WEST VIRGINIA
Division of Environmental Protection

Office of Water Resources

An Ecological Assessment of the

South Branch of The Potomac River Watershed

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1996

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Watershed Assessment Program

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SUMMARY

To evaluate the health of the South Branch of the Potomac River Watershed, assessment teams visited 115 sites, most of which were on tributaries near their mouths, during August and September 1996. The assessment teams recorded qualitative observations of human impacts and land uses, streamside and instream habitat conditions, and obvious indicators of water quality. Selected physical, chemical and biological water quality variables were measured either at each site or in the laboratory.

Two variables, 1) an index of habitat and benthic community conditions, and 2) the concentration of fecal coliform bacteria, are focal indicators of stream health. When the streams were sampled, 80 of the 115 sites (70%) had water with concentrations of fecal coliform bacteria lower (i.e., were safer) than the standard for water-contact recreation (400 colonies/ 100 ml), whereas 35 (30%) exceeded (i.e., were less safe than) the standard. Except for pH at 2 sites, (i.e. an unnamed tributary of the South Branch at McNeil [PSB-18.2] and Reeds Creek [PSB-33]) measurements of temperature, pH, and dissolved oxygen concentration met the state water quality standards.

Stream sites were also evaluated by comparing the habitat and benthic community to those of reference streams. Thirteen (13) sites provided better habitat and supported the least impaired benthos (i.e., most ecologically intact sites). Eleven sites had relatively poorer habitat and more impaired benthos. The remaining sites fell somewhere in the middle. Although the specific reasons why individual sites were healthy or degraded vary among streams, some tendencies were apparent. In general, the healthiest sites

were associated with few land use disturbances, few streambed alterations, at least moderately intact riparian habitat, and little silt. The most degraded sites, on the other hand, were associated with obvious nonpoint source pollution and degraded riparian habitat.

The Program recommends the following actions:

1. Study Lunice Creek [PSB-26] and Mill Creek [PSB-9] to determine the sources and the reaches affected by nitrogen and fecal coliform bacteria.

2. Although the fecal coliform bacteria concentrations for four streams were below the standard on the date samples were collected for this study, historic data and a Total Maximum Daily Load (TMDL) study indicate fecal coliform bacteria impact these four and two additional streams.

Subsequently, TMDLs were completed on each of these streams for fecal coliform bacteria. These TMDLs require reductions in loading of fecal coliform bacteria from agriculture and pasture nonpoint sources and one point source.

The Program recommends continuing support of the Potomac Headwaters Water Quality Program (PHWQP), the Water Quality Improvement Project in the North Fork of the South Branch watershed, and efforts by the West Virginia Department of Agriculture to further understand the fecal coliform bacteria loading and sources in the watershed.

3. Study the streams with high fecal coliform bacteria concentrations to determine the sources and extent of the streams impacted.

4. Continue the educational program on the dangers of improper sewage management and animal manure management in the South Branch of the Potomac Watershed.

5. Study Walnut Bottom Run [PSB-18-B], the unnamed tributary of the South Branch at McNeil [PSB-18.2] and Reeds Creek [PSB-33] to determine the sources of the stressors and reaches impacted. In the case of the unnamed tributary of the South Branch this may be a naturally occurring sulfur bearing rock stratum.

6. Ensure the protection of the especially healthy streams identified in this report.

ACKNOWLEDGEMENTS

Funding for this watershed assessment was provided by the US Environmental Protection Agency's 319 and 104(b)(3) programs and by the WV Division of Environmental Protection. Citizens offered valuable insights on the health of tributaries during public meetings in Franklin, Petersburg, Moorefield, and Romney. Robin Dolly, Dick Gray, Don Phares, and Bill Timmermeyer provided information on the status of various streams.

David Corbitt provided the photographs used on the front and rear cover. Robin Dolly, WV DEP Environmental Inspector and Steve Shaluta, WV Division of Tourism and Parks provided additional photographs. River Network, Portland Oregon shared Sarah Lauterbach's watershed drawing.

During this project, the Program's staff consisted of Patrick Campbell (Program Manager), Michael Arcuri, Jeffrey Bailey, George Constantz, Alvan Gale, Jim Hudson, Karen Maes, Christina Moore, Michael Nowlin, Michael Puckett, Janice Smithson, Steve Stutler, Charles Surbaugh, Michael Whitman, John Wirts, and Douglas Wood. This project and the subsequent report would not have been possible without their continual assistance and support. Thanks to all.

