae	3	1
	Philopotamidae	3	1	Simuliidae	6	47
	Curculionidae	5	1			
WVMC-4	Sphaeriidae	8	1	Elmidae	4	76
	Asellidae	8	6	Chironomidae	6	14
	Heptageniidae	4	5	Simuliidae	6	16
	Baetidae	4	3	Tipulidae	3	3
	Hydropsychidae	6	10			
WVMC-7	Oligochaeta	10	7	Corydalidae	5	1
	Cambaridae	5	3	Cossidae	0	1
	Asellidae	8	24	Pyralidae	5	1
	Capniidae/Leuctridae	1	24	Athericidae	2	1
	Psephenidae	4	1	Chironomidae	6	5

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-10	Oligochaeta	10	14	Capniidae/Leuctridae	1	3
	Cambaridae	5	1	Gomphidae	1	1
	Asellidae	8	1	Cordulegastridae	3	1
	Baetidae	4	1	Psephenidae	4	1
	Heptageniidae	4	5	Corydalidae	5	3
	Hydropsychidae	6	14	Sialidae	4	1
	Philopotamidae	3	7	Chironomidae	6	6
	Perlidae	1	15	Tipulidae	3	1
	Chloroperlidae	1	6	Tabanidae	6	1
	Perlodidae	2	3	Dolichopodidae	4	1
WVMC-11-D-{00}	Asellidae	8	1	Chrysomelidae	5	1
	Chloroperlidae	1	1	Corydalidae	5	2
	Capniidae/Leuctridae	1	59	Chironomidae	6	2
	Nemouridae	2	17	Tipulidae	3	3
	Elmidae	4	1			
WVMC-11-D-{10}	Oligochaeta	10	5	Capniidae/Leuctridae	1	60
	Baetidae	4	3	Nemouridae	2	16
	Leptophlebiidae	2	1	Tipulidae	3	4
	Rhyacophilidae	0	1	Simuliidae	6	2
	Limnephilidae	4	1			
WVMC-12-.5A-{0}	Capniidae/Leuctridae	1	30	Chironomidae	6	7
	Corydalidae	5	1			
WVMC-12-.7A	Oligochaeta	10	3	Capniidae/Leuctridae	1	15
	Cambaridae	5	1	Perlidae	1	4
	Baetidae	4	2	Elmidae	4	1
	Caenidae	4	1	Corydalidae	5	16
	Heptageniidae	4	15	Sialidae	4	1
	Leptophlebiidae	2	1	Chironomidae	6	13
	Hydropsychidae	6	15	Tipulidae	3	6
	Chloroperlidae	1	2	Tabanidae	6	1
WVMC-12-A-{02.5}	Oligochaeta	10	2	Capniidae/Leuctridae	1	61
	Cambaridae	5	1	Perlidae	1	1
	Baetidae	4	2	Perlodidae	2	1
	Isonychiidae	2	1	Pteronarcyidae	0	1
	Leptophlebiidae	2	3	Nemouridae	2	6
	Hydropsychidae	6	1	Elmidae	4	1
	Polycentropodidae	6	1	Chironomidae	6	1
	Lepidostomatidae	1	1			
WVMC-12-A-1	Oligochaeta	10	6	Peltoperlidae	2	2
	Cambaridae	5	3	Nemouridae	2	39
	Asellidae	8	6	Elmidae	4	1
	Polycentropodidae	6	1	Corydalidae	5	1
	Lepidostomatidae	1	2	Chironomidae	6	3
	Capniidae/Leuctridae	1	34	Simuliidae	6	1
WVMC-12-A-2	Turbellaria	4	8	Baetidae	4	51
	Oligochaeta	10	3	Heptageniidae	4	3
	Planorbidae	7	9	Hydropsychidae	6	144
	Physidae	8	5	Simuliidae	6	121

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-12-A-{03}	Oligochaeta	10	4	Odontoceridae	0	6
	Cambaridae	5	3	Chloroperlidae	1	1
	Baetidae	4	8	Capniidae/Leuctridae	1	43
	Heptageniidae	4	1	Perlidae	1	3
	Hydropsychidae	6	7	Perlodidae	2	1
	Polycentropodidae	6	3	Chironomidae	6	5
	Philopotamidae	3	2	Tipulidae	3	6
	Rhyacophilidae	0	1			
WVMC-12-B-{01}	Baetidae	4	4	Perlidae	1	1
	Hydropsychidae	6	10	Corydalidae	5	1
	Philopotamidae	3	2	Sialidae	4	2
	Capniidae/Leuctridae	1	15	Chironomidae	6	4
WVMC-12-B-.5-{00}	Cambaridae	5	2	Rhyacophilidae	0	1
	Hydropsychidae	6	7			
WVMC-12-B-.5-A	Philopotamidae	3	1	Tipulidae	3	2
	Capniidae/Leuctridae	1	1			
WVMC-12-B-.5-{02}	Oligochaeta	10	16	Capniidae/Leuctridae	1	19
	Asellidae	8	3	Perlodidae	2	3
	Baetidae	4	20	Nemouridae	2	20
	Leptophlebiidae	2	3	Elmidae	4	1
	Hydropsychidae	6	2	Chironomidae	6	2
	Philopotamidae	3	10	Tipulidae	3	12
	Chloroperlidae	1	1			
WVMC-12-B-{02}	Baetidae	4	12	Perlidae	1	2
	Hydropsychidae	6	11	Aeshnidae	3	1
	Polycentropodidae	6	7	Sialidae	4	1
	Philopotamidae	3	3	Chironomidae	6	7
	Chloroperlidae	1	1	Tipulidae	3	3
	Capniidae/Leuctridae	1	45			
WVMC-12-B-1-{01}	Cambaridae	5	2	Elmidae	4	1
	Capniidae/Leuctridae	1	25	Chironomidae	6	1
	Peltoperlidae	2	1	Tipulidae	3	1
WVMC-12-B-1-{04}	Oligochaeta	10	3	Chloroperlidae	1	3
	Cambaridae	5	1	Capniidae/Leuctridae	1	39
	Asellidae	8	2	Nemouridae	2	15
	Ephemerellidae	4	1	Chironomidae	6	2
	Hydropsychidae	6	1	Tipulidae	3	2
	Rhyacophilidae	0	1	Simuliidae	6	3
WVMC-12-B-2	Oligochaeta	10	7	Sialidae	4	1
	Caenidae	4	3	Chironomidae	6	1
	Leptophlebiidae	2	1	Tabanidae	6	2
WVMC-12-B-{06}	Oligochaeta	10	1	Hydropsychidae	6	3
	Cambaridae	5	1	Capniidae/Leuctridae	1	2
	Baetidae	4	3	Chironomidae	6	31

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-12-B-3-{02}	Oligochaeta	10	4	Perlodidae	2	1
	Cambaridae	5	2	Peltoperlidae	2	1
	Baetidae	4	3	Nemouridae	2	27
	Leptophlebiidae	2	5	Gomphidae	1	1
	Hydropsychidae	6	15	Elmidae	4	7
	Rhyacophilidae	0	5	Corydalidae	5	1
	Capniidae/Leuctridae	1	3	Chironomidae	6	36
	Perlidae	1	2	Tipulidae	3	8
WVMC-12-B-4-{02}	Baetidae	4	14	Nemouridae	2	18
	Hydropsychidae	6	5	Cordulegastridae	3	1
	Polycentropodidae	6	2	Corydalidae	5	2
	Limnephilidae	4	1	Tipulidae	3	10
	Chloroperlidae	1	1	Simuliidae	6	2
	Capniidae/Leuctridae	1	36			
WVMC-12-B-4-{03}	Cambaridae	5	1	Peltoperlidae	2	2
	Leptophlebiidae	2	2	Nemouridae	2	4
	Lepidostomatidae	1	1	Corixidae	5	1
	Chloroperlidae	1	1	Chironomidae	6	23
	Capniidae/Leuctridae	1	62	Tipulidae	3	15
	Perlodidae	2	2			
WVMC-12-B-6	Oligochaeta	10	8	Hydropsychidae	6	1
	Cambaridae	5	1	Capniidae/Leuctridae	1	64
	Asellidae	8	1	Nemouridae	2	5
	Baetidae	4	5	Chironomidae	6	3
WVMC-12-B-{11}	Oligochaeta	10	1	Chironomidae	6	6
	Limnephilidae	4	1	Tipulidae	3	7
	Capniidae/Leuctridae	1	63	Simuliidae	6	2
WVMC-12-B-5-C	Oligochaeta	10	2	Nemouridae	2	2
	Cambaridae	5	1	Corydalidae	5	1
	Asellidae	8	1	Chironomidae	6	2
	Capniidae/Leuctridae	1	226	Simuliidae	6	1
	Peltoperlidae	2	1			
WVMC-12-B-5-{03}	Oligochaeta	10	1	Chironomidae	6	51
	Gomphidae	1	1			
WVMC-12-C-{01}	Oligochaeta	10	1	Corydalidae	5	2
	Asellidae	8	1	Sialidae	4	1
	Leptophlebiidae	2	2	Chironomidae	6	4
	Capniidae/Leuctridae	1	50	Tipulidae	3	3
	Perlodidae	2	5	Simuliidae	6	23
	Nemouridae	2	8			
WVMC-12-C-{04}	Oligochaeta	10	2	Chloroperlidae	1	5
	Cambaridae	5	2	Capniidae/Leuctridae	1	24
	Asellidae	8	1	Perlodidae	2	39
	Leptophlebiidae	2	2	Peltoperlidae	2	1
	Lepidostomatidae	1	7	Nemouridae	2	16
	Limnephilidae	4	1	Tipulidae	3	2

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-12-D	Cambaridae	5	2	Capniidae/Leuctridae	1	36
	Baetidae	4	12	Perlidae	1	2
	Heptageniidae	4	2	Perlodidae	2	1
	Isonychiidae	2	1	Nemouridae	2	6
	Leptophlebiidae	2	11	Chironomidae	6	26
	Hydropsychidae	6	1	Tipulidae	3	2
	Chloroperlidae	1	2			
WVMC-12-{10}	Oligochaeta	10	3	Limnephilidae	4	3
	Corbiculidae	8	2	Leptoceridae	4	1
	Cambaridae	5	4	Capniidae/Leuctridae	1	1
	Baetidae	4	32	Elmidae	4	1
	Ephemerellidae	4	3	Sialidae	4	2
	Heptageniidae	4	13	Chironomidae	6	22
	Isonychiidae	2	3	Tipulidae	3	1
	Rhyacophilidae	0	1	Simuliidae	6	1
WVMC-12-E	Oligochaeta	10	2	Perlidae	1	8
	Baetidae	4	2	Nemouridae	2	3
	Philopotamidae	3	74	Chironomidae	6	6
	Rhyacophilidae	0	1	Simuliidae	6	1
	Chloroperlidae	1	2	Empididae	6	1
	Capniidae/Leuctridae	1	1			
WVMC-12-E.1	Oligochaeta	10	1	Capniidae/Leuctridae	1	9
	Cambaridae	5	1	Perlidae	1	2
	Baetidae	4	56	Peltoperlidae	2	1
	Leptophlebiidae	2	4	Psephenidae	4	1
	Philopotamidae	3	1	Corydalidae	5	1
	Limnephilidae	4	1	Chironomidae	6	35
	Pteronarcyidae	0	1	Tipulidae	3	4
WVMC-12-F-{00.0}	Oligochaeta	10	3	Odontoceridae	0	1
	Sphaeriidae	8	1	Capniidae/Leuctridae	1	8
	Asellidae	8	1	Perlidae	1	3
	Baetidae	4	3	Nemouridae	2	1
	Heptageniidae	4	2	Elmidae	4	1
	Leptophlebiidae	2	2	Corydalidae	5	3
	Hydropsychidae	6	1	Chironomidae	6	6
	Polycentropodidae	6	2	Tipulidae	3	9
	Limnephilidae	4	1	Ceratopogonidae	6	1
WVMC-12-F-{01.0}	Oligochaeta	10	1	Capniidae/Leuctridae	1	16
	Heptageniidae	4	4	Chloroperlidae	1	1
	Baetidae	4	5	Peltoperlidae	2	1
	Tricorythidae	4	4	Corydalidae	5	8
	Ephemeridae	4	1	Sialidae	4	1
	Hydropsychidae	6	15	Chironomidae	6	3
	Philopotamidae	3	2	Simuliidae	6	13
	Polycentropodidae	6	1	Tipulidae	3	4
WVMC-12-{14}	Baetidae	4	3	Elmidae	4	1
	Heptageniidae	4	2	Psephenidae	4	1
	Siphlonuridae	7	1	Chironomidae	6	5
	Capniidae/Leuctridae	1	3	Simuliidae	6	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-13-{01}	Oligochaeta	10	5	Hydropsychidae	6	1
	Cambaridae	5	4	Philopotamidae	3	1
	Asellidae	8	1	Lepidostomatidae	1	1
	Baetidae	4	15	Chloroperlidae	1	2
	Heptageniidae	4	1	Capniidae/Leuctridae	1	30
	Leptophlebiidae	2	8	Perlodidae	2	6
	Peltoperlidae	2	2	Elmidae	4	1
	Cordulegastridae	3	3	Chironomidae	6	5
	Calopterygidae	5	1	Tipulidae	3	10
WVMC-14-{02}	Oligochaeta	10	26	Capniidae/Leuctridae	1	54
	Cambaridae	5	3	Perlodidae	2	2
	Baetidae	4	16	Nemouridae	2	21
	Caenidae	4	1	Corydalidae	5	1
	Ameletidae	0	5	Tipulidae	3	8
	Limnephilidae	4	1	Simuliidae	6	2
	Lepidostomatidae	1	1	Tabanidae	6	2
	Chloroperlidae	1	1			
WVMC-15-{01}	Cambaridae	5	1	Capniidae/Leuctridae	1	17
	Asellidae	8	1	Perlidae	1	1
	Baetidae	4	6	Nemouridae	2	28
	Heptageniidae	4	19	Elmidae	4	1
	Leptophlebiidae	2	2	Chironomidae	6	3
	Hydroptilidae	6	12	Simuliidae	6	4
	Philopotamidae	3	1			
WVMC-15-A	Oligochaeta	10	15	Chloroperlidae	1	7
	Cambaridae	5	1	Capniidae/Leuctridae	1	13
	Heptageniidae	4	23	Perlodidae	2	1
	Baetidae	4	11	Elmidae	4	3
	Hydropsychidae	6	12	Chironomidae	6	1
	Philopotamidae	3	2	Athericidae	2	2
	Perlidae	1	9	Tabanidae	6	1
	Peltoperlidae	2	1	Tipulidae	3	1
WVMC-16-A-{0.8}	Asellidae	8	1	Perlodidae	2	1
	Hydropsychidae	6	1	Chironomidae	6	2
WVMC-17-.6A	Oligochaeta	10	4	Chloroperlidae	1	1
	Cambaridae	5	1	Perlodidae	2	9
	Baetidae	4	4	Peltoperlidae	2	104
	Ameletidae	0	1	Nemouridae	2	1
	Lepidostomatidae	1	1	Chironomidae	6	3
WVMC-17-.7	Oligochaeta	10	3	Perlidae	1	1
	Gammaridae	4	455	Elmidae	4	1
	Baetidae	4	1	Chironomidae	6	27
	Philopotamidae	3	10	Tipulidae	3	1
	Capniidae/Leuctridae	1	1			
WVMC-17-{2.6}	Gammaridae	4	4	Philopotamidae	3	1
	Corixidae	5	1	Chironomidae	6	2
	Baetidae	4	1	Ceratopogonidae	6	2
WVMC-17-A-	Corydalidae	5	1	Chironomidae	6	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-17-A-.5-{0}	Curculionidae	5	1	Simuliidae	6	2
	Corixidae	5	8	Ceratopogonidae	6	2
	Chironomidae	6	10	Sciomyzidae	10	1
	Tipulidae	3	1			
WVMC-17-A-.5-{3}	Heptageniidae	4	3	Nemouridae	2	10
	Baetidae	4	1	Limnephilidae	4	4
WVMC-17-A-1-{0.0}	Curculionidae	5	1	Sciomyzidae	10	1
	Chironomidae	6	36	Dytiscidae	5	2
	Ceratopogonidae	6	3			
WVMC-17-{3.2}	Baetidae	4	30	Nemouridae	2	4
	Hydropsychidae	6	1	Elmidae	4	1
	Polycentropodidae	6	2	Corydalidae	5	3
	Philopotamidae	3	1	Sialidae	4	1
	Capniidae/Leuctridae	1	7	Chironomidae	6	21
	Perlidae	1	1			
WVMC-17-A.1	Oligochaeta	10	2	Capniidae/Leuctridae	1	3
	Baetidae	4	34	Elmidae	4	3
	Ephemerellidae	4	5	Ptilodactylidae	5	2
	Hydropsychidae	6	4	Chironomidae	6	20
	Philopotamidae	3	27	Tipulidae	3	1
	Rhyacophilidae	0	2	Simuliidae	6	1
	Brachycentridae	1	1			
WVMC-17-{6.8}	Hydropsychidae	6	1	Nemouridae	2	2
	Capniidae/Leuctridae	1	22	Corydalidae	5	4
	Perlidae	1	1	Chironomidae	6	1
WVMC-17-B	Asellidae	8	3	Corydalidae	5	1
	Hydropsychidae	6	1	Chironomidae	6	2
	Rhyacophilidae	0	3	Tipulidae	3	2
	Capniidae/Leuctridae	1	69	Simuliidae	6	6
	Nemouridae	2	18			
WVMC-17-C	Oligochaeta	10	1	Perlodidae	2	1
	Asellidae	8	1	Corydalidae	5	1
	Baetidae	4	7	Pyralidae	5	1
	Hydropsychidae	6	15	Chironomidae	6	5
	Rhyacophilidae	0	3	Tipulidae	3	1
	Capniidae/Leuctridae	1	55	Simuliidae	6	2
	Chloroperlidae	1	2	Tabanidae	6	1
	Peltoperlidae	2	6			
WVMC-17-{10.2}	Oligochaeta	10	2	Glossosomatidae	0	2
	Baetidae	4	51	Capniidae/Leuctridae	1	9
	Ephemeridae	4	2	Perlidae	1	2
	Ephemerellidae	4	8	Perlodidae	2	3
	Heptageniidae	4	3	Nemouridae	2	2
	Leptophlebiidae	2	8	Elmidae	4	10
	Polycentropodidae	6	1	Corydalidae	5	1
	Philopotamidae	3	11	Chironomidae	6	9
	Rhyacophilidae	0	1	Tipulidae	3	1
	Lepidostomatidae	1	1	Ceratopogonidae	6	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-17-{14.4}	Hirudinidae	7	1	Philopotamidae	3	7
	Oligochaeta	10	4	Rhyacophilidae	0	1
	Cambaridae	5	2	Capniidae/Leuctridae	1	7
	Gammaridae	4	4	Perlodidae	2	1
	Baetidae	4	117	Elmidae	4	2
	Ephemerellidae	4	5	Chironomidae	6	51
	Heptageniidae	4	4	Tipulidae	3	5
	Leptophlebiidae	2	3	Simuliidae	6	1
	Hydropsychidae	6	4	Blephariceridae	0	1
WVMC-18-{0.0}	Oligochaeta	10	5	Perlodidae	2	1
	Gammaridae	4	2	Peltoperlidae	2	3
	Hydropsychidae	6	1	Nemouridae	2	1
	Pteronarcyidae	0	1	Corydalidae	5	1
	Chloroperlidae	1	1	Chironomidae	6	1
	Capniidae/Leuctridae	1	6	Tipulidae	3	1
WVMC-18-1A	Oligochaeta	10	2	Nemouridae	2	17
	Cambaridae	5	2	Elmidae	4	1
	Baetidae	4	43	Psephenidae	4	1
	Leptophlebiidae	2	2	Corydalidae	5	1
	Ameletidae	0	1	Chironomidae	6	13
	Rhyacophilidae	0	1	Tipulidae	3	1
	Perlodidae	2	2	Simuliidae	6	2
	Peltoperlidae	2	1			
WVMC-18-A-1	Leptophlebiidae	2	1	Chironomidae	6	8
	Capniidae/Leuctridae	1	65	Tipulidae	3	1
	Nemouridae	2	16	Simuliidae	6	10
	Elmidae	4	1			
WVMC-18-A	Oligochaeta	10	6	Elmidae	4	1
	Rhyacophilidae	0	2	Corydalidae	5	1
	Lepidostomatidae	1	1	Sialidae	4	1
	Capniidae/Leuctridae	1	87	Chironomidae	6	16
	Peltoperlidae	2	1	Tipulidae	3	1
	Nemouridae	2	9	Simuliidae	6	23
WVMC-18-{6.0}	Oligochaeta	10	13	Pteronarcyidae	0	9
	Gammaridae	4	3	Chloroperlidae	1	7
	Baetidae	4	57	Capniidae/Leuctridae	1	6
	Ephemerellidae	4	9	Perlidae	1	1
	Heptageniidae	4	18	Perlodidae	2	5
	Leptophlebiidae	2	2	Peltoperlidae	2	52
	Hydropsychidae	6	1	Nemouridae	2	2
	Philopotamidae	3	4	Elmidae	4	2
	Rhyacophilidae	0	2	Chironomidae	6	10
	Glossosomatidae	0	3	Tipulidae	3	2
	Limnephilidae	4	1	Simuliidae	6	2

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-19	Oligochaeta	10	1	Lepidostomatidae	1	1
	Cambaridae	5	3	Capniidae/Leuctridae	1	1
	Asellidae	8	3	Peltoperlidae	2	4
	Baetidae	4	39	Nemouridae	2	4
	Ephemerellidae	4	3	Corydalidae	5	1
	Heptageniidae	4	2	Chironomidae	6	6
	Isonychiidae	2	2	Tipulidae	3	1
	Hydropsychidae	6	9	Athericidae	2	1
	Philopotamidae	3	8			
WVMC-19-A	Gammaridae	4	15	Lepidostomatidae	1	1
	Baetidae	4	10	Capniidae/Leuctridae	1	3
	Ephemerellidae	4	3	Perlidae	1	8
	Heptageniidae	4	8	Peltoperlidae	2	4
	Leptophlebiidae	2	6	Elmidae	4	1
	Hydropsychidae	6	4	Staphylinidae		1
	Philopotamidae	3	16	Chironomidae	6	6
	Rhyacophilidae	0	4	Tipulidae	3	10
	Glossosomatidae	0	4	Athericidae	2	1
WVMC-20-{0.0}	Baetidae	4	32	Capniidae/Leuctridae	1	2
	Ephemerellidae	4	10	Perlidae	1	1
	Heptageniidae	4	2	Perlodidae	2	4
	Leptophlebiidae	2	5	Peltoperlidae	2	2
	Hydropsychidae	6	4	Nemouridae	2	1
	Philopotamidae	3	17	Corydalidae	5	2
	Lepidostomatidae	1	1	Chironomidae	6	6
	Chloroperlidae	1	1	Tipulidae	3	3
WVMC-20-{6.0}	Oligochaeta	10	1	Limnephilidae	4	2
	Sphaeriidae	8	2	Lepidostomatidae	1	1
	Gammaridae	4	1	Capniidae/Leuctridae	1	28
	Baetidae	4	9	Elmidae	4	1
	Ephemeridae	4	5	Corydalidae	5	4
	Heptageniidae	4	3	Chironomidae	6	37
	Leptophlebiidae	2	1	Tipulidae	3	13
	Hydropsychidae	6	1	Tabanidae	6	1
	Rhyacophilidae	0	1			
WVMC-21	Oligochaeta	10	14	Peltoperlidae	2	3
	Baetidae	4	30	Nemouridae	2	5
	Leptophlebiidae	2	2	Gomphidae	1	1
	Hydropsychidae	6	4	Psephenidae	4	1
	Philopotamidae	3	4	Corydalidae	5	2
	Lepidostomatidae	1	2	Chironomidae	6	10
	Capniidae/Leuctridae	1	15	Tipulidae	3	4
WVMC-22-{1.5}	Asellidae	8	1	Capniidae/Leuctridae	1	51
	Baetidae	4	1	Peltoperlidae	2	3
	Leptophlebiidae	2	4	Nemouridae	2	18
	Hydropsychidae	6	2	Corydalidae	5	1
	Rhyacophilidae	0	1	Chironomidae	6	9
	Chloroperlidae	1	1	Tipulidae	3	4

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-22-B	Oligochaeta	10	1	Capniidae/Leuctridae	1	7
	Sphaeriidae	8	1	Perlidae	1	1
	Cambaridae	5	1	Nemouridae	2	7
	Asellidae	8	1	Elmidae	4	1
	Baetidae	4	2	Dytiscidae	5	1
	Leptophlebiidae	2	1	Corydalidae	5	3
	Ameletidae	0	2	Chironomidae	6	72
	Philopotamidae	3	1	Tipulidae	3	3
	Rhyacophilidae	0	1			
WVMC-22-{2.0}	Oligochaeta	10	1	Capniidae/Leuctridae	1	49
	Ameletidae	0	1	Peltoperlidae	2	8
	Hydropsychidae	6	1	Nemouridae	2	20
	Polycentropodidae	6	1	Corydalidae	5	2
	Rhyacophilidae	0	3	Chironomidae	6	2
	Lepidostomatidae	1	1	Tipulidae	3	7
WVMC-23-A-{2.9}	Capniidae/Leuctridae	1	65	Chironomidae	6	29
	Corydalidae	5	2	Tipulidae	3	6
	Sialidae	4	3	Empididae	6	1
WVMC-26-{0.0}	Cambaridae	5	4	Lepidostomatidae	1	1
	Baetidae	4	3	Capniidae/Leuctridae	1	5
	Hydropsychidae	6	3	Nemouridae	2	35
WVMC-26-{1.5}	Philopotamidae	3	1	Chironomidae	6	27
	Libellulidae	9	1	Chironomidae	6	3
	Curculionidae	5	1	Athericidae	2	61
	Corydalidae	5	6			
WVMC-28	Oligochaeta	10	15	Perlidae	1	2
	Baetidae	4	5	Peltoperlidae	2	5
	Caenidae	4	2	Corydalidae	5	3
	Hydropsychidae	6	4	Chironomidae	6	1
	Philopotamidae	3	1	Tipulidae	3	2
	Capniidae/Leuctridae	1	17			
WVMC-31-{0.0}	Turbellaria	4	1	Haliplidae	5	1
	Oligochaeta	10	1	Pyralidae	5	4
	Cambaridae	5	1	Chironomidae	6	2
	Capniidae/Leuctridae	1	5	Tipulidae	3	1
WVMC-31.7	Oligochaeta	10	25	Chloroperlidae	1	5
	Baetidae	4	3	Capniidae/Leuctridae	1	13
	Heptageniidae	4	3	Perlidae	1	1
	Isonychiidae	2	1	Peltoperlidae	2	5
	Leptophlebiidae	2	16	Gomphidae	1	1
	Hydropsychidae	6	2	Psephenidae	4	2
	Philopotamidae	3	2	Chironomidae	6	5
WVMC-32	Baetidae	4	33	Capniidae/Leuctridae	1	21
	Caenidae	4	2	Perlidae	1	7
	Heptageniidae	4	6	Peltoperlidae	2	2
	Isonychiidae	2	3	Elmidae	4	1
	Hydropsychidae	6	8	Chironomidae	6	14

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
	Chloroperlidae	1	3			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-32-B	Oligochaeta	10	2	Chloroperlidae	1	2
	Heptageniidae	4	9	Perlodidae	2	1
	Leptophlebiidae	2	2	Capniidae/Leuctridae	1	10
	Baetidae	4	44	Psephenidae	4	2
	Isonychiidae	2	6	Elmidae	4	5
	Hydropsychidae	6	18	Corydalidae	5	2
	Philopotamidae	3	5	Chironomidae	6	6
	Perlidae	1	5	Athericidae	2	1
	Pteronarcyidae	0	9	Tipulidae	3	4
WVMC-32-C-1	Oligochaeta	10	1	Rhyacophilidae	0	1
	Cambaridae	5	1	Peltoperlidae	2	17
	Gammaridae	4	17	Chloroperlidae	1	14
	Leptophlebiidae	2	16	Perlodidae	2	7
	Heptageniidae	4	9	Capniidae/Leuctridae	1	8
	Baetidae	4	1	Athericidae	2	2
	Hydropsychidae	6	1	Tipulidae	3	2
	Philopotamidae	3	2	Chironomidae	6	3
WVMC-32-D	Hirudinidae	7	1	Perlidae	1	5
	Cambaridae	5	1	Peltoperlidae	2	13
	Gammaridae	4	1	Perlodidae	2	2
	Heptageniidae	4	25	Capniidae/Leuctridae	1	3
	Baetidae	4	11	Chloroperlidae	1	2
	Ephemerellidae	4	1	Psephenidae	4	1
	Leptophlebiidae	2	2	Chironomidae	6	5
	Hydropsychidae	6	11	Tipulidae	3	1
	Philopotamidae	3	1	Simuliidae	6	1
WVMC-32-E	Oligochaeta	10	1	Perlidae	1	1
	Baetidae	4	46	Chloroperlidae	1	2
	Heptageniidae	4	12	Peltoperlidae	2	2
	Caenidae	4	1	Elmidae	4	7
	Leptophlebiidae	2	3	Psephenidae	4	1
	Ephemerellidae	4	1	Tipulidae	3	3
	Hydropsychidae	6	10	Chironomidae	6	10
	Philopotamidae	3	2			
WVMC-32-F	Oligochaeta	10	2	Pteronarcyidae	0	3
	Cambaridae	5	1	Chloroperlidae	1	1
	Baetidae	4	19	Peltoperlidae	2	23
	Heptageniidae	4	16	Capniidae/Leuctridae	1	33
	Leptophlebiidae	2	9	Perlodidae	2	6
	Hydropsychidae	6	15	Elmidae	4	7
	Rhyacophilidae	0	2	Chironomidae	6	54
	Philopotamidae	3	1	Tipulidae	3	3
	Perlidae	1	9	Simuliidae	6	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-32-G	Oligochaeta	10	2	Capniidae/Leuctridae	1	15
	Baetidae	4	16	Perlidae	1	8
	Heptageniidae	4	6	Peltoperlidae	2	49
	Hydropsychidae	6	6	Elmidae	4	16
	Philopotamidae	3	3	Psephenidae	4	1
	Pteronarcyidae	0	1	Chironomidae	6	6
	Chloroperlidae	1	28	Tipulidae	3	2
WVMC-33-{0.0}	Oligochaeta	10	1	Capniidae/Leuctridae	1	3
	Heptageniidae	4	16	Perlidae	1	5
	Caenidae	4	1	Chloroperlidae	1	4
	Isonychiidae	2	7	Psephenidae	4	3
	Leptophlebiidae	2	11	Elmidae	4	5
	Baetidae	4	50	Carabidae	0	1
	Neoephemeridae	3	1	Chironomidae	6	49
	Hydropsychidae	6	29	Simuliidae	6	1
	Philopotamidae	3	3	Athericidae	2	1
	Peltoperlidae	2	1	Tipulidae	3	6
WVMC-33-A	Oligochaeta	10	6	Glossosomatidae	0	1
	Cambaridae	5	2	Odontoceridae	0	1
	Gammaridae	4	2	Capniidae/Leuctridae	1	35
	Heptageniidae	4	15	Perlidae	1	8
	Isonychiidae	2	9	Pteronarcyidae	0	1
	Baetidae	4	15	Chloroperlidae	1	2
	Leptophlebiidae	2	1	Psephenidae	4	9
	Hydropsychidae	6	48	Corydalidae	5	1
	Philopotamidae	3	4	Tipulidae	3	5
	Polycentropodidae	6	2	Chironomidae	6	26
WVMC-33-A.5	Oligochaeta	10	4	Chloroperlidae	1	16
	Cambaridae	5	1	Pteronarcyidae	0	1
	Heptageniidae	4	6	Perlodidae	2	5
	Baetidae	4	16	Perlidae	1	5
	Leptophlebiidae	2	9	Peltoperlidae	2	3
	Hydropsychidae	6	18	Chironomidae	6	12
	Limnephilidae	4	1	Tipulidae	3	4
	Capniidae/Leuctridae	1	25			
WVMC-33-B	Leptophlebiidae	2	4	Perlidae	1	3
	Heptageniidae	4	5	Peltoperlidae	2	2
	Baetidae	4	4	Capniidae/Leuctridae	1	1
	Hydropsychidae	6	1	Perlodidae	2	3
	Philopotamidae	3	7	Corydalidae	5	1
	Capniidae/Leuctridae	1	51	Tipulidae	3	4
	Chloroperlidae	1	11	Chironomidae	6	12
	Pteronarcyidae	0	2	Athericidae	2	2

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-33-B.5	Oligochaeta	10	2	Capniidae/Leuctridae	1	33
	Cambaridae	5	1	Perlidae	1	7
	Baetidae	4	5	Pteronarcyidae	0	1
	Heptageniidae	4	4	Chloroperlidae	1	22
	Leptophlebiidae	2	5	Perlodidae	2	1
	Hydropsychidae	6	1	Elmidae	4	1
	Philopotamidae	3	2	Chironomidae	6	23
	Polycentropodidae	6	1	Tipulidae	3	5
WVMC-33-C	Asellidae	8	1	Chloroperlidae	1	2
	Isonychiidae	2	4	Perlidae	1	7
	Baetidae	4	23	Perlodidae	2	4
	Leptophlebiidae	2	2	Capniidae/Leuctridae	1	10
	Caenidae	4	1	Psephenidae	4	15
	Heptageniidae	4	18	Elmidae	4	1
	Hydropsychidae	6	19	Tipulidae	3	2
	Philopotamidae	3	1	Chironomidae	6	7
	Peltoperlidae	2	1			
WVMC-33-D	Cambaridae	5	1	Perlidae	1	4
	Heptageniidae	4	9	Capniidae/Leuctridae	1	15
	Baetidae	4	32	Chloroperlidae	1	6
	Ephemerellidae	4	1	Psephenidae	4	2
	Isonychiidae	2	6	Elmidae	4	1
	Leptophlebiidae	2	1	Tipulidae	3	8
	Hydropsychidae	6	7	Chironomidae	6	13
	Philopotamidae	3	1			
WVMC-33-E	Cambaridae	5	1	Chloroperlidae	1	3
	Heptageniidae	4	20	Psephenidae	4	1
	Baetidae	4	9	Hydrophilidae	5	1
	Hydropsychidae	6	19	Chironomidae	6	11
	Philopotamidae	3	13	Athericidae	2	2
	Perlidae	1	5	Tipulidae	3	1
	Capniidae/Leuctridae	1	7			
WVMC-33-F	Nemertea	6	2	Peltoperlidae	2	1
	Cambaridae	5	1	Chloroperlidae	1	2
	Heptageniidae	4	24	Perlodidae	2	3
	Baetidae	4	19	Elmidae	4	1
	Leptophlebiidae	2	1	Psephenidae	4	1
	Hydropsychidae	6	8	Tipulidae	3	7
	Philopotamidae	3	6	Chironomidae	6	16
	Perlidae	1	3	Simuliidae	6	1
	Capniidae/Leuctridae	1	9			
WVMC-34-{0.0}	Oligochaeta	10	26	Peltoperlidae	2	11
	Cambaridae	5	1	Capniidae/Leuctridae	1	50
	Gammaridae	4	4	Perlodidae	2	8
	Heptageniidae	4	9	Chloroperlidae	1	8
	Leptophlebiidae	2	5	Haliplidae	5	2
	Baetidae	4	1	Tipulidae	3	2
	Hydropsychidae	6	2	Chironomidae	6	11
	Polycentropodidae	6	1			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-35	Oligochaeta	10	5	Lepidostomatidae	1	3
	Heptageniidae	4	5	Perlidae	1	3
	Ephemeridae	4	1	Pteronarcyidae	0	6
	Ephemerellidae	4	6	Capniidae/Leuctridae	1	17
	Peltoperlidae	2	1	Chloroperlidae	1	3
	Baetidae	4	4	Perlodidae	2	3
	Leptophlebiidae	2	2	Psephenidae	4	2
	Limnephilidae	4	1	Haliplidae	5	2
	Hydropsychidae	6	7	Tipulidae	3	6
	Philopotamidae	3	6	Chironomidae	6	20
WVMC-35.5-{0.0}	Nemertea	6	2	Capniidae/Leuctridae	1	16
	Oligochaeta	10	2	Chloroperlidae	1	9
	Cambaridae	5	3	Peltoperlidae	2	1
	Baetidae	4	3	Perlodidae	2	6
	Heptageniidae	4	5	Corydalidae	5	1
	Leptophlebiidae	2	10	Gerridae	8	1
	Hydropsychidae	6	4	Chironomidae	6	11
	Philopotamidae	3	1	Tipulidae	3	2
WVMC-36-{0.0}	Heptageniidae	4	5	Capniidae/Leuctridae	1	5
	Baetidae	4	10	Aeshnidae	3	1
	Leptophlebiidae	2	1	Psephenidae	4	1
	Hydropsychidae	6	46	Elmidae	4	2
	Philopotamidae	3	1	Corydalidae	5	1
	Peltoperlidae	2	7	Chironomidae	6	10
	Pteronarcyidae	0	1	Tipulidae	3	2
	Perlidae	1	12	Simuliidae	6	1
	Chloroperlidae	1	17			
WVMC-36-A	Oligochaeta	10	3	Perlidae	1	1
	Baetidae	4	30	Peltoperlidae	2	3
	Heptageniidae	4	4	Capniidae/Leuctridae	1	4
	Leptophlebiidae	2	1	Elmidae	4	1
	Hydropsychidae	6	10	Chironomidae	6	11
	Philopotamidae	3	2	Tipulidae	3	2
	Polycentropodidae	6	1	Athericidae	2	2
	Chloroperlidae	1	2			
WVMC-39	Oligochaeta	10	5	Perlodidae	2	4
	Heptageniidae	4	19	Chloroperlidae	1	24
	Leptophlebiidae	2	6	Capniidae/Leuctridae	1	34
	Baetidae	4	12	Pteronarcyidae	0	1
	Hydropsychidae	6	6	Psephenidae	4	1
	Philopotamidae	3	5	Chironomidae	6	7
	Perlidae	1	7	Tipulidae	3	2
	Peltoperlidae	2	10			
WVMC-40	Oligochaeta	10	10	Philopotamidae	3	2
	Baetidae	4	32	Capniidae/Leuctridae	1	8
	Heptageniidae	4	20	Chloroperlidae	1	2
	Leptophlebiidae	2	11	Perlodidae	2	1
	Ephemerellidae	4	2	Chironomidae	6	12
	Lepidostomatidae	1	1	Tipulidae	3	2