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's waters.

At the federal level, the U.S. Congress enacted the Clean Water Act of 1972 (the Act) plus its subsequent amendments to restore the quality of our nation's waters. For 25 years, the Act's National Pollutant Discharge Elimination System (NPDES) has caused reductions in 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 federal law, each state was given the option of managing NPDES permits within its borders or leaving the federal government in that role. When West Virginia assumed primacy over NPDES permits in 1982, the state's Water Resources Board [combined with the Air Pollution Control Board in 1994 to become the

<u>Water Quality Criteria</u> – 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).

<u>Designated Uses</u> – 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.**

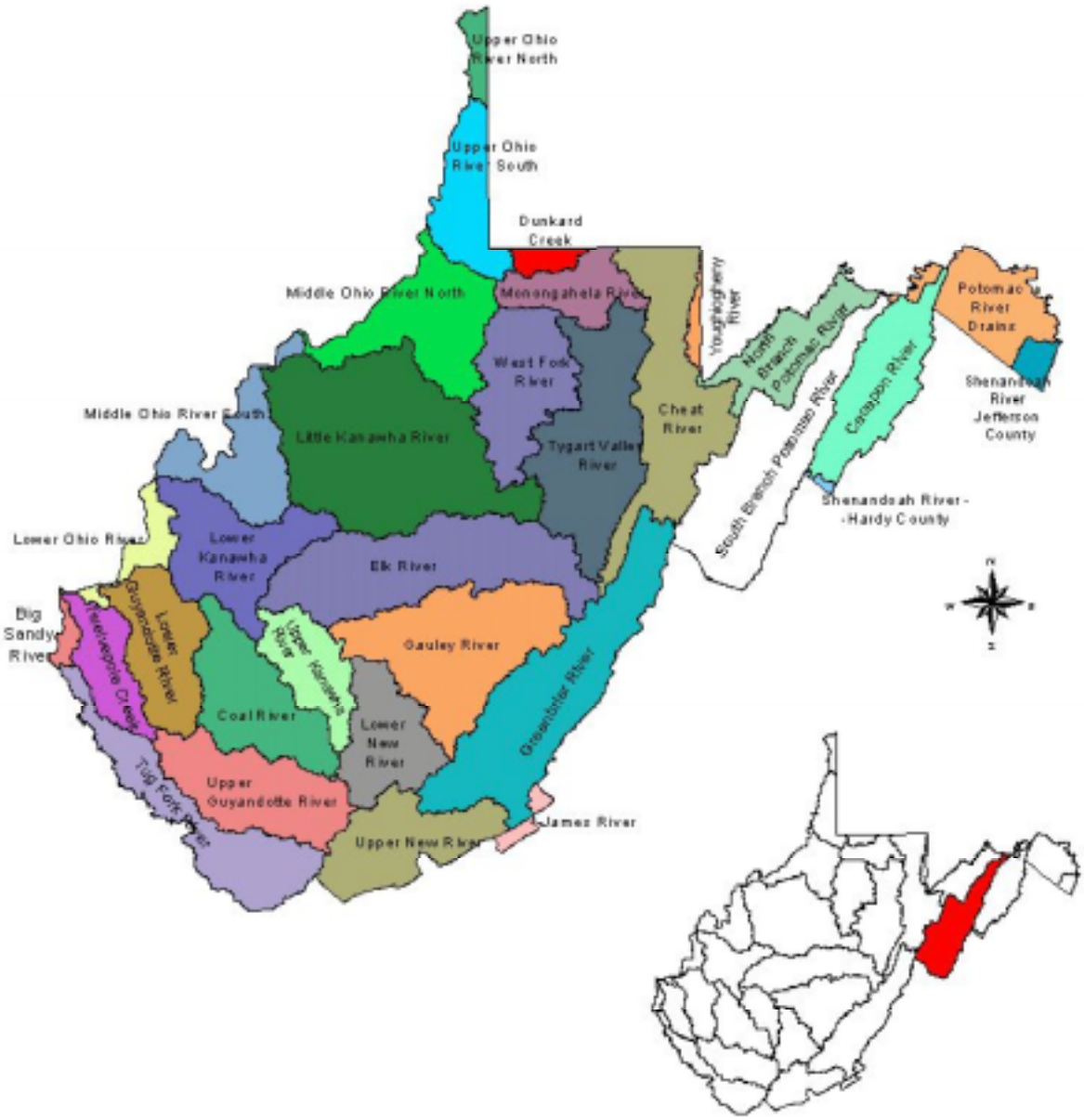
Environmental Quality Board (EQB)] began developing water quality criteria for each kind of use designated for the state's waters (see box).