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-42	Oligochaeta	10	3	Philopotamidae	3	2
	Baetidae	4	30	Limnephilidae	4	1
	Heptageniidae	4	15	Capniidae/Leuctridae	1	24
	Leptophlebiidae	2	14	Peltoperlidae	2	4
	Ephemerellidae	4	1	Chloroperlidae	1	4
	Hydropsychidae	6	2	Chironomidae	6	9
	Lepidostomatidae	1	1	Tipulidae	3	2
WVMC-43-{0.0}	Turbellaria	4	1	Polycentropodidae	6	1
	Oligochaeta	10	5	Capniidae/Leuctridae	1	11
	Baetidae	4	38	Chloroperlidae	1	9
	Heptageniidae	4	15	Perlidae	1	2
	Leptophlebiidae	2	15	Psephenidae	4	1
	Isonychiidae	2	1	Chironomidae	6	4
	Hydropsychidae	6	2	Tipulidae	3	1
	Philopotamidae	3	2			
WVMC-43-A	Oligochaeta	10	1	Peltoperlidae	2	6
	Gammaridae	4	11	Perlidae	1	1
	Heptageniidae	4	7	Chloroperlidae	1	8
	Leptophlebiidae	2	3	Capniidae/Leuctridae	1	18
	Baetidae	4	22	Perlodidae	2	2
	Hydropsychidae	6	3	Pteronarcyidae	0	1
	Philopotamidae	3	6	Chironomidae	6	9
WVMC-43-B	Oligochaeta	10	1	Glossosomatidae	0	1
	Gammaridae	4	1	Peltoperlidae	2	1
	Baetidae	4	15	Perlidae	1	1
	Leptophlebiidae	2	2	Perlodidae	2	1
	Limnephilidae	4	1	Chironomidae	6	1
	Lepidostomatidae	1	1			
WVMC-44-{0.0}	Oligochaeta	10	6	Capniidae/Leuctridae	1	5
	Cambaridae	5	5	Perlodidae	2	1
	Heptageniidae	4	17	Perlidae	1	3
	Baetidae	4	3	Pteronarcyidae	0	1
	Leptophlebiidae	2	6	Chironomidae	6	6
	Hydropsychidae	6	8	Tipulidae	3	4
	Psycomyiidae	2	1			
WVMC-46	Oligochaeta	10	1	Perlidae	1	6
	Cambaridae	5	1	Chloroperlidae	1	14
	Baetidae	4	23	Pteronarcyidae	0	4
	Leptophlebiidae	2	3	Peltoperlidae	2	1
	Heptageniidae	4	1	Psephenidae	4	2
	Hydropsychidae	6	19	Corydalidae	5	2
	Philopotamidae	3	4	Cossidae	0	1
	Polycentropodidae	6	4	Chironomidae	6	23
	Capniidae/Leuctridae	1	19	Tipulidae	3	10

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-46-A	Baetidae	4	26	Pteronarcvidae	0	4
	Heptageniidae	4	9	Perlidae	1	15
	Ephemerellidae	4	1	Peltoperlidae	2	2
	Leptophlebiidae	2	1	Chloroperlidae	1	1
	Hydropsychidae	6	9	Corydalidae	5	1
	Philopotamidae	3	1	Tipulidae	3	4
	Capniidae/Leuctridae	1	34	Chironomidae	6	5
	Perlodidae	2	3			
WVMC-46-B	Baetidae	4	29	Peltoperlidae	2	1
	Isonychiidae	2	5	Perlidae	1	9
	Leptophlebiidae	2	8	Chloroperlidae	1	13
	Heptageniidae	4	25	Psephenidae	4	1
	Ephemerellidae	4	1	Elmidae	4	3
	Hydropsychidae	6	14	Corydalidae	5	2
	Philopotamidae	3	5	Chironomidae	6	6
	Capniidae/Leuctridae	1	21	Tipulidae	3	3
WVMC-47	Oligochaeta	10	13	Capniidae/Leuctridae	1	30
	Heptageniidae	4	6	Perlidae	1	1
	Leptophlebiidae	2	2	Perlodidae	2	1
	Ephemerellidae	4	1	Chloroperlidae	1	5
	Baetidae	4	8	Simuliidae	6	2
	Hydropsychidae	6	7	Chironomidae	6	5
	Philopotamidae	3	7	Tipulidae	3	3
	Peltoperlidae	2	2			
WVMC-49	Oligochaeta	10	7	Perlidae	1	7
	Baetidae	4	3	Corydalidae	5	3
	Heptageniidae	4	5	Sialidae	4	1
	Leptophlebiidae	2	2	Chironomidae	6	18
	Hydropsychidae	6	15	Tipulidae	3	2
WVMC-50	Hirudinidae	7	1	Pteronarcyidae	0	5
	Oligochaeta	10	3	Peltoperlidae	2	8
	Baetidae	4	15	Chloroperlidae	1	5
	Heptageniidae	4	2	Perlidae	1	2
	Leptophlebiidae	2	3	Capniidae/Leuctridae	1	11
	Isonychiidae	2	1	Chironomidae	6	14
	Hydropsychidae	6	6	Simuliidae	6	3
	Philopotamidae	3	8	Tipulidae	3	6
WVMC-51	Oligochaeta	10	5	Chloroperlidae	1	8
	Cambaridae	5	1	Capniidae/Leuctridae	1	1
	Baetidae	4	20	Perlidae	1	3
	Heptageniidae	4	1	Perlodidae	2	2
	Isonychiidae	2	7	Elmidae	4	2
	Leptophlebiidae	2	2	Corydalidae	5	2
	Hydropsychidae	6	21	Chironomidae	6	4
	Philopotamidae	3	2	Tipulidae	3	2
	Pteronarcyidae	0	2	Simuliidae	6	3

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

WVMC-51-A	Cambaridae	5	1	Pteronarcvidae	0	1
	Heptageniidae	4	12	Peltoperlidae	2	2
	Baetidae	4	10	Capniidae/Leuctridae	1	8
	Isonychiidae	2	4	Chloroperlidae	1	21
	Leptophlebiidae	2	3	Elmidae	4	1
	Ephemerellidae	4	1	Corydalidae	5	2
	Hydropsychidae	6	14	Chironomidae	6	13
	Philopotamidae	3	14	Simuliidae	6	4
	Perlidae	1	6	Tipulidae	3	1
WVMC-51-B	Heptageniidae	4	2	Peltoperlidae	2	1
	Baetidae	4	18	Capniidae/Leuctridae	1	2
	Hydropsychidae	6	39	Elmidae	4	1
	Philopotamidae	3	6	Chironomidae	6	8
	Polycentropodidae	6	1	Tipulidae	3	2
	Perlidae	1	3	Athericidae	2	2
	Chloroperlidae	1	4	Simuliidae	6	1
WVMC-51-B-2	Baetidae	4	9	Perlodidae	2	1
	Heptageniidae	4	4	Peltoperlidae	2	5
	Hydropsychidae	6	12	Elmidae	4	1
	Philopotamidae	3	2	Chironomidae	6	5
	Pteronarcyidae	0	1	Tipulidae	3	6
	Chloroperlidae	1	15	Simuliidae	6	2
	Capniidae/Leuctridae	1	3	Empididae	6	1
	Perlidae	1	5			
WVMC-51-B-3	Oligochaeta	10	4	Chloroperlidae	1	13
	Heptageniidae	4	5	Peltoperlidae	2	6
	Baetidae	4	8	Perlidae	1	2
	Leptophlebiidae	2	3	Perlodidae	2	2
	Hydropsychidae	6	8	Capniidae/Leuctridae	1	20
	Philopotamidae	3	1	Simuliidae	6	14
	Psycomyiidae	2	1	Chironomidae	6	9
	Pteronarcyidae	0	1	Tipulidae	3	1
WVMC-51-B-4	Baetidae	4	2	Capniidae/Leuctridae	1	7
	Heptageniidae	4	15	Perlidae	1	8
	Isonychiidae	2	2	Peltoperlidae	2	1
	Hydropsychidae	6	13	Chironomidae	6	2
	Pteronarcyidae	0	3	Tipulidae	3	3
	Chloroperlidae	1	20	Simuliidae	6	2
WVMC-51-B-5	Oligochaeta	10	1	Perlidae	1	5
	Baetidae	4	37	Peltoperlidae	2	1
	Heptageniidae	4	2	Psephenidae	4	1
	Isonychiidae	2	6	Georyssidae	0	1
	Leptophlebiidae	2	2	Dryopidae	5	1
	Hydropsychidae	6	21	Corydalidae	5	2
	Philopotamidae	3	1	Chironomidae	6	5
	Capniidae/Leuctridae	1	7	Simuliidae	6	10
	Chloroperlidae	1	2	Tipulidae	3	4

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-52	Gammaridae	4	1	Capniidae/Leuctridae	1	3
	Baetidae	4	50	Perlidae	1	2
	Heptageniidae	4	33	Peltoperlidae	2	1
	Leptophlebiidae	2	5	Corydalidae	5	1
	Hydropsychidae	6	16	Chironomidae	6	3
	Philopotamidae	3	7	Tipulidae	3	1
	Chloroperlidae	1	8	Simuliidae	6	1
WVMC-52-.7A	Oligochaeta	10	1	Peltoperlidae	2	8
	Gammaridae	4	3	Pteronarcyidae	0	1
	Heptageniidae	4	16	Perlidae	1	3
	Leptophlebiidae	2	5	Perlodidae	2	5
	Ephemerellidae	4	1	Capniidae/Leuctridae	1	18
	Baetidae	4	14	Chloroperlidae	1	15
	Hydropsychidae	6	4	Corydalidae	5	1
	Philopotamidae	3	4	Chironomidae	6	5
	Glossosomatidae	0	1	Tipulidae	3	7
WVMC-52-A	Baetidae	4	14	Capniidae/Leuctridae	1	40
	Ephemerellidae	4	1	Perlidae	1	10
	Heptageniidae	4	8	Peltoperlidae	2	1
	Leptophlebiidae	2	2	Gomphidae	1	1
	Hydropsychidae	6	3	Psephenidae	4	1
	Philopotamidae	3	1	Chironomidae	6	4
	Rhyacophilidae	0	1	Tipulidae	3	1
	Pteronarcyidae	0	1	Empididae	6	1
	Chloroperlidae	1	13	Dixidae	1	1
WVMC-53	Oligochaeta	10	2	Rhyacophilidae	0	1
	Gammaridae	4	1	Capniidae/Leuctridae	1	21
	Baetidae	4	68	Peltoperlidae	2	11
	Heptageniidae	4	13	Perlodidae	2	6
	Leptophlebiidae	2	3	Perlidae	1	1
	Hydropsychidae	6	3	Chironomidae	6	16
	Philopotamidae	3	5	Tipulidae	3	6
WVMC-54	Baetidae	4	44	Perlidae	1	3
	Caenidae	4	2	Perlodidae	2	1
	Heptageniidae	4	10	Elmidae	4	3
	Isonychiidae	2	11	Chironomidae	6	3
	Hydropsychidae	6	18	Tipulidae	3	1
	Philopotamidae	3	1	Simuliidae	6	4
	Chloroperlidae	1	3	Athericidae	2	9
WVMC-54-A	Baetidae	4	81	Perlodidae	2	4
	Heptageniidae	4	40	Peltoperlidae	2	3
	Hydropsychidae	6	5	Gomphidae	1	1
	Philopotamidae	3	12	Psephenidae	4	1
	Chloroperlidae	1	31	Chironomidae	6	5
	Capniidae/Leuctridae	1	18	Simuliidae	6	7
	Perlidae	1	3			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-54-C	Cambaridae	5	1	Pteronarcyidae	0	1
	Baetidae	4	43	Peltoperlidae	2	6
	Heptageniidae	4	10	Chloroperlidae	1	2
	Leptophlebiidae	2	1	Capniidae/Leuctridae	1	8
	Isonychiidae	2	1	Perlidae	1	1
	Hydropsychidae	6	6	Chironomidae	6	2
	Philopotamidae	3	10	Tipulidae	3	2
WVMC-54-D	Turbellaria	4	1	Perlodidae	2	5
	Oligochaeta	10	9	Capniidae/Leuctridae	1	2
	Baetidae	4	17	Pteronarcyidae	0	1
	Isonychiidae	2	5	Gomphidae	1	1
	Heptageniidae	4	19	Elmidae	4	2
	Ephemeridae	4	1	Psephenidae	4	1
	Leptophlebiidae	2	1	Corydalidae	5	5
	Hydropsychidae	6	19	Chironomidae	6	17
	Philopotamidae	3	10	Simuliidae	6	2
	Rhyacophilidae	0	1	Athericidae	2	3
	Perlidae	1	7	Tipulidae	3	2
	Chloroperlidae	1	16			
WVMC-54-F	Gammaridae	4	1	Capniidae/Leuctridae	1	4
	Baetidae	4	28	Perlidae	1	11
	Ephemerellidae	4	1	Perlodidae	2	1
	Heptageniidae	4	5	Peltoperlidae	2	5
	Hydropsychidae	6	12	Chironomidae	6	14
	Philopotamidae	3	36	Tipulidae	3	1
	Rhyacophilidae	0	1	Simuliidae	6	4
	Pteronarcyidae	0	1	Empididae	6	3
	Chloroperlidae	1	4	Athericidae	2	3
WVMC-54-H	Heptageniidae	4	27	Chloroperlidae	1	28
	Baetidae	4	24	Capniidae/Leuctridae	1	3
	Leptophlebiidae	2	5	Perlodidae	2	1
	Oligoneuriidae	2	1	Corydalidae	5	3
	Hydropsychidae	6	4	Cossidae	0	1
	Philopotamidae	3	2	Tipulidae	3	1
	Pteronarcyidae	0	3	Chironomidae	6	6
	Peltoperlidae	2	1	Athericidae	2	1
	Perlidae	1	12	Simuliidae	6	1
WVMC-54-H-1	Cambaridae	5	1	Chloroperlidae	1	8
	Baetidae	4	24	Capniidae/Leuctridae	1	7
	Heptageniidae	4	3	Perlidae	1	3
	Leptophlebiidae	2	8	Perlodidae	2	4
	Hydropsychidae	6	1	Peltoperlidae	2	3
	Philopotamidae	3	6	Chironomidae	6	16

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-54-I	Baetidae	4	42	Chloroperlidae	1	15
	Heptageniidae	4	6	Capniidae/Leuctridae	1	7
	Leptophlebiidae	2	2	Perlidae	1	5
	Isonychiidae	2	4	Perlodidae	2	2
	Hydropsychidae	6	8	Elmidae	4	1
	Philopotamidae	3	6	Corydalidae	5	1
	Rhyacophilidae	0	1	Chironomidae	6	10
	Pteronarcyidae	0	1	Tipulidae	3	7
WVMC-54-I-1	Baetidae	4	19	Capniidae/Leuctridae	1	10
	Heptageniidae	4	11	Perlidae	1	7
	Leptophlebiidae	2	7	Perlodidae	2	6
	Hydropsychidae	6	9	Peltoperlidae	2	2
	Philopotamidae	3	2	Psephenidae	4	1
	Glossosomatidae	0	1	Chironomidae	6	10
	Pteronarcyidae	0	1	Tipulidae	3	2
	Chloroperlidae	1	8			
WVMC-54-J	Heptageniidae	4	10	Peltoperlidae	2	9
	Baetidae	4	31	Chloroperlidae	1	1
	Caenidae	4	1	Capniidae/Leuctridae	1	3
	Isonychiidae	2	2	Chironomidae	6	11
	Philopotamidae	3	3	Tipulidae	3	3
	Hydropsychidae	6	17	Empididae	6	1
	Perlidae	1	2			
WVMC-54-K	Hirudinidae	7	1	Chloroperlidae	1	30
	Oligochaeta	10	2	Capniidae/Leuctridae	1	18
	Baetidae	4	19	Perlidae	1	8
	Heptageniidae	4	14	Peltoperlidae	2	14
	Leptophlebiidae	2	2	Chironomidae	6	9
	Hydropsychidae	6	6	Tipulidae	3	2
	Pteronarcyidae	0	2	Simuliidae	6	1
WVMC-56	Oligochaeta	10	3	Peltoperlidae	2	12
	Baetidae	4	38	Chloroperlidae	1	17
	Heptageniidae	4	13	Perlodidae	2	5
	Leptophlebiidae	2	3	Capniidae/Leuctridae	1	3
	Hydropsychidae	6	6	Elmidae	4	1
	Philopotamidae	3	10	Tipulidae	3	5
	Rhyacophilidae	0	1	Chironomidae	6	6
	Perlidae	1	9	Simuliidae	6	3
	Pteronarcyidae	0	3	Athericidae	2	1
WVMC-57	Oligochaeta	10	1	Perlidae	1	1
	Baetidae	4	99	Peltoperlidae	2	1
	Heptageniidae	4	9	Perlodidae	2	2
	Ephemerellidae	4	1	Corydalidae	5	1
	Hydropsychidae	6	2	Chironomidae	6	22
	Philopotamidae	3	1	Simuliidae	6	3

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-59-{00.0}	Oligochaeta	10	1	Brachycentridae	1	1
	Baetidae	4	10	Lepidostomatidae	1	1
	Ephemerellidae	4	2	Capniidae/Leuctridae	1	1
	Heptageniidae	4	2	Perlidae	1	6
	Isonychiidae	2	12	Perlodidae	2	1
	Leptophlebiidae	2	4	Elmidae	4	2
	Hydropsychidae	6	4	Chironomidae	6	43
	Polycentropodidae	6	3	Simuliidae	6	3
	Philopotamidae	3	5			
WVMCS-.5	Ephemerellidae	4	8	Psephenidae	4	2
	Leptophlebiidae	2	1	Corydalidae	5	1
	Siphlonuridae	7	7	Chironomidae	6	5
	Gomphidae	1	1	Tabanidae	6	1
WVMCS-2	Hirudinidae	7	3	Lepidostomatidae	1	1
	Cambaridae	5	3	Pteronarcyidae	0	1
	Gammaridae	4	16	Capniidae/Leuctridae	1	5
	Baetidae	4	14	Perlidae	1	1
	Ephemerellidae	4	1	Perlodidae	2	5
	Heptageniidae	4	37	Peltoperlidae	2	7
	Leptophlebiidae	2	2	Nemouridae	2	1
	Hydropsychidae	6	12	Chironomidae	6	1
	Philopotamidae	3	7	Tipulidae	3	1
WVMCS-3	Oligochaeta	10	1	Pteronarcyidae	0	1
	Baetidae	4	29	Capniidae/Leuctridae	1	1
	Ephemerellidae	4	14	Perlidae	1	1
	Heptageniidae	4	3	Nemouridae	2	2
	Isonychiidae	2	7	Elmidae	4	2
	Leptophlebiidae	2	35	Psephenidae	4	3
	Hydropsychidae	6	4	Chironomidae	6	12
	Philopotamidae	3	30	Simuliidae	6	11
WVMCS-3-A	Hirudinidae	7	1	Pteronarcyidae	0	1
	Cambaridae	5	2	Peltoperlidae	2	11
	Baetidae	4	3	Chloroperlidae	1	20
	Heptageniidae	4	2	Capniidae/Leuctridae	1	11
	Leptophlebiidae	2	2	Perlodidae	2	4
	Hydropsychidae	6	16	Corydalidae	5	1
	Polycentropodidae	6	2	Simuliidae	6	6
	Perlidae	1	5	Chironomidae	6	3
WVMCS-5	Hirudinidae	7	1	Peltoperlidae	2	24
	Cambaridae	5	1	Capniidae/Leuctridae	1	15
	Baetidae	4	8	Chloroperlidae	1	4
	Heptageniidae	4	4	Perlodidae	2	2
	Leptophlebiidae	2	1	Gomphidae	1	1
	Hydropsychidae	6	13	Elmidae	4	1
	Philopotamidae	3	1	Chironomidae	6	4
	Perlidae	1	5	Simuliidae	6	1
	Pteronarcyidae	0	3			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMCS-6	Baetidae	4	27	Capniidae/Leuctridae	1	28
	Ephemerellidae	4	43	Nemouridae	2	1
	Physidae	8	8	Elmidae	4	1
	Leptophlebiidae	2	27	Chironomidae	6	7
	Hydropsychidae	6	2	Tipulidae	3	2
	Polycentropodidae	6	1	Simuliidae	6	1
	Philopotamidae	3	21			
WVMCS-6-B	Cambaridae	5	1	Chloroperlidae	1	1
	Baetidae	4	3	Capniidae/Leuctridae	1	5
	Ephemerellidae	4	7	Perlodidae	2	1
	Heptageniidae	4	10	Peltoperlidae	2	3
	Leptophlebiidae	2	66	Psephenidae	4	2
	Hydropsychidae	6	3	Chironomidae	6	2
	Philopotamidae	3	13	Tipulidae	3	4
	Lepidostomatidae	1	1	Ceratopogonidae	6	1
	Pteronarcyidae	0	1			
WVMCS-6-C	Hirudinidae	7	1	Chloroperlidae	1	10
	Cambaridae	5	1	Capniidae/Leuctridae	1	10
	Baetidae	4	2	Peltoperlidae	2	4
	Heptageniidae	4	5	Perlodidae	2	1
	Isonychiidae	2	3	Elmidae	4	2
	Leptophlebiidae	2	2	Psephenidae	4	1
	Hydropsychidae	6	22	Tipulidae	3	13
	Philopotamidae	3	1	Simuliidae	6	2
	Perlidae	1	12	Chironomidae	6	1
	Pteronarcyidae	0	3			
WVMCS-6-E	Oligochaeta	10	2	Lepidostomatidae	1	2
	Cambaridae	5	5	Capniidae/Leuctridae	1	13
	Talitridae	8	2	Peltoperlidae	2	14
	Crangonyctidae		3	Nemouridae	2	6
	Heptageniidae	4	14	Pteronarcyidae	0	1
	Leptophlebiidae	2	42	Perlodidae	2	2
	Siphlonuridae	7	7	Psephenidae	4	1
	Baetidae	4	13	Corydalidae	5	2
	Philopotamidae	3	2	Chironomidae	6	2
	Brachycentridae	1	1	Athericidae	2	1
WVMCS-7	Turbellaria	4	1	Rhyacophilidae	0	3
	Oligochaeta	10	9	Pteronarcyidae	0	21
	Gammaridae	4	21	Chloroperlidae	1	6
	Baetidae	4	12	Capniidae/Leuctridae	1	17
	Ephemerellidae	4	2	Perlidae	1	1
	Heptageniidae	4	29	Perlodidae	2	12
	Leptophlebiidae	2	18	Peltoperlidae	2	4
	Ameletidae	0	3	Nemouridae	2	14
	Siphlonuridae	7	1	Chironomidae	6	7
	Hydropsychidae	6	13	Tipulidae	3	3
	Philopotamidae	3	20	Athericidae	2	3

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMCS-7.5	Oligochaeta	10	2	Lepidostomatidae	1	2
	Gammaridae	4	4	Pteronarcyidae	0	8
	Baetidae	4	29	Chloroperlidae	1	2
	Heptageniidae	4	18	Capniidae/Leuctridae	1	15
	Leptophlebiidae	2	33	Perlodidae	2	11
	Ameletidae	0	1	Peltoperlidae	2	1
	Hydropsychidae	6	25	Nemouridae	2	2
	Philopotamidae	3	23	Chironomidae	6	20
	Rhyacophilidae	0	3	Tipulidae	3	3
WVMCS-8	Oligochaeta	10	3	Chloroperlidae	1	29
	Heptageniidae	4	18	Perlidae	1	8
	Baetidae	4	5	Capniidae/Leuctridae	1	20
	Leptophlebiidae	2	8	Perlodidae	2	6
	Ephemerellidae	4	1	Chironomidae	6	8
	Hydropsychidae	6	16	Simuliidae	6	1
	Philopotamidae	3	6	Dixidae	1	1
	Peltoperlidae	2	4			
WVMCS-12	Heptageniidae	4	3	Perlidae	1	4
	Baetidae	4	26	Perlodidae	2	3
	Leptophlebiidae	2	1	Capniidae/Leuctridae	1	6
	Hydropsychidae	6	23	Chloroperlidae	1	2
	Philopotamidae	3	2	Chironomidae	6	5
	Glossosomatidae	0	5	Simuliidae	6	1
	Peltoperlidae	2	24			
WVMCS-13	Oligochaeta	10	1	Peltoperlidae	2	17
	Baetidae	4	18	Perlidae	1	1
	Heptageniidae	4	9	Perlodidae	2	8
	Leptophlebiidae	2	5	Capniidae/Leuctridae	1	13
	Ephemerellidae	4	1	Chloroperlidae	1	3
	Hydropsychidae	6	8	Elmidae	4	2
	Polycentropodidae	6	2	Chironomidae	6	3
	Glossosomatidae	0	1	Simuliidae	6	1
	Pteronarcyidae	0	6	Tipulidae	3	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMCS-14	Oligochaeta	10	6	Chloroperlidae	1	1
	Baetidae	4	22	Capniidae/Leuctridae	1	26
	Ephemerellidae	4	7	Perlidae	1	3
	Heptageniidae	4	2	Perlodidae	2	3
	Leptophlebiidae	2	14	Peltoperlidae	2	2
	Hydropsychidae	6	5	Nemouridae	2	1
	Philopotamidae	3	13	Elmidae	4	1
	Rhyacophilidae	0	2	Chironomidae	6	4
	Pteronarcyidae	0	1	Simuliidae	6	1
WVMCS-15	Oligochaeta	10	2	Pteronarcyidae	0	1
	Baetidae	4	11	Chloroperlidae	1	4
	Ephemerellidae	4	4	Capniidae/Leuctridae	1	2
	Heptageniidae	4	10	Perlidae	1	3
	Leptophlebiidae	2	15	Perlodidae	2	13
	Hydropsychidae	6	8	Nemouridae	2	1
	Philopotamidae	3	10	Chironomidae	6	11
	Lepidostomatidae	1	2	Tipulidae	3	1
WVMCS-16	Oligochaeta	10	1	Chloroperlidae	1	21
	Baetidae	4	30	Perlidae	1	1
	Heptageniidae	4	7	Perlodidae	2	7
	Leptophlebiidae	2	3	Peltoperlidae	2	9
	Hydropsychidae	6	5	Chironomidae	6	15
	Philopotamidae	3	4	Tipulidae	3	2
	Pteronarcyidae	0	1	Simuliidae	6	1
WVMCS-18	Oligochaeta	10	3	Chloroperlidae	1	1
	Baetidae	4	6	Capniidae/Leuctridae	1	7
	Ephemeridae	4	1	Perlidae	1	5
	Ephemerellidae	4	13	Perlodidae	2	3
	Heptageniidae	4	106	Peltoperlidae	2	14
	Leptophlebiidae	2	2	Nemouridae	2	8
	Ameletidae	0	7	Elmidae	4	1
	Hydropsychidae	6	23	Chironomidae	6	1
	Pteronarcyidae	0	5	Tipulidae	3	2
WVMC-59-{20.4}	Oligochaeta	10	4	Lepidostomatidae	1	1
	Gammaridae	4	1	Chloroperlidae	1	2
	Baetidae	4	23	Capniidae/Leuctridae	1	1
	Ephemerellidae	4	6	Perlidae	1	12
	Heptageniidae	4	11	Gomphidae	1	3
	Isonychiidae	2	7	Psephenidae	4	1
	Leptophlebiidae	2	6	Corydalidae	5	3
	Hydropsychidae	6	7	Chironomidae	6	18
	Polycentropodidae	6	1	Simuliidae	6	1
	Philopotamidae	3	6			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMCS-22	Oligochaeta	10	1	Pteronarcyidae	0	9
	Gammaridae	4	3	Chloroperlidae	1	7
	Baetidae	4	11	Capniidae/Leuctridae	1	5
	Ephemerellidae	4	9	Perlidae	1	2
	Heptageniidae	4	33	Perlodidae	2	6
	Leptophlebiidae	2	18	Peltoperlidae	2	5
	Hydropsychidae	6	5	Nemouridae	2	15
	Polycentropodidae	6	1	Curculionidae	5	1
	Rhyacophilidae	0	3	Chironomidae	6	5
WVMCS-25	Oligochaeta	10	5	Limnephilidae	4	3
	Gammaridae	4	69	Lepidostomatidae	1	1
	Baetidae	4	2	Pteronarcyidae	0	3
	Ephemerellidae	4	18	Chloroperlidae	1	7
	Heptageniidae	4	7	Capniidae/Leuctridae	1	50
	Leptophlebiidae	2	3	Perlodidae	2	10
	Ameletidae	0	4	Nemouridae	2	1
	Hydropsychidae	6	3	Tipulidae	3	12
	Philopotamidae	3	4	Ceratopogonidae	6	1
	Rhyacophilidae	0	6			
WVMCS-28	Oligochaeta	10	1	Capniidae/Leuctridae	1	7
	Baetidae	4	2	Perlodidae	2	3
	Ephemerellidae	4	11	Peltoperlidae	2	1
	Heptageniidae	4	17	Nemouridae	2	8
	Leptophlebiidae	2	1	Elmidae	4	1
	Hydropsychidae	6	5	Curculionidae	5	2
	Rhyacophilidae	0	1	Chironomidae	6	1
	Pteronarcyidae	0	3	Tipulidae	3	1
	Chloroperlidae	1	13			
WVMCS-33	Ameletidae	0	18	Perlidae	1	1
	Hydropsychidae	6	2	Peltoperlidae	2	1
	Rhyacophilidae	0	5	Nemouridae	2	44
	Chloroperlidae	1	1	Carabidae	0	1
	Capniidae/Leuctridae	1	36	Simuliidae	6	13
WVMCS-46	Baetidae	4	7	Nemouridae	2	8
	Leptophlebiidae	2	1	Chironomidae	6	1
	Hydropsychidae	6	1	Tipulidae	3	4
	Rhyacophilidae	0	3	Simuliidae	6	5
	Capniidae/Leuctridae	1	94			
WVMCS-47	Oligochaeta	10	1	Pteronarcyidae	0	2
	Cambaridae	5	2	Chloroperlidae	1	4
	Baetidae	4	7	Capniidae/Leuctridae	1	12
	Ephemerellidae	4	4	Perlidae	1	2
	Heptageniidae	4	2	Nemouridae	2	8
	Leptophlebiidae	2	25	Chironomidae	6	3
	Hydropsychidae	6	4	Tipulidae	3	1
	Philopotamidae	3	1	Simuliidae	6	2
	Rhyacophilidae	0	1			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMCS-53	Oligochaeta	10	1	Chloroperlidae	1	8
	Cambaridae	5	2	Capniidae/Leuctridae	1	22
	Gammaridae	4	3	Perlidae	1	3
	Baetidae	4	9	Peltoperlidae	2	4
	Heptageniidae	4	5	Elmidae	4	3
	Leptophlebiidae	2	4	Dryopidae	5	1
	Isonychiidae	2	1	Chironomidae	6	2
	Hydropsychidae	6	12	Tipulidae	3	1
	Philopotamidae	3	2	Tabanidae	6	1
	Rhyacophilidae	0	4			
WVMCS-54	Oligochaeta	10	7	Chloroperlidae	1	44
	Heptageniidae	4	6	Perlodidae	2	1
	Polycentropodidae	6	2	Nemouridae	2	16
	Philopotamidae	3	3	Elmidae	4	2
	Rhyacophilidae	0	1	Chironomidae	6	12
	Limnephilidae	4	1	Tipulidae	3	2
	Nemertea	6	1			
WVMC-60-A	Oligochaeta	10	8	Pteronarcyidae	0	5
	Baetidae	4	13	Capniidae/Leuctridae	1	4
	Ephemerellidae	4	11	Perlodidae	2	3
	Heptageniidae	4	3	Peltoperlidae	2	4
	Hydroptilidae	6	1	Nemouridae	2	6
	Philopotamidae	3	57	Chironomidae	6	6
	Limnephilidae	4	1	Simuliidae	6	2
WVMC-60-C	Oligochaeta	10	4	Lepidostomatidae	1	2
	Cambaridae	5	1	Pteronarcyidae	0	8
	Baetidae	4	23	Chloroperlidae	1	2
	Ephemerellidae	4	6	Capniidae/Leuctridae	1	3
	Heptageniidae	4	13	Perlodidae	2	3
	Leptophlebiidae	2	21	Peltoperlidae	2	3
	Hydropsychidae	6	5	Nemouridae	2	10
	Philopotamidae	3	36	Chironomidae	6	3
	Rhyacophilidae	0	4	Tipulidae	3	3
WVMC-60-C-3	Oligochaeta	10	1	Philopotamidae	3	5
	Baetidae	4	9	Pteronarcyidae	0	2
	Ephemerellidae	4	1	Chloroperlidae	1	2
	Heptageniidae	4	18	Capniidae/Leuctridae	1	26
	Leptophlebiidae	2	8	Perlodidae	2	1
	Ameletidae	0	7	Peltoperlidae	2	5
	Hydropsychidae	6	2	Nemouridae	2	18

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-C-4	Oligochaeta	10	6	Pteronarcyidae	0	1
	Cambaridae	5	1	Chloroperlidae	1	8
	Gammaridae	4	41	Capniidae/Leuctridae	1	13
	Baetidae	4	16	Perlodidae	2	4
	Ephemerellidae	4	2	Peltoperlidae	2	5
	Heptageniidae	4	10	Elmidae	4	3
	Leptophlebiidae	2	9	Staphylinidae		1
	Ameletidae	0	1	Chironomidae	6	9
	Hydropsychidae	6	10	Tipulidae	3	5
	Philopotamidae	3	6	Empididae	6	1
	Rhyacophilidae	0	3	Dixidae	1	1
	Limnephilidae	4	1			
WVMC-60-D-1	Heptageniidae	4	4	Perlodidae	2	5
	Ameletidae	0	7	Nemouridae	2	6
	Hydropsychidae	6	2	Chironomidae	6	5
	Rhyacophilidae	0	1	Simuliidae	6	2
	Capniidae/Leuctridae	1	62	Tipulidae	3	1
WVMC-60-D-3-B	Oligochaeta	10	7	Elmidae	4	3
	Cambaridae	5	1	Corydalidae	5	1
	Baetidae	4	1	Chironomidae	6	6
	Hydropsychidae	6	35	Simuliidae	6	7
	Rhyacophilidae	0	2	Tipulidae	3	9
	Capniidae/Leuctridae	1	48			
WVMC-60-D-3-C	Baetidae	4	1	Elmidae	4	2
	Hydropsychidae	6	10	Tipulidae	3	4
	Rhyacophilidae	0	1	Chironomidae	6	13
	Capniidae/Leuctridae	1	60	Simuliidae	6	3
WVMC-60-D-3-E	Oligochaeta	10	1	Perlidae	1	1
	Heptageniidae	4	2	Chironomidae	6	9
	Leptophlebiidae	2	8	Tipulidae	3	1
	Hydropsychidae	6	60	Simuliidae	6	8
	Capniidae/Leuctridae	1	31			
WVMC-60-D-4	Oligochaeta	10	4	Coenagrionidae	9	9
	Planorbidae	7	40	Libellulidae	9	6
	Lymnaeidae	7	1	Haliplidae	5	2
	Caenidae	4	7	Gyrinidae	4	1
	Baetidae	4	4	Saldidae	0	1
	Polycentropodidae	6	1	Chironomidae	6	6
	Leptoceridae	4	2			
WVMC-60-D-4.5	Oligochaeta	10	46	Capniidae/Leuctridae	1	112
	Heptageniidae	4	60	Perlodidae	2	1
	Siphlonuridae	7	3	Chloroperlidae	1	1
	Rhyacophilidae	0	6	Athericidae	2	4
	Nemouridae	2	48	Chironomidae	6	21