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 West Virginia's watersheds. The Program is guided, in part, by the Interagency Watershed Management Steering Committee (see box).

The Program uses the U.S. Geological Survey's (USGS) scheme of hydrologic units to divide the state into 32 watersheds (see map, Figure 1).

Figure 1: Map of West Virginia Watersheds



Some of these watershed units are entire stream basins bounded by natural hydrologic divides (e.g., Coal 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 5 years, an interval coinciding with the reissuance of National Pollutant Discharge Elimination System (NPDES) permits.

The Interagency Watershed Management Steering Committee – consists of representatives from each agency participating 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 is the day to day contact for the committee. The responsibilities of this position are to organize and facilitate the committee meetings, maintain the watershed management schedule, assist with public outreach, and to be the contact for watershed

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. 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 first step in the general sampling strategy is retrieving the names of streams within the watershed from the United States Environmental Protection Agency's (EPA) Water Body System database. A list of streams is developed that includes several sub-lists. These sub-lists include:

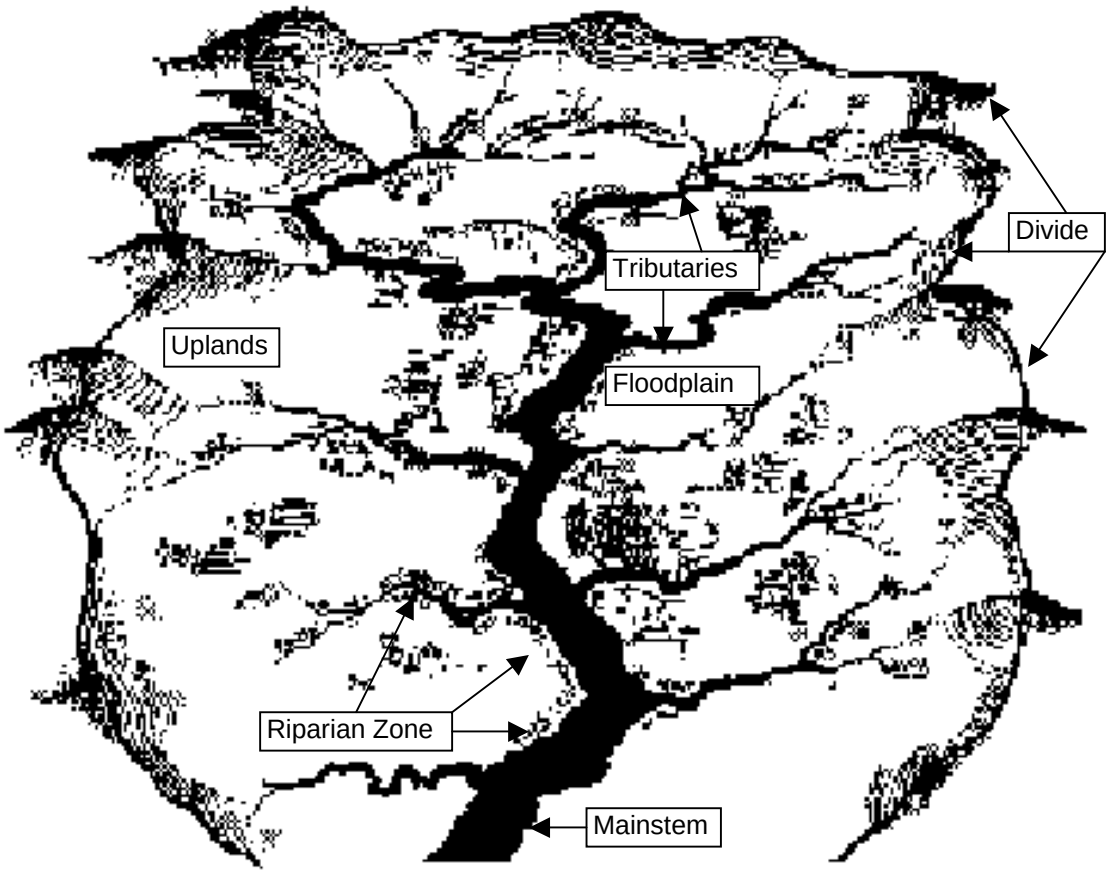
1. Severely impaired streams,
2. Slightly or moderately impaired streams,
3. Unimpaired streams,
4. Unassessed streams, and
5. Streams of particular concern to citizens or permit writers.

Subsequently, assessment teams visit as many streams listed as possible and sample as close to the streams' mouths as allowed by road access and sample site suitability. Longer streams may 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. Inaccessible or unsuitable sites are dropped from the list and replaced with previously determined alternate sites.

The Program has scheduled the study of each watershed for a specific year of a 5-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) insuring assessment of all watersheds, d) improving the OWR's ability to plan and e) buffering the assessment process against domination by special interests.

FIGURE 2: 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. For example, the South Branch of the Potomac River watershed includes those parts of Pendleton, Hardy, Grant, and Hampshire counties from which water drains to the mouth of the South Branch of the Potomac River at its confluence with the North Branch of the Potomac River where it forms the Potomac River.



After a drawing by Sarah B. Lauterbach

In broad terms, OWR evaluates the streams and the Interagency Watershed Management Steering Committee sets priorities in each watershed in 5 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; assists the US Environmental Protection Agency in developing total maximum daily loads, if applicable (see box); and, makes data available to any interested party such as local watershed associations, educators, consultants, and citizen monitoring teams.

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

Every two years the Office of Water Resources prepares a list of water quality limited streams, called the 303(d) list after the section number of the Clean Water Act where the list is described. 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, 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 a particular contaminant must be reduced in a stream in order to meet the appropriate water quality criterion,**
- **Calculate the TMDL 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 assist in determining whether a stream belongs on the 303(d) list. In some cases this determination can be readily made. For example, a stream damaged by acid mine drainage obviously belongs on the list. However, the determination is more difficult to make for most streams because of a lack of data or data that are conflicting, of questionable value, or are too old. Any stream which would not support its designated uses, even after technology based controls are applied, would be 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.