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-D-4.7	Oligochaeta	10	1	Perlodidae	2	1
	Heptageniidae	4	65	Pyralidae	5	1
	Lepidostomatidae	1	1	Chironomidae	6	5
	Rhyacophilidae	0	2	Simuliidae	6	1
	Capniidae/Leuctridae	1	23	Tipulidae	3	1
	Nemouridae	2	21			
WVMC-60-D-9	Physidae	8	16	Elmidae	4	1
	Planorbidae	7	3	Haliplidae	5	1
	Cambaridae	5	2	Chironomidae	6	16
	Talitridae	8	13	Simuliidae	6	8
	Baetidae	4	11	Dixidae	1	1
	Hydropsychidae	6	2	Tabanidae	6	1
	Aeshnidae	3	1			
WVMC-60-D-11	Cambaridae	5	1	Capniidae/Leuctridae	1	6
	Baetidae	4	22	Perlidae	1	2
	Leptophlebiidae	2	6	Chloroperlidae	1	1
	Heptageniidae	4	4	Chironomidae	6	43
	Hydropsychidae	6	15	Tipulidae	3	4
	Philopotamidae	3	3	Simuliidae	6	1
WVMC-60-D-12	Oligochaeta	10	1	Peltoperlidae	2	2
	Cambaridae	5	1	Perlodidae	2	1
	Baetidae	4	19	Capniidae/Leuctridae	1	3
	Isonychiidae	2	2	Elmidae	4	1
	Philopotamidae	3	3	Chironomidae	6	82
	Hydropsychidae	6	2	Tipulidae	3	2
	Pteronarcyidae	0	1	Simuliidae	6	5
WVMC-60-D-14	Oligochaeta	10	1	Polycentropodidae	6	1
	Sphaeriidae	8	3	Perlidae	1	2
	Cambaridae	5	3	Peltoperlidae	2	1
	Asellidae	8	4	Chloroperlidae	1	2
	Talitridae	8	1	Capniidae/Leuctridae	1	1
	Heptageniidae	4	16	Aeshnidae	3	1
	Baetidae	4	10	Elmidae	4	12
	Caenidae	4	3	Psephenidae	4	2
	Ephemerellidae	4	2	Dytiscidae	5	1
	Leptophlebiidae	2	4	Chironomidae	6	70
	Isonychiidae	2	1	Simuliidae	6	12
	Hydropsychidae	6	48	Empididae	6	1
WVMC-60-E	Oligochaeta	10	2	Ameletidae	0	5
	Cambaridae	5	1	Psycomyiidae	2	3
	Asellidae	8	1	Limnephilidae	4	2
	Baetidae	4	1	Capniidae/Leuctridae	1	12
	Ephemerellidae	4	1	Nemouridae	2	69
	Heptageniidae	4	1	Simuliidae	6	6

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-F	Oligochaeta	10	14	Chloroperlidae	1	22
	Cambaridae	5	2	Capniidae/Leuctridae	1	14
	Baetidae	4	32	Perlidae	1	1
	Ephemerellidae	4	4	Nemouridae	2	8
	Heptageniidae	4	4	Chironomidae	6	5
	Hydropsychidae	6	2	Tipulidae	3	1
	Philopotamidae	3	1	Simuliidae	6	6
	Rhyacophilidae	0	2	Stratiomyidae	7	1
	Lepidostomatidae	1	1			
WVMC-60-G	Baetidae	4	52	Perlodidae	2	1
	Heptageniidae	4	8	Nemouridae	2	12
	Ameletidae	0	1	Chironomidae	6	5
	Chloroperlidae	1	4	Tipulidae	3	1
	Capniidae/Leuctridae	1	12	Simuliidae	6	13
WVMC-60-I	Oligochaeta	10	7	Capniidae/Leuctridae	1	2
	Cambaridae	5	1	Perlidae	1	2
	Gammaridae	4	15	Perlodidae	2	3
	Caenidae	4	3	Peltoperlidae	2	2
	Ephemerellidae	4	2	Nemouridae	2	1
	Heptageniidae	4	25	Psephenidae	4	1
	Leptophlebiidae	2	13	Chironomidae	6	4
	Hydropsychidae	6	4	Tipulidae	3	4
	Philopotamidae	3	15	Simuliidae	6	1
	Rhyacophilidae	0	9	Blephariceridae	0	1
	Pteronarcyidae	0	16			
WVMC-60-J	Hirudinidae	7	1	Pteronarcyidae	0	13
	Gammaridae	4	14	Capniidae/Leuctridae	1	4
	Baetidae	4	10	Perlidae	1	3
	Ephemerellidae	4	1	Perlodidae	2	1
	Heptageniidae	4	5	Peltoperlidae	2	3
	Leptophlebiidae	2	11	Nemouridae	2	6
	Hydropsychidae	6	4	Chironomidae	6	1
	Philopotamidae	3	1	Tipulidae	3	3
	Rhyacophilidae	0	2	Simuliidae	6	7
WVMC-60-K	Nemertea	6	1	Capniidae/Leuctridae	1	11
	Baetidae	4	25	Perlidae	1	2
	Ephemerellidae	4	4	Perlodidae	2	3
	Heptageniidae	4	23	Psephenidae	4	4
	Isonychiidae	2	3	Dryopidae	5	1
	Leptophlebiidae	2	2	Corydalidae	5	1
	Hydropsychidae	6	6	Chironomidae	6	11
	Philopotamidae	3	14	Simuliidae	6	1

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-K-2-A	Cambaridae	5	1	Chloroperlidae	1	5
	Gammaridae	4	19	Capniidae/Leuctridae	1	9
	Baetidae	4	21	Perlidae	1	1
	Heptageniidae	4	13	Perlodidae	2	8
	Hydropsychidae	6	5	Peltoperlidae	2	10
	Philopotamidae	3	1	Chironomidae	6	6
	Rhyacophilidae	0	1	Tipulidae	3	2
	Pteronarcyidae	0	7			
WVMC-60-K-5	Gammaridae	4	87	Chloroperlidae	1	5
	Baetidae	4	41	Capniidae/Leuctridae	1	9
	Heptageniidae	4	33	Perlodidae	2	19
	Ephemerellidae	4	3	Nemouridae	2	1
	Leptophlebiidae	2	2	Pteronarcyidae	0	4
	Hydropsychidae	6	2	Gomphidae	1	3
	Rhyacophilidae	0	1	Elmidae	4	1
	Glossosomatidae	0	1	Tipulidae	3	2
	Lepidostomatidae	1	1	Chironomidae	6	3
WVMC-60-K-8	Cambaridae	5	1	Glossosomatidae	0	1
	Baetidae	4	22	Pteronarcyidae	0	5
	Ephemerellidae	4	4	Capniidae/Leuctridae	1	2
	Heptageniidae	4	11	Perlidae	1	4
	Leptophlebiidae	2	7	Nemouridae	2	28
	Ameletidae	0	1	Chironomidae	6	5
	Hydropsychidae	6	1	Simuliidae	6	1
WVMC-60-K-16	Cambaridae	5	1	Capniidae/Leuctridae	1	21
	Baetidae	4	49	Perlodidae	2	2
	Ephemeridae	4	1	Nemouridae	2	1
	Ephemerellidae	4	6	Gomphidae	1	1
	Heptageniidae	4	12	Elmidae	4	1
	Isonychiidae	2	6	Psephenidae	4	1
	Leptophlebiidae	2	4	Corydalidae	5	1
	Hydropsychidae	6	3	Chironomidae	6	3
	Philopotamidae	3	32	Tipulidae	3	4
	Rhyacophilidae	0	1	Simuliidae	6	2
	Glossosomatidae	0	1	Athericidae	2	1
	Pteronarcyidae	0	1			
WVMC-60-K-17	Ephemerellidae	4	7	Perlodidae	2	6
	Heptageniidae	4	10	Peltoperlidae	2	11
	Leptophlebiidae	2	38	Nemouridae	2	16
	Philopotamidae	3	3	Gomphidae	1	1
	Pteronarcyidae	0	1	Elmidae	4	6
	Chloroperlidae	1	3	Chironomidae	6	11
	Capniidae/Leuctridae	1	14	Simuliidae	6	3

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-K-17-A	Hirudinidae	7	2	Pteronarcyidae	0	3
	Oligochaeta	10	2	Chloroperlidae	1	2
	Cambaridae	5	3	Capniidae/Leuctridae	1	15
	Baetidae	4	1	Perlidae	1	5
	Ephemerellidae	4	1	Perlodidae	2	1
	Heptageniidae	4	22	Peltoperlidae	2	1
	Leptophlebiidae	2	5	Nemouridae	2	7
	Hydropsychidae	6	19	Gomphidae	1	2
	Philopotamidae	3	4	Elmidae	4	1
	Rhyacophilidae	0	1	Tipulidae	3	1
	Lepidostomatidae	1	1	Athericidae	2	1
WVMC-60-L	Gammaridae	4	20	Rhyacophilidae	0	1
	Baetidae	4	33	Pteronarcyidae	0	6
	Heptageniidae	4	1	Capniidae/Leuctridae	1	7
	Isonychiidae	2	1	Perlidae	1	1
	Leptophlebiidae	2	8	Peltoperlidae	2	8
	Hydropsychidae	6	2	Nemouridae	2	1
	Philopotamidae	3	22	Chironomidae	6	6
WVMC-60-N-{01}	Oligochaeta	10	1	Pteronarcyidae	0	1
	Baetidae	4	29	Capniidae/Leuctridae	1	3
	Ephemerellidae	4	2	Perlidae	1	6
	Heptageniidae	4	22	Peltoperlidae	2	1
	Isonychiidae	2	21	Nemouridae	2	1
	Leptophlebiidae	2	8	Elmidae	4	3
	Hydropsychidae	6	4	Chironomidae	6	36
	Rhyacophilidae	0	1	Simuliidae	6	5
	Brachycentridae	1	11			
WVMC-60-N-4	Oligochaeta	10	3	Perlidae	1	2
	Gammaridae	4	10	Perlodidae	2	1
	Baetidae	4	10	Nemouridae	2	1
	Heptageniidae	4	4	Elmidae	4	3
	Leptophlebiidae	2	31	Corydalidae	5	1
	Hydropsychidae	6	7	Chironomidae	6	21
	Philopotamidae	3	6	Tipulidae	3	2
	Rhyacophilidae	0	1	Simuliidae	6	5
	Capniidae/Leuctridae	1	6			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-N-8	Cambaridae	5	2	Pteronarcvidae	0	1
	Baetidae	4	2	Chloroperlidae	1	3
	Ephemeridae	4	1	Capniidae/Leuctridae	1	6
	Ephemerellidae	4	1	Perlidae	1	8
	Heptageniidae	4	2	Nemouridae	2	3
	Leptophlebiidae	2	25	Elmidae	4	3
	Hydropsychidae	6	5	Chironomidae	6	3
	Philopotamidae	3	6	Tipulidae	3	2
	Rhyacophilidae	0	2	Simuliidae	6	1
WVMC-60-N-8.5	Cambaridae	5	1	Odontoceridae	0	2
	Baetidae	4	1	Chironomidae	6	1
	Ephemerellidae	4	1	Lepidostomatidae	1	1
	Heptageniidae	4	29	Pteronarcyidae	0	26
	Leptophlebiidae	2	6	Capniidae/Leuctridae	1	1
	Hydropsychidae	6	21	Perlodidae	2	2
	Philopotamidae	3	2	Nemouridae	2	17
	Rhyacophilidae	0	2	Curculionidae	5	1
WVMC-60-N-{20}	Oligochaeta	10	1	Chloroperlidae	1	1
	Cambaridae	5	1	Capniidae/Leuctridae	1	20
	Baetidae	4	11	Perlidae	1	5
	Ephemeridae	4	1	Perlodidae	2	1
	Ephemerellidae	4	23	Nemouridae	2	2
	Heptageniidae	4	18	Elmidae	4	1
	Isonychiidae	2	4	Chrysomelidae	5	1
	Leptophlebiidae	2	11	Corydalidae	5	1
	Hydropsychidae	6	1	Chironomidae	6	1
	Philopotamidae	3	12	Tipulidae	3	1
	Pteronarcyidae	0	1	Athericidae	2	2
WVMC-60-{11.6}	Baetidae	4	28	Pteronarcyidae	0	1
	Ephemerellidae	4	21	Capniidae/Leuctridae	1	5
	Heptageniidae	4	3	Perlidae	1	12
	Isonychiidae	2	2	Elmidae	4	3
	Leptophlebiidae	2	2	Corydalidae	5	1
	Hydropsychidae	6	6	Chironomidae	6	9
	Polycentropodidae	6	1	Tipulidae	3	2
	Philopotamidae	3	2	Blephariceridae	0	1
	Brachycentridae	1	21			
WVMC-60-O-{01.0}	Oligochaeta	10	1	Rhyacophilidae	0	1
	Baetidae	4	31	Brachycentridae	1	11
	Heptageniidae	4	3	Perlidae	1	7
	Isonychiidae	2	5	Elmidae	4	2
	Hydropsychidae	6	37	Chironomidae	6	12
	Polycentropodidae	6	1	Simuliidae	6	1
	Philopotamidae	3	2	Athericidae	2	4

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-O-1	Oligochaeta	10	4	Perlodidae	2	1
	Baetidae	4	27	Peltoperlidae	2	17
	Heptageniidae	4	32	Chironomidae	6	40
	Isonychiidae	2	1	Simuliidae	6	5
	Hydropsychidae	6	19	Empididae	6	1
	Philopotamidae	3	7	Athericidae	2	1
	Capniidae/Leuctridae	1	1			
WVMC-60-O-{07.0}	Cambaridae	5	1	Perlodidae	2	1
	Heptageniidae	4	5	Perlidae	1	1
	Baetidae	4	32	Elmidae	4	1
	Hydropsychidae	6	10	Corydalidae	5	1
	Peltoperlidae	2	5	Simuliidae	6	52
	Capniidae/Leuctridae	1	9	Chironomidae	6	28
	Chloroperlidae	1	1			
WVMC-60-P	Gammaridae	4	1	Capniidae/Leuctridae	1	2
	Baetidae	4	34	Perlidae	1	1
	Ephemerellidae	4	2	Perlodidae	2	2
	Heptageniidae	4	33	Nemouridae	2	4
	Leptophlebiidae	2	20	Chironomidae	6	12
	Philopotamidae	3	16	Tipulidae	3	2
	Lepidostomatidae	1	1	Simuliidae	6	1
	Pteronarcyidae	0	2			
WVMC-60-Q	Baetidae	4	8	Perlidae	1	1
	Ephemerellidae	4	4	Nemouridae	2	1
	Heptageniidae	4	10	Chironomidae	6	5
	Chloroperlidae	1	1	Tipulidae	3	1
	Capniidae/Leuctridae	1	1	Simuliidae	6	1
WVMC-60-R	Oligochaeta	10	3	Capniidae/Leuctridae	1	2
	Gammaridae	4	324	Chloroperlidae	1	1
	Baetidae	4	5	Gomphidae	1	1
	Heptageniidae	4	5	Elmidae	4	1
	Hydropsychidae	6	4	Tipulidae	3	1
	Rhyacophilidae	0	5	Tabanidae	6	1
	Psycomyiidae	2	1	Chironomidae	6	2
WVMC-60-{25.1}	Gammaridae	4	39	Perlodidae	2	1
	Baetidae	4	6	Peltoperlidae	2	1
	Ephemerellidae	4	1	Nemouridae	2	5
	Heptageniidae	4	26	Psephenidae	4	2
	Leptophlebiidae	2	13	Dryopidae	5	1
	Ameletidae	0	1	Chironomidae	6	15
	Pteronarcyidae	0	1	Simuliidae	6	1
	Capniidae/Leuctridae	1	4			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-T-{02.5}	Baetidae	4	11	Perlidae	1	6
	Ephemerellidae	4	33	Peltoperlidae	2	1
	Heptageniidae	4	7	Elmidae	4	1
	Isonychiidae	2	4	Psephenidae	4	1
	Leptophlebiidae	2	8	Chironomidae	6	2
	Hydropsychidae	6	7	Tipulidae	3	1
	Polycentropodidae	6	2	Simuliidae	6	7
	Capniidae/Leuctridae	1	1	Athericidae	2	1
WVMC-60-T-1	Cambaridae	5	38	Chloroperlidae	1	3
	Gammaridae	4	1	Capniidae/Leuctridae	1	5
	Ephemerellidae	4	4	Perlidae	1	2
	Heptageniidae	4	145	Perlodidae	2	1
	Leptophlebiidae	2	5	Peltoperlidae	2	1
	Hydropsychidae	6	13	Nemouridae	2	8
	Philopotamidae	3	7	Chironomidae	6	10
	Rhyacophilidae	0	1	Tipulidae	3	1
	Odontoceridae	0	2	Simuliidae	6	3
	Pteronarcyidae	0	1			
WVMC-60-T-2	Gammaridae	4	56	Lepidostomatidae	1	2
	Baetidae	4	2	Pteronarcyidae	0	7
	Ephemerellidae	4	4	Chloroperlidae	1	7
	Heptageniidae	4	95	Capniidae/Leuctridae	1	9
	Leptophlebiidae	2	7	Perlodidae	2	13
	Hydropsychidae	6	15	Peltoperlidae	2	1
	Philopotamidae	3	6	Nemouridae	2	12
	Rhyacophilidae	0	1	Chironomidae	6	20
WVMC-60-T-3	Oligochaeta	10	3	Capniidae/Leuctridae	1	12
	Gammaridae	4	1	Perlodidae	2	3
	Talitridae	8	1	Peltoperlidae	2	5
	Baetidae	4	1	Heliophoridae	0	1
	Heptageniidae	4	5	Chironomidae	6	17
	Leptophlebiidae	2	6	Tipulidae	3	3
	Hydropsychidae	6	3	Athericidae	2	7
	Chloroperlidae	1	8			
WVMC-60-T-8	Cambaridae	5	3	Chloroperlidae	1	15
	Baetidae	4	6	Capniidae/Leuctridae	1	2
	Ephemerellidae	4	8	Perlidae	1	2
	Heptageniidae	4	37	Nemouridae	2	2
	Leptophlebiidae	2	1	Gomphidae	1	2
	Hydropsychidae	6	12	Chironomidae	6	2
	Philopotamidae	3	2	Tipulidae	3	2
	Rhyacophilidae	0	5	Blephariceridae	0	1
	Pteronarcyidae	0	1			

Table 16: (Continued)
Benthic Macroinvertebrates Identified From Each Site

STREAM CODE	TAXA	TV	# ORGS	TAXA	TV	# ORGS
WVMC-60-T-9	Hirudinidae	7	1	Pteronarcyidae	0	10
	Oligochaeta	10	1	Peltoperlidae	2	37
	Baetidae	4	6	Chloroperlidae	1	36
	Heptageniidae	4	13	Capniidae/Leuctridae	1	8
	Ephemerellidae	4	5	Perlodidae	2	5
	Leptophlebiidae	2	4	Elmidae	4	3
	Hydropsychidae	6	3	Chironomidae	6	22
	Rhyacophilidae	0	3	Tipulidae	3	1
WVMC-60-T-10	Gammaridae	4	15	Chloroperlidae	1	9
	Baetidae	4	3	Capniidae/Leuctridae	1	1
	Ephemerellidae	4	6	Perlodidae	2	2
	Heptageniidae	4	62	Peltoperlidae	2	1
	Hydropsychidae	6	22	Elmidae	4	6
	Rhyacophilidae	0	3	Curculionidae	5	1
	Limnephilidae	4	1	Chironomidae	6	1
	Pteronarcyidae	0	4	Tipulidae	3	1
WVMC-60-T-11	Hirudinidae	7	2	Capniidae/Leuctridae	1	5
	Cambaridae	5	3	Perlidae	1	1
	Baetidae	4	40	Perlodidae	2	7
	Ephemerellidae	4	12	Nemouridae	2	2
	Heptageniidae	4	17	Elmidae	4	2
	Hydropsychidae	6	7	Chironomidae	6	1
	Pteronarcyidae	0	1	Tipulidae	3	3
	Chloroperlidae	1	7	Simuliidae	6	1
WVMC-60-T-13	Heptageniidae	4	7	Capniidae/Leuctridae	1	11
	Ephemerellidae	4	8	Perlidae	1	3
	Leptophlebiidae	2	6	Nemouridae	2	2
	Baetidae	4	6	Pteronarcyidae	0	2
	Ephemeridae	4	2	Tenebrionidae		1
	Isonychiidae	2	1	Elmidae	4	2
	Hydropsychidae	6	23	Corydalidae	5	2
	Philopotamidae	3	1	Simuliidae	6	3
	Polycentropodidae	6	2	Chironomidae	6	6
	Rhyacophilidae	0	1	Tipulidae	3	5
WVMC-60-T-{13.0}	Baetidae	4	40	Pteronarcyidae	0	1
	Ephemerellidae	4	8	Capniidae/Leuctridae	1	4
	Heptageniidae	4	23	Elmidae	4	1
	Isonychiidae	2	4	Carabidae	0	1
	Leptophlebiidae	2	15	Corydalidae	5	2
	Hydropsychidae	6	2	Chironomidae	6	9
	Philopotamidae	3	1	Tipulidae	3	10
	Rhyacophilidae	0	1			

TV = Tolerancwe Value
# ORGS Number of organisms identified

Table 17: Water Characteristics Observed				
STREAM CODE	**WATER ODOR**	**SURFACE OILS**	**TURBIDITY**	**WATER COLOR**
WVMC-2	normal	none	moderate	
WVMC-2-A	normal	none	slight	
WVMC-2.5	normal	none	slight	
WVMC-2.5-A	normal	none	clear	
WVMC-2.7	normal	none	slight	
WVMC-4	normal	none	slight	
WVMC-7	normal	none	clear	
WVMC-10	normal	none	slight	
WVMC-11-{00}	normal	none	slight	
WVMC-11-.1A	normal	none	slight	
WVMC-11-A	normal	none	clear	
WVMC-11-{05}	normal	none	clear	
WVMC-11-B	normal	none	clear	
WVMC-11-C	normal	none	clear	
WVMC-11-{07}	normal	none	clear	
WVMC-11-C.1	normal	none	clear	
WVMC-11-D-{00}	anaerobic	none	opaque	
WVMC-11-D-{10}	normal	none	turbid	
WVMC-11-E	normal	none	clear	
WVMC-12-{00}	normal	none	slight	
WVMC-12-.5A-{0}	normal	none	clear	
WVMC-12-.5A-{3}	normal	none	clear	
WVMC-12-.5A-{5}	normal	none	clear	
WVMC-12-.7A	normal	none	slight	
WVMC-12-A-{02.5}	normal	none	slight	
WVMC-12-A-1	normal	none	slight	
WVMC-12-A-1-A	normal	none	clear	
WVMC-12-A-2	normal	none	slight	
WVMC-12-A-{03}	normal	none	slight	
WVMC-12-B-{01}	normal	none	clear	
WVMC-12-B-.5-{00}	normal	none	clear	
WVMC-12-B-.5-A	sewage	none	slight	
WVMC-12-B-.5-{02}	normal	none	clear	
WVMC-12-B-{02}	normal	none	slight	
WVMC-12-B-1-{01}	normal	none	moderate	
WVMC-12-B-1-B	anaerobic	none	moderate	
WVMC-12-B-1-{04}	none	none	clear	
WVMC-12-B-2	anaerobic	none	turbid	

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMC-12-B-{06}	normal	none	clear	
WVMC-12-B-3-{00}	normal	none	moderate	
WVMC-12-B-3-{02}	anaerobic	none	slight	
WVMC-12-B-4-{02}	normal	none	clear	
WVMC-12-B-4-{03}	normal	none	clear	
WVMC-12-B-4.5	normal	none	moderate	
WVMC-12-B-6	normal	none	clear	
WVMC-12-B-{11}	normal	none	clear	
WVMC-12-B-5-C	none	none	clear	
WVMC-12-B-5-{03}	anaerobic	none	opaque	
WVMC-12-B-{12}	normal	none	clear	
WVMC-12-C-{01}	normal	none	opaque	muddy
WVMC-12-C-{04}	normal	none	opaque	mud
WVMC-12-D	normal	none	slight	
WVMC-12-{10}	normal	none	slight	
WVMC-12-E	normal	none	clear	
WVMC-12-E.1	none	none	clear	
WVMC-12-F-{00.0}	anaerobic	none	moderate	
WVMC-12-F-{01.0}	normal	none	moderate	
WVMC-12-{14}	anaerobic	none	clear	
WVMC-00-{18.3}	normal	none	turbid	
WVMC-13-{01}	normal	none	clear	
WVMC-13.5-{2.3}	sewage	sheen	slight	
WVMC-14-{02}	anaerobic	none	moderate	
WVMC-15-{01}	normal	none	clear	
WVMC-15-A	normal	none	slight	
WVMC-16-{02}	normal	none	opaque	
WVMC-16-A-{0.2}	normal	none	opaque	orange
WVMC-16-A-.1	normal	none	clear	
WVMC-16-A-{0.8}	normal	none	opaque	orange
WVMC-16-A-{2.5}	none	none	slight	slight brown
WVMC-16-A-{3.9}	normal	none	turbid	brownish white
WVMC-16-{04}	normal	none	clear	
WVMC-17-{0.0}	none	none	opaque	orange
WVMC-17-.6A	normal	none	clear	
WVMC-17-.7	normal	none	clear	
WVMC-17-{2.6}	normal	none	opaque	orange
WVMC-17-A-{0.0}	normal	none	turbid	orange
WVMC-17-A-.5-{0}	normal	none		very red
WVMC-17-A-.5-{3}	normal	none	clear	
WVMC-17-A-1-{0.0}	normal	none	clear	

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMC-17-A-1.1	normal	none	clear	
WVMC-17-A-1.2	normal	none		
WVMC-17-A-1-{3.2}	normal	sheen	clear	some iron seeps
WVMC-17-A-{2.1}	normal	none	moderate	red-brown
WVMC-17-{3.2}				
WVMC-17-A.1	normal	none	clear	
WVMC-17-{6.8}	normal	none	clear	
WVMC-17-B	none	none	clear	
WVMC-17-C	normal	none	clear	
WVMC-17-{10.2}	normal	none	slight	
WVMC-17-{14.4}	normal	none	slight	
WVMC-18-{0.0}	none	none	slight	
WVMC-18-.1A	none	none	slight	
WVMC-18-A-1	none	none	slight	
WVMC-18-A	normal	none	clear	very light grey
WVMC-18-{6.0}	none	none	clear	
WVMC-19	normal	none	slight	
WVMC-19-A	normal	none	clear	
WVMC-20-{0.0}	normal	none	clear	
WVMC-20-{6.0}	normal	none	clear	
WVMC-21	normal	none	clear	
WVMC-22-{1.5}	normal	none	clear	
WVMC-22-B	normal	none	clear	
WVMC-22-{2.0}	normal	none	clear	
WVMC-23-{0.0}	anaerobic	none	moderate	brownish red
WVMC-23-.2A	normal	none	slight	light grey
WVMC-23-A-{0.0}	normal	none		red
WVMC-23-A-.1-A	normal	none	clear	
WVMC-23-A-.1-B	normal	none	slight	light brown
WVMC-23-A-{2.9}	normal	slick	slight	
WVMC-23-{1.8}	normal	none	slight	light brown
WVMC-23-{2.0}	normal	none	slight	light red
WVMC-24-{0.0}	normal	none	slight	light brown
WVMC-24-A	normal	none	slight	very light brown
WVMC-24-{2.7}	normal	none	slight	light brown
WVMC-25-{0.0}	normal	none	moderate	red
WVMC-25-{2.3}	normal	none	clear	light red brown
WVMC-26-{0.0}	normal	none	clear	
WVMC-26-{1.5}	normal	none	clear	
WVMC-27-{0.0}	normal	none	clear	
WVMC-27-{2.7}	sewage	none	slight	brown red

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMC-27-A	sewage	none	slight	light red
WVMC-27-B	normal	none	slight	very light brown
WVMC-28	normal	none	slight	
WVMC-31-{0.0}	normal	none	clear	
WVMC-31.7	dirty	none	slight	
WVMC-32	normal	none	slight	
WVMC-32-B	normal	none	clear	
WVMC-32-C-1	normal	none	slight	
WVMC-32-D	normal	none	clear	
WVMC-32-E	normal	none	clear	
WVMC-32-F	normal	none	clear	
WVMC-32-G	normal	none	slight	
WVMC-00-{43}	normal	none	clear	
WVMC-33-{0.0}	normal	none	clear	
WVMC-33-A		none	clear	
WVMC-33-A.5	normal	none	clear	
WVMC-33-B	normal	none	clear	
WVMC-33-B.5	normal	none	clear	
WVMC-33-C	normal	none	clear	
WVMC-33-D	normal	none	clear	
WVMC-33-E	normal	none	clear	
WVMC-33-F	normal	none	clear	
WVMC-34-{0.0}	none	none	clear	
WVMC-35	normal	none	clear	
WVMC-35.5-{0.0}	none	none	clear	
WVMC-36-{0.0}	none	none	clear	
WVMC-36-A	none	none	clear	
WVMC-39	normal	none		
WVMC-40	normal	none	clear	
WVMC-42	normal	none	clear	
WVMC-43-{0.0}	normal	none	clear	
WVMC-43-A	normal	none	clear	
WVMC-43-B	normal	none	clear	
WVMC-44-{0.0}	normal	none	clear	
WVMC-46	normal	none	clear	
WVMC-46-A	normal	none	clear	
WVMC-46-B	normal	none	clear	
WVMC-47	normal	none	clear	
WVMC-49	normal	none	slight	
WVMC-50	normal	none	slight	
WVMC-51	normal	none	clear	

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMC-51-A	normal	none	clear	
WVMC-51-B	normal	none	clear	
WVMC-51-B-2	normal	none	clear	
WVMC-51-B-3	normal	none	clear	
WVMC-51-B-4	normal	none	clear	
WVMC-51-B-5	normal	none	clear	
WVMC-00-{71.0}	normal	none	opaque	
WVMC-52	none	none	clear	
WVMC-52-.7A				
WVMC-52-A	normal	none	clear	
WVMC-53	none	none	clear	
WVMC-54	none	none	moderate	
WVMC-54-A	normal	none	clear	
WVMC-54-C	none	none	clear	
WVMC-54-D	none	none	clear	
WVMC-54-F	none	none	clear	
WVMC-54-H	normal	none	clear	
WVMC-54-H-1	normal	none	clear	
WVMC-54-I	none	none	clear	
WVMC-54-I-1	sawdust	none	clear	
WVMC-54-J	none	none	clear	
WVMC-54-K	none	none	clear	
WVMC-55	normal	none	clear	
WVMC-56	normal	none	clear	
WVMC-57	normal	none	clear	
WVMC-59-{00.0}	sewage	none	clear	
WVMCS-.5	sewage	none	moderate	
WVMCS-2	normal	none	clear	
WVMCS-3	normal	none	slight	
WVMCS-3-A	normal	none	clear	
WVMCS-5	normal	none	clear	
WVMCS-6	normal	none	moderate	
WVMCS-6-B	normal	none	clear	
WVMCS-6-C	normal	none	opaque	
WVMCS-6-E	normal	none	clear	
WVMCS-7	normal	none	clear	
WVMCS-7.5	normal	none	clear	
WVMCS-8	normal	none	clear	
WVMCS-12	normal	none	clear	
WVMCS-13	normal	none	clear	
WVMCS-14	normal	none	clear	

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMCS-15	normal	none	clear	
WVMCS-16	normal	none	clear	
WVMCS-18	normal	none	clear	
WVMC-59-{20.4}	normal	none	clear	
WVMCS-22	normal	none	clear	
WVMCS-25	normal	none	clear	
WVMCS-28	normal	none	clear	
WVMCS-33	normal	none	clear	
WVMCS-46	normal	none	clear	
WVMCS-47	normal	none	moderate	tannin red color
WVMCS-53	normal	none	clear	
WVMCS-54	normal	none	clear	
WVMC-60-A	normal	none	clear	
WVMC-60-C	normal	none	clear	
WVMC-60-C-3	normal	none	clear	
WVMC-60-C-4	normal	none	clear	
WVMC-60-D-1	none	none		slight tea color
WVMC-60-D-2	normal	none	clear	
WVMC-60-D-3-A	normal	none	clear	
WVMC-60-D-3-B	none	none	clear	
WVMC-60-D-3-C	normal	none	clear	
WVMC-60-D-3-E				
WVMC-60-D-4	normal	none		tea color
WVMC-60-D-4.5	none	none		tea color
WVMC-60-D-4.7		none		tea color
WVMC-60-D-9	normal	none	clear	
WVMC-60-D-11	sewage	none	clear	
WVMC-60-D-12	normal	none	clear	
WVMC-60-D-14	normal	none	slight	
WVMC-60-D-{25.0}	normal	none	opaque	
WVMC-60-E	normal	none	slight	
WVMC-60-F	normal	none	clear	
WVMC-60-G	anaerobic	none	slight	
WVMC-60-I	normal	none	slight	
WVMC-60-J	normal	none	moderate	
WVMC-60-K	normal	none	clear	
WVMC-60-K-2-A	normal	none	clear	
WVMC-60-K-5	normal	none	clear	
WVMC-60-K-8	sewage	none	clear	
WVMC-60-K-16		none	clear	
WVMC-60-K-17	normal	none	clear	

Table 17: (Continued)
Water Characteristics Observed

STREAM CODE	WATER ODOR	SURFACE OILS	TURBIDITY	WATER COLOR
WVMC-60-K-17-A	normal	none	clear	
WVMC-60-L	normal	none	moderate	
WVMC-60-N-{01}	normal	none	clear	
WVMC-60-N-4	normal	none	clear	
WVMC-60-N-8	normal	none	clear	
WVMC-60-N-8.5	none	none	clear	
WVMC-60-N-{20}	normal	none	clear	
WVMC-60-{11.6}	normal	none	moderate	
WVMC-60-O-{01.0}	normal	none	clear	
WVMC-60-O-1	normal	none	clear	
WVMC-60-O-{07.0}	normal	none	clear	
WVMC-60-P	normal	none	slight	
WVMC-60-Q	normal	none	clear	
WVMC-60-R	normal	none	clear	
WVMC-60-S				
WVMC-60-{25.1}	normal	none	clear	
WVMC-60-T-{02.5}	none	none	clear	
WVMC-60-T-1	none	none	clear	
WVMC-60-T-2	normal	none	clear	
WVMC-60-T-3	normal	none	clear	
WVMC-60-T-8	normal	none	clear	
WVMC-60-T-9	normal	none	clear	
WVMC-60-T-10	none	none	clear	
WVMC-60-T-11	normal	none	clear	tea color
WVMC-60-T-13	normal	none	clear	tea color
WVMC-60-T-{13.0}	normal	none	clear	weak tea color