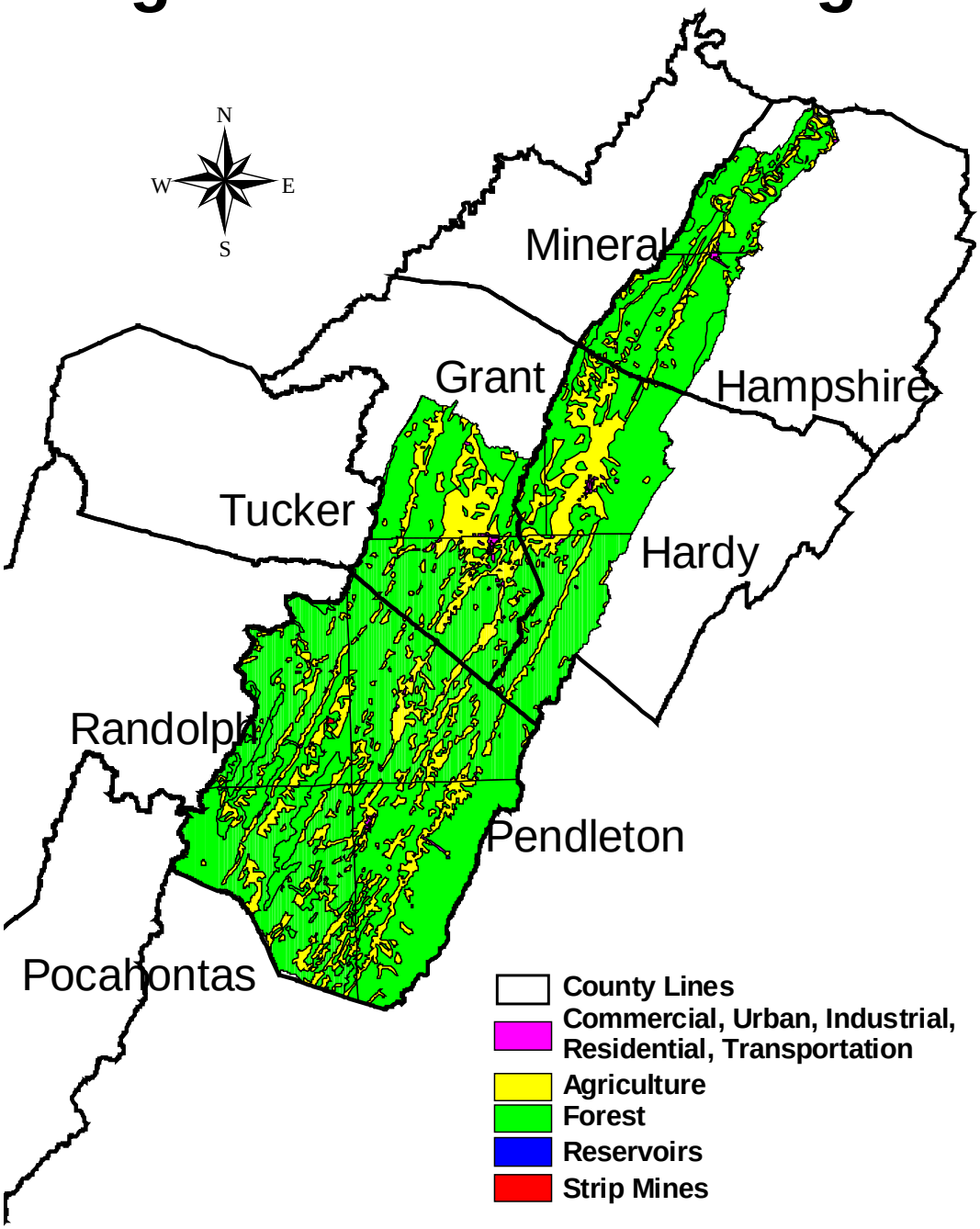
SOUTH BRANCH OF THE POTOMAC RIVER WATERSHED

The total length of the South Branch of the Potomac (South Branch) from its entrance into West Virginia to its confluence with the North Branch of the Potomac River (North Branch) is about 214 kilometers (133 miles). The South Branch basin is a natural, hydrologically defined watershed of 3,867 square kilometers (1,493 square miles), within Pendleton, Grant, Hardy, and Hampshire counties, West Virginia. A small area of the headwaters is located in Highland County, Virginia (Wiley et al. 1996). The South Branch joins with the North Branch just down stream from Green Springs in Hampshire County to form the Potomac River. From this point until it reaches Harpers Ferry in Jefferson County the Potomac River forms the Maryland-West Virginia boundary. Located at the base of West Virginia's eastern panhandle, the South Branch (USGS HUC # 02070001) watershed is about 137 kilometers (85 miles long) (northeast to southwest) by 50 kilometers (30 miles wide) (northwest to southeast). The majority of the rocks are shale, sandstone, and limestone; marketable coal is absent.

The South Branch drains parts of two ecoregions:

Central Appalachians (Ecoregion 69) - Only a thin sliver of the extreme western edge of the South Branch's Watershed is within this ecoregion. This sliver is so thin it does not show up on maps at the scale available in this document. It features narrow valleys, steep ridges, swift streams, low soil permeability, and horizontally bedded sedimentary rocks such as coal, sandstone, shale, and limestone. Within this ecoregion, only the high eastern slope of Allegheny Mountain drains into this watershed. None of the sampling sites were located in this ecoregion.

Figure 3: Landuse Categories



Ridge & Valley (Ecoregion 67) - Practically the entire South Branch Watershed lies in this ecoregion. Its strata and topography are intensely folded and faulted. Parallel valleys are separated by long, steep ridges that reinforce a classic trellised drainage pattern. All 115 sampling sites in this watershed were located within this ecoregion.

Detailed background information on the South Branch Watershed is available in a variety of documents. Hobbs et al. (1972) described the South Branch's topography, rocks, weather, hydrology, flood frequency, groundwater, and water quality. The Comprehensive Survey of the Potomac River Basin (DNR & USDA 1981) details the region's landscape, climate, population, minerals and raw materials, forest, agriculture, water resources developments, transportation and utilities, recreation, and economy.

At times water quality problems have been detected in the South Branch. In 1977, the South Branch was degraded by nutrients, possibly from Moorefield's sewage treatment plant (ICPRB 1980). Several miles of the South Branch down river of Moorefield supported a dense population of algae and other aquatic plants. During 1978-79, fecal contamination was detected (ICPRB 1980), suspected sources included Moorefield's sewage treatment plant, industrial discharges, and agricultural runoff.

By 1980-81, however, water quality of the South Branch at Moorefield and Springfield had improved to the point it was considered "good" and "good to excellent", respectively, with a trend of "remaining stable" (ICPRB 1982).