Table 18: Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-2	17.2	7.5	9.0	105	350
WVMC-2-A	17.2	7.3	9.2	68	30
WVMC-2.5	18.2	7.4	8.6	208	100
WVMC-2.5-A	18.1	7.2	8.6	76	**3000**
WVMC-2.7	19.2	7.2	8.5	300	150
WVMC-4	17.6	7.7	8.2	379	160
WVMC-7	17.0	6.5	9.1	88	20
WVMC-10	17.8	7.1	8.5	186	200
WVMC-11-{00}	16.4	**3.2**	9.5	977	
WVMC-11-.1A	17.1	**3.7**	9.1	385	
WVMC-11-A	18.4	**3.0**	9.3	952	
WVMC-11-{05}	17.4	**3.3**	9.2	996	
WVMC-11-B	18.8	**3.4**	8.8	489	
WVMC-11-C	16.0	**3.1**	9.6	1139	
WVMC-11-{07}	19.0	**3.6**	8.9	792	
WVMC-11-C.1	19.3	**3.0**	8.7	1171	
WVMC-11-D-{00}	20.1	6.7	8.6	188	180
WVMC-11-D-{10}	17.3	7.0	8.5	120	**1100**
WVMC-11-E	20.9	**3.7**	8.4	1113	
WVMC-12-{00}	22.9	7.4	8.6	101	320
WVMC-12-.5A-{0}	18.7	**4.1**	9.2	443	170
WVMC-12-.5A-{3}	19.1	**3.5**	8.9	713	
WVMC-12-.5A-{5}	21.4	**3.2**	8.3	1176	
WVMC-12-.7A	18.6	6.4	7.9	72	**850**
WVMC-12-A-{02.5}	19.0	7.3	7.9	103	**1200**
WVMC-12-A-1	17.1	7.1	8.4	181	**1500**
WVMC-12-A-1-A	16.9	6.1	8.0	77	20
WVMC-12-A-2	20.0	7.2	7.7	64	20
WVMC-12-A-{03}	17.6	6.5	8.1	51	110
WVMC-12-B-{01}	22.3	7.2	7.8	260	53
WVMC-12-B-.5-{00}	22.3	7.2	7.8	260	75
WVMC-12-B-.5-A	20.3	**4.6**	7.9	865	8
WVMC-12-B-.5-{02}	18.3	7.4	8.9	447	170
WVMC-12-B-{02}	21.4	7.3	7.8	198	180
WVMC-12-B-1-{01}	19.2	**5.9**	8.7	149	**680**

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-12-B-1-B	23.0	**4.3**	6.4	396	**1300**
WVMC-12-B-1-{04}	16.5	**4.6**	9.1	32	250
WVMC-12-B-2	27.0	6.2	8.2	107	340
WVMC-12-B-{06}	21.1	6.0	8.1	147	**540**
WVMC-12-B-3-{00}	24.2	6.5	8.7	191	390
WVMC-12-B-3-{02}	16.8	6.9	8.5	279	240
WVMC-12-B-4-{02}	18.4	6.1	8.8	99	**500**
WVMC-12-B-4-{03}	18.1	6.1	8.4	110	**17000**
WVMC-12-B-4.5	25.6	6.1	7.2	229	**14000**
WVMC-12-B-6	17.2	**5.8**	9.0	53	250
WVMC-12-B-{11}	17.1	6.1	8.8	73	100
WVMC-12-B-5-C	18.8	**4.6**	8.2	50	110
WVMC-12-B-5-{03}	21.1	6.2	3.3	193	390
WVMC-12-B-{12}	23.8	7.7	5.4	487	**450**
WVMC-12-C-{01}	17.6	7.0	8.1	51	**30000**
WVMC-12-C-{04}	16.5	7.0	7.6	75	**60000**
WVMC-12-D	19.8	7.2	7.2	101	**2200**
WVMC-12-{10}	20.0	6.3	8.9	70	**1700**
WVMC-12-E	18.5	7.3	8.8	235	76
WVMC-12-E.1	17.8	6.7	9.0	94	330
WVMC-12-F-{00.0}	21.2	6.3	8.7	59	28
WVMC-12-F-{01.0}	18.6	6.3	8.3	47	64
WVMC-12-{14}	21.3	6.5	9.0	67	41
WVMC-00-{18.3}	27.1	7.4	7.7	158	64
WVMC-13-{01}	22.3	7.3	7.6	81	**900**
WVMC-13.5-{2.3}	19.9	**3.1**	7.1	920	
WVMC-14-{02}	16.9	6.8	8.4	94	**60000**
WVMC-15-{01}	23.2	6.9	7.4	73	**1300**
WVMC-15-A	17.4	7.4	8.3	94	20
WVMC-00-{28.8}					**20000**
WVMC-16-{02}	20.0	**3.3**	8.8	819	
WVMC-16-A-{0.2}	19.7	**3.1**	8.9	1356	
WVMC-16-A-.1	20.8	**2.7**	9.2	1737	
WVMC-16-A-{0.8}	16.1	**4.1**	9.6	1128	2
WVMC-16-A-{2.5}	13.3	**2.6**	8.9	1770	
WVMC-16-A-{3.9}	17.3	**3.5**	5.2	295	

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-16-{04}	18.0	**4.0**	8.8	188	
WVMC-17-{0.0}	19.6	**3.2**	9.0	1239	2
WVMC-17-.6A	15.0	6.9	7.7	74	430
WVMC-17-.7	21.3	8.3	7.1	977	4200
WVMC-17-{2.6}	19.7	**3.2**	8.0	1121	
WVMC-17-A-{0.0}	19.7	**3.0**	7.9	2430	
WVMC-17-A-.5-{0}	20.0	**2.8**	6.7	3920	
WVMC-17-A-.5-{3}	19.7	7.5	6.4	1137	**4500**
WVMC-17-A-1-{0.0}	19.3	**3.2**	8.1	1960	
WVMC-17-A-1.1	17.3	**3.2**	8.2	2370	
WVMC-17-A-1.2	16.7	**3.4**	8.6	2370	
WVMC-17-A-1-{3.2}	18.9	**5.7**	7.4	909	270
WVMC-17-A-{2.1}	24.0	**3.3**	7.2	1424	
WVMC-17-{3.2}	21.4	7.8	7.8	236	**5000**
WVMC-17-A.1	15.8	7.6	8.9	810	**1500**
WVMC-17-{6.8}	16.3	7.0	8.6	147	**850**
WVMC-17-B	19.7	**4.6**	8.6	363	**1000**
WVMC-17-C	15.3	**4.8**	8.8	36	20
WVMC-17-{10.2}	15.6	6.5	9.4	83	**450**
WVMC-17-{14.4}	16.5	6.6	8.4	92	**2400**
WVMC-18-{0.0}	17.5	7.4	9.5	234	**450**
WVMC-18-.1A	18.6	7.6	9.2	189	**3000**
WVMC-18-A-1	24.0	6.4	8.2	76	**530**
WVMC-18-A	17.4	**3.9**	7.9	2052	
WVMC-18-{6.0}	15.9	7.1	9.7	71	280
WVMC-19	18.5	7.4	9.4	135	**3200**
WVMC-19-A	18.2	6.9	8.6	61	**860**
WVMC-20-{0.0}	16.5	7.7	9.8	65	**9000**
WVMC-20-{6.0}	18.3	6.8	8.6	53	180
WVMC-21	17.3	7.2	9.2	77	300
WVMC-22-{1.5}	19.6	6.8	8.7	410	200
WVMC-22-B	20.2	6.9	8.6	498	**2300**
WVMC-22-{2.0}	19.1	**4.9**	9.1	480	18
WVMC-23-{0.0}	20.0	**2.4**	7.8	1398	
WVMC-23-.2A	18.9	**4.9**	7.3	708	3
WVMC-23-A-{0.0}	23.2	**2.6**	7.2	1475	
WVMC-23-A-.1-A	18.9	**3.1**	7.7	413	

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-23-A-.1-B	20.1	**2.5**	7.8	1255	
WVMC-23-A-{2.9}	16.8	**3.1**	5.7	656	
WVMC-23-{1.8}	19.4	**2.6**	7.5	1590	
WVMC-23-{2.0}	24.1	**2.8**	7.4	925	
WVMC-24-{0.0}	20.4	**2.4**	7.6	949	
WVMC-24-A	19.2	**2.2**	7.8	1710	
WVMC-24-{2.7}	16.3	**2.4**	7.6	1600	
WVMC-25-{0.0}	17.0	**2.4**	8.5	2240	
WVMC-25-{2.3}	19.3	**2.3**	7.5	1304	
WVMC-26-{0.0}	18.6	7.4	9.3	431	**4000**
WVMC-26-{1.5}	19.4	**3.9**	8.7	278	**1100**
WVMC-27-{0.0}	18.5	**3.1**	8.5	723	
WVMC-27-{2.7}	18.8	**2.8**	7.4	713	
WVMC-27-A	19.1	**2.7**	7.7	843	
WVMC-27-B	17.5	**3.0**	6.7	679	
WVMC-28	16.2	**5.7**	8.7	33	20
WVMC-31-{0.0}	16.4	8.0	9.2	30	20
WVMC-31.7	18.8	6.8	8.3	59	20
WVMC-32	18.9	6.5	8.4	77	20
WVMC-32-B	15.7	6.8	8.8	76	110
WVMC-32-C-1	15.7	6.3	8.4	48	140
WVMC-32-D	16.2	6.6	8.4	53	92
WVMC-32-E	15.9	6.7	8.4	66	**450**
WVMC-32-F	14.7	6.6	8.5	50	20
WVMC-32-G	14.6	6.9	8.8	80	20
WVMC-00-{43}	26.0	7.0	7.3	96	43
WVMC-33-{0.0}	16.9		8.7	62	25
WVMC-33-A	17.4		9.2	65	170
WVMC-33-A.5	16.2		9.2	55	**430**
WVMC-33-B	17.4		8.8	31	55
WVMC-33-B.5	15.2	6.2	8.8	35	20
WVMC-33-C	16.6	7.5	9.0	76	330
WVMC-33-D	15.6	7.1	9.1	32	180
WVMC-33-E	18.4	6.9	8.6	34	**9000**
WVMC-33-F	16.4	6.9	8.9	36	**1500**
WVMC-34-{0.0}	16.2		9.1	36	220
WVMC-35	16.0		9.2	41	280

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-35.5-{0.0}	16.3		9.0	32	50
WVMC-36-{0.0}	15.3		9.2	65	20
WVMC-36-A	14.8		9.6	44	20
WVMC-39	14.7	7.5	9.1	79	20
WVMC-40	14.6	7.2	9.2	28	20
WVMC-42	14.4	7.1	9.4	34	**12000**
WVMC-43-{0.0}	16.6		8.9	51	50
WVMC-43-A	15.5		8.7	42	20
WVMC-43-B	15.7		8.9	47	91
WVMC-44-{0.0}	15.6		9.0	43	20
WVMC-46	19.5	7.2	8.0	55	**750**
WVMC-46-A	16.7		8.8	35	100
WVMC-46-B	17.3		8.8	48	25
WVMC-47	17.3	7.0	8.5	44	**450**
WVMC-49	20.6	7.5	7.7	52	**500**
WVMC-50	18.4	6.7	8.2	37	73
WVMC-51	19.9	7.4	8.0	61	20
WVMC-51-A	17.6	7.3	8.5	70	10
WVMC-51-B	17.9	7.1	8.4	60	10
WVMC-51-B-2	16.5	7.6	7.8	84	10
WVMC-51-B-3	16.1	6.7	7.3	45	10
WVMC-51-B-4	16.8	7.9	6.9	138	10
WVMC-51-B-5	18.0	7.3	8.6	66	10
WVMC-00-{71.0}	19.7	7.3	8.4	63	**1500**
WVMC-52	19.1	7.3	8.4	39	193
WVMC-52-.7A	17.3	6.9	8.1	41	14
WVMC-52-A	17.3	7.3	9.1	41	42
WVMC-53	15.6	7.1	8.7	43	6
WVMC-54	18.7	7.2	8.6	51	163
WVMC-54-A	17.5	7.2	8.8	41	29
WVMC-54-C	16.7	7.5	9.0	60	28
WVMC-54-D	18.9	7.3	8.6	41	15
WVMC-54-F	17.0	7.4	9.0	46	14
WVMC-54-H	19.6	7.0	8.3	36	41
WVMC-54-H-1	18.7	7.1	7.4	39	44
WVMC-54-I	17.8	7.7	8.8	72	55
WVMC-54-I-1	16.8	7.6	8.9	61	28
WVMC-54-J	18.1	7.5	8.7	48	361

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (μmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-54-K	17.8	6.6	8.6	34	39
WVMC-55	18.8	7.8	8.5	76	10
WVMC-56	17.8	7.8	8.7	93	10
WVMC-57	18.9	7.5	8.8	43	10
WVMC-59-{00.0}	20.2	7.6	8.4	58	**6000**
WVMCS-.5	18.9	7.5	7.2	283	**2100**
WVMCS-2	16.9	7.7	7.8	46	72
WVMCS-3	19.0	7.9	8.4	94	**2200**
WVMCS-3-A	18.2	7.1	8.9	43	33
WVMCS-5	15.8	7.7	7.6	56	200
WVMCS-6	17.9	7.6	8.7	60	110
WVMCS-6-B	16.1	7.1	8.6	44	60
WVMCS-6-C	21.8	7.3	8.0	82	324
WVMCS-6-E	14.6	6.7	7.8	42	60
WVMCS-7	14.9	6.7	8.3	43	4
WVMCS-7.5	15.4	7.4	8.1	108	16
WVMCS-8	17.3	7.0	7.2	38	10
WVMCS-12	17.0	7.7	8.3	101	32
WVMCS-13	15.6	7.0	8.6	52	31
WVMCS-14	16.3	7.0	8.3	47	18
WVMCS-15	15.5	7.7	8.5	90	92
WVMCS-16	15.5	6.9	8.6	50	18
WVMCS-18	14.0	7.7	8.9	132	9
WVMC-59-{20.4}	19.3	7.4	8.3	50	6
WVMCS-22	14.6	7.2	8.8	104	60
WVMCS-25	11.3	7.9	9.5	104	2
WVMCS-28	14.5	6.9	8.9	33	3
WVMCS-33	14.8	7.1	8.9	49	0
WVMCS-46	14.5	7.5	8.6	56	43
WVMCS-47	15.9	7.3	8.2	54	9
WVMCS-53	13.1	6.5	8.7	30	27
WVMCS-54	12.4	6.2	9.2	28	1
WVMC-60-A	16.3	8.1	8.1	179	8
WVMC-60-C	14.9	7.9	7.6	101	0
WVMC-60-C-3	14.2	6.9	8.0	40	0
WVMC-60-C-4	14.1	8.0	8.8	144	3
WVMC-60-D-1	18.0	**3.9**	8.0	57	62
WVMC-60-D-2	17.8	**4.0**	7.7	89	

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-60-D-2.7	15.9	**3.2**	7.4	456	
WVMC-60-D-3-A	15.7	**3.0**	8.7	681	
WVMC-60-D-3-B	18.7	6.5	8.0	74	**14750**
WVMC-60-D-3-C	24.5	6.3	7.7	58	**5440**
WVMC-60-D-3-E	21.4	6.5	7.4	73	**1470**
WVMC-60-D-4	26.9	6.8	8.1	112	224
WVMC-60-D-4.5	14.3	**3.7**	8.5	67	237
WVMC-60-D-4.7	16.2	**3.9**	8.2	60	193
WVMC-60-D-9	18.5	7.0	8.8	98	245
WVMC-60-D-11	19.2	8.2	8.1	86	**1101**
WVMC-60-D-12	21.1	7.5	8.0	45	**5430**
WVMC-60-D-14	24.5	8.0	9.9	154	**6700**
WVMC-60-D-{25.0}	22.2	7.4	8.2	102	404
WVMC-60-E	13.3	6.7	8.4	62	0
WVMC-60-F	16.1	7.8	8.8	39	0
WVMC-60-G	15.3	6.2	8.9	28	9
WVMC-60-I	15.5	8.2	8.7	106	7
WVMC-60-J	16.3	8.3	8.5	149	87
WVMC-60-K	18.3	7.6	8.7	49	300
WVMC-60-K-2-A	14.2	6.3	8.7	26	6
WVMC-60-K-5	12.4	7.3	9.1	75	15
WVMC-60-K-8	15.2	7.8	8.6	168	68
WVMC-60-K-16	19.1	8.0	9.4	53	200
WVMC-60-K-17	18.6	7.1	9.1	28	22
WVMC-60-K-17-A	14.4	6.8	9.0	31	2
WVMC-60-L	15.5	8.1	8.6	156	21
WVMC-60-N-{01}	17.9	7.8	8.8	66	200
WVMC-60-N-4	17.0	6.5	8.0	26	**1700**
WVMC-60-N-8	17.7	8.0	8.0	152	12
WVMC-60-N-8.5	13.0	6.0	9.1	17	2
WVMC-60-N-{20}	18.9	7.7	7.9	65	2
WVMC-60-{11.6}	17.3	8.4	9.1	69	4
WVMC-60-O-{01.0}	20.0	7.6	8.5	56	79
WVMC-60-O-1	20.0	8.1	8.2	147	113
WVMC-60-O-{07.0}	18.3	**5.1**	8.4	25	360
WVMC-60-P	15.0	8.0	8.7	119	40
WVMC-60-Q	16.0	8.7	9.5	185	96
WVMC-60-R	14.1	7.2	9.5	55	29

Table 18: (Continued)
Water Quality - Parameters Measured Onsite And Fecal Coliform Bacteria

STREAM CODE	TEMPERATURE (°C)	pH (S.U.)	OXYGEN (mg/l)	CONDUCTIVITY (µmhos/ cm)	FECAL COLIFORM BACTERIA (colonies / 100 ml)
WVMC-60-S					
WVMC-60-{25.1}	11.4	7.5	9.8	111	34
WVMC-60-T-{02.5}	16.7	8.4	9.4		3
WVMC-60-T-1	12.4	7.4	9.5		0
WVMC-60-T-2	12.6	6.5	9.3		0
WVMC-60-T-3	12.3	6.4	9.2	32	10
WVMC-60-T-8	12.2	6.2	9.0	0	48
WVMC-60-T-9	12.3	6.1	9.2	25	8
WVMC-60-T-10	15.0	7.1	6.8		44
WVMC-60-T-11	14.2	6.4	8.8	13	0
WVMC-60-T-13	17.9	6.3	8.3	14	2
WVMC-60-T-{13.0}	15.5	7.4	9.0	41	109

No entry indicates parameter was not measured.

Table 19: Sites With Fecal Coliform Violations

(>400 Colonies/100 ml)

STREAM NAME	STREAM CODE	FECAL	ECOID
BIRCH HOLLOW	WVMC-2.5-A	3000	69
LEFT FORK BULL RUN @ HEADWATERS	WVMC-11-D-{10}	1100	69
PARKER RUN OF BIG SANDY CREEK	WVMC-12-.7A	850	69
LAUREL RUN NEAR MOUTH	WVMC-12-A-{02.5}	1200	69
LITTLE LAUREL RUN	WVMC-12-A-1	1500	69
BEAVER CREEK NEAR MOUTH	WVMC-12-B-1-{01}	680	69
1ST UNT OF BEAVER CREEK	WVMC-12-B-1-B	1300	69
LITTLE SANDY CREEK BELOW HOG RUN	WVMC-12-B-{06}	540	69
ELK RUN NEAR MOUTH	WVMC-12-B-4-{02}	500	69
ELK RUN ABOVE UNT	WVMC-12-B-4-{03}	17000	69
PINEY RUN AT MOUTH	WVMC-12-B-4.5	14000	69
LITTLE SANDY ABOVE CHERRY RUN	WVMC-12-B-{12}	450	69
HAZEL RUN NEAR MOUTH	WVMC-12-C-{01}	30000	69
HAZEL RUN @ HEADWATERS	WVMC-12-C-{04}	60000	69
GLADE RUN WEST OF BRUCETON MILLS	WVMC-12-D	2200	69
BIG SANDY CREEK @ BRUCETON MILLS FALLS	WVMC-12-{10}	1700	69
GIBSON RUN	WVMC-13-{01}	900	69
HACKELBARNEY RUN NEAR HEADWATERS	WVMC-14-{02}	60000	69
LAUREL RUN ABOVE HOGBACK RUN	WVMC-15-{01}	1300	69
CHEAT RIVER @ ALBRIGHT	WVMC-00-{28.8}	20000	69
2ND UNT / MUDDY CREEK	WVMC-17-.6A	430	69
CRAB ORCHARD CREEK @ MOUTH	WVMC-17-.7	4200	69
FICKEY RUN NEAR HEADWATERS	WVMC-17-A-.5-{3}	4500	69
MUDDY CREEK ABOVE MARTIN CREEK	WVMC-17-{3.2}	5000	69
UNT OF MUDDY CREEK @ MOUTH	WVMC-17-A.1	1500	69
MUDDY CREEK @ BRANDONVILLE TURNPIKE	WVMC-17-{6.8}	850	69
JUMP ROCK RUN @ MOUTH	WVMC-17-B	1000	69
MUDDY CREEK ABOVE SUGARCAMP RUN	WVMC-17-{10.2}	450	69
MUDDY CREEK NEAR HEADWATERS	WVMC-17-{14.4}	2400	67
ROARING CREEK @ MOUTH	WVMC-18-{0.0}	450	69
1ST UNT OF ROARING CREEK @ MOUTH	WVMC-18-.1A	3000	69
LITTLE LICK RUN	WVMC-18-A-1	530	69
DAUGHERTY RUN	WVMC-19	3200	69
DORITY RUN @ MOUTH	WVMC-19-A	860	67
ELSEY RUN	WVMC-20-{0.0}	9000	69
2ND UNT OF BUFFALO RUN	WVMC-22-B	2300	69
JOES RUN NEAR MOUTH	WVMC-26-{0.0}	4000	69
JOES RUN ABOVE 1ST UNT	WVMC-26-{1.5}	1100	69
BUCKLICK RUN OF SALTLICK CREEK	WVMC-32-E	450	67
BELL HOLLOW	WVMC-33-A.5	430	67
BUCKLICK RUN OF BUFFALO CREEK	WVMC-33-E	9000	67
SUGARCAMP RUN OF BUFFALO CREEK	WVMC-33-F	1500	67
LOUSE CAMP RUN	WVMC-42	12000	67
BULL RUN	WVMC-46	750	67
JOHNATHAN RUN	WVMC-47	450	67

Table 19: (Continued)
Sites With Fecal Coliform Violations
(>400 Colonies/100 ml)

STREAM NAME	STREAM CODE	FECAL	ECOID
CLAY LICK RUN	WVMC-49	500	67
CHEAT RIVER @ ST. GEORGE	WVMC-00-{71.0}	1500	67
SHAVERS FORK @ PARSONS	WVMC-59-{00.0}	6000	67
SMOKY HOLLOW	WVMCS-.5	2100	67
HADDIX RUN	WVMCS-3	2200	67
MIDDLE RUN	WVMC-60-D-3-B	14750	69
SNYDER RUN	WVMC-60-D-3-C	5440	69
SAND RUN	WVMC-60-D-3-E	1470	69
YOAKUM RUN	WVMC-60-D-11	1101	69
FREELAND RUN	WVMC-60-D-12	5430	69
MILL RUN OF BLACKWATER RIVER	WVMC-60-D-14	6700	69
BLACKWATER RIVER BELOW CANAAN VALLEY STATE PARK	WVMC-60-D-{25.0}	404	69
BEAVERDAM RUN	WVMC-60-N-4	1700	67

Table 20: Acid Mine Drainage Parameters

STREAM CODE	ALUMINUM (mg/l)	IRON (mg/l)	MANGANESE (mg/l)
WVMC-11-{00}	12	5.8	1.7
WVMC-11-.1A	4.1	0.24	0.87
WVMC-11-A	10	5.9	1.9
WVMC-11-{05}	12	6.7	1.7
WVMC-11-B	6.8	1.1	0.64
WVMC-11-C	16	13	0.92
WVMC-11-{07}	11	1.4	4
WVMC-11-C.1	18	8.9	7.5
WVMC-11-D-{00}	5.9	3.6	2.2
WVMC-11-D-{10}	0.62	<0.20	0.26
WVMC-11-E	18	1.8	5.5
WVMC-12-{00}	0.38	0.2	0.077
WVMC-12-.5A-{0}	8.6	0.37	2
WVMC-12-.5A-{3}	15	1.4	3
WVMC-12-.5A-{5}	28	4.9	4.8
WVMC-12-A-{02.5}	0.44	<0.20	0.044
WVMC-12-A-1	0.51	<0.20	0.12
WVMC-12-A-{03}	0.98	0.93	0.19
WVMC-12-B-{01}	0.3	<0.20	0.17
WVMC-12-B-.5-{00}	0.6	0.75	1.2
WVMC-12-B-.5-A	6.6	0.94	3.4
WVMC-12-B-.5-{02}	0.32	0.47	0.089
WVMC-12-B-{02}	0.42	0.49	0.18
WVMC-12-B-1-{01}	0.73	0.65	0.52
WVMC-12-B-1-B	1.3	2.6	1.9
WVMC-12-B-1-{04}	0.59	0.44	0.2
WVMC-12-B-2	0.3	1.8	0.59
WVMC-12-B-{06}	0.34	0.84	0.4
WVMC-12-B-3-{00}	0.32	1.6	0.67
WVMC-12-B-3-{02}	0.29	0.64	0.096
WVMC-12-B-4-{02}	0.33	0.36	0.15
WVMC-12-B-4-{03}	0.45	0.63	0.39
WVMC-12-B-4.5	0.54	2.9	1.3
WVMC-12-B-6	0.47	0.34	0.22
WVMC-12-B-{11}	0.38	0.39	0.25
WVMC-12-B-5-C	0.49	1.2	0.19
WVMC-12-B-5-{03}	0.23	2.8	1.3
WVMC-12-B-{12}	0.78	0.29	0.59
WVMC-12-C-{01}	0.77	1.1	0.44

Table 20: (Continued)
Acid Mine Drainage Parameters

STREAM CODE	ALUMINUM (mg/l)	IRON (mg/l)	MANGANESE (mg/l)
WVMC-12-C-{04}	0.82	0.86	0.14
WVMC-12-D	0.38	1.2	0.078
WVMC-12-{10}	0.34	0.42	0.059
WVMC-12-E	0.62	0.74	0.21
WVMC-12-E.1	0.26	0.29	<0.010
WVMC-12-F-{00.0}	0.59	0.46	0.045
WVMC-12-{14}	0.24	0.35	0.042
WVMC-00-{18.3}	0.81	1.2	0.21
WVMC-13-{01}	0.26	0.54	0.068
WVMC-13.5-{2.3}	13	8.4	7.3
WVMC-14-{02}	2.2	3.1	0.13
WVMC-15-{01}	0.28	0.37	0.047
WVMC-00-{28.8}	1.1	1.4	0.058
WVMC-16-{02}	10	25	1.7
WVMC-16-A-{0.2}	19	39	3
WVMC-16-A-.1	26	72	3.6
WVMC-16-A-{0.8}	17	41	2.8
WVMC-16-A-{2.5}	29	110	3.8
WVMC-16-A-{3.9}	1.3	3.6	0.64
WVMC-16-{04}	3.8	0.42	1.1
WVMC-17-{0.0}	14	43	3.1
WVMC-17-.6A	0.29	<0.20	<0.010
WVMC-17-.7	0.25	1.4	0.21
WVMC-17-{2.6}	15	48	3.7
WVMC-17-A-{0.0}	49	170	13
WVMC-17-A-.5-{0}	140	680	18
WVMC-17-A-.5-{3}	0.26	0.5	0.072
WVMC-17-A-1-{0.0}	31	7.8	13
WVMC-17-A-1.1	38	7.6	21
WVMC-17-A-1.2	40	6.4	29
WVMC-17-A-1-{3.2}	2.4	3.4	3.6
WVMC-17-A-{2.1}	5.5	3.5	12
WVMC-17-{3.2}	0.44	0.33	0.12
WVMC-17-A.1	0.63	0.32	0.1
WVMC-17-{6.8}	0.7	0.31	0.22
WVMC-17-B	0.88	1.1	0.26
WVMC-17-{10.2}	0.38	0.33	0.036
WVMC-17-{14.4}	0.38	0.37	0.036
WVMC-18-{0.0}	0.43	0.39	0.14
WVMC-18-.1A	0.31	0.47	0.046

Table 20: (Continued)
Acid Mine Drainage Parameters

STREAM CODE	ALUMINUM (mg/l)	IRON (mg/l)	MANGANESE (mg/l)
WVMC-18-A-1	0.38	1.3	0.28
WVMC-18-A	0.89	0.22	0.22
WVMC-18-{6.0}	0.29	<0.20	<0.010
WVMC-19	0.31	0.22	0.04
WVMC-19-A	0.27	0.22	0.015
WVMC-20-{0.0}	0.28	<0.20	<0.010
WVMC-20-{6.0}	0.25	0.49	0.039
WVMC-21	30	<0.20	0.012
WVMC-22-{1.5}	0.49	0.55	0.86
WVMC-22-B	0.36	0.48	0.41
WVMC-22-{2.0}	0.69	0.94	1.4
WVMC-23-{0.0}	28	53	2.4
WVMC-23-.2A	2.8	1	3.4
WVMC-23-A-{0.0}	25	43	1.9
WVMC-23-A-.1-A	8.4	1.5	1.9
WVMC-23-A-.1-B	23	14	6
WVMC-23-A-{2.9}	14	4.2	2.4
WVMC-23-{1.8}	40	87	3.1
WVMC-23-{2.0}	14	16	2.6
WVMC-24-{0.0}	17	15	1.5
WVMC-24-A	42	80	3.6
WVMC-24-{2.7}	20	25	2.1
WVMC-25-{0.0}	53	130	1.9
WVMC-25-{2.3}	20	35	1.5
WVMC-26-{0.0}	0.37	0.46	0.35
WVMC-26-{1.5}	4.6	0.85	4.1
WVMC-27-{0.0}	8.9	2	2
WVMC-27-{2.7}	11	5.1	1.8
WVMC-27-A	16	10	1.7
WVMC-27-B	9.9	4.7	1.9
WVMC-00-{43}	0.3	<0.20	0.02

Table 21: Additional Acid Mine Drainage Parameters

STREAM CODE	ACID HOT (mg/l)	ALKALINITY (mg/l)	SULFATE (mg/l)	ALUMINUM (mg/l)	IRON (mg/l)	MANGANESE (mg/l)
WVMC-00-{71.0}	<1	17	10	-1	0.5	0.08
WVMC-60-D-1	76	<1.0000	6	0.4	0.45	0.8
WVMC-60-D-2	30	<1.0000	28	2.1	2.24	0.32
WVMC-60-D-3-A	150	<1.0000	230	14.5	10	0.48

Table 22: Sites With pH Violations
(<6.0 S.U.)

NAME	STREAM CODE	pH (S.U.)	ECOID
BULL RUN @ MOUTH	WVMC-11-{00}	3.2	69
1ST UNT OF BULL RUN @ MOUTH	WVMC-11-.1A	3.7	69
MIDDLE RUN @ MOUTH	WVMC-11-A	3.0	69
BULL RUN ABOVE MIDDLE RUN	WVMC-11-{05}	3.3	69
MOUNTAIN RUN @ MOUTH	WVMC-11-B	3.4	69
LICK RUN OF BULL RUN @ MOUTH	WVMC-11-C	3.1	69
BULL RUN BELOW 2ND UNT	WVMC-11-{07}	3.6	69
2ND UNT OF BULL RUN	WVMC-11-C.1	3.0	69
RIGHT FORK BULL RUN @ MOUTH	WVMC-11-E	3.7	69
SOVERN RUN @ MOUTH	WVMC-12-.5A-{0}	4.1	69
SOVERN RUN @ HUDSON	WVMC-12-.5A-{3}	3.5	69
SOVERN RUN @ HEADWATERS	WVMC-12-.5A-{5}	3.2	69
UNT OF WEBSTER RUN	WVMC-12-B-.5-A	4.6	69
BEAVER CREEK NEAR MOUTH	WVMC-12-B-1-{01}	5.9	69
1ST UNT OF BEAVER CREEK	WVMC-12-B-1-B	4.3	69
BEAVER CREEK NEAR HEADWATERS	WVMC-12-B-1-{04}	4.6	69
MILL RUN OF LITTLE SANDY NR MOUTH	WVMC-12-B-6	5.8	69
THIRD UNT OF CHERRY RUN NEAR HEAD	WVMC-12-B-5-C	4.6	69
CONNER RUN NEAR HEADWATERS	WVMC-13.5-{2.3}	3.1	69
GREENS RUN	WVMC-16-{02}	3.3	69
SOUTH FORK GREENS RUN @ MOUTH	WVMC-16-A-{0.2}	3.1	69
MIDDLE FORK OF GREENS RUN	WVMC-16-A-.1	2.7	69
SOUTH FORK GREENS RUN ABOVE MIDDLE FORK	WVMC-16-A-{0.8}	4.1	69
SOUTH FORK GREENS RUN ABOVE TREATMENT	WVMC-16-A-{2.5}	2.6	69
SOUTH FORK GREENS RUN NEAR HEADWATERS	WVMC-16-A-{3.9}	3.5	69
GREENS RUN @ PLEASANTDALE	WVMC-16-{04}	4.0	69
MUDDY CREEK @ MOUTH	WVMC-17-{0.0}	3.2	69
MUDDY CREEK BELOW MARTIN CREEK	WVMC-17-{2.6}	3.2	69
MARTIN CREEK @ MOUTH	WVMC-17-A-{0.0}	3.0	69
FICKEY RUN @ MOUTH	WVMC-17-A-.5-{0}	2.8	69
GLADE RUN @ MOUTH	WVMC-17-A-1-{0.0}	3.2	69
1ST UNT OF GLADE RUN @ MOUTH	WVMC-17-A-1.1	3.2	69
2ND UNT OF GLADE RUN NEAR MOUTH	WVMC-17-A-1.2	3.4	69
GLADE RUN NEAR HEADWATERS	WVMC-17-A-1-{3.2}	5.7	69
MARTIN CREEK @ HEADWATERS	WVMC-17-A-{2.1}	3.3	69
JUMP ROCK RUN AT MOUTH	WVMC-17-B	4.6	69
SUGARCAMP RUN OF MUDDY CREEK	WVMC-17-C	4.8	69
LICK RUN ABOVE LITTLE LICK RUN	WVMC-18-A	3.9	69
BUFFALO RUN ABOVE 2ND UNT	WVMC-22-{2.0}	4.9	69
MORGAN RUN @ MOUTH	WVMC-23-{0.0}	2.4	69
1ST UNT OF MORGAN RUN	WVMC-23-.2A	4.9	69
CHURCH RUN @ MOUTH	WVMC-23-A-{0.0}	2.6	69
LEFT FORK OF UNT OF CHURCH RUN	WVMC-23-A-.1-A	3.1	69
RIGHT FORK OF UNT OF CHURCH RUN	WVMC-23-A-.1-B	2.5	69
CHURCH RUN NEAR HEADWATERS	WVMC-23-A-{2.9}	3.1	69

Table 22: (continued)
Sites With pH Violations (<6.0 S.U.)

NAME	STREAM CODE	pH	ECOID

Table 22: (continued)
Sites With pH Violations (<6.0 S.U.)

NAME	STREAM CODE	pH	ECOID
MORGAN RUN BELOW CHURCH RUN	WVMC-23-{1.8}	2.6	69
MORGAN RUN ABOVE CHURCH RUN	WVMC-23-{2.0}	2.8	69
HEATHER RUN @ MOUTH	WVMC-24-{0.0}	2.4	69
1ST UNT OF HEATHER RUN	WVMC-24-A	2.2	69
HEATHER RUN ABOVE 2ND UNT	WVMC-24-{2.7}	2.4	69
LICK RUN NEAR MOUTH	WVMC-25-{0.0}	2.4	69
LICK RUN OF CHEAT RIVER ABOVE 1ST UNT	WVMC-25-{2.3}	2.3	69
JOES RUN ABOVE 1ST UNT	WVMC-26-{1.5}	3.9	69
PRINGLE RUN @ MOUTH	WVMC-27-{0.0}	3.1	69
PRINGLE RUN BELOW FORKS	WVMC-27-{2.7}	2.8	69
LEFT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-A	2.7	69
RIGHT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-B	3.0	69
STAMPING GROUND RUN	WVMC-28	5.7	69
BIG RUN OF BLACKWATER RIVER	WVMC-60-D-1	3.9	69
TUB RUN	WVMC-60-D-2	4.0	69
FINLEY RUN	WVMC-60-D-2.7	3.2	69
LONG RUN	WVMC-60-D-3-A	3.0	69
SHAYS RUN	WVMC-60-D-4.5	3.7	69
ENGINE RUN NEAR ELK	WVMC-60-D-4.7	3.9	69
RED CREEK NEAR LANEVILLE	WVMC-60-O-{07.0}	5.1	69

Table 23: Sites With Metals Violations

NAME	STREAM CODE	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	ECOID
BULL RUN @ MOUTH	WVMC-11-{00}	12	5.8	1.7	69
1ST UNT OF BULL RUN @ MOUTH	WVMC-11-.1A	4.1	NV	NV	69
MIDDLE RUN @ MOUTH	WVMC-11-A	10	5.9	1.9	69
BULL RUN ABOVE MIDDLE RUN	WVMC-11-{05}	12	6.7	1.7	69
MOUNTAIN RUN @ MOUTH	WVMC-11-B	6.8	NV	NV	69
LICK RUN OF BULL RUN @ MOUTH	WVMC-11-C	16	13	NV	69
BULL RUN BELOW 2ND UNNAMED TRIB	WVMC-11-{07}	11	NV	4.0	69
2ND UNT OF BULL RUN	WVMC-11-C.1	18	8.9	7.5	69
LEFT FORK BULL RUN @ MOUTH	WVMC-11-D-{00}	5.9	3.6	2.2	69
LEFT FORK BULL RUN @ HEADWATERS	WVMC-11-D-{10}	NV	<0.20	NV	69
RIGHT FORK BULL RUN @ MOUTH	WVMC-11-E	18	1.8	5.5	69
SOVERN RUN @ MOUTH	WVMC-12-.5A-{0}	8.6	NV	2.0	69
SOVERN RUN @ HUDSON	WVMC-12-.5A-{3}	15	NV	3.0	69
SOVERN RUN @ HEADWATERS	WVMC-12-.5A-{5}	28	4.9	4.8	69
LAUREL RUN NEAR MOUTH	WVMC-12-A-{02.5}	NV	<0.20	NV	69
LITTLE LAUREL RUN	WVMC-12-A-1	NV	<0.20	NV	69
LAUREL RUN ABOVE PATTERSON RUN	WVMC-12-A-{03}	0.98	NV	NV	69
UNT OF WEBSTER RUN	WVMC-12-B-.5-A	6.6	NV	3.4	69
LITTLE SANDY CREEK NEAR MOUTH	WVMC-12-B-{01}		<0.20	NV	69
1ST UNT OF BEAVER CREEK	WVMC-12-B-1-B	1.3	2.6	1.9	69
LITTLE SANDY ABOVE CHERRY RUN	WVMC-12-B-{12}	0.78		NV	69
BARNES RUN	WVMC-12-B-2		1.8	NV	69
HOG RUN @ MOUTH	WVMC-12-B-3-{00}		1.6	NV	69
PINEY RUN @ MOUTH	WVMC-12-B-4.5		2.9	1.3	69
CHERRY RUN NEAR HEADWATERS	WVMC-12-B-5-{03}		2.8	1.3	69
HAZEL RUN NEAR MOUTH	WVMC-12-C-{01}	0.77	NV	NV	69
HAZEL RUN AT HEADWATERS	WVMC-12-C-{04}	0.82	NV	NV	69
CHEAT RIVER ABOVE BIG SANDY	WVMC-00-{18.3}	0.81	NV	NV	69
CONNER RUN NEAR HEADWATERS	WVMC-13.5-{2.3}	13	8.4	7.3	69
HACKELBARNEY RUN NEAR HEADWATERS	WVMC-14-{02}	2.2	3.1	NV	69
CHEAT RIVER @ ALBRIGHT	WVMC-00-{28.8}	1.1	NV	NV	69
GREENS RUN	WVMC-16-{02}	10	25	1.7	69
SOUTH FORK GREENS RUN @ MOUTH	WVMC-16-A-{0.2}	19	39	3.0	69
MIDDLE FORK OF GREENS RUN	WVMC-16-A-.1	26	72	3.6	69
SOUTH FORK GREENS RUN ABOVE MIDDLE FORK	WVMC-16-A-{0.8}	17	41	2.8	69
SOUTH FORK GREENS RUN ABOVE TREATMENT	WVMC-16-A-{2.5}	29	110	3.8	69
SOUTH FORK GREENS RUN NEAR HEADWATERS	WVMC-16-A-{3.9}	1.3	3.6	NV	69
GREENS RUN @ PLEASANTDALE	WVMC-16-{04}	3.8	NV	1.1	69
MUDDY CREEK @ MOUTH	WVMC-17-{0.0}	14	43	3.1	69
2ND UNT OF MUDDY CREEK	WVMC-17-.6A	NV	<0.20	NV	69
MUDDY CREEK BELOW MARTIN CREEK	WVMC-17-{2.6}	15	48	3.7	69
MARTIN CREEK @ MOUTH	WVMC-17-A-{0.0}	49	170	13	69

TABLE 23: (continued)
Sites With Metals Violations

NAME	STREAM CODE	Al (mg/l)	Fe (mg/l)	Mn (mg/l)	ECOID
FICKEY RUN @ MOUTH	WVMC-17-A-.5-{0}	140	680	18	69
GLADE RUN @ MOUTH	WVMC-17-A-1-{0.0}	31	7.8	13	69
1ST UNT OF GLADE RUN @ MOUTH	WVMC-17-A-1.1	38	7.6	21	69
2ND UNT OF GLADE RUN NEAR MOUTH	WVMC-17-A-1.2	40	6.4	29	69
GLADE RUN NEAR HEADWATERS	WVMC-17-A-1-{3.2}	2.4	3.4	3.6	69
MARTIN CREEK @ HEADWATERS	WVMC-17-A-{2.1}	5.5	3.5	12	69
ROARING CREEK @ HEADWATERS	WVMC-18-{6.0}	NV	<0.20	NV	69
ELSEY RUN	WVMC-20-{0.0}	NV	<0.20	NV	69
JUMP ROCK RUN @ MOUTH	WVMC-17-B	0.88	NV	NV	69
LICK RUN ABOVE LITTLE LICK RUN	WVMC-18-A	0.89	NV	NV	69
ASHPOLE RUN	WVMC-21	30	<0.20	NV	69
BUFFALO RUN ABOVE 2ND UNT	WVMC-22-{2.0}	NV	NV	1.4	69
MORGAN RUN @ MOUTH	WVMC-23-{0.0}	28	53	2.4	69
1ST UNT OF MORGAN RUN	WVMC-23-.2A	2.8	NV	3.4	69
CHURCH RUN @ MOUTH	WVMC-23-A-{0.0}	25	43	1.9	69
LEFT FORK OF UNT OF CHURCH RUN	WVMC-23-A-.1-A	8.4	NV	1.9	69
RIGHT FORK OF UNT OF CHURCH RUN	WVMC-23-A-.1-B	23	14	6.0	69
CHURCH RUN NEAR HEADWATERS	WVMC-23-A-{2.9}	14	4.2	2.4	69
MORGAN RUN BELOW CHURCH RUN	WVMC-23-{1.8}	40	87	3.1	69
MORGAN RUN ABOVE CHURCH RUN	WVMC-23-{2.0}	14	16	2.6	69
HEATHER RUN @ MOUTH	WVMC-24-{0.0}	17	15	1.5	69
1ST UNT OF HEATHER RUN	WVMC-24-A	42	80	3.6	69
HEATHER RUN ABOVE 2ND UNT	WVMC-24-{2.7}	20	25	2.1	69
LICK RUN NEAR MOUTH	WVMC-25-{0.0}	53	130	1.9	69
LICK RUN OF CHEAT RIVER ABOVE 1ST UNT	WVMC-25-{2.3}	20	35	1.5	69
JOES RUN ABOVE 1ST UNT	WVMC-26-{1.5}	4.6	NV	1.5	69
PRINGLE RUN @ MOUTH	WVMC-27-{0.0}	8.9	2.0	2.0	69
PRINGLE RUN BELOW FORKS	WVMC-27-{2.7}	11	5.1	1.8	69
LEFT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-A	16	10	1.7	69
RIGHT FORK OF PRINGLE RUN @ MOUTH	WVMC-27-B	9.9	4.7	1.9	69
CHEAT RIVER @ ROWLESBURG	WVMC-00-{43}		<0.20	NV	67
TUB RUN	WVMC-60-D-2	2.1000	2.2400	NV	69
LONG RUN	WVMC-60-D-3-A	14.5000	10.000	NV	69

NV= No Violation

Table 24: Stream Reach Activities And Disturbances – Agricultural										
Stream Code	**row crops**	**pasture**	**hay**	**orchard**	**poultry**	**cattle access**	**irrigation**	**pipe or drain**	**road**	**bridge or culvert**
WVMC-2										
WVMC-2-A										
WVMC-2.5										
WVMC-2.5-A										
WVMC-2.7										
WVMC-4										
WVMC-7										
WVMC-10										
WVMC-11-{00}		✓								
WVMC-11-.1A										
WVMC-11-A										
WVMC-11-{05}										
WVMC-11-B										
WVMC-11-C										
WVMC-11-{07}										
WVMC-11-C.1										
WVMC-11-D-{00}		✓				✓			✓	✓
WVMC-11-D-{10}										
WVMC-11-E		✓				✓			✓	✓
WVMC-12-{00}										
WVMC-12-.5A-{0}										
WVMC-12-.5A-{3}										
WVMC-12-.5A-{5}										
WVMC-12-.7A		✓								
WVMC-12-A-{02.5}										
WVMC-12-A-1										
WVMC-12-A-1-A										
WVMC-12-A-2										
WVMC-12-A-{03}										
WVMC-12-B-{01}			✓							
WVMC-12-B-.5-{00}										
WVMC-12-B-.5-A										
WVMC-12-B-.5-{02}										
WVMC-12-B-{02}										
WVMC-12-B-1-{01}										
WVMC-12-B-1-B										
WVMC-12-B-1-{04}										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-12-B-2			✔							
WVMC-12-B-{06}										
WVMC-12-B-3-{00}										
WVMC-12-B-3-{02}										
WVMC-12-B-4-{02}										
WVMC-12-B-4-{03}										
WVMC-12-B-4.5									✔	✔
WVMC-12-B-6	✔									
WVMC-12-B-{11}										
WVMC-12-B-5-C		✔							✔	✔
WVMC-12-B-5-{03}		✔							✔	✔
WVMC-12-B-{12}										
WVMC-12-C-{01}										
WVMC-12-C-{04}										
WVMC-12-D										
WVMC-12-{10}										
WVMC-12-E										
WVMC-12-E.1			✔							
WVMC-12-F-{00.0}										
WVMC-12-F-{01.0}										
WVMC-12-{14}										
WVMC-00-{18.3}										
WVMC-13-{01}										
WVMC-13.5-{2.3}		✔								
WVMC-14-{02}		✔			✔		✔			
WVMC-15-{01}										
WVMC-15-A										
WVMC-00-{28.8}										
WVMC-16-{02}										
WVMC-16-A-{0.2}		✔								
WVMC-16-A-.1										
WVMC-16-A-{0.8}										
WVMC-16-A-{2.5}										
WVMC-16-A-{3.9}										
WVMC-16-{04}										
WVMC-17-{0.0}										
WVMC-17-.6A										
WVMC-17-.7										
WVMC-17-{2.6}										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-17-A-{0.0}										
WVMC-17-A-.5-{0}										
WVMC-17-A-.5-{3}										
WVMC-17-A-1-{0.0}										
WVMC-17-A-1.1										
WVMC-17-A-1.2										
WVMC-17-A-1-{3.2}		✔				✔				
WVMC-17-A-{2.1}										
WVMC-17-{3.2}										
WVMC-17-A.1										
WVMC-17-{6.8}			✔						✔	✔
WVMC-17-B										
WVMC-17-C										
WVMC-17-{10.2}										
WVMC-17-{14.4}			✔						✔	✔
WVMC-18-{0.0}										
WVMC-18-.1A										
WVMC-18-A-1		✔								
WVMC-18-A		✔	✔						✔	✔
WVMC-18-{6.0}										
WVMC-19										
WVMC-19-A										
WVMC-20-{0.0}										
WVMC-20-{6.0}										
WVMC-21										
WVMC-22-{1.5}										
WVMC-22-B										
WVMC-22-{2.0}										
WVMC-23-{0.0}									✔	✔
WVMC-23-.2A										
WVMC-23-A-{0.0}										
WVMC-23-A-.1-A										
WVMC-23-A-.1-B										
WVMC-23-A-{2.9}										
WVMC-23-{1.8}										
WVMC-23-{2.0}										
WVMC-24-{0.0}										
WVMC-24-A		✔							✔	✔
WVMC-24-{2.7}										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-25-{0.0}										
WVMC-25-{2.3}									✔	✔
WVMC-26-{0.0}										
WVMC-26-{1.5}		✔				✔			✔	✔
WVMC-27-{0.0}										
WVMC-27-{2.7}									✔	✔
WVMC-27-A			✔						✔	✔
WVMC-27-B	✔								✔	✔
WVMC-28		✔								
WVMC-31-{0.0}										
WVMC-31.5										
WVMC-31.7										
WVMC-32										
WVMC-32-B										
WVMC-32-C-1										
WVMC-32-D		✔								
WVMC-32-E		✔								
WVMC-32-F		✔				✔				
WVMC-32-G										
WVMC-00-{43}										
WVMC-33-{0.0}										
WVMC-33-A										
WVMC-33-A.5										
WVMC-33-B										
WVMC-33-B.5										
WVMC-33-C			✔							
WVMC-33-D			✔					✔		
WVMC-33-E			✔							
WVMC-33-F			✔						✔	
WVMC-34-{0.0}										
WVMC-35										
WVMC-35.5-{0.0}		✔	✔							
WVMC-36-{0.0}										
WVMC-36-A		✔				✔				✔
WVMC-39			✔							
WVMC-40			✔							
WVMC-42			✔							
WVMC-43-{0.0}										
WVMC-43-A										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-43-B			✔							
WVMC-44-{0.0}										
WVMC-46	✔	✔		✔	✔	✔				
WVMC-46-A										
WVMC-46-B										
WVMC-47										
WVMC-48										
WVMC-49										
WVMC-50										
WVMC-51	✔	✔								
WVMC-51-A										
WVMC-51-B										
WVMC-51-B-1										
WVMC-51-B-2										
WVMC-51-B-3		✔				✔				
WVMC-51-B-4										
WVMC-51-B-5										
WVMC-00-{71.0}	✔									
WVMC-52										
WVMC-52-.7A										
WVMC-52-A										
WVMC-53										
WVMC-54			✔						✔	✔
WVMC-54-A		✔				✔				
WVMC-54-C										
WVMC-54-D										
WVMC-54-F										
WVMC-54-H										
WVMC-54-H-1										
WVMC-54-I										
WVMC-54-I-1										
WVMC-54-J										
WVMC-54-K										
WVMC-55	✔	✔								
WVMC-56										
WVMC-57										
WVMC-59-{00.0}										
WVMCS-.5										
WVMCS-2										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMCS-3										
WVMCS-3-A										
WVMCS-5										
WVMCS-6										
WVMCS-6-B										
WVMCS-6-C										
WVMCS-6-E										
WVMCS-7										
WVMCS-7.5										
WVMCS-8										
WVMCS-12										
WVMCS-13										
WVMCS-14										
WVMCS-15										
WVMCS-16			✔							
WVMCS-18										
WVMC-59-{20.4}										
WVMCS-22										
WVMCS-25										
WVMCS-28										
WVMCS-33										
WVMCS-46										
WVMCS-47										
WVMCS-53										
WVMCS-54										
WVMC-60-A										
WVMC-60-C										
WVMC-60-C-3										
WVMC-60-C-4										
WVMC-60-C-5										
WVMC-60-D-1										
WVMC-60-D-2										
WVMC-60-D-2.7										
WVMC-60-D-3-A										
WVMC-60-D-3-B										
WVMC-60-D-3-C										
WVMC-60-D-3-E										
WVMC-60-D-4										
WVMC-60-D-4.5										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-60-D-4.7										
WVMC-60-D-9		✔	✔							
WVMC-60-D-11										
WVMC-60-D-12		✔				✔				
WVMC-60-D-14										
WVMC-60-D-{25.0}										
WVMC-60-E										
WVMC-60-F										
WVMC-60-G										
WVMC-60-H.5										
WVMC-60-I										
WVMC-60-J										
WVMC-60-K										
WVMC-60-K-2-A										
WVMC-60-K-5										
WVMC-60-K-8										
WVMC-60-K-16			✔							
WVMC-60-K-17			✔							
WVMC-60-K-17-A										
WVMC-60-L										
WVMC-60-N-{01}	✔	✔	✔			✔				
WVMC-60-N-4										
WVMC-60-N-8										
WVMC-60-N-8.5										
WVMC-60-N-{20}										
WVMC-60-{11.6}										
WVMC-60-O-{01.0}										
WVMC-60-O-1		✔				✔				
WVMC-60-O-{07.0}										
WVMC-60-P		✔								
WVMC-60-Q										
WVMC-60-R			✔							
WVMC-60-S										
WVMC-60-{25.1}		✔								
WVMC-60-T-{02.5}										
WVMC-60-T-1										
WVMC-60-T-2										
WVMC-60-T-3										
WVMC-60-T-8										

Table 24: (Continued)
Stream Reach Activities And Disturbances – Agricultural

Stream Code	row crops	pasture	hay	orchard	poultry	cattle access	irrigation	pipe or drain	road	bridge or culvert
WVMC-60-T-9										
WVMC-60-T-10										
WVMC-60-T-11										
WVMC-60-T-13										
WVMC-60-T-{13.0}		✔				✔			✔	✔

Table 25: Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-2																
WVMC-2-A																
WVMC-2.5																
WVMC-2.5-A																
WVMC-2.7																
WVMC-4																
WVMC-7																
WVMC-10																
WVMC-11-{00}																
WVMC-11-.1A																
WVMC-11-A																
WVMC-11-{05}																
WVMC-11-B																
WVMC-11-C																
WVMC-11-{07}																
WVMC-11-C.1																
WVMC-11-D-{00}																
WVMC-11-D-{10}																
WVMC-11-E																
WVMC-12-{00}																
WVMC-12-.5A-{0}																
WVMC-12-.5A-{3}																
WVMC-12-.5A-{5}																
WVMC-12-.7A																
WVMC-12-A-{02.5}													✔			
WVMC-12-A-1		✔														
WVMC-12-A-1-A																
WVMC-12-A-2																
WVMC-12-A-{03}		✔														
WVMC-12-B-{01}		✔														
WVMC-12-B-.5-{00}		✔														
WVMC-12-B-.5-A																
WVMC-12-B-.5-{02}		✔														
WVMC-12-B-{02}		✔														
WVMC-12-B-1-{01}															✔	✔
WVMC-12-B-1-B													✔		✔	
WVMC-12-B-1-{04}															✔	✔

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-12-B-2																
WVMC-12-B-{06}																✔
WVMC-12-B-3-{00}															✔	✔
WVMC-12-B-3-{02}															✔	✔
WVMC-12-B-4-{02}															✔	✔
WVMC-12-B-4-{03}															✔	✔
WVMC-12-B-4.5																
WVMC-12-B-6																
WVMC-12-B-{11}															✔	✔
WVMC-12-B-5-C																
WVMC-12-B-5-{03}																
WVMC-12-B-{12}		✔														
WVMC-12-C-{01}																
WVMC-12-C-{04}		✔														
WVMC-12-D																
WVMC-12-{10}																
WVMC-12-E															✔	
WVMC-12-E.1															✔	
WVMC-12-F-{00.0}																✔
WVMC-12-F-{01.0}																
WVMC-12-{14}															✔	
WVMC-00-{18.3}																
WVMC-13-{01}																
WVMC-13.5-{2.3}																
WVMC-14-{02}									✔							
WVMC-15-{01}																
WVMC-15-A																
WVMC-00-{28.8}																
WVMC-16-{02}		✔	✔													
WVMC-16-A-{0.2}		✔	✔													
WVMC-16-A-.1		✔	✔													
WVMC-16-A-{0.8}		✔			✔											
WVMC-16-A-{2.5}		✔						✔								
WVMC-16-A-{3.9}								✔							✔	✔
WVMC-16-{04}																
WVMC-17-{0.0}		✔	✔	✔	✔			✔								
WVMC-17-.6A																
WVMC-17-.7																
WVMC-17-{2.6}																
WVMC-17-A-{0.0}		✔	✔	✔												

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-17-A-.5-{0}		✔														
WVMC-17-A-.5-{3}																
WVMC-17-A-1-{0.0}		✔													✔	✔
WVMC-17-A-1.1		✔													✔	✔
WVMC-17-A-1.2		✔													✔	✔
WVMC-17-A-1-{3.2}		✔														
WVMC-17-A-{2.1}		✔													✔	✔
WVMC-17-{3.2}		✔														
WVMC-17-A.1		✔														
WVMC-17-{6.8}		✔														
WVMC-17-B															✔	✔
WVMC-17-C																
WVMC-17-{10.2}															✔	✔
WVMC-17-{14.4}																
WVMC-18-{0.0}																
WVMC-18-.1A																
WVMC-18-A-1																
WVMC-18-A																
WVMC-18-{6.0}																
WVMC-19							✔								✔	✔
WVMC-19-A																
WVMC-20-{0.0}																
WVMC-20-{6.0}																
WVMC-21																
WVMC-22-{1.5}																
WVMC-22-B																
WVMC-22-{2.0}																
WVMC-23-{0.0}		✔	✔	✔				✔								
WVMC-23-.2A		✔											✔		✔	✔
WVMC-23-A-{0.0}		✔	✔												✔	✔
WVMC-23-A-.1-A		✔						✔							✔	✔
WVMC-23-A-.1-B		✔													✔	✔
WVMC-23-A-{2.9}																
WVMC-23-{1.8}		✔	✔	✔										✔	✔	✔
WVMC-23-{2.0}		✔	✔	✔												✔
WVMC-24-{0.0}		✔	✔					✔							✔	✔
WVMC-24-A		✔	✔	✔											✔	✔
WVMC-24-{2.7}		✔						✔							✔	✔
WVMC-25-{0.0}		✔	✔	✔				✔							✔	✔
WVMC-25-{2.3}		✔	✔	✔				✔							✔	✔

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-26-{0.0}																
WVMC-26-{1.5}																
WVMC-27-{0.0}		✔	✔	✔				✔							✔	✔
WVMC-27-{2.7}								✔							✔	✔
WVMC-27-A		✔						✔							✔	✔
WVMC-27-B		✔	✔	✔				✔							✔	✔
WVMC-28																
WVMC-31-{0.0}					✔											
WVMC-31.5																
WVMC-31.7																
WVMC-32	✔															
WVMC-32-B																
WVMC-32-C-1																
WVMC-32-D																
WVMC-32-E																
WVMC-32-F																
WVMC-32-G																
WVMC-00-{43}								✔	✔						✔	✔
WVMC-33-{0.0}																
WVMC-33-A																
WVMC-33-A.5																
WVMC-33-B																
WVMC-33-B.5																
WVMC-33-C																
WVMC-33-D																
WVMC-33-E																
WVMC-33-F																
WVMC-34-{0.0}																
WVMC-35																
WVMC-35.5-{0.0}																
WVMC-36-{0.0}																
WVMC-36-A																
WVMC-39																
WVMC-40																
WVMC-42																
WVMC-43-{0.0}																
WVMC-43-A																
WVMC-43-B																
WVMC-44-{0.0}																
WVMC-46																

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-46-A																
WVMC-46-B																
WVMC-47																
WVMC-48																
WVMC-49																
WVMC-50																
WVMC-51																
WVMC-51-A																
WVMC-51-B																
WVMC-51-B-1																
WVMC-51-B-2																
WVMC-51-B-3																
WVMC-51-B-4																
WVMC-51-B-5																
WVMC-00-{71.0}																
WVMC-52																
WVMC-52-.7A																
WVMC-52-A																
WVMC-53																
WVMC-54																
WVMC-54-A																
WVMC-54-C																
WVMC-54-D																
WVMC-54-F																
WVMC-54-H						✓										
WVMC-54-H-1																
WVMC-54-I															✓	✓
WVMC-54-I-1								✓							✓	
WVMC-54-J																
WVMC-54-K																
WVMC-55																
WVMC-56																
WVMC-57																
WVMC-59-{00.0}																
WVMCS-.5											✓					
WVMCS-2									✓							
WVMCS-3																
WVMCS-3-A																
WVMCS-5																
WVMCS-6																

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMCS-6-B																
WVMCS-6-C																
WVMCS-6-E																
WVMCS-7																
WVMCS-7.5																
WVMCS-8																
WVMCS-12																
WVMCS-13																
WVMCS-14																
WVMCS-15																
WVMCS-16																
WVMCS-18																
WVMC-59-{20.4}																
WVMCS-22												✓				
WVMCS-25																
WVMCS-28																
WVMCS-33																
WVMCS-46																
WVMCS-47																
WVMCS-53																
WVMCS-54																
WVMC-60-A																
WVMC-60-C																
WVMC-60-C-3																
WVMC-60-C-4																
WVMC-60-C-5																
WVMC-60-D-1																
WVMC-60-D-2		✓													✓	✓
WVMC-60-D-2.7																
WVMC-60-D-3-A		✓													✓	✓
WVMC-60-D-3-B		✓													✓	✓
WVMC-60-D-3-C		✓													✓	✓
WVMC-60-D-3-E																
WVMC-60-D-4		✓													✓	✓
WVMC-60-D-4.5																
WVMC-60-D-4.7																
WVMC-60-D-9																
WVMC-60-D-11																
WVMC-60-D-12																
WVMC-60-D-14																

Table 25: (Continued)
Stream Reach Activities And Disturbances - Industrial

STREAM CODE	PNT	SM	DM	CP	QU	OGW	PLIN	LOG	SAW	LF	WW	PUB	PD	PLOT	ROAD	BC
WVMC-60-D-{25.0}																
WVMC-60-E																
WVMC-60-F																
WVMC-60-G																
WVMC-60-H.5																
WVMC-60-I																
WVMC-60-J																
WVMC-60-K																
WVMC-60-K-2-A																
WVMC-60-K-5																
WVMC-60-K-8															✔	
WVMC-60-K-16																
WVMC-60-K-17																
WVMC-60-K-17-A																
WVMC-60-L																
WVMC-60-N-{01}																
WVMC-60-N-4																
WVMC-60-N-8																
WVMC-60-N-8.5																
WVMC-60-N-{20}																
WVMC-60-{11.6}																
WVMC-60-O-{01.0}																
WVMC-60-O-1																
WVMC-60-O-{07.0}																
WVMC-60-P																
WVMC-60-Q																
WVMC-60-R																
WVMC-60-S																
WVMC-60-{25.1}																
WVMC-60-T-{02.5}																
WVMC-60-T-1																
WVMC-60-T-2																
WVMC-60-T-3																
WVMC-60-T-8																
WVMC-60-T-9																
WVMC-60-T-10																
WVMC-60-T-11																
WVMC-60-T-13								✔								
WVMC-60-T-{13.0}																

PNT = INDUSTRIAL PLANT
DM = DEEP MINE
QU = QUARRY
PLIN = POWER LINE
SAW = SAWMILL
WW = WASTEWATER TREATMENT
PD = PIPES OR DRAINS
ROAD = ROAD
SM = SURFACE MINE
CP = COAL PREP
OGW = OIL OR GAS WELL
LOG = LOGGING
LF = SANITARY LANDFILL
PUB = PUBLIC WATER TREATMENT
PLOT = PARKING LOT
BC = BRIDGE OR CULVERT

Table 26: Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-2	✔	✔				✔	✔							✔			
WVMC-2-A														✔		✔	✔
WVMC-2.5	✔	✔			✔	✔	✔										
WVMC-2.5-A	✔	✔			✔	✔	✔										
WVMC-2.7	✔	✔				✔	✔		✔								
WVMC-4	✔	✔		✔	✔	✔	✔										
WVMC-7								✔	✔	✔				✔			
WVMC-10						✔	✔										
WVMC-11-{00}	✔	✔				✔	✔										
WVMC-11-.1A	✔				✔	✔											
WVMC-11-A	✔	✔				✔											
WVMC-11-{05}	✔	✔				✔	✔										
WVMC-11-B		✔				✔			✔								
WVMC-11-C	✔	✔				✔	✔		✔								
WVMC-11-{07}	✔	✔				✔											
WVMC-11-C.1						✔	✔										
WVMC-11-D-{00}	✔	✔															
WVMC-11-D-{10}						✔	✔										
WVMC-11-E																	
WVMC-12-{00}						✔		✔	✔		✔	✔		✔	✔		
WVMC-12-.5A-{0}	✔	✔				✔	✔										
WVMC-12-.5A-{3}	✔	✔				✔	✔										
WVMC-12-.5A-{5}						✔	✔										
WVMC-12-.7A	✔	✔		✔		✔	✔										
WVMC-12-A-{02.5}						✔	✔					✔		✔			
WVMC-12-A-1						✔	✔										
WVMC-12-A-1-A						✔	✔										
WVMC-12-A-2	✔	✔	✔			✔	✔	✔			✔	✔					
WVMC-12-A-{03}	✔																
WVMC-12-B-{01}																	
WVMC-12-B-.5-{00}	✔	✔				✔	✔										
WVMC-12-B-.5-A	✔	✔				✔	✔										
WVMC-12-B-.5-{02}	✔	✔				✔	✔										
WVMC-12-B-{02}	✔	✔				✔	✔					✔					
WVMC-12-B-1-{01}																	
WVMC-12-B-1-B																	
WVMC-12-B-1-{04}																	

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-12-B-2	✔	✔			✔	✔	✔										
WVMC-12-B-{06}																	
WVMC-12-B-3-{00}																	
WVMC-12-B-3-{02}																	
WVMC-12-B-4-{02}																	
WVMC-12-B-4-{03}																	
WVMC-12-B-4.5																	
WVMC-12-B-6	✔	✔				✔	✔										
WVMC-12-B-{11}																	
WVMC-12-B-5-C																	
WVMC-12-B-5-{03}																	
WVMC-12-B-{12}						✔	✔										
WVMC-12-C-{01}						✔	✔										
WVMC-12-C-{04}																✔	✔
WVMC-12-D	✔	✔				✔	✔										
WVMC-12-{10}												✔					
WVMC-12-E																	
WVMC-12-E.1	✔	✔															
WVMC-12-F-{00.0}	✔	✔															
WVMC-12-F-{01.0}					✔	✔	✔										
WVMC-12-{14}	✔	✔															
WVMC-00-{18.3}						✔	✔	✔	✔		✔	✔		✔	✔	✔	
WVMC-13-{01}						✔	✔										
WVMC-13.5-{2.3}					✔	✔	✔										
WVMC-14-{02}	✔	✔			✔	✔	✔										
WVMC-15-{01}						✔	✔										
WVMC-15-A	✔	✔				✔	✔										
WVMC-00-{28.8}																	
WVMC-16-{02}	✔	✔				✔	✔										
WVMC-16-A-{0.2}																	
WVMC-16-A-.1	✔	✔			✔	✔	✔										
WVMC-16-A-{0.8}	✔	✔				✔	✔										
WVMC-16-A-{2.5}						✔	✔										
WVMC-16-A-{3.9}															✔	✔	✔
WVMC-16-{04}	✔	✔				✔	✔										
WVMC-17-{0.0}								✔	✔	✔							
WVMC-17-.6A						✔	✔										
WVMC-17-.7						✔	✔										

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-17-{2.6}							✔										
WVMC-17-A-{0.0}						✔	✔										
WVMC-17-A-.5-{0}																	
WVMC-17-A-.5-{3}	✔	✔				✔	✔										
WVMC-17-A-1-{0.0}																	
WVMC-17-A-1.1																	
WVMC-17-A-1.2																	
WVMC-17-A-1-{3.2}	✔	✔				✔	✔										
WVMC-17-A-{2.1}																	
WVMC-17-{3.2}						✔	✔										
WVMC-17-A.1	✔	✔				✔	✔										
WVMC-17-{6.8}																	
WVMC-17-B																	
WVMC-17-C														✔			
WVMC-17-{10.2}														✔			
WVMC-17-{14.4}	✔	✔				✔	✔								✔	✔	✔
WVMC-18-{0.0}	✔	✔					✔		✔								
WVMC-18-.1A	✔	✔															
WVMC-18-A-1	✔					✔	✔										
WVMC-18-A	✔	✔				✔	✔										
WVMC-18-{6.0}						✔	✔										
WVMC-19																	
WVMC-19-A						✔	✔										
WVMC-20-{0.0}	✔	✔				✔	✔										
WVMC-20-{6.0}	✔	✔				✔	✔										
WVMC-21																	
WVMC-22-{1.5}																	
WVMC-22-B	✔	✔				✔	✔										
WVMC-22-{2.0}	✔	✔				✔	✔										
WVMC-23-{0.0}						✔	✔										✔
WVMC-23-.2A						✔			✔								
WVMC-23-A-{0.0}						✔	✔										
WVMC-23-A-.1-A	✔	✔				✔	✔										
WVMC-23-A-.1-B	✔	✔				✔											
WVMC-23-A-{2.9}	✔	✔				✔	✔										
WVMC-23-{1.8}						✔	✔		✔								
WVMC-23-{2.0}							✔										
WVMC-24-{0.0}	✔	✔				✔	✔										

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-24-A	✔				✔	✔	✔									✔	✔
WVMC-24-{2.7}																✔	✔
WVMC-25-{0.0}						✔	✔				✔						
WVMC-25-{2.3}	✔	✔				✔	✔									✔	✔
WVMC-26-{0.0}																	
WVMC-26-{1.5}	✔	✔				✔	✔										
WVMC-27-{0.0}						✔	✔				✔						
WVMC-27-{2.7}	✔	✔				✔	✔							✔		✔	✔
WVMC-27-A	✔	✔			✔	✔	✔									✔	✔
WVMC-27-B	✔	✔				✔	✔									✔	✔
WVMC-28					✔	✔	✔										
WVMC-31-{0.0}									✔							✔	
WVMC-31.5																	
WVMC-31.7	✔	✔				✔	✔										
WVMC-32	✔	✔		✔		✔	✔										
WVMC-32-B	✔	✔				✔									✔		
WVMC-32-C-1	✔	✔				✔	✔										
WVMC-32-D	✔	✔				✔	✔										
WVMC-32-E	✔	✔				✔		✔									
WVMC-32-F						✔	✔										
WVMC-32-G				✔		✔	✔										
WVMC-00-{43}							✔					✔		✔	✔	✔	✔
WVMC-33-{0.0}	✔	✔				✔	✔										
WVMC-33-A	✔	✔				✔	✔										
WVMC-33-A.5						✔											
WVMC-33-B																✔	
WVMC-33-B.5						✔											
WVMC-33-C		✔				✔	✔										
WVMC-33-D						✔	✔										
WVMC-33-E	✔	✔				✔											
WVMC-33-F																	
WVMC-34-{0.0}						✔	✔										
WVMC-35	✔					✔	✔										
WVMC-35.5-{0.0}																	
WVMC-36-{0.0}	✔																
WVMC-36-A		✔															
WVMC-39	✔	✔				✔	✔										
WVMC-40	✔	✔				✔	✔										

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-42	✔	✔				✔		✔	✔							✔	
WVMC-43-{0.0}	✔	✔				✔	✔										
WVMC-43-A																✔	
WVMC-43-B	✔	✔				✔	✔										
WVMC-44-{0.0}																	
WVMC-46	✔	✔				✔	✔										
WVMC-46-A	✔	✔				✔											
WVMC-46-B						✔											
WVMC-47								✔				✔				✔	✔
WVMC-48																	
WVMC-49						✔	✔										
WVMC-50	✔	✔			✔	✔	✔										
WVMC-51	✔	✔				✔											
WVMC-51-A					✔	✔											
WVMC-51-B								✔						✔	✔	✔	
WVMC-51-B-1																	
WVMC-51-B-2						✔											
WVMC-51-B-3	✔	✔				✔	✔										
WVMC-51-B-4						✔	✔							✔			
WVMC-51-B-5	✔	✔				✔	✔										
WVMC-00-{71.0}	✔	✔				✔	✔	✔	✔	✔	✔	✔					
WVMC-52	✔	✔					✔										
WVMC-52-.7A																	
WVMC-52-A															✔		
WVMC-53								✔								✔	✔
WVMC-54																	
WVMC-54-A																	
WVMC-54-C														✔		✔	✔
WVMC-54-D								✔								✔	✔
WVMC-54-F	✔	✔				✔	✔										
WVMC-54-H						✔											
WVMC-54-H-1	✔	✔				✔											
WVMC-54-I																	
WVMC-54-I-1																	
WVMC-54-J	✔	✔				✔	✔										
WVMC-54-K	✔	✔				✔	✔										
WVMC-55	✔	✔				✔	✔								✔		
WVMC-56	✔	✔				✔	✔								✔		

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-57	✔	✔			✔	✔	✔										
WVMC-59-{00.0}	✔	✔			✔	✔											
WVMCS-.5						✔											
WVMCS-2	✔	✔			✔	✔	✔										
WVMCS-3	✔	✔		✔		✔	✔										
WVMCS-3-A	✔	✔					✔										
WVMCS-5	✔	✔				✔	✔										
WVMCS-6	✔	✔				✔	✔										
WVMCS-6-B	✔	✔				✔	✔										
WVMCS-6-C	✔	✔				✔	✔										
WVMCS-6-E																	
WVMCS-7																	
WVMCS-7.5																	
WVMCS-8					✔	✔	✔										
WVMCS-12	✔	✔															
WVMCS-13																✔	✔
WVMCS-14																	
WVMCS-15	✔	✔				✔	✔										
WVMCS-16	✔	✔				✔											
WVMCS-18																	
WVMC-59-{20.4}								✔	✔			✔		✔		✔	
WVMCS-22								✔	✔			✔	✔			✔	✔
WVMCS-25																	
WVMCS-28																	
WVMCS-33	✔	✔				✔	✔										
WVMCS-46								✔				✔				✔	✔
WVMCS-47												✔				✔	✔
WVMCS-53									✔							✔	✔
WVMCS-54																	
WVMC-60-A						✔	✔										
WVMC-60-C						✔	✔										
WVMC-60-C-3						✔	✔										
WVMC-60-C-4																	
WVMC-60-C-5																	
WVMC-60-D-1																✔	
WVMC-60-D-2																	
WVMC-60-D-2.7																	
WVMC-60-D-3-A																	

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-60-D-3-B																	
WVMC-60-D-3-C																	
WVMC-60-D-3-E		✔				✔	✔										
WVMC-60-D-4																	
WVMC-60-D-4.5								✔							✔	✔	✔
WVMC-60-D-4.7																✔	✔
WVMC-60-D-9								✔					✔	✔			
WVMC-60-D-11	✔	✔				✔	✔	✔									
WVMC-60-D-12	✔	✔				✔	✔										
WVMC-60-D-14		✔				✔	✔	✔									
WVMC-60-D-{25.0}						✔	✔					✔					
WVMC-60-E						✔	✔										
WVMC-60-F														✔			
WVMC-60-G	✔	✔				✔	✔										
WVMC-60-H.5																	
WVMC-60-I						✔	✔	✔									
WVMC-60-J							✔										
WVMC-60-K																	
WVMC-60-K-2-A																✔	✔
WVMC-60-K-5																	
WVMC-60-K-8																	
WVMC-60-K-16	✔				✔												
WVMC-60-K-17																	
WVMC-60-K-17-A																✔	
WVMC-60-L						✔											
WVMC-60-N-{01}	✔	✔				✔											
WVMC-60-N-4								✔									
WVMC-60-N-8								✔	✔			✔		✔		✔	
WVMC-60-N-8.5														✔			
WVMC-60-N-{20}								✔	✔			✔		✔		✔	
WVMC-60-{11.6}						✔											
WVMC-60-O-{01.0}	✔	✔				✔	✔										
WVMC-60-O-1	✔																
WVMC-60-O-{07.0}	✔					✔	✔										
WVMC-60-P	✔	✔		✔		✔	✔										
WVMC-60-Q	✔	✔			✔	✔	✔										
WVMC-60-R																	
WVMC-60-S	✔	✔		✔	✔	✔	✔										

Table 26: (Continued)
Stream Reach Activities And Disturbances - Residential And Recreational

STREAM CODE	res	lwn	dock res	con	pd1	res road	bc1	prk	pl	dock rec	swm	fsh	pd2	tr1	tr2	rec road	bc2
WVMC-60-{25.1}				✔		✔	✔										
WVMC-60-T-{02.5}	✔	✔			✔	✔	✔										
WVMC-60-T-1														✔			
WVMC-60-T-2														✔			
WVMC-60-T-3														✔			
WVMC-60-T-8												✔					
WVMC-60-T-9														✔		✔	✔
WVMC-60-T-10								✔				✔		✔			
WVMC-60-T-11								✔				✔				✔	✔
WVMC-60-T-13																	
WVMC-60-T-{13.0}							✔					✔					

res = residence
dock-rec = public boat dock
swm = area used for swimming
fsh = area used for fishing
pd2 = pipe or drain from recreational activity
tr1 = foot trail
tr2 = trail primarily for ATVs, horses, or bicycles
rec roads = roads serving recreational needs
bc2 = bridge or culvert serving recreational needs

lwn = lawn
dock-res = residential boat dock
con = residential construction
pd1 = pipe or drain from residence
resroad = road serving residential needs
bc1 = bridge or culvert serving residential needs
parks = park or camping area
pl = parking lot serving recreational use

Table 27: Stream Reach Activities And Disturbances - Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-2							SLIGHT	NONE
WVMC-2-A						✔	SLIGHT	NONE
WVMC-2.5		✔		✔		✔	MODERATE	NONE
WVMC-2.5-A		✔		✔			NONE	NONE
WVMC-2.7							NONE	NONE
WVMC-4		✔					HIGH	OBVIOUS
WVMC-7							NONE	NONE
WVMC-10							SLIGHT	NONE
WVMC-11-{00}				✔			NONE	POTENTIAL
WVMC-11-.1A							NONE	POTENTIAL
WVMC-11-A							NONE	POTENTIAL
WVMC-11-{05}							NONE	POTENTIAL
WVMC-11-B							NONE	NONE
WVMC-11-C							NONE	POTENTIAL
WVMC-11-{07}							NONE	NONE
WVMC-11-C.1							NONE	NONE
WVMC-11-D-{00}							HIGH	OBVIOUS
WVMC-11-D-{10}							HIGH	POTENTIAL
WVMC-11-E							HIGH	OBVIOUS
WVMC-12-{00}							NONE	NONE
WVMC-12-.5A-{0}							SLIGHT	NONE
WVMC-12-.5A-{3}							MODERATE	POTENTIAL
WVMC-12-.5A-{5}							NONE	NONE
WVMC-12-.7A							HIGH	POTENTIAL
WVMC-12-A-{02.5}							SLIGHT	POTENTIAL
WVMC-12-A-1							SLIGHT	POTENTIAL
WVMC-12-A-1-A							NONE	NONE
WVMC-12-A-2						✔	NONE	NONE
WVMC-12-A-{03}							SLIGHT	NONE
WVMC-12-B-{01}							SLIGHT	POTENTIAL
WVMC-12-B-.5-{00}							SLIGHT	POTENTIAL
WVMC-12-B-.5-A							MODERATE	OBVIOUS
WVMC-12-B-.5-{02}							SLIGHT	POTENTIAL
WVMC-12-B-{02}							SLIGHT	POTENTIAL
WVMC-12-B-1-{01}							SLIGHT	OBVIOUS
WVMC-12-B-1-B							SLIGHT	OBVIOUS
WVMC-12-B-1-{04}								OBVIOUS
WVMC-12-B-2							MODERATE	OBVIOUS
WVMC-12-B-{06}							MODERATE	POTENTIAL
WVMC-12-B-3-{00}							SLIGHT	OBVIOUS
WVMC-12-B-3-{02}							MODERATE	OBVIOUS
WVMC-12-B-4-{02}				✔			SLIGHT	OBVIOUS
WVMC-12-B-4-{03}							NONE	OBVIOUS

Table 27: (Continued)
Stream Reach Activities And Disturbances -
Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-12-B-4.5							SLIGHT	POTENTIAL
WVMC-12-B-6		✔		✔			SLIGHT	OBVIOUS
WVMC-12-B-{11}		✔		✔			MODERATE	OBVIOUS
WVMC-12-B-5-C							MODERATE	OBVIOUS
WVMC-12-B-5-{03}							SLIGHT	OBVIOUS
WVMC-12-B-{12}							SLIGHT	POTENTIAL
WVMC-12-C-{01}							SLIGHT	POTENTIAL
WVMC-12-C-{04}								
WVMC-12-D							SLIGHT	POTENTIAL
WVMC-12-{10}		✔				✔	SLIGHT	OBVIOUS
WVMC-12-E							MODERATE	OBVIOUS
WVMC-12-E.1							SLIGHT	OBVIOUS
WVMC-12-F-{00.0}							SLIGHT	OBVIOUS
WVMC-12-F-{01.0}							MODERATE	NONE
WVMC-12-{14}								OBVIOUS
WVMC-00-{18.3}							SLIGHT	NONE
WVMC-13-{01}							MODERATE	NONE
WVMC-13.5-{2.3}							HIGH	OBVIOUS
WVMC-14-{02}							HIGH	OBVIOUS
WVMC-15-{01}							SLIGHT	NONE
WVMC-15-A							HIGH	NONE
WVMC-00-{28.8}								
WVMC-16-{02}							SLIGHT	OBVIOUS
WVMC-16-A-{0.2}							SLIGHT	OBVIOUS
WVMC-16-A-.1							SLIGHT	OBVIOUS
WVMC-16-A-{0.8}	✔						HIGH	OBVIOUS
WVMC-16-A-{2.5}	✔						MODERATE	OBVIOUS
WVMC-16-A-{3.9}							HIGH	OBVIOUS
WVMC-16-{04}				✔			MODERATE	POTENTIAL
WVMC-17-{0.0}							NONE	OBVIOUS
WVMC-17-.6A							SLIGHT	POTENTIAL
WVMC-17-.7								POTENTIAL
WVMC-17-{2.6}							SLIGHT	POTENTIAL
WVMC-17-A-{0.0}							SLIGHT	POTENTIAL
WVMC-17-A-.5-{0}							SLIGHT	POTENTIAL
WVMC-17-A-.5-{3}							MODERATE	POTENTIAL
WVMC-17-A-1-{0.0}							SLIGHT	POTENTIAL
WVMC-17-A-1.1							SLIGHT	NONE
WVMC-17-A-1.2							MODERATE	POTENTIAL
WVMC-17-A-1-{3.2}							MODERATE	OBVIOUS
WVMC-17-A-{2.1}							MODERATE	OBVIOUS
WVMC-17-{3.2}							SLIGHT	POTENTIAL
WVMC-17-A.1							SLIGHT	POTENTIAL
WVMC-17-{6.8}							NONE	POTENTIAL
WVMC-17-B							SLIGHT	OBVIOUS
WVMC-17-C							HIGH	NONE
WVMC-17-{10.2}							SLIGHT	OBVIOUS
WVMC-17-{14.4}				✔			MODERATE	POTENTIAL

Table 27: (Continued)
Stream Reach Activities And Disturbances -
Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-18-{0.0}							NONE	NONE
WVMC-18-.1A							NONE	NONE
WVMC-18-A-1							NONE	NONE
WVMC-18-A		✓		✓			HIGH	OBVIOUS
WVMC-18-{6.0}							NONE	NONE
WVMC-19							HIGH	OBVIOUS
WVMC-19-A							SLIGHT	POTENTIAL
WVMC-20-{0.0}							NONE	POTENTIAL
WVMC-20-{6.0}							SLIGHT	NONE
WVMC-21							MODERATE	POTENTIAL
WVMC-22-{1.5}							MODERATE	POTENTIAL
WVMC-22-B							SLIGHT	POTENTIAL
WVMC-22-{2.0}							SLIGHT	OBVIOUS
WVMC-23-{0.0}				✓			MODERATE	OBVIOUS
WVMC-23-.2A		✓		✓			MODERATE	OBVIOUS
WVMC-23-A-{0.0}		✓		✓				OBVIOUS
WVMC-23-A-.1-A							MODERATE	OBVIOUS
WVMC-23-A-.1-B							MODERATE	POTENTIAL
WVMC-23-A-{2.9}				✓			MODERATE	POTENTIAL
WVMC-23-{1.8}				✓			MODERATE	OBVIOUS
WVMC-23-{2.0}				✓			MODERATE	OBVIOUS
WVMC-24-{0.0}				✓			MODERATE	POTENTIAL
WVMC-24-A				✓			MODERATE	POTENTIAL
WVMC-24-{2.7}							MODERATE	OBVIOUS
WVMC-25-{0.0}				✓				POTENTIAL
WVMC-25-{2.3}				✓			MODERATE	POTENTIAL
WVMC-26-{0.0}							MODERATE	POTENTIAL
WVMC-26-{1.5}							MODERATE	OBVIOUS
WVMC-27-{0.0}				✓			SLIGHT	POTENTIAL
WVMC-27-{2.7}		✓		✓			MODERATE	POTENTIAL
WVMC-27-A				✓			MODERATE	POTENTIAL
WVMC-27-B				✓			MODERATE	POTENTIAL
WVMC-28							SLIGHT	NONE
WVMC-31-{0.0}		✓		✓	✓		MODERATE	POTENTIAL
WVMC-31.5								
WVMC-31.7		✓					SLIGHT	OBVIOUS
WVMC-32		✓					SLIGHT	POTENTIAL
WVMC-32-B							NONE	NONE
WVMC-32-C-1							SLIGHT	NONE
WVMC-32-D							SLIGHT	NONE
WVMC-32-E				✓			SLIGHT	POTENTIAL
WVMC-32-F							MODERATE	OBVIOUS
WVMC-32-G							SLIGHT	NONE
WVMC-00-{43}							MODERATE	POTENTIAL
WVMC-33-{0.0}		✓	✓	✓	✓		SLIGHT	POTENTIAL
WVMC-33-A							MODERATE	OBVIOUS

Table 27: (Continued)
Stream Reach Activities And Disturbances -
Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-33-A.5							SLIGHT	OBVIOUS
WVMC-33-B							MODERATE	POTENTIAL
WVMC-33-B.5							MODERATE	POTENTIAL
WVMC-33-C		✔	✔	✔			MODERATE	POTENTIAL
WVMC-33-D		✔	✔	✔			SLIGHT	POTENTIAL
WVMC-33-E		✔		✔			MODERATE	POTENTIAL
WVMC-33-F							MODERATE	OBVIOUS
WVMC-34-{0.0}							SLIGHT	POTENTIAL
WVMC-35								OBVIOUS
WVMC-35.5-{0.0}								
WVMC-36-{0.0}							MODERATE	POTENTIAL
WVMC-36-A							MODERATE	OBVIOUS
WVMC-39							MODERATE	POTENTIAL
WVMC-40				✔			SLIGHT	OBVIOUS
WVMC-42		✔		✔		✔	MODERATE	POTENTIAL
WVMC-43-{0.0}		✔	✔	✔			SLIGHT	POTENTIAL
WVMC-43-A							MODERATE	POTENTIAL
WVMC-43-B		✔	✔	✔			SLIGHT	POTENTIAL
WVMC-44-{0.0}							MODERATE	POTENTIAL
WVMC-46							SLIGHT	OBVIOUS
WVMC-46-A			✔	✔	✔		SLIGHT	POTENTIAL
WVMC-46-B					✔		MODERATE	POTENTIAL
WVMC-47							SLIGHT	NONE
WVMC-48								
WVMC-49		✔		✔	✔		SLIGHT	NONE
WVMC-50							NONE	POTENTIAL
WVMC-51							SLIGHT	POTENTIAL
WVMC-51-A							MODERATE	NONE
WVMC-51-B							MODERATE	NONE
WVMC-51-B-1								
WVMC-51-B-2			✔	✔			HIGH	NONE
WVMC-51-B-3		✔					MODERATE	POTENTIAL
WVMC-51-B-4							MODERATE	NONE
WVMC-51-B-5			✔	✔			MODERATE	NONE
WVMC-00-{71.0}							MODERATE	OBVIOUS
WVMC-52								OBVIOUS
WVMC-52-.7A								
WVMC-52-A							SLIGHT	POTENTIAL
WVMC-53							MODERATE	
WVMC-54								
WVMC-54-A							MODERATE	NONE
WVMC-54-C							MODERATE	POTENTIAL
WVMC-54-D							SLIGHT	POTENTIAL
WVMC-54-F		✔					SLIGHT	OBVIOUS
WVMC-54-H							SLIGHT	NONE
WVMC-54-H-1							SLIGHT	NONE
WVMC-54-I							MODERATE	OBVIOUS

Table 27: (Continued)
Stream Reach Activities And Disturbances -
Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-54-I-1							HIGH	OBVIOUS
WVMC-54-J							MODERATE	OBVIOUS
WVMC-54-K							SLIGHT	N/A
WVMC-55		✔					SLIGHT	POTENTIAL
WVMC-56		✔					NONE	POTENTIAL
WVMC-57							SLIGHT	POTENTIAL
WVMC-59-{00.0}							MODERATE	OBVIOUS
WVMCS-.5						✔	HIGH	OBVIOUS
WVMCS-2							SLIGHT	POTENTIAL
WVMCS-3		✔					HIGH	POTENTIAL
WVMCS-3-A				✔			MODERATE	POTENTIAL
WVMCS-5							SLIGHT	POTENTIAL
WVMCS-6							SLIGHT	POTENTIAL
WVMCS-6-B							SLIGHT	POTENTIAL
WVMCS-6-C			✔	✔			HIGH	POTENTIAL
WVMCS-6-E							NONE	NONE
WVMCS-7		✔					SLIGHT	OBVIOUS
WVMCS-7.5							SLIGHT	POTENTIAL
WVMCS-8							SLIGHT	NONE
WVMCS-12		✔					SLIGHT	POTENTIAL
WVMCS-13		✔					NONE	NONE
WVMCS-14							MODERATE	POTENTIAL
WVMCS-15		✔					SLIGHT	POTENTIAL
WVMCS-16		✔					NONE	POTENTIAL
WVMCS-18							SLIGHT	POTENTIAL
WVMC-59-{20.4}							SLIGHT	POTENTIAL
WVMCS-22							HIGH	OBVIOUS
WVMCS-25							MODERATE	OBVIOUS
WVMCS-28							NONE	POTENTIAL
WVMCS-33							NONE	POTENTIAL
WVMCS-46				✔			NONE	POTENTIAL
WVMCS-47							SLIGHT	POTENTIAL
WVMCS-53							NONE	NONE
WVMCS-54							NONE	NONE
WVMC-60-A							SLIGHT	POTENTIAL
WVMC-60-C							NONE	NONE
WVMC-60-C-3							NONE	NONE
WVMC-60-C-4							NONE	NONE
WVMC-60-C-5							NONE/A	N/A
WVMC-60-D-1							SLIGHT	OBVIOUS
WVMC-60-D-2							SLIGHT	OBVIOUS
WVMC-60-D-2.7							NONE/A	N/A
WVMC-60-D-3-A							NONE/A	OBVIOUS
WVMC-60-D-3-B		✔					SLIGHT	OBVIOUS
WVMC-60-D-3-C							MODERATE	OBVIOUS
WVMC-60-D-3-E							SLIGHT	OBVIOUS
WVMC-60-D-4							SLIGHT	OBVIOUS

Table 27: (Continued)
Stream Reach Activities And Disturbances - Stream Management, Erosion and NPS Pollution

STREAM CODE	LIMING	RIPRAP / BANK STABILIZATION	DREDGING	CHANNEL-IZATION	FILL	DAMS	WATERSHED EROSION	NPS POLLUTION
WVMC-60-D-4.5							SLIGHT	OBVIOUS
WVMC-60-D-4.7							NONE	OBVIOUS
WVMC-60-D-9							SLIGHT	POTENTIAL
WVMC-60-D-11				✔			SLIGHT	POTENTIAL
WVMC-60-D-12				T			SLIGHT	OBVIOUS
WVMC-60-D-14							NONE	NONE
WVMC-60-D-{25.0}							MODERATE	NONE
WVMC-60-E							NONE	NONE
WVMC-60-F							NONE	NONE
WVMC-60-G							SLIGHT	POTENTIAL
WVMC-60-H.5							NONE/A	N/A
WVMC-60-I							NONE	NONE
WVMC-60-J							MODERATE	NONE
WVMC-60-K							NONE	NONE
WVMC-60-K-2-A							NONE	NONE
WVMC-60-K-5							SLIGHT	POTENTIAL
WVMC-60-K-8							MODERATE	OBVIOUS
WVMC-60-K-16							MODERATE	POTENTIAL
WVMC-60-K-17							HIGH	POTENTIAL
WVMC-60-K-17-A							MODERATE	POTENTIAL
WVMC-60-L							SLIGHT	NONE
WVMC-60-N-{01}		✔	✔	✔			SLIGHT	POTENTIAL
WVMC-60-N-4							SLIGHT	POTENTIAL
WVMC-60-N-8							MODERATE	OBVIOUS
WVMC-60-N-8.5							MODERATE	N/A
WVMC-60-N-{20}							MODERATE	OBVIOUS
WVMC-60-{11.6}							SLIGHT	NONE
WVMC-60-O-{01.0}							SLIGHT	NONE
WVMC-60-O-1				✔			MODERATE	OBVIOUS
WVMC-60-O-{07.0}							MODERATE	NONE
WVMC-60-P				✔			HIGH	POTENTIAL
WVMC-60-Q		✔		✔			HIGH	POTENTIAL
WVMC-60-R							NONE/A	OBVIOUS
WVMC-60-S		✔		✔			HIGH	NONE
WVMC-60-{25.1}				✔			MODERATE	OBVIOUS
WVMC-60-T-{02.5}							MODERATE	OBVIOUS
WVMC-60-T-1							SLIGHT	POTENTIAL
WVMC-60-T-2							SLIGHT	NONE
WVMC-60-T-3						✔	NONE	NONE
WVMC-60-T-8							MODERATE	POTENTIAL
WVMC-60-T-9		✔					NONE	NONE
WVMC-60-T-10							SLIGHT	POTENTIAL
WVMC-60-T-11							MODERATE	OBVIOUS
WVMC-60-T-13							MODERATE	POTENTIAL
WVMC-60-T-{13.0}							MODERATE	OBVIOUS

✔ = activity or disturbance was present at site

NONE = none observed

Table 28: Riparian Habitat Assessment - Ground Cover (> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-2	1	4	2	1	3	1	4	2	4
WVMC-2-A	1	2	4	1	1	1	4	1	4
WVMC-2.5	1	2	1	0	2	2	1	1	4
WVMC-2.5-A	2	2	3	0	1	2	3	0	3
WVMC-2.7	2	2	1	0	2	2	1	0	3
WVMC-4	2	1	1	3	2	1	1	3	3
WVMC-7	1	1	3	2	1	1	3	2	4
WVMC-10	1	2	1	2	1	2	3	1	3
WVMC-11-{00}	2	3	1	1	2	4	1	2	3
WVMC-11-.1A	3	3	1	1	3	3	1	2	3
WVMC-11-A	2	4	1	2	2	1	1	1	2
WVMC-11-{05}	1	2	0	1	2	2	1	1	1
WVMC-11-B	1	4	2	0	2	4	2	0	1
WVMC-11-C	2	2	1	1	3	4	1	2	2
WVMC-11-{07}	2	2	1	1	2	2	1	2	4
WVMC-11-C.1	2	2	2	2	2	2	2	2	4
WVMC-11-D-{00}	1	3	0	3	1	3	0	3	1
WVMC-11-D-{10}	2	1	2	3	3	3	2	2	3
WVMC-11-E	1	3	1	2	2	3	1	2	2
WVMC-12-{00}	2	2	2	1	2	2	2	1	3
WVMC-12-.5A-{0}	2	3	2	1	2	2	2	2	4
WVMC-12-.5A-{3}	2	3	1	1	2	3	1	1	1
WVMC-12-.5A-{5}	2	3	1	1	2	3	1	1	2
WVMC-12-.7A	2	2	3	3	1	3	3	3	3
WVMC-12-A-{02.5}	1	4	4	0	1	4	1	1	0
WVMC-12-A-1	1	1	4	0	1	1	4	0	4
WVMC-12-A-1-A	2	2	3	0	2	2	2	1	4
WVMC-12-A-2	1	4	1	0	1	3	1	0	1
WVMC-12-A-{03}	1	4	4	0	1	4	4	0	1
WVMC-12-B-{01}	1	4	1	2	1	4	1	1	2
WVMC-12-B-.5-{00}	1	3	4	0	0	4	0	0	2
WVMC-12-B-.5-A	1	4	4	0	1	4	4	0	4
WVMC-12-B-.5-{02}	2	3	4	1	2	2	4	0	2
WVMC-12-B-{02}	1	2	4	0	3	2	2	1	2
WVMC-12-B-1-{01}	0	3	3	1	0	3	3	1	3

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-12-B-1-B	1	3	3	1	1	3	3	1	1
WVMC-12-B-1-{04}	3	2	0	0	3	2	0	0	4
WVMC-12-B-2	0	4	0	2	1	4	0	2	1
WVMC-12-B-{06}	1	2	3	1	1	2	2	0	3
WVMC-12-B-3-{00}	1	4	0	0	1	4	0	0	1
WVMC-12-B-3-{02}	1	3	1	1	1	3	1	1	3
WVMC-12-B-4-{02}	1	1	1	1	1	1	1	1	3
WVMC-12-B-4-{03}	1	3	3	0	1	1	1	0	4
WVMC-12-B-4.5	1	4	0	0	1	4	0	0	0
WVMC-12-B-6	1	1	1	0	1	4	0	0	2
WVMC-12-B-{11}	1	4	0	2	1	4	0	1	1
WVMC-12-B-5-C	1	4	0	0	1	4	0	2	2
WVMC-12-B-5-{03}	1	4	0	1	1	4	0	1	1
WVMC-12-B-{12}	1	2	4	0	1	3	4	0	4
WVMC-12-C-{01}	4	2	4	0	4	2	4	0	0
WVMC-12-C-{04}	3	4	0	0	3	4	0	0	3
WVMC-12-D	0	4	0	0	3	1	4	0	3
WVMC-12-{10}	1	1	1	1	1	3	0	2	2
WVMC-12-E	1	3	2	1	1	3	2	1	4
WVMC-12-E.1	1	3	0	1	1	2	0	1	3
WVMC-12-F-{00.0}	1	3	1	0	1	3	1	1	3
WVMC-12-F-{01.0}	2	2	3	1	2	2	3	1	3
WVMC-12-{14}	1	4	0	2	2	2	2	1	2
WVMC-00-{18.3}	2	2	2	1	2	2	2	1	2
WVMC-13-{01}	2	2	3	1	2	2	3	1	4
WVMC-13.5-{2.3}	2	2	2	4	2	2	2	4	3
WVMC-14-{02}	2	4	1	1	2	4	1	1	1
WVMC-15-{01}	3	3	2	2	3	3	2	2	4
WVMC-15-A	3	1	4	2	2	1	4	1	4
WVMC-00-{28.8}	0	0	0	0	0	0	0	0	0
WVMC-16-{02}	2	3	2	2	1	2	1	1	3
WVMC-16-A-{0.2}	0	3	1	1	1	3	2	2	4
WVMC-16-A-.1	0	3	0	0	0	4	0	0	1
WVMC-16-A-{0.8}	1	2	2	1	1	2	2	1	4
WVMC-16-A-{2.5}	2	2	0	0	2	2	0	0	3
WVMC-16-A-{3.9}	3	2	4	0	3	2	4	0	4
WVMC-16-{04}	2	3	2	1	2	2	2	2	4

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-17-{0.0}	1	3	2	2	1	3	2	1	3
WVMC-17-.6A	1	4	4	1	1	4	4	1	4
WVMC-17-.7	1	2	4	0	1	2	4	0	4
WVMC-17-{2.6}	1	4	1	0	1	4	1	0	1
WVMC-17-A-{0.0}	1	1	3	1	1	1	3	1	3
WVMC-17-A-.5-{0}	1	0	4	0	1	0	4	1	4
WVMC-17-A-.5-{3}	2	2	4	0	4	1	4	0	3
WVMC-17-A-1-{0.0 }	4	1	2	0	2	4	2	0	3
WVMC-17-A-1.1	1	4	4	0	1	4	4	0	0
WVMC-17-A-1.2	0	4	0	0	0	4	1	0	3
WVMC-17-A-1-{3.2 }	0	4	0	0	0	4	0	2	1
WVMC-17-A-{2.1}	1	3	0	0	1	3	0	0	1
WVMC-17-{3.2}	1	4	0	0	1	1	4	0	2
WVMC-17-A.1	1	2	2	0	0	4	0	0	3
WVMC-17-{6.8}	1	3	2	1	1	2	1	1	0
WVMC-17-B	1	1	3	0	1	1	3	0	4
WVMC-17-C	1	1	3	3	1	1	3	2	4
WVMC-17-{10.2}	1	2	3	1	1	3	2	1	4
WVMC-17-{14.4}	1	2	2	1	0	2	1	2	4
WVMC-18-{0.0}	0	4	0	0	0	4	0	1	3
WVMC-18-.1A	1	4	3	1	1	4	3	1	4
WVMC-18-A-1	2	4	4	1	2	4	4	1	1
WVMC-18-A	1	2	1	1	1	2	1	1	2
WVMC-18-{6.0}	2	3	2	1	2	3	2	1	4
WVMC-19	1	2	1	1	1	1	0	0	1
WVMC-19-A	2	2	3	1	2	1	3	1	4
WVMC-20-{0.0}	2	3	1	1	1	2	0	2	4
WVMC-20-{6.0}	2	3	1	1	2	3	1	1	4
WVMC-21	1	1	1	0	1	1	3	1	4
WVMC-22-{1.5}	2	2	3	1	2	2	3	1	4
WVMC-22-B	1	2	2	1	2	1	3	0	4
WVMC-22-{2.0}	2	2	2	1	1	3	3	0	4
WVMC-23-{0.0}	3	2	3	0	2	1	1	1	3
WVMC-23-.2A	2	1	1	1	2	1	1	0	3
WVMC-23-A-{0.0}	0	1	2	0	0	1	0	2	1
WVMC-23-A-.1-A	0	3	0	0	0	3	3	0	4

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-23-A-.1-B	3	1	3	0	1	2	0	0	3
WVMC-23-A-{2.9}	1	2	3	1	1	2	3	1	3
WVMC-23-{1.8}	3	3	0	0	2	2	0	0	1
WVMC-23-{2.0}	2	2	0	1	1	1	3	0	1
WVMC-24-{0.0}	3	2	3	1	3	2	3	1	3
WVMC-24-A	2	1	2	1	2	1	2	1	4
WVMC-24-{2.7}	1	2	3	0	1	2	3	0	4
WVMC-25-{0.0}	3	1	4	1	3	1	4	1	4
WVMC-25-{2.3}	2	2	3	1	2	3	2	1	3
WVMC-26-{0.0}	1	2	1	3	1	1	1	3	4
WVMC-26-{1.5}	0	3	0	1	0	3	0	1	1
WVMC-27-{0.0}	3	1	4	1	3	1	4	1	4
WVMC-27-{2.7}	3	1	3	1	2	2	1	2	2
WVMC-27-A	1	2	1	0	1	2	1	0	2
WVMC-27-B	1	3	0	1	1	3	0	1	3
WVMC-28	1	1	3	2	1	3	3	1	4
WVMC-31-{0.0}	1	4	2	1	1	2	1	2	4
WVMC-31.5	0	0	0	0	0	0	0	0	0
WVMC-31.7	2	1	2	1	2	1	1	2	4
WVMC-32	2	3	2	1	2	1	1	1	1
WVMC-32-B	2	3	3	1	2	2	3	1	3
WVMC-32-C-1	2	2	3	1	2	1	4	2	4
WVMC-32-D	1	1	3	3	2	1	4	2	3
WVMC-32-E	1	1	1	3	1	2	2	3	1
WVMC-32-F	1	3	4	1	1	2	2	3	4
WVMC-32-G	1	3	1	2	2	3	1	1	1
WVMC-00-{43}	2	2	2	1	2	2	2	1	1
WVMC-33-{0.0}	0	3	1	1	0	4	0	3	1
WVMC-33-A	1	4	0	1	1	4	0	1	4
WVMC-33-A.5	2	3	3	2	1	2	2	1	4
WVMC-33-B	1	2	4	1	1	3	3	2	4
WVMC-33-B.5	0	3	2	1	0	3	1	2	4
WVMC-33-C	0	4	0	1	0	4	0	0	1
WVMC-33-D	1	3	0	1	1	4	0	0	1
WVMC-33-E	0	3	0	1	0	3	0	1	1
WVMC-33-F	0	4	0	0	0	4	0	0	1
WVMC-34-{0.0}	1	2	4	1	1	3	4	1	4

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-35	1	4	1	0	0	4	1	0	3
WVMC-35.5-{0.0}	2	1	1	2	2	1	2	1	4
WVMC-36-{0.0}	2	3	3	2	2	4	2	2	3
WVMC-36-A	1	4	1	3	1	4	1	3	2
WVMC-39	0	3	0	1	1	3	0	1	1
WVMC-40	1	3	0	0	1	3	0	0	2
WVMC-42	1	2	0	1	1	2	0	0	2
WVMC-43-{0.0}	1	3	0	1	1	4	0	1	3
WVMC-43-A	1	4	3	0	1	4	3	1	4
WVMC-43-B	0	4	0	0	1	4	0	0	2
WVMC-44-{0.0}	1	2	3	2	1	2	3	2	4
WVMC-46	1	1	1	1	1	1	1	1	2
WVMC-46-A	1	3	2	2	1	3	0	2	0
WVMC-46-B	1	2	4	0	0	3	0	2	3
WVMC-47	1	2	2	1	1	3	3	2	4
WVMC-48	0	0	0	0	0	0	0	0	0
WVMC-49	1	2	3	2	1	2	3	2	4
WVMC-50	2	3	1	0	2	3	1	0	4
WVMC-51	1	3	1	1	1	3	1	1	1
WVMC-51-A	1	3	2	2	1	3	2	2	4
WVMC-51-B	1	1	3	2	1	1	3	3	4
WVMC-51-B-1	0	0	0	0	0	0	0	0	0
WVMC-51-B-2	1	2	2	3	1	2	2	3	2
WVMC-51-B-3	1	3	1	2	1	2	1	3	3
WVMC-51-B-4	2	2	1	1	2	2	3	1	4
WVMC-51-B-5	2	2	2	2	2	3	2	2	2
WVMC-00-{71.0}	1	4	0	2	1	4	0	2	1
WVMC-52	0	4	1	0	0	4	1	0	2
WVMC-52-.7A	1	1	4	1	2	4	2	1	4
WVMC-52-A	2	3	3	0	2	2	3	1	4
WVMC-53	3	4	1	0	1	2	3	0	3
WVMC-54	0	4	0	2	1	1	2	1	1
WVMC-54-A	2	2	3	2	2	2	3	1	4
WVMC-54-C	2	1	2	1	3	3	2	1	3
WVMC-54-D	1	2	3	1	1	2	3	1	4
WVMC-54-F	1	4	0	2	1	2	2	1	3
WVMC-54-H	1	1	3	2	1	1	3	3	4

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-54-H-1	1	3	1	0	1	3	1	0	1
WVMC-54-I	2	2	1	2	1	3	1	1	2
WVMC-54-I-1	1	2	3	1	1	2	2	3	4
WVMC-54-J	1	4	1	2	1	4	1	1	2
WVMC-54-K	1	3	1	1	2	3	3	0	0
WVMC-55	2	2	3	1	1	3	1	2	1
WVMC-56	1	3	1	3	2	2	4	1	4
WVMC-57	1	2	1	3	1	2	2	2	1
WVMC-59-{00.0}	3	3	1	2	3	3	1	2	1
WVMCS-.5	2	2	1	2	3	3	1	3	1
WVMCS-2	2	2	2	1	3	3	2	1	3
WVMCS-3	0	2	0	3	2	3	0	2	1
WVMCS-3-A	3	3	2	0	2	4	4	0	3
WVMCS-5	2	3	1	2	2	2	1	1	3
WVMCS-6	1	1	3	1	2	1	1	1	3
WVMCS-6-B	1	2	0	1	1	2	0	1	4
WVMCS-6-C	0	4	0	0	0	4	0	1	1
WVMCS-6-E	1	1	4	2	1	3	3	2	4
WVMCS-7	1	3	2	1	1	3	3	1	4
WVMCS-7.5	2	2	2	1	2	1	1	3	3
WVMCS-8	2	3	3	1	2	2	3	1	4
WVMCS-12	0	1	2	0	0	1	2	0	4
WVMCS-13	1	1	2	1	1	2	0	1	3
WVMCS-14	0	1	3	0	0	1	3	0	4
WVMCS-15	1	3	2	2	1	2	2	1	1
WVMCS-16	0	2	1	2	1	1	1	1	3
WVMCS-18	1	3	1	0	2	2	1	0	4
WVMC-59-{20.4}	2	3	1	1	2	1	1	2	2
WVMCS-22	2	3	1	2	1	1	0	4	2
WVMCS-25	2	2	4	1	3	2	4	1	4
WVMCS-28	1	2	2	1	1	2	2	1	4
WVMCS-33	2	2	2	0	2	1	2	0	4
WVMCS-46	1	1	1	2	1	1	1	1	2
WVMCS-47	1	2	1	2	1	2	1	3	4
WVMCS-53	1	2	2	1	1	2	1	1	4
WVMCS-54	1	3	1	0	1	2	1	0	3
WVMC-60-A	3	3	1	2	3	3	3	1	3

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-60-C	4	4	1	1	3	3	3	1	3
WVMC-60-C-3	2	1	3	1	2	1	3	1	4
WVMC-60-C-4	2	2	3	1	2	2	3	1	4
WVMC-60-C-5	0	0	0	0	0	0	0	0	0
WVMC-60-D-1	0	0	3	1	0	0	3	1	4
WVMC-60-D-2	1	2	3	0	1	1	2	1	4
WVMC-60-D-2.7	0	0	0	0	0	0	0	0	0
WVMC-60-D-3-A	1	4	0	0	1	4	0	0	2
WVMC-60-D-3-B	2	1	1	1	1	1	1	1	4
WVMC-60-D-3-C	1	4	0	1	1	4	0	0	1
WVMC-60-D-3-E	1	4	0	1	1	4	0	1	2
WVMC-60-D-4	1	4	0	0	1	4	0	0	3
WVMC-60-D-4.5	0	2	3	0	0	2	3	1	4
WVMC-60-D-4.7	1	0	4	0	1	0	4	0	4
WVMC-60-D-9	1	4	0	0	1	4	0	0	1
WVMC-60-D-11	2	3	0	1	2	3	0	2	1
WVMC-60-D-12	0	4	1	1	0	4	1	1	3
WVMC-60-D-14	0	4	0	1	0	4	0	2	1
WVMC-60-D-{25.0}	1	4	0	1	1	4	0	1	1
WVMC-60-E	2	3	2	1	2	2	2	2	4
WVMC-60-F	2	2	2	1	2	2	2	1	3
WVMC-60-G	2	3	1	2	3	4	1	1	3
WVMC-60-H.5	0	0	0	0	0	0	0	0	0
WVMC-60-I	3	2	3	1	3	2	3	1	4
WVMC-60-J	2	2	1	3	3	3	2	2	3
WVMC-60-K	1	3	0	4	1	1	0	4	1
WVMC-60-K-2-A	1	3	2	0	1	1	4	0	4
WVMC-60-K-5	0	2	2	2	1	1	1	2	4
WVMC-60-K-8	2	2	2	2	2	3	3	2	3
WVMC-60-K-16	0	4	0	0	2	4	0	1	1
WVMC-60-K-17	0	4	0	3	0	4	0	4	1
WVMC-60-K-17-A	1	4	1	1	1	4	1	1	4
WVMC-60-L	2	3	2	1	2	3	2	1	4
WVMC-60-N-{01}	1	1	0	4	1	1	0	4	1
WVMC-60-N-4	1	4	0	0	1	4	0	0	0
WVMC-60-N-8	2	3	0	1	1	3	0	2	2
WVMC-60-N-8.5	2	4	2	1	2	2	3	1	4

Table 28: (Continued)
Riparian Habitat Assessment - Ground Cover
(> 0.5 M High)

STREAM CODE	LEFT BANK				RIGHT BANK				STREAM SHADE
	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	SHRUBS SEEDLINGS	NON-WOODY HERBS, GRASSES, FERNS, ETC.	LEAF LITTER	BARE SOIL	
WVMC-60-N-{20}	1	2	0	1	1	3	0	2	1
WVMC-60-{11.6}	3	3	1	0	1	1	1	3	1
WVMC-60-O-{01.0}	2	1	1	0	2	1	1	0	2
WVMC-60-O-1	1	2	0	2	2	1	0	2	2
WVMC-60-O-{07.0}	2	3	1	1	2	2	1	2	1
WVMC-60-P	2	2	1	2	2	2	1	2	2
WVMC-60-Q	2	2	1	3	2	2	1	3	1
WVMC-60-R	0	4	0	0	1	3	0	0	4
WVMC-60-S	2	2	0	2	2	2	0	1	1
WVMC-60-{25.1}	2	2	1	1	2	2	1	2	2
WVMC-60-T-{02.5}	2	2	1	3	0	3	0	3	0
WVMC-60-T-1	1	2	3	1	1	2	3	1	4
WVMC-60-T-2	2	4	4	1	2	4	4	1	4
WVMC-60-T-3	1	1	2	3	1	2	4	1	4
WVMC-60-T-8	2	4	3	1	2	4	3	1	4
WVMC-60-T-9	0	1	2	1	0	2	3	1	4
WVMC-60-T-10	1	4	2	1	1	4	2	0	0
WVMC-60-T-11	1	2	0	2	1	2	0	2	3
WVMC-60-T-13	0	3	0	1	0	3	0	2	2
WVMC-60-T-{13.0}	0	4	0	1	0	4	0	1	1

values:
0 = absent
1 = sparse (0-10% of ground cover)
2 = moderate (10-40%)
3 = heavy (40-75%)
4 = very heavy (>75%)

stream shade:
1 = fully exposed (0-25% shade)
2 = partially exposed (25-50 %)
3 = partially shaded (50-75%)
4 = fully shaded (75-100%)

Table 29: Riparian Habitat Assessment - Understory (0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-2	D	3	2	D	2	1
WVMC-2-A	D	3	0	D	3	0
WVMC-2.5	M	1	0	D	2	2
WVMC-2.5-A	D	2	1	D	1	3
WVMC-2.7	D	3	3	D	3	3
WVMC-4	D	3	1	D	3	1
WVMC-7	D	2	1	D	2	1
WVMC-10	D	3	2	D	2	2
WVMC-11-{00}	M	1	1	M	2	2
WVMC-11-.1A	M	2	2	M	2	2
WVMC-11-A	D	2	1	D	1	2
WVMC-11-{05}	D	1	1	D	1	2
WVMC-11-B	D	0	0	D	2	2
WVMC-11-C	D	3	1	D	2	1
WVMC-11-{07}	D	3	2	D	3	2
WVMC-11-C.1	D	1	1	D	3	2
WVMC-11-D-{00}	D	1	1	D	1	1
WVMC-11-D-{10}	D	2	2	D	1	1
WVMC-11-E	D	2	1	D	2	1
WVMC-12-{00}	D	2	2	D	3	2
WVMC-12-.5A-{0}	M	3	1	M	3	1
WVMC-12-.5A-{3}	M	1	1	D	2	1
WVMC-12-.5A-{5}	D	2	2	D	2	2
WVMC-12-.7A	D	3	1	D	2	2
WVMC-12-A-{02.5}	M	4	2	D	2	1
WVMC-12-A-1	D	3	0	D	3	0
WVMC-12-A-1-A	D	3	0	D	2	2
WVMC-12-A-2	D	2	2	D	2	2
WVMC-12-A-{03}	D	3	4	D	4	4
WVMC-12-B-{01}	D	2	2	D	1	3
WVMC-12-B-.5-{00}	D	4	2		0	0
WVMC-12-B-.5-A	D	1	2	D	1	2
WVMC-12-B-.5-{02}	D	3	1	D	2	1
WVMC-12-B-{02}	D	4	1	D	2	1
WVMC-12-B-1-{01}	M	4	2	M	4	2
WVMC-12-B-1-B	D	2	3	D	2	3

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-12-B-1-{04}	D	1	1	D	1	1
WVMC-12-B-2	D	0	0	D	1	1
WVMC-12-B-{06}	M	1	1	M	3	1
WVMC-12-B-3-{00}	D	4	2	D	4	2
WVMC-12-B-3-{02}	D	4	3	D	4	3
WVMC-12-B-4-{02}	D	2	3	D	2	3
WVMC-12-B-4-{03}	D	2	2	D	3	1
WVMC-12-B-4.5	D	1	4	D	2	2
WVMC-12-B-6	D	2	2	D	1	1
WVMC-12-B-{11}	D	2	3	D	2	3
WVMC-12-B-5-C	D	1	1	D	2	3
WVMC-12-B-5-{03}	D	2	4	D	2	4
WVMC-12-B-{12}	D	4	0	D	3	0
WVMC-12-C-{01}	D	4	1	D	4	1
WVMC-12-C-{04}	D	3	3	D	3	3
WVMC-12-D		0	0	D	4	2
WVMC-12-{10}	D	3	4	D	3	2
WVMC-12-E	D	2	2	D	2	2
WVMC-12-E.1	D	3	2	D	4	2
WVMC-12-F-{00.0}	D	3	3	D	3	3
WVMC-12-F-{01.0}	D	3	3	D	3	2
WVMC-12-{14}	D	3	2	D	4	2
WVMC-00-{18.3}	D	3	2	D	3	2
WVMC-13-{01}	D	2	1	D	2	1
WVMC-13.5-{2.3}	D	2	0	D	2	0
WVMC-14-{02}	D	3	2	D	3	2
WVMC-15-{01}	D	3	2	D	3	2
WVMC-15-A	D	3	1	D	3	1
WVMC-16-{02}	D	2	2	D	2	2
WVMC-16-A-{0.2}	D	2	2	D	2	2
WVMC-16-A-.1	D	0	4	D	0	0
WVMC-16-A-{0.8}	D	1	3	D	2	2
WVMC-16-A-{2.5}	D	2	1	D	3	2
WVMC-16-A-{3.9}	D	3	2	D	3	2
WVMC-16-{04}	M	3	1	M	3	1
WVMC-17-{0.0}	D	3	3	D	3	3
WVMC-17-.6A	D	1	1	D	1	1
WVMC-17-.7	M	4	1	M	4	1

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-17-{2.6}	M	2	4	M	2	4
WVMC-17-A-{0.0}	D	4	0	M	3	0
WVMC-17-A-.5-{0}	D	2	0	D	3	0
WVMC-17-A-.5-{3}	D	1	2	D	2	3
WVMC-17-A-1-{0.0}	D	2	4	D	4	1
WVMC-17-A-1.1	D	3	1	D	2	1
WVMC-17-A-1.2	D	4	3	D	4	3
WVMC-17-A-1-{3.2}	0	0	0	0	0	0
WVMC-17-A-{2.1}	D	2	3	D	0	2
WVMC-17-{3.2}	D	1	4	D	4	1
WVMC-17-A.1	R	4	1	D	1	3
WVMC-17-{6.8}	D	1	1	R	4	1
WVMC-17-B	M	4	2	M	4	2
WVMC-17-C	M	3	1	M	3	1
WVMC-17-{10.2}	M	3	2	M	2	2
WVMC-17-{14.4}	D	1	2	D	2	3
WVMC-18-{0.0}	D	1	0	D	1	1
WVMC-18-.1A	D	4	3	D	4	3
WVMC-18-A-1	D	2	3	D	1	4
WVMC-18-A	D	1	2	D	1	2
WVMC-18-{6.0}	D	3	3	D	3	3
WVMC-19	D	3	3	D	3	1
WVMC-19-A	M	3	1	M	3	1
WVMC-20-{0.0}	D	1	1	D	2	1
WVMC-20-{6.0}	D	2	2	D	3	2
WVMC-21	D	2	4	D	2	3
WVMC-22-{1.5}	D	2	2	D	2	1
WVMC-22-B	D	2	3	D	2	1
WVMC-22-{2.0}	D	3	1	D	2	3
WVMC-23-{0.0}	D	2	2	D	2	2
WVMC-23-.2A	D	3	1	D	3	1
WVMC-23-A-{0.0}	D	2	1	D	1	1
WVMC-23-A-.1-A	D	2	1	D	1	1
WVMC-23-A-.1-B	D	3	1	D	1	2
WVMC-23-A-{2.9}	D	2	2	D	2	2
WVMC-23-{1.8}	D	2	2	D	2	2
WVMC-23-{2.0}	D	1	1	D	3	1
WVMC-24-{0.0}	D	3	2	D	3	2

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-24-A	D	2	1	D	2	1
WVMC-24-{2.7}	D	3	2	D	3	2
WVMC-25-{0.0}	D	4	1	D	4	1
WVMC-25-{2.3}	D	2	2	D	2	2
WVMC-26-{0.0}	D	3	1	D	2	1
WVMC-26-{1.5}	D	0	2	D	1	2
WVMC-27-{0.0}	D	4	1	D	4	1
WVMC-27-{2.7}	D	3	2	D	2	1
WVMC-27-A	D	2	2	D	2	2
WVMC-27-B	D	2	2	D	2	2
WVMC-28	D	3	2	D	3	2
WVMC-31-{0.0}	D	2	1	D	2	1
WVMC-31.7	D	3	2	D	2	3
WVMC-32	D	2	2	D	2	2
WVMC-32-B	D	3	3	D	3	3
WVMC-32-C-1	D	3	2	D	3	1
WVMC-32-D	D	4	1	D	3	1
WVMC-32-E	D	1	1	D	2	2
WVMC-32-F	D	3	1	M	2	1
WVMC-32-G	D	1	3	D	1	3
WVMC-00-{43}	D	3	2	D	3	2
WVMC-33-{0.0}	D	1	1	D	1	3
WVMC-33-A	D	2	2	D	2	3
WVMC-33-A.5	M	1	1	M	2	1
WVMC-33-B	D	4	1	D	4	1
WVMC-33-B.5	D	2	0	D	2	1
WVMC-33-C	D	1	2	D	1	3
WVMC-33-D	D	2	1	D	1	1
WVMC-33-E	D	1	1	D	0	1
WVMC-33-F	D	1	1	D	0	1
WVMC-34-{0.0}	D	2	1	D	3	1
WVMC-35	D	3	4	D	1	4
WVMC-35.5-{0.0}	D	3	1	D	3	1
WVMC-36-{0.0}	D	2	2	D	1	2
WVMC-36-A	D	2	1	D	2	1
WVMC-39	D	1	2	D	1	2
WVMC-40	D	2	2	D	2	2
WVMC-42	D	2	1	D	1	1

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-43-{0.0}	D	2	1	D	2	2
WVMC-43-A	D	1	0	D	1	1
WVMC-43-B	D	1	2	D	3	2
WVMC-44-{0.0}	D	1	0	D	1	0
WVMC-46	D	1	3	D	1	3
WVMC-46-A	D	3	1	D	1	1
WVMC-46-B	D	2	2	D	1	2
WVMC-47	D	3	2	D	3	2
WVMC-49	D	3	1	D	3	1
WVMC-50	D	2	2	D	2	2
WVMC-51	D	4	3	D	4	3
WVMC-51-A	M	3	2	M	3	1
WVMC-51-B	M	3	1	M	3	1
WVMC-51-B-2	D	3	3	D	3	3
WVMC-51-B-3	D	1	2	D	1	1
WVMC-51-B-4	D	2	1	D	3	1
WVMC-51-B-5	D	2	2	D	3	1
WVMC-00-{71.0}	D	0	2	D	1	2
WVMC-52	D	2	2	D	2	2
WVMC-52-.7A	M	2	1	M	1	3
WVMC-52-A	M	2	2	M	2	2
WVMC-53	M	2	3	M	3	1
WVMC-54	D	1	1	D	3	3
WVMC-54-A	M	3	0	M	3	0
WVMC-54-C	D	2	3	D	1	2
WVMC-54-D	M	2	1	M	2	1
WVMC-54-F	M	1	1	M	3	3
WVMC-54-H	M	2	0	M	2	0
WVMC-54-H-1	D	1	3	D	1	3
WVMC-54-I	M	1	1	N	1	2
WVMC-54-I-1	M	4	1	M	3	1
WVMC-54-J	D	1	2	D	1	2
WVMC-54-K	M	2	2	M	2	3
WVMC-55	D	3	1	D	1	2
WVMC-56	D	1	3	D	3	2
WVMC-57	D	2	2	D	2	2
WVMC-59-{00.0}	D	2	1	D	3	1
WVMCS-.5	D	1	1	D	1	1

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMCS-2	M	2	1	M	2	1
WVMCS-3	D	1	0	D	2	0
WVMCS-3-A	D	2	2	D	3	1
WVMCS-5	M	3	1	M	2	1
WVMCS-6	D	2	1	D	2	2
WVMCS-6-B	D	2	1	D	3	1
WVMCS-6-C	N	0	0	N	0	0
WVMCS-6-E	D	2	0	D	1	0
WVMCS-7	D	1	2	D	1	1
WVMCS-7.5	D	3	2	D	3	1
WVMCS-8	M	4	2	M	4	3
WVMCS-12	C	1	1	D	1	1
WVMCS-13	M	2	0	D	1	2
WVMCS-14	D	3	0	D	3	0
WVMCS-15	D	1	3	D	1	3
WVMCS-16	D	1	3	D	3	0
WVMCS-18	D	2	1	D	2	1
WVMC-59-{20.4}	D	1	1	D	1	1
WVMCS-22	D	2	1	D	1	0
WVMCS-25	D	2	0	D	3	0
WVMCS-28	D	1	1	D	2	1
WVMCS-33	D	3	1	D	3	1
WVMCS-46	M	3	1	M	1	1
WVMCS-47	M	2	1	M	3	1
WVMCS-53	D	2	2	M	3	2
WVMCS-54	D	2	1	D	2	1
WVMC-60-A	D	2	2	M	3	2
WVMC-60-C	D	2	1	M	3	2
WVMC-60-C-3	M	3	2	M	3	2
WVMC-60-C-4	M	3	2	M	3	2
WVMC-60-D-1	M	4	1	M	4	1
WVMC-60-D-2	M	4	2	M	3	3
WVMC-60-D-3-A	D	1	4	D	1	4
WVMC-60-D-3-B		2	1		4	1
WVMC-60-D-3-C	M	4	4	M	4	4
WVMC-60-D-3-E	M	4	4	N	3	4
WVMC-60-D-4	M	4	4	M	4	4
WVMC-60-D-4.5		4	1		4	2

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-60-D-4.7	M	4	0	M	4	0
WVMC-60-D-9	D	4	1	D	4	1
WVMC-60-D-11	D	2	2	D	2	2
WVMC-60-D-12	D	0	0	D	0	0
WVMC-60-D-14	D	0	1	D	0	1
WVMC-60-D-{25.0}	D	2	2	D	3	2
WVMC-60-E	M	3	2	M	3	2
WVMC-60-F	M	3	2	M	3	2
WVMC-60-G	D	2	2	D	2	2
WVMC-60-I	M	3	2	M	3	2
WVMC-60-J	D	1	1	D	3	3
WVMC-60-K	D	1	1	D	1	0
WVMC-60-K-2-A	D	1	1	D	3	0
WVMC-60-K-5	M	2	1	M	1	0
WVMC-60-K-8	D	4	3	D	3	3
WVMC-60-K-16	D	0	1	D	2	1
WVMC-60-K-17	D	1	1	D	1	1
WVMC-60-K-17-A	D	3	2	D	3	2
WVMC-60-L	D	2	2	D	3	2
WVMC-60-N-{01}	D	1	1	D	1	1
WVMC-60-N-4	D	2	4	D	2	4
WVMC-60-N-8	D	3	1	D	1	1
WVMC-60-N-8.5	M	3	1	M	3	1
WVMC-60-N-{20}	D	1	1	D	2	1
WVMC-60-{11.6}	D	2	2	D	1	1
WVMC-60-O-{01.0}	D	3	2	M	2	2
WVMC-60-O-1	D	1	1	D	3	1
WVMC-60-O-{07.0}	M	2	1	M	2	1
WVMC-60-P	D	2	1	D	3	2
WVMC-60-Q	D	2	1	D	2	1
WVMC-60-R	D	1	2	D	1	2
WVMC-60-S	D	1	0	D	1	0
WVMC-60-{25.1}	D	2	2	D	2	2
WVMC-60-T-{02.5}	D	2	3	N	0	0
WVMC-60-T-1	D	3	1	D	3	1
WVMC-60-T-2	M	4	1	M	4	1
WVMC-60-T-3	D	4	1	D	2	1
WVMC-60-T-8	D	4	2	D	4	2

Table 29: (Continued)
Riparian Habitat Assessment - Understory
(0.5 - 5.0 M)

STREAM CODE	LEFT			RIGHT		
	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS	VEG TYPE	SHRUBS/ SAPLINGS	NONWOODY HERBS
WVMC-60-T-9	D	1	1	D	1	1
WVMC-60-T-10	M	2	2	M	2	2
WVMC-60-T-11	M	4	0	M	4	0
WVMC-60-T-13	M	1	1	M	1	1
WVMC-60-T-{13.0}	N	0	0	M	1	0

veg type:
D = deciduous
C = coniferous
M = mixed (at least 10% of each type)
N = none

veg values:
0 = absent
1 = sparse (0-10%)
2 = moderate (10-40%)
3 = heavy (40-75%)
4 = very heavy (>75%)

Table 30: Riparian Habitat Assessment - Canopy (> 5 M High)

STREAM CODE	LEFT ZONE WIDTH	LEFT VEG TYPE	LEFT BIG TREES	LEFT SMALL TREES	RIGHT ZONE WIDTH	RIGHT VEG TYPE	RIGHT BIG TREES	RIGHT SMALL TREES
WVMC-2	18.0	D	2	3	16.0	D	3	4
WVMC-2-A	10.0	D	2	4	10.0	D	2	4
WVMC-2.5	2.0	M	2	1	3.0	D	1	1
WVMC-2.5-A	2.0	D	1	1	2.0	D	0	1
WVMC-2.7	3.0	D	1	2	2.0	D	1	2
WVMC-4	8.0	D	1	2	7.0	D	1	2
WVMC-7	18.0	D	3	4	12.0	D	3	4
WVMC-10	12.0	D	2	3	18.0	D	3	1
WVMC-11-{00}	7.0	M	3	3	5.0	M	2	2
WVMC-11-.1A	3.0	M	0	0	4.0	M	1	1
WVMC-11-A	4.0	D	0	0	1.0	D	1	1
WVMC-11-{05}	2.0	D	0	1	4.0	D	1	0
WVMC-11-B	4.0	D	0	0	10.0	D	1	2
WVMC-11-C	3.0	D	0	1	3.0	D	1	3
WVMC-11-{07}	10.0	D	2	4	5.0	D	2	3
WVMC-11-C.1	10.0	D	3	3	4.0	D	3	3
WVMC-11-D-{00}	1.0	D	0	1	1.0	D	0	0
WVMC-11-D-{10}	10.0	D	3	4	7.0	D	2	3
WVMC-11-E	2.0	D	0	2	2.0	D	0	1
WVMC-12-{00}	10.0	D	2	4	10.0	D	3	1
WVMC-12-.5A-{0}	8.0	M	2	3	5.0	M	2	3
WVMC-12-.5A-{3}	4.0	M	1	1	3.0	D	1	1
WVMC-12-.5A-{5}	4.0	D	0	0	4.0	D	0	0
WVMC-12-.7A	18.0	D	1	4	10.0	D	1	2
WVMC-12-A-{02.5}	0.0	M	1	4	1.5	D	1	2
WVMC-12-A-1	50.0	M	1	4	40.0	M	1	4
WVMC-12-A-1-A	18.0	D	3	4	13.0	D	2	3
WVMC-12-A-2	6.0	D	0	1	7.0	D	1	3
WVMC-12-A-{03}	50.0	M	1	3	50.0	M	0	2
WVMC-12-B-{01}	15.0	M	1	2	15.0	M	2	2
WVMC-12-B-.5-{00}	20.0	D	1	4	0.0		0	0
WVMC-12-B-.5-A	10.5	D	1	2	20.0	D	1	2
WVMC-12-B-.5-{02}	20.0	D	1	3	10.0	D	0	2
WVMC-12-B-{02}	20.0	M	1	2	2.5	M	1	2
WVMC-12-B-1-{01}	15.0	M	2	3	15.0	M	2	3
WVMC-12-B-1-B	12.0	D	1	3	14.0	D	1	3
WVMC-12-B-1-{04}	14.0	D	2	3	14.0	D	2	3
WVMC-12-B-2	0.0	D	0	0	2.0	D	0	0
WVMC-12-B-{06}	18.0	M	2	3	18.0	M	3	2
WVMC-12-B-3-{00}	18.0	D	0	1	18.0	D	0	1

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMC-12-B-3-{02}	17.0	D	1	2	17.0	D	1	2
WVMC-12-B-4-{02}	10.0	D	2	3	10.0	D	2	3
WVMC-12-B-4-{03}	6.0	D	1	2	18.0	D	4	3
WVMC-12-B-4.5	0.0	D	0	1	0.0	D	0	0
WVMC-12-B-6	3.0	D	1	1	1.0	D	0	1
WVMC-12-B-{11}	6.0	D	0	0	6.0	D	0	0
WVMC-12-B-5-C	6.0	D	1	1	10.0	D	2	2
WVMC-12-B-5-{03}	10.0	D	1	0	10.0	D	0	0
WVMC-12-B-{12}	0.0	D	0	4	0.0	D	0	3
WVMC-12-C-{01}	20.0	M	1	4	20.0	M	1	4
WVMC-12-C-{04}	25.0	D	1	3	100.0	D	1	3
WVMC-12-D	0.0	C	1	1	20.0	M	1	3
WVMC-12-{10}	10.0	D	2	4	5.0	D	1	1
WVMC-12-E	11.0	D	3	3	15.0	D	3	3
WVMC-12-E.1	9.0	D	1	1	16.0	D	1	2
WVMC-12-F-{00.0}	10.0	D	2	2	9.0	D	2	2
WVMC-12-F-{01.0}	18.0	D	3	4	12.0	D	4	4
WVMC-12-{14}	5.0	D	1	1	18.0	D	2	2
WVMC-00-{18.3}	10.0	D	3	4	10.0	D	3	4
WVMC-13-{01}	10.0	D	1	3	10.0	D	1	3
WVMC-13.5-{2.3}	6.0	D	0	1	6.0	D	0	1
WVMC-14-{02}	2.0	D	0	0	1.0	D	1	0
WVMC-15-{01}	10.0	D	3	4	8.0	D	3	4
WVMC-15-A	18.0	D	3	4	14.0	D	3	2
WVMC-00-{28.8}	0.0		0	0	0.0		0	0
WVMC-16-{02}	50.0	D	1	3	15.0	D	1	3
WVMC-16-A-{0.2}	5.0	D	1	2	5.0	D	1	2
WVMC-16-A-.1	3.0	D	0	0	0.0	D	0	0
WVMC-16-A-{0.8}	8.0	D	2	3	40.0	D	2	1
WVMC-16-A-{2.5}	16.0	D	0	3	3.0	D	0	3
WVMC-16-A-{3.9}	8.0	D	0	3	8.0	D	0	3
WVMC-16-{04}	3.0	M	2	2	8.0	M	2	3
WVMC-17-{0.0}	13.0	D	2	3	50.0	D	2	3
WVMC-17-.6A	4.0	M	1	2	4.0	M	1	2
WVMC-17-.7	20.0	M	2	4	20.0	M	1	4
WVMC-17-{2.6}	25.0	M	0	4	0.0	M	0	4
WVMC-17-A-{0.0}	10.0	D	1	2	20.0	M	1	3
WVMC-17-A-.5-{0}	100.0	M	1	2	100.0	M	1	2
WVMC-17-A-.5-{3}	0.5	D	1	1	1.5	D	1	1
WVMC-17-A-1-{0.0}	6.0	D	0	3	20.0	D	0	3
WVMC-17-A-1.1	0.0	D	0	2	0.0	D	0	2

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMC-17-A-1.2	20.0		0	0	11.5	D	0	1
WVMC-17-A-1-{3.2}	0.0	0	0	0	0.0	0	0	0
WVMC-17-A-{2.1}	0.0		0	2	0.0	D	0	0
WVMC-17-{3.2}	20.0	D	1	4	1.5	M	1	1
WVMC-17-A.1	20.0	M	2	3	1.5	D	0	0
WVMC-17-{6.8}	6.0	D	0	1	0.0	M	2	2
WVMC-17-B	17.0	M	3	3	17.0	M	3	3
WVMC-17-C	18.0	M	3	4	18.0	M	3	4
WVMC-17-{10.2}	18.0	M	3	3	14.0	M	2	4
WVMC-17-{14.4}	3.5	D	1	1	25.0	D	1	2
WVMC-18-{0.0}	5.0	D	1	3	5.0	D	1	2
WVMC-18-.1A	3.0	D	2	3	50.0	D	2	3
WVMC-18-A-1	50.0	D	0	0	50.0	D	1	1
WVMC-18-A	10.0	D	0	2	2.0	D	0	2
WVMC-18-{6.0}	20.0	D	2	3	50.0	D	2	3
WVMC-19	5.0	D	1	2	5.0	D	1	2
WVMC-19-A	10.0	M	2	4	10.0	M	2	4
WVMC-20-{0.0}	4.0	D	2	1	2.5	D	2	1
WVMC-20-{6.0}	8.0	D	2	3	7.0	D	2	4
WVMC-21	30.0	D	1	2	12.0	D	1	2
WVMC-22-{1.5}	10.0	D	2	2	50.0	D	2	3
WVMC-22-B	3.0	D	1	2	20.0	D	1	2
WVMC-22-{2.0}	10.0	D	1	3	10.0	D	1	3
WVMC-23-{0.0}	25.0	D	1	3	3.0	D	0	2
WVMC-23-.2A	4.0	D	0	0	6.0	D	0	0
WVMC-23-A-{0.0}	11.0	D	1	2	0.0	N	0	0
WVMC-23-A-.1-A	1.0	D	0	2	12.0	D	1	3
WVMC-23-A-.1-B	0.0	D	1	2	1.0	D	0	0
WVMC-23-A-{2.9}	7.5	D	2	3	5.0	D	1	3
WVMC-23-{1.8}	10.0	D	0	2	3.0	D	1	1
WVMC-23-{2.0}	3.0	D	0	2	20.0	D	1	3
WVMC-24-{0.0}	7.0	D	2	3	25.0	D	1	3
WVMC-24-A	8.5	D	0	3	5.5	D	0	3
WVMC-24-{2.7}	20.0	D	1	3	20.0	D	1	3
WVMC-25-{0.0}	25.0	D	1	3	15.5	D	1	3
WVMC-25-{2.3}	8.5		2	2	6.0	D	1	2
WVMC-26-{0.0}	20.0	D	2	2	20.0	M	2	2
WVMC-26-{1.5}	0.0	D	1	1	0.0	D	0	0
WVMC-27-{0.0}	25.0	D	1	3	25.0	D	1	3
WVMC-27-{2.7}	25.0	D	2	3	13.0	M	1	2
WVMC-27-A	3.5	D	1	2	2.0	D	0	2

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMC-27-B	1.5	D	0	2	3.0	D	0	2
WVMC-28	18.0	D	2	3	18.0	D	2	3
WVMC-31-{0.0}	18.0	D	3	3	10.0	D	3	3
WVMC-31.5	ND							
WVMC-31.7	6.0	D	2	3	3.0	D	1	2
WVMC-32	6.0	D	1	2	4.0	D	1	1
WVMC-32-B	18.0	D	2	4	18.0	D	2	4
WVMC-32-C-1	4.0	D	1	1	18.0	D	2	2
WVMC-32-D	9.0	D	1	1	18.0	D	2	4
WVMC-32-E	2.0	D	2	1	3.0	D	2	1
WVMC-32-F	18.0	D	3	4	4.0	M	2	3
WVMC-32-G	10.0	D	0	0	10.0	D	0	1
WVMC-00-{43}	20.0	D	2	3	20.0	D	2	3
WVMC-33-{0.0}	11.5	M	2	2	20.0	D	1	1
WVMC-33-A	3.0	D	0	0	18.0	D	0	0
WVMC-33-A.5	6.0	M	1	1	18.0	M	2	3
WVMC-33-B	17.0	D	4	1	12.0	M	3	1
WVMC-33-B.5	100.0	D	2	3	25.0	D	2	3
WVMC-33-C	0.0	D	0	1	0.0	D	0	0
WVMC-33-D	1.0	D	1	1	0.0	D	0	0
WVMC-33-E	0.0	D	0	0	0.0	D	0	0
WVMC-33-F	0.0	D	0	0	0.0	D	0	0
WVMC-34-{0.0}	18.0	D	1	4	17.0	D	1	4
WVMC-35	5.0	D	1	2	15.0	D	1	2
WVMC-35.5-{0.0}	12.0	D	1	2	15.0	M	2	4
WVMC-36-{0.0}	18.0	D	3	3	15.0	D	4	2
WVMC-36-A	5.0	D	1	1	5.0	D	1	1
WVMC-39	2.0	D	1	1	2.0	D	1	1
WVMC-40	1.0	M	2	1	2.0	M	2	1
WVMC-42	3.0	D	3	2	2.0	D	3	2
WVMC-43-{0.0}	4.0	D	1	1	11.0	M	2	2
WVMC-43-A	18.0	D	2	2	18.0	D	2	2
WVMC-43-B	0.0	D	1	1	3.0	D	1	2
WVMC-44-{0.0}	18.0	D	3	4	18.0	D	3	4
WVMC-46	3.0	D	2	2	4.0	D	1	2
WVMC-46-A	18.0	D	3	3	0.0	D	1	1
WVMC-46-B	18.0	D	3	3	2.0	D	2	1
WVMC-47	18.0	D	2	4	12.0	D	2	4
WVMC-48	ND							
WVMC-49	13.0	D	2	4	18.0	D	1	4
WVMC-50	6.0	D	0	2	6.0	D	1	2

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMC-51	18.0	D	2	4	16.0	D	2	4
WVMC-51-A	10.0	M	1	3	18.0	M	2	4
WVMC-51-B	18.0	M	3	4	18.0	M	3	4
WVMC-51-B-1	ND							
WVMC-51-B-2	18.0	D	2	3	10.0	D	2	4
WVMC-51-B-3	4.0	D	1	2	3.0	D	1	2
WVMC-51-B-4	9.0	D	1	3	18.0	D	2	4
WVMC-51-B-5	3.0	D	2	1	4.0	D	3	2
WVMC-00-{71.0}	4.0	D	1	1	4.0	0	1	1
WVMC-52	8.0	D	1	2	5.0	D	1	2
WVMC-52-.7A	18.0	M	3	2	10.0	M	2	2
WVMC-52-A	18.0	M	2	3	16.0	M	2	3
WVMC-53	7.0	M	1	2	18.0	M	2	4
WVMC-54	3.0	D	1	1	10.0	D	3	2
WVMC-54-A	18.0	M	2	4	18.0	M	2	4
WVMC-54-C	17.0	M	2	4	18.0	D	2	4
WVMC-54-D	18.0	M	4	2	18.0	M	4	2
WVMC-54-F	2.0	M	1	1	9.0	M	3	2
WVMC-54-H	18.0	M	3	4	10.0	M	3	4
WVMC-54-H-1	10.0	D	1	1	10.0	D	1	1
WVMC-54-I	3.0	M	1	1	7.0	M	1	1
WVMC-54-I-1	18.0	M	2	4	7.0	M	1	2
WVMC-54-J	3.0	M	1	1	5.0	D	1	1
WVMC-54-K	7.0	M	1	2	18.0	M	2	3
WVMC-55	18.0	D	3	4	2.0	D	1	1
WVMC-56	18.0	D	1	1	4.0	D	3	4
WVMC-57	4.0	D	1	2	4.0	D	1	2
WVMC-59-{00.0}	6.0	D	1	1	6.0	D	2	2
WVMCS-.5	3.0	D	1	0	4.0	D	0	1
WVMCS-2	5.0	M	0	3	3.0	M	0	2
WVMCS-3	0.1	D	0	1	3.0	D	2	1
WVMCS-3-A	10.0	D	1	2	25.0	D	1	2
WVMCS-5	5.0	M	2	2	2.0	M	2	1
WVMCS-6	4.0	M	1	1	50.0	M	1	3
WVMCS-6-B	2.0	D	2	1	3.0	D	2	1
WVMCS-6-C	0.0	D	1	1	0.0	D	1	1
WVMCS-6-E	50.0	D	1	4	5.0	D	1	2
WVMCS-7	6.0	M	1	2	15.0	M	1	2
WVMCS-7.5	8.0	D	2	2	5.0	D	0	2
WVMCS-8	18.0	M	2	4	18.0	M	2	4
WVMCS-12	30.0	C	1	4	15.0	M	1	4

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMCS-13	30.0	M	2	3	4.0	D	0	2
WVMCS-14	8.0	M	2	2	50.0	M	2	3
WVMCS-15	50.0	D	1	2	15.0	D	1	2
WVMCS-16	4.0	D	0	1	30.0	D	1	2
WVMCS-18	8.0	D	1	2	10.0	D	1	4
WVMC-59-{20.4}	50.0	D	3	3	5.0	M	3	2
WVMCS-22	8.0	D	1	1	0.0	D	1	1
WVMCS-25	30.0	D	2	3	20.0	D	2	3
WVMCS-28	15.0	D	1	3	10.0	D	2	2
WVMCS-33	10.0	D	1	3	5.0	D	1	3
WVMCS-46	5.0	M	2	1	10.0	M	3	1
WVMCS-47	10.0	M	2	3	25.0	M	3	2
WVMCS-53	30.0	D	1	2	30.0	D	1	4
WVMCS-54	30.0	M	2	1	15.0	M	2	2
WVMC-60-A	8.0	D	0	2	10.0	M	2	4
WVMC-60-C	5.0	D	0	2	10.0	M	1	4
WVMC-60-C-3	10.0	M	3	4	10.0	M	3	4
WVMC-60-C-4	10.0	M	2	4	10.0	M	2	4
WVMC-60-C-5	ND							
WVMC-60-D-1	15.0	M	3	2	18.0	M	3	2
WVMC-60-D-2	18.0	M	3	2	17.0	M	2	2
WVMC-60-D-2.7	ND							
WVMC-60-D-3-A	6.0	D	1	2	6.0	D	1	2
WVMC-60-D-3-B	0.0	D	1	4	0.0	D	1	1
WVMC-60-D-3-C	18.0	M	0	1	15.0	M	0	1
WVMC-60-D-3-E	18.0	M	0	1	6.0	M	0	1
WVMC-60-D-4	18.0	M	1	1	18.0	M	1	1
WVMC-60-D-4.5	15.0	M	3	1	15.0	M	3	1
WVMC-60-D-4.7	18.0	M	4	1	18.0	M	4	1
WVMC-60-D-9	5.0	D	0	0	5.0	D	0	0
WVMC-60-D-11	6.0	D	0	0	7.0	D	0	0
WVMC-60-D-12	10.0	D	2	2	10.0	D	2	2
WVMC-60-D-14	10.0	D	0	0	10.0	D	0	0
WVMC-60-D-{25.0}	18.0	D	1	1	18.0	D	0	0
WVMC-60-E	10.0	M	2	3	10.0	M	2	3
WVMC-60-F	10.0	M	2	4	10.0	M	2	4
WVMC-60-G	10.0	D	1	3	8.0	D	1	3
WVMC-60-H.5	ND							
WVMC-60-I	10.0	M	2	4	10.0	M	2	4
WVMC-60-J	6.0	D	1	2	10.0	D	1	3
WVMC-60-K	18.0	M	1	1	18.0	D	2	2

Table 30: (Continued)
Riparian Habitat Assessment - Canopy
(> 5 M High)

STREAM CODE	LEFT				RIGHT			
	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES	ZONE WIDTH	VEG TYPE	BIG TREES	SMALL TREES
WVMC-60-K-2-A	30.0	D	1	3	30.0	M	1	4
WVMC-60-K-5	15.0	M	1	3	8.0	C	1	2
WVMC-60-K-8	0.0	M	3	1	0.0	D	3	1
WVMC-60-K-16	0.0	D	0	0	0.0	D	0	1
WVMC-60-K-17	0.0	D	0	1	2.0	D	1	1
WVMC-60-K-17-A	18.0	M	4	3	10.0	M	3	2
WVMC-60-L	10.0	D	1	3	10.0	D	2	3
WVMC-60-N-{01}	0.0	D	1	1	18.0	D	2	2
WVMC-60-N-4	18.0	M	2	1	18.0	M	2	1
WVMC-60-N-8	10.0	D	1	1	18.0	M	1	1
WVMC-60-N-8.5	14.0	M	2	3	18.0	M	2	4
WVMC-60-N-{20}	18.0	D	1	3	10.0	D	1	1
WVMC-60-{11.6}	4.0	D	0	1	2.0	D	0	0
WVMC-60-O-{01.0}	5.0	D	1	2	9.0	M	1	4
WVMC-60-O-1	1.0	D	1	2	12.0	D	3	4
WVMC-60-O-{07.0}	10.0	M	3	3	18.0	M	1	4
WVMC-60-P	2.0	D	1	1	8.0	D	1	2
WVMC-60-Q	4.0	D	1	2	2.0	D	0	1
WVMC-60-R	5.0	M	2	3	30.0	M	1	3
WVMC-60-S	2.0	M	1	1	2.0	D	1	1
WVMC-60-{25.1}	8.0	D	1	2	6.0	D	1	2
WVMC-60-T-{02.5}	2.0	D	3	3	0.0	N	0	0
WVMC-60-T-1	16.0	D	2	3	18.0	D	2	3
WVMC-60-T-2	18.0	M	4	3	18.0	M	4	3
WVMC-60-T-3	30.0	D	1	3	30.0	D	1	3
WVMC-60-T-8	18.0	D	2	4	18.0	M	2	4
WVMC-60-T-9	8.0	M	1	2	8.0	M	1	2
WVMC-60-T-10	15.0	M	3	2	18.0	M	4	3
WVMC-60-T-11	18.0	M	1	4	18.0	M	2	4
WVMC-60-T-13	10.0	M	1	2	18.0	M	1	1
WVMC-60-T-{13.0}	0.0	C	1	1	0.0	C	1	1

veg type: D = deciduous
C = coniferous
M = mixed (at least 10 % of each type)
N = none
ND = not determined

Tree values: 0 = absent
1 = sparse (0-10% of canopy)
2 = moderate (10-40%)
3 = heavy (40-75%)
4 = very heavy (>75%)

Table 31: Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-2	18	19	19	18	20	17	19	20	15	16	18	19	218
WVMC-2-A	10	15	14	18	15	15	19	17	16	13	18	11	183
WVMC-2.5	10	13	16	15	14	10	18	16	14	11	10	5	152
WVMC-2.5-A	12	18	19	17	15	18	17	19	15	16	10	1	177
WVMC-2.7	11	16	17	15	15	18	17	17	19	19	12	3	179
WVMC-4	13	19	19	18	10	17	20	15	13	7	2	7	163
WVMC-7	17	19	19	19	20	20	18	18	15	14	20	15	214
WVMC-10	12	19	15	16	19	7	18	19	15	10	18	15	184
WVMC-11-{00}	12	16	17	17	15	18	17	14	16	17	12	7	178
WVMC-11-.1A	16	17	17	15	9	3	16	17	17	16	19	18	180
WVMC-11-A	5	13	16	10	15	16	14	15	15	15	6	1	141
WVMC-11-{05}	17	18	16	17	15	16	16	19	16	14	7	1	172
WVMC-11-B	15	16	17	15	17	17	17	18	19	19	8	5	183
WVMC-11-C	18	16	19	17	14	17	17	18	18	16	12	2	184
WVMC-11-{07}	12	16	16	16	14	17	14	16	13	16	14	5	169
WVMC-11-C.1	14	16	16	17	16	18	16	14	16	13	9	5	170
WVMC-11-D-{00}	4	5	4	4	15	7	10	13	9	13	3	2	89
WVMC-11-D-{10}	14	15	11	16	12	9	5	13	12	12	14	8	141
WVMC-11-E	4	6	3	5	19	2	10	11	7	11	4	4	86
WVMC-12-{00}	18	16	18	17	19	18	17	19	19	18	18	19	216
WVMC-12-.5A-{0}	18	17	18	18	19	19	17	19	19	12	19	14	209
WVMC-12-.5A-{3}	16	16	18	13	16	10	16	15	16	15	7	5	163
WVMC-12-.5A-{5}	2	1	8	5	17	10	4	4	18	18	14	4	95
WVMC-12-.7A	13	16	16	17	17	16	16	19	1	10	11	8	160
WVMC-12-A-{02.5}	18	19	18	15	15	15	19	16	15	17	13	5	185
WVMC-12-A-1	18	19	18	15	15	18	19	19	18	18	20	20	202
WVMC-12-A-1-A	17	19	15	16	16	14	19	17	18	18	18	16	203
WVMC-12-A-2	16	17	19	17	12	17	18	19	20	20	7	5	187
WVMC-12-A-{03}	19	19	19	20	20	13	19	19	18	19	20	20	225
WVMC-12-B-{01}	16	13	13	15	20	17	14	15	5	8	13	12	161
WVMC-12-B-.5-{00}	16	18	17	15	15	17	18	18	17	18	8	4	181
WVMC-12-B-.5-A	7	7	6	12	15	6	12	8	14	15	15	8	125
WVMC-12-B-.5-{02}	2	8	15	12	15	15	14	9	17	15	9	9	140
WVMC-12-B-{02}	19	19	19	15	15	19	20	20	15	16	10	5	192
WVMC-12-B-1-{01}	14	14	11	14	14	12	16	18	16	16	19	15	179
WVMC-12-B-1-B	7	12	8	15	13	17	11	19	17	16	15	14	164

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-12-B-1-{04}	12	18	12	15	13	10	18	19	17	17	16	15	182
WVMC-12-B-2	3	2	9	7	12	11	9	19	9	10	11	4	106
WVMC-12-B-{06}	14	15	10	17	19	10	18	18	15	16	18	18	188
WVMC-12-B-3-{00}	6	3	6	5	20	8	15	19	18	18	19	19	156
WVMC-12-B-3-{02}	9	7	10	14	14	8	8	16	10	11	17	16	140
WVMC-12-B-4-{02}	8	12	12	9	13	10	8	18	16	15	17	10	148
WVMC-12-B-4-{03}	15	13	18	10	13	13	19	20	18	18	12	6	171
WVMC-12-B-4.5	1	1	1	2	12	1	1	19	19	18	19	19	113
WVMC-12-B-6	19	18	14	14	11	14	17	18	18	12	11	7	173
WVMC-12-B-{11}	13	12	11	13	2	8	10	17	8	6	18	7	125
WVMC-12-B-5-C	13	18	12	10	15	10	18	18	13	14	8	5	154
WVMC-12-B-5-{03}	1	13	8	13	14	13	8	18	16	18	14	13	149
WVMC-12-B-{12}	0	1	0	1	15	0	1	4	17	19	20	20	98
WVMC-12-C-{01}	1	5	13	6	15	1	2	18	15	16	19	19	130
WVMC-12-C-{04}	1	2	0	8	18	2	7	8	18	3	17	17	101
WVMC-12-D	16	19	18	15	15	19	19	18	19	13	5	1	177
WVMC-12-{10}	14	15	11	18	12	10	13	18	14	15	10	10	160
WVMC-12-E	16	19	13	14	13	10	19	16	11	8	16	12	167
WVMC-12-E.1	16	19	16	15	13	17	20	19	15	17	18	9	194
WVMC-12-F-{00.0}	8	9	2	14	13	8	12	16	15	16	10	9	132
WVMC-12-F-{01.0}	12	11	15	11	18	16	16	17	16	16	18	15	181
WVMC-12-{14}	7	4	5	11	18	6	8	17	14	14	16	5	125
WVMC-00-{18.3}	15	14	11	15	17	16	15	19	15	17	19	19	192
WVMC-13-{01}	5	4	10	5	18	2	4	7	11	15	18	10	109
WVMC-13.5-{2.3}	0	0	0	2	18	1	2	7	6	4	18	7	65
WVMC-14-{02}	1	5	4	6	14	3	8	16	17	16	3	1	94
WVMC-15-{01}	16	16	19	19	20	19	16	17	11	19	19	20	211
WVMC-15-A	10	8	6	13	18	5	14	18	16	15	19	14	156
WVMC-16-{02}	18	18	11	16	16	5	18	17	10	11	16	12	168
WVMC-16-A-{0.2}	17	17	10	15	16	5	18	14	13	12	8	6	146
WVMC-16-A-.1	15	17	5	15	15	5	17	16	17	16	1	1	140
WVMC-16-A-{0.8}	12	13	9	13	15	5	13	16	9	12	17	8	142
WVMC-16-A-{2.5}	17	13	10	11	13	13	17	16	13	13	9	7	152
WVMC-16-A-{3.9}	1	2	0	1	18	1	1	7	19	19	19	8	96
WVMC-16-{04}	16	17	18	16	16	19	19	17	10	15	15	8	186
WVMC-17-{0.0}	17	16	16	18	18	15	17	16	16	19	19	14	201
WVMC-17-.6A	19	12	18	13	15	19	19	8	18	19	19	19	188
WVMC-17-.7	18	16	13	15	15	18	19	18	17	18	19	19	188
WVMC-17-{2.6}	19	16	8	13	15	17	19	18	15	17	15	10	182

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-17-A-{0.0}	17	17	4	16	15	15	19	17	18	18	18	10	184
WVMC-17-A-.5-{0}	17	17	2	15	20	13	19	15	12	12	20	19	165
WVMC-17-A-.5-{3}	1	4	5	7	15	2	9	9	14	13	5	4	88
WVMC-17-A-1-{0.0}	18	19	14	15	17	18	19	17	17	18	19	10	201
WVMC-17-A-1.1	3	8	11	9	15	2	12	18	18	8	19	19	142
WVMC-17-A-1.2	1	6	4	8	15	2	2	16	16	17	15	18	120
WVMC-17-A-1-{3.2}	1	3	2	5	13	2	2	13	15	10	3	1	80
WVMC-17-A-{2.1}	6	6	2	6	2	3	8	14	12	12	7	2	80
WVMC-17-{3.2}	17	18	19	18	15	16	18	19	17	19	18	7	201
WVMC-17-A.1	17	18	18	15	15	15	19	19	17	18	10	4	185
WVMC-17-{6.8}	14	19	18	19	15	17	19	18	18	15	15	7	194
WVMC-17-B	16	10	14	14	15	10	17	19	17	18	20	15	185
WVMC-17-C	13	17	16	17	20	11	16	19	15	9	20	20	205
WVMC-17-{10.2}	15	19	13	14	20	11	18	16	15	15	19	13	188
WVMC-17-{14.4}	13	16	12	10	14	16	14	14	10	10	13	8	150
WVMC-18-{0.0}	16	18	19	10	19	15	20	16	17	19	17	5	191
WVMC-18-.1A	16	19	14	16	18	14	19	16	19	20	19	17	207
WVMC-18-A-1	13	14	15	10	20	17	10	19	19	20	17	13	187
WVMC-18-A	6	11	1	7	11	2	10	14	6	11	9	5	93
WVMC-18-{6.0}	19	19	16	18	19	14	17	15	16	18	18	16	205
WVMC-19	19	16	6	15	14	5	20	20	15	17	8	4	159
WVMC-19-A	17	17	16	19	19	14	19	15	18	15	20	20	209
WVMC-20-{0.0}	20	20	20	20	15	19	20	20	13	16	12	5	200
WVMC-20-{6.0}	15	14	16	14	19	16	15	16	15	18	15	11	184
WVMC-21	19	17	11	19	20	10	20	19	19	17	17	15	203
WVMC-22-{1.5}	19	17	11	19	15	8	18	17	14	16	16	15	185
WVMC-22-B	14	8	12	14	15	9	16	15	16	16	14	5	154
WVMC-22-{2.0}	19	18	7	19	14	8	19	18	17	17	15	13	182
WVMC-23-{0.0}	12	16	0	11	13	12	17	14	15	16	18	5	149
WVMC-23-.2A	11	9	7	9	8	12	16	13	7	10	13	5	120
WVMC-23-A-{0.0}	6	9	7	11	6	11	8	8	2	2	14	1	85
WVMC-23-A-.1-A	12	11	15	10	12	18	14	10	18	19	12	2	153
WVMC-23-A-.1-B	12	11	7	9	7	6	12	9	8	7	12	0	100
WVMC-23-A-{2.9}	8	7	8	10	13	11	8	8	7	9	12	8	109
WVMC-23-{1.8}	8	11	7	9	12	10	16	8	12	16	19	6	134
WVMC-23-{2.0}	5	9	3	6	8	3	8	8	11	16	14	3	94
WVMC-24-{0.0}	16	15	8	13	14	12	17	14	18	19	17	12	175
WVMC-24-A	11	12	8	11	13	12	11	11	13	13	11	6	132
WVMC-24-{2.7}	7	11	5	8	20	3	12	14	17	20	20	20	157

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-25-{0.0}	18	20	0	19	15	19	18	20	19	20	18	18	204
WVMC-25-{2.3}	11	14	9	7	13	12	13	14	15	14	11	9	142
WVMC-26-{0.0}	17	17	11	16	15	10	19	17	9	7	16	15	169
WVMC-26-{1.5}	7	7	11	11	14	10	12	17	16	14	6	0	125
WVMC-27-{0.0}	20	19	0	18	15	20	20	15	19	20	20	19	205
WVMC-27-{2.7}	8	9	4	8	11	8	8	12	11	8	11	8	106
WVMC-27-A	11	11	6	6	11	14	9	14	12	17	12	1	124
WVMC-27-B	8	7	1	6	12	3	8	13	9	12	13	0	92
WVMC-28	15	17	16	16	19	16	16	19	15	11	14	16	190
WVMC-31-{0.0}	19	19	12	9	13	19	19	12	13	17	10	8	170
WVMC-31.7	10	18	18	18	15	18	18	20	16	14	10	2	177
WVMC-32	16	17	18	18	17	18	19	19	16	15	10	2	185
WVMC-32-B	16	16	18	17	19	17	19	19	17	17	18	15	208
WVMC-32-C-1	10	16	14	16	13	16	17	19	16	11	14	2	164
WVMC-32-D	14	18	18	19	15	17	18	18	15	15	15	9	191
WVMC-32-E	13	17	16	19	11	17	17	19	15	4	9	2	159
WVMC-32-F	15	16	15	16	15	18	16	18	16	16	14	8	183
WVMC-32-G	12	17	19	16	15	19	16	16	12	16	14	10	182
WVMC-00-{43}	13	11	12	13	14	14	7	17	17	18	20	16	172
WVMC-33-{0.0}	15	18	17	15	15	17	16	15	18	13	15	10	188
WVMC-33-A	16	18	17	10	14	17	19	17	14	16	10	5	173
WVMC-33-A.5	16	18	15	10	16	14	19	18	16	18	15	7	182
WVMC-33-B	18	17	16	10	16	14	18	17	16	16	14	11	183
WVMC-33-B.5	17	18	19	15	18	15	19	17	16	15	20	17	206
WVMC-33-C	16	17	16	15	13	15	16	16	15	16	10	5	170
WVMC-33-D	15	17	17	15	13	18	18	18	16	12	9	5	173
WVMC-33-E	18	17	19	10	12	16	17	18	10	11	6	1	155
WVMC-33-F	16	16	16	13	16	16	16	13	10	16	12	5	165
WVMC-34-{0.0}	14	17	17	10	20	17	18	17	12	14	18	18	192
WVMC-35	14	18	17	10	15	15	18	13	17	18	12	5	172
WVMC-35.5-{0.0}	15	18	15	10	14	14	18	16	13	13	14	12	172
WVMC-36-{0.0}	15	16	18	15	16	16	16	17	13	14	18	15	189
WVMC-36-A	14	17	17	10	7	17	18	18	10	7	5	4	144
WVMC-39	16	19	18	10	11	19	19	18	14	16	9	2	171
WVMC-40	16	16	16	11	13	16	17	19	16	17	11	5	173
WVMC-42	16	17	17	12	13	18	16	16	14	16	12	5	172
WVMC-43-{0.0}	18	17	18	15	13	19	16	15	16	13	11	5	176
WVMC-43-A	16	18	17	10	17	18	18	15	14	15	18	15	191
WVMC-43-B	12	18	16	8	12	16	19	16	10	15	6	3	151

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-44-{0.0}	17	19	13	10	20	14	19	9	14	14	19	20	188
WVMC-46	16	16	16	17	15	17	18	19	20	20	6	2	182
WVMC-46-A	18	19	18	11	13	18	18	16	17	16	10	3	157
WVMC-46-B	18	18	18	10	12	18	19	14	14	15	16	4	176
WVMC-47	16	18	16	18	20	19	17	18	16	18	13	10	199
WVMC-49	15	18	15	16	15	17	18	19	10	10	15	15	183
WVMC-50	16	17	16	17	16	18	18	19	20	16	15	6	179
WVMC-51	17	18	18	18	17	18	17	19	18	16	16	13	205
WVMC-51-A	16	19	18	19	19	19	18	19	15	16	14	8	200
WVMC-51-B	17	18	19	16	19	18	18	19	14	15	19	20	212
WVMC-51-B-2	8	16	14	15	6	15	17	19	10	13	14	10	157
WVMC-51-B-3	14	15	15	17	15	18	16	17	13	13	10	4	167
WVMC-51-B-4	11	17	15	18	18	18	18	19	15	16	17	8	190
WVMC-51-B-5	8	11	17	14	1	16	13	18	4	0	1	3	106
WVMC-00-{71.0}	0	2	0	3	16	0	2	19	18	18	5	2	85
WVMC-52	15	16	18	15	15	18	16	16	16	17	18	5	185
WVMC-52-.7A	15	17	13	10	19	12	18	15	14	15	17	10	175
WVMC-52-A	14	18	17	10	19	17	19	16	16	16	19	16	197
WVMC-53	15	18	20	10	15	15	19	9	15	16	13	9	174
WVMC-54	14	13	18	16	15	16	14	15	12	13	8	3	157
WVMC-54-A	16	17	18	17	20	19	18	16	14	15	16	19	205
WVMC-54-C	15	20	19	10	18	16	20	10	15	16	17	16	192
WVMC-54-D	14	17	18	10	17	15	17	15	14	14	18	19	188
WVMC-54-F	16	19	17	10	10	17	19	17	15	6	9	2	157
WVMC-54-H	17	19	18	19	16	17	19	17	15	12	16	10	195
WVMC-54-H-1	12	18	16	15	16	19	18	19	12	19	20	10	194
WVMC-54-I	14	18	16	10	15	16	19	17	13	14	8	3	163
WVMC-54-I-1	16	17	14	15	16	12	19	19	18	16	9	9	180
WVMC-54-J	14	17	17	10	13	15	16	15	11	12	9	3	152
WVMC-54-K	14	18	16	10	15	18	20	18	16	16	10	7	178
WVMC-55	16	17	14	18	14	15	18	18	14	19	3	1	167
WVMC-56	18	19	18	19	11	19	20	20	11	18	12	3	188
WVMC-57	11	16	15	16	15	14	16	9	14	16	10	5	153
WVMC-59-{00.0}	16	18	16	18	17	17	16	19	14	13	8	9	181
WVMCS-.5	0	1	2	3	15	3	1	7	1	3	4	4	44
WVMCS-2	9	10	14	10	17	15	18	15	17	11	12	4	162
WVMCS-3	16	15	16	15	10	16	15	14	4	2	1	0	124
WVMCS-3-A	16	19	16	19	11	17	16	15	9	5	17	15	175
WVMCS-5	6	10	13	12	17	10	18	16	16	11	11	3	133

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMCS-6	13	15	17	17	14	14	18	17	16	14	8	5	168
WVMCS-6-B	17	17	16	17	15	12	18	16	15	15	14	2	163
WVMCS-6-C	15	18	16	10	1	10	18	8	8	2	2	1	109
WVMCS-6-E	7	8	19	9	15	19	16	7	14	11	14	10	147
WVMCS-7	11	12	18	10	13	15	15	7	12	11	13	10	147
WVMCS-7.5	15	17	16	13	13	13	17	11	12	9	8	8	152
WVMCS-8	16	18	15	16	16	18	17	10	16	19	18	19	198
WVMCS-12	17	14	16	15	15	15	19	16	18	18	18	15	196
WVMCS-13	20	18	20	19	15	19	19	19	8	15	10	5	187
WVMCS-14	19	19	17	19	19	13	18	17	20	19	19	15	214
WVMCS-15	17	14	17	15	14	13	18	15	16	18	15	13	186
WVMCS-16	16	17	19	10	15	19	18	14	9	11	7	4	159
WVMCS-18	20	20	17	17	18	15	19	17	18	19	17	15	212
WVMC-59-{20.4}	17	17	18	15	19	17	17	18	13	15	11	9	176
WVMCS-22	15	16	14	14	11	13	16	17	9	8	2	1	136
WVMCS-25	12	17	14	14	18	10	17	6	17	17	19	16	177
WVMCS-28	20	18	20	18	19	19	18	17	14	13	17	15	209
WVMCS-33	19	15	19	19	15	19	16	16	15	17	10	9	189
WVMCS-46	18	18	18	17	15	17	18	18	15	14	16	3	187
WVMCS-47	16	17	17	17	17	9	18	17	10	14	16	12	180
WVMCS-53	18	20	17	18	15	17	19	17	17	18	16	16	208
WVMCS-54	16	19	19	10	20	20	20	20	18	18	18	16	216
WVMC-60-A	17	18	15	17	15	16	17	16	16	15	15	10	187
WVMC-60-C	12	15	15	15	18	15	13	15	16	19	18	19	190
WVMC-60-C-3	17	17	16	10	15	16	16	10	14	18	19	20	188
WVMC-60-C-4	11	15	16	12	20	19	17	10	18	16	17	20	193
WVMC-60-D-1	17	18	9	11	20	14	16	18	18	18	19	16	194
WVMC-60-D-2	12	16	12	10	15	13	16	18	16	18	18	15	179
WVMC-60-D-3-A	2	3	18	10	16	16	3	18	18	19	19	7	149
WVMC-60-D-3-B	3	1	18	5	1	16	20	16	19	18	19	0	136
WVMC-60-D-3-C	10	18	11	10	18	13	16	16	16	19	19	14	180
WVMC-60-D-3-E	13	16	9	10	15	10	16	15	18	17	13	7	159
WVMC-60-D-4	13	16	12	8	18	12	5	18	16	17	19	19	173
WVMC-60-D-4.5	14	15	9	10	19	14	18	17	17	19	19	15	186
WVMC-60-D-4.7	16	14	9	10	20	15	19	19	18	19	20	20	199
WVMC-60-D-9	5	11	8	12	15	11	18	18	18	17	13	7	153
WVMC-60-D-11	16	18	18	16	12	16	17	17	18	13	14	7	182
WVMC-60-D-12	10	18	18	18	15	16	18	8	15	18	17	16	187
WVMC-60-D-14	13	15	15	10	20	10	8	18	18	20	17	15	179

Table 31: (Continued)
Rapid Habitat Assessment Scores

STREAM CODE	COV	SUB	EMBED	VELO	ALTER	SEDMT	RIFFS	FLOW	BANK	BANK VEG	GRAZE	RIP VEG	TOTAL
WVMC-60-D-{25.0}	1	14	16	15	19	17	16	17	14	16	17	18	180
WVMC-60-E	16	17	14	17	18	15	17	16	18	19	19	19	205
WVMC-60-F	18	18	17	18	20	20	18	18	19	19	20	20	225
WVMC-60-G	16	18	16	17	16	15	17	16	17	15	14	7	187
WVMC-60-I	17	18	15	17	18	16	17	16	17	19	16	19	205
WVMC-60-J	15	17	13	17	14	14	16	14	8	13	10	6	157
WVMC-60-K	20	19	20	16	20	20	18	15	19	10	20	20	217
WVMC-60-K-2-A	18	20	18	16	20	19	19	17	17	17	17	17	214
WVMC-60-K-5	15	19	16	14	17	13	20	19	16	14	13	10	186
WVMC-60-K-8	18	15	19	10	14	16	16	16	12	4	20	9	169
WVMC-60-K-16	15	12	11	11	14	15	10	15	15	10	14	3	145
WVMC-60-K-17	15	14	17	15	20	15	15	16	8	5	12	2	154
WVMC-60-K-17-A	18	17	16	15	20	18	18	19	12	11	20	11	195
WVMC-60-L	19	18	16	19	20	17	19	17	17	19	20	18	219
WVMC-60-N-{01}	19	19	20	16	7	20	19	10	20	2	13	3	168
WVMC-60-N-4	15	18	16	15	20	14	19	20	15	15	20	20	207
WVMC-60-N-8	17	17	19	15	18	15	16	12	13	14	13	16	185
WVMC-60-N-8.5	18	18	18	14	20	16	20	19	12	13	20	15	203
WVMC-60-N-{20}	16	19	18	15	16	16	18	14	12	15	8	6	173
WVMC-60-{11.6}	18	19	17	19	19	17	19	17	17	7	17	5	191
WVMC-60-O-{01.0}	18	19	19	20	16	19	19	19	19	19	13	5	205
WVMC-60-O-1	15	18	16	16	11	16	18	15	16	3	9	1	154
WVMC-60-O-{07.0}	19	19	19	20	20	18	17	10	10	16	19	15	202
WVMC-60-P	17	16	18	18	15	16	18	17	11	12	10	3	171
WVMC-60-Q	18	19	17	18	10	18	19	18	8	4	7	5	161
WVMC-60-R	14	9	6	14	20	2	13	15	12	12	12	5	134
WVMC-60-S	17	0	0	0	8	0	0	0	9	5	9	3	51
WVMC-60-{25.1}	19	17	20	18	12	18	18	19	15	9	10	9	184
WVMC-60-T-{02.5}	16	18	18	16	9	18	18	15	10	0	10	8	156
WVMC-60-T-1	18	17	18	15	20	20	20	19	16	16	20	17	216
WVMC-60-T-2	18	15	18	11	20	19	20	20	13	20	20	18	211
WVMC-60-T-3	20	18	20	18	20	20	20	17	15	16	18	19	221
WVMC-60-T-8	15	18	16	15	17	18	17	18	12	3	20	18	187
WVMC-60-T-9	16	19	19	13	15	19	20	18	18	18	15	10	200
WVMC-60-T-10	15	17	16	15	20	17	18	18	12	6	18	15	187
WVMC-60-T-11	12	18	19	14	15	18	20	18	18	8	16	17	193
WVMC-60-T-13	19	19	15	17	20	11	18	15	10	15	16	12	187
WVMC-60-T-{13.0}	17	17	16	15	13	15	16	16	5	11	7	2	150

Key: Categories scored 0-20, total score possible = 240
cov = instream cover
sub = epifaunal substrate
embed = embeddedness
velo = # of velocity/depth regimes present (ie. fast/shallow)
alter = channel alteration
sedmt = sediment deposition
riffs = frequency of riffles
flow = channel flow status
bank = erosional condition of banks (ex. 20 = no signs of erosion)
bank veg = vegetative protection
graze = grazing or other disruptive pressure
rip veg = riparian vegetation zone width (least buffered side)

APPENDIX B: GLOSSARY

303(d) list -a list of streams that are water quality limited and not expected to meet water quality criteria even after applying technology-based controls. Required by the Clean Water Act and named for the section of the Act in which it appears.

acidity -the capacity of water to donate protons. The abbreviation pH (see def.) refers to degree of acidity. Higher acidities are more corrosive and harmful to aquatic life.

acid mine drainage (AMD) -acidic water discharged from an active or abandoned mine.

alkalinity -measures water's buffering capacity, or resistance to acidification; often expressed as the concentration of carbonate and bicarbonate.

aluminum -a potentially toxic metallic element often found in mine drainage; when oxidized forms a white precipitate called "white boy".

benthic macroinvertebrates - small animals without backbones yet still visible to the naked eye, that live on the bottom (the substrate) of a water body, that are large enough to be collected with a 595 m mesh screen. Examples include insects, worms, snails, clams and crayfish.

benthic organisms, or benthos - organisms that live on or near the substrate (bottom) of a water body, e.g., algae, mayfly larvae and darters.

buffer -a dissolved substance that maintains a solution's original pH by neutralizing added acid.

canopy -The layer of vegetation that is more than 5 meters from the ground; see understory and ground cover.

citizens monitoring team -a group of people that periodically check the ecological health of their local streams.

conductivity (conductance) -the capacity of water to conduct an electrical current, higher conductivities indicate higher concentrations of ions.

designated uses -the uses specified in the state water quality standards for each water body or segment (e.g., fish propagation or industrial water supply).

discharge -liquid flowing from a point source; or the volume of water flowing down a stream per unit of time, typically recorded as cfs (cubic feet / second).

discharge permit -a legal document issued by a government regulatory agency specifying the kinds and amounts of pollutants a person or group may discharge into a water body; often called NPDES permit.

dissolved oxygen - the amount of molecular oxygen dissolved in water.

Division of Environmental Protection (DEP) -a unit in the executive branch of West Virginia's state government charged with enforcing environmental laws and monitoring environmental quality.

ecoregion -a land area with relative homogeneity in ecosystems that, under nonimpaired conditions, contain habitats which should support similar communities of animals.

ecosystem -the complex of a community and its environment functioning as an ecological unit in nature. A not easily defined aggregation of biotic and abiotic components that are interconnected through various trophic pathways and that interact systematically in the transfer of nutrients and energy.

effluent -liquid flowing from a point source (e.g., pipe or collection pond).

Environmental Quality Board (EQB) -a standing group, whose members are appointed by the governor, that promulgates water quality criteria and judges appeals for relief from water quality regulations.

Environmental Protection Agency (EPA) -a unit in the executive branch of the federal government charged with enforcing environmental laws.

ephemeral -a stream that carries surface water during only part of the year; a stream that occasionally dries up.

eutrophic -a condition of a lake or stream which has higher than normal levels of nutrients, contributing to excessive plant growth. Usually eutropic waters are seasonally deficient in oxygen. Consequently more food and cover is provided to some macrobenthos than would be provided otherwise.

fecal coliform bacteria -a group of single-celled organisms common in the alimentary tracts of some birds and all mammals, including man; indicates fecal pollution and the *potential* presence of human pathogens.

ground cover -vegetation that forms the lowest layer in a plant community (defined as less than 0.5 meters high for this assessment) .

impaired -(1) according to the water quality standards, a stream that does not fully support one or more of its designated uses; (2) as used in this assessment report, a benthic macroinvertebrate community with metric scores substantially worse than those of an appropriate reference site; or having a bioscore below 50.

iron -a metallic element, often found in mine drainage, that is potentially harmful to aquatic life. When oxidized, it forms an orange precipitate called yellow boy that can clog fish and macroinvertebrate gills.

lacustrine - of or having to do with a lake or lakes.

MACS -Mid-Atlantic Coastal Streams -macrobenthic sampling methodology used in streams with very low gradient that lack riffle habitat suitable for the Program's preferred procedure.

manganese -a metallic element, often found in mine drainage, that is potentially harmful to aquatic life.

metrics -statistical tools used by ecologists to evaluate biological communities.

National Pollutant Discharge Elimination System (NPDES) -a government permitting activity created by section 402 of the federal Clean Water Act of 1972 to control all discharges of pollutants from point sources. In West Virginia this activity is conducted by the Office of Water Resources.

nonimpaired -(1) according to the water quality standard, a stream that fully supports all of its designated uses: (2) as used in this assessment report, a benthic community with metric scores comparable to those of an appropriate reference site.

nonpoint source (NPS) pollution -contaminants that run off a broad landscape area (e.g., plowed field, parking lot, dirt road) and enter a receiving water body.

Office of Water Resources (OWR) -a unit within the DEP that manages a variety of regulatory and voluntary activities to enhance and protect West Virginia's surface and ground waters.

oligotrophic - a stream, lake or pond which is poor in nutrients.

palustrine - of or having to do with a marsh, swamp or bog.

pH -indicates the concentration of hydrogen ions; a measure of the intensity of acidity of a liquid. Represented on a scale of zero-foourteen, a pH of one describes the strongest acid, 14 represents the strongest base and seven is neutral. Aquatic life cannot tolerate either extreme.

point source -a specific, discernible site (e.g., pipe, ditch, container) locatable on a map as a point, from which pollution discharges into a water body.

reference site -a stream reach that represents an area's (watershed or ecoregion) least impacted condition; used for comparison with other sites within that area. Site must meet the agency's minimum degradation criteria.

SCA -Soil Conservation Agency

stakeholder -a person or group with a vested interest in a watershed, e.g., landowner, businessperson, angler.

STORET -STOrage and RETrieval of U.S. waterways parametric data -a system maintained by EPA and used by OWR to store and analyze water quality data.

total maximum daily load (TMDL) -the total amount of a particular pollutant that can enter a water body and not cause a water quality standards violation.

turbidity -the extent to which light passes through water, indicating its clarity; indirect measure of suspended sediment.

understory -the layer of vegetation that forms a forest's middle layer (defined as 0.5 to 5 meters high for this assessment).

USGS -United States Geological Survey.

water-contact recreation -the type of designated use in which a person (e.g., angler, swimmer, or boater) comes in contact with the stream's water.

watershed -a geographic area from which water drains to a particular point.

Watershed Approach Steering Committee -a task force of federal (e.g., U.S. EPA, USGS) and state (e.g., DEP, SCA) officers that recommends streams for intense, detailed study.

Watershed Assessment Program (the Program) -a group of scientists within the OWR charged with evaluating and reporting on the ecological health of West Virginia's watersheds.

watershed association -a group of diverse stakeholders working via a consensus process to improve water quality in their local streams.

Watershed Network -an informal coalition of federal, state, multi-state and non-governmental groups cooperating to support local watershed associations.

Watershed Characterization and Modeling System – A computer program developed by West Virginia University that examines land uses and other characteristics of interest in examining watersheds. This program is based on the Arcview computer program.

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