During 1994-95, Mathes (1996) evaluated the relationship between land uses and water quality in the South Branch Watershed and concluded that there were positive correlations between (a) the numbers of feedlots and

poultry houses and (b) the concentrations of nitrate and fecal coliform bacteria. These findings suggest that non-point source (NPS) pollution was degrading some of the South Branch's streams.

One of West Virginia's most agricultural watersheds, the South Branch includes concentrated cattle and poultry production, as well as field crops and pasture. Concentrated animal production (e.g., cattle feedlots, poultry houses) may be producing excess levels of fecal, sediment and nutrient pollution (PHIWQO 1996, PVSCD et al. 1996, Lipton 1997). In terms of point sources of pollution, the South Branch Watershed has 36 NPDES dischargers (Table 4, Appendix A).

The South Branch Watershed contains some streams of exceptional health and others that are seriously degraded. High quality streams provide significant, even irreplaceable, resources for fishes, wildlife and recreational users (DNR 1986).

Within this watershed, six streams are on the 303(d) primary list of Water Quality Impaired Streams (Office of Water Resources 1998) all because of excess levels of fecal coliform bacteria. All six have had Total Maximum Daily Loads developed for them since the field work for this report was accomplished (see TMDL box on Page 6). Five of these streams are also listed on the DNR High Quality Stream List (Division of Wildlife Resources, 1986). This apparent paradox is easily explained when you consider that these lists were prepared ten to twelve years apart and that the two agencies had different criteria for establishing the lists. These streams are:

Lunice Creek [PSB-26], High Quality,
North Fork of South Branch Potomac [PSB-28], High Quality,

South Fork of South Branch Potomac [PSB-21], High Quality,
South Branch of Potomac River [WVP-21] or [PSB], High Quality,
Mill Creek of the South Branch Potomac. [PSB-25], High Quality, and
Anderson Run [PSB-18], the only stream in this group which was not considered a DNR high quality stream.

The Division of Wildlife Resources considered any stream a high quality stream if it contained a native trout population or was stocked with trout. They also included any warm water stream over five miles in length with a desirable fish population that was actively fished by the public. If a portion of a stream deserved to be listed as high quality, then the entire stream was listed.

The Office of Water Resources, on the other hand, bases its decision upon water quality data collected from sections of streams which are suspected of being impaired. If a portion of the stream deserved to be listed as water quality impaired, especially if only limited data were available, the entire stream was usually listed.

It should be obvious that some streams will have high quality sections and other sections that are impaired by some local point discharge or an accumulation of nonpoint source discharges. Due to the different agencies' perspectives the same streams could, and should, be placed on both lists.

Because of an oversight, Mill Creek [PSB-25] was not visited during this assessment. To prevent this type of oversight from recurring, the Program's system of tracking sampling efforts has been improved. Mill Creek was, however, sampled as part of the TMDL development project. This project measured the fecal coliform concentrations immediately downstream

of the confluence of Mill Creek's two main branches, North Mill Creek [PSB-25-B] and South Mill Creek [PSB-25-C]. On June 3, 1997, during a high water event, and on August 25, 1997, with low discharge, the concentrations of fecal coliform bacteria were >6,000 and 1,900 colonies/100 ml, respectively. Both of these levels are violations of the standard of 400 colonies per 100 ml.

More information on the TMDLs developed for these six streams and the TMDL program can be obtained by contacting the TMDL Program, US Environmental Protection Agency, 841 Chestnut Building, Philadelphia, PA 19107.

Assessment Procedures for the South Branch of the Potomac River Watershed

Given its charge and resources, the Program has chosen a specific combination of physical, chemical and biological variables to evaluate stream health. Biological metrics were selected to ensure usefulness in discriminating between the reference conditions and sites with human-induced stressors. The stream side and instream habitats and the benthic macroinvertebrates are the foci of the site's ecological assessment. (Benthic macroinvertebrates are bottom-dwelling animals that do not have backbones such as insects, worms and snails. This excludes fishes, salamanders, tadpoles, etc.)

Habitat evaluations are important to the assessment because they reflect the physical conditions that support the benthic community. The benthic community is crucial because it reflects environmental conditions for an extended period prior to the site visit. Other parameters, like dissolved oxygen concentration, are complementary, but may not reflect recent fluctuations in environmental conditions. A release of a contaminant that flowed through the reach a week ago, for example, might be reflected by the impaired benthos, but might not be revealed in a water sample.

In May of 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 WVDEP-WAP 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 RBP's can also be applied to other program areas, such as the following:

- 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.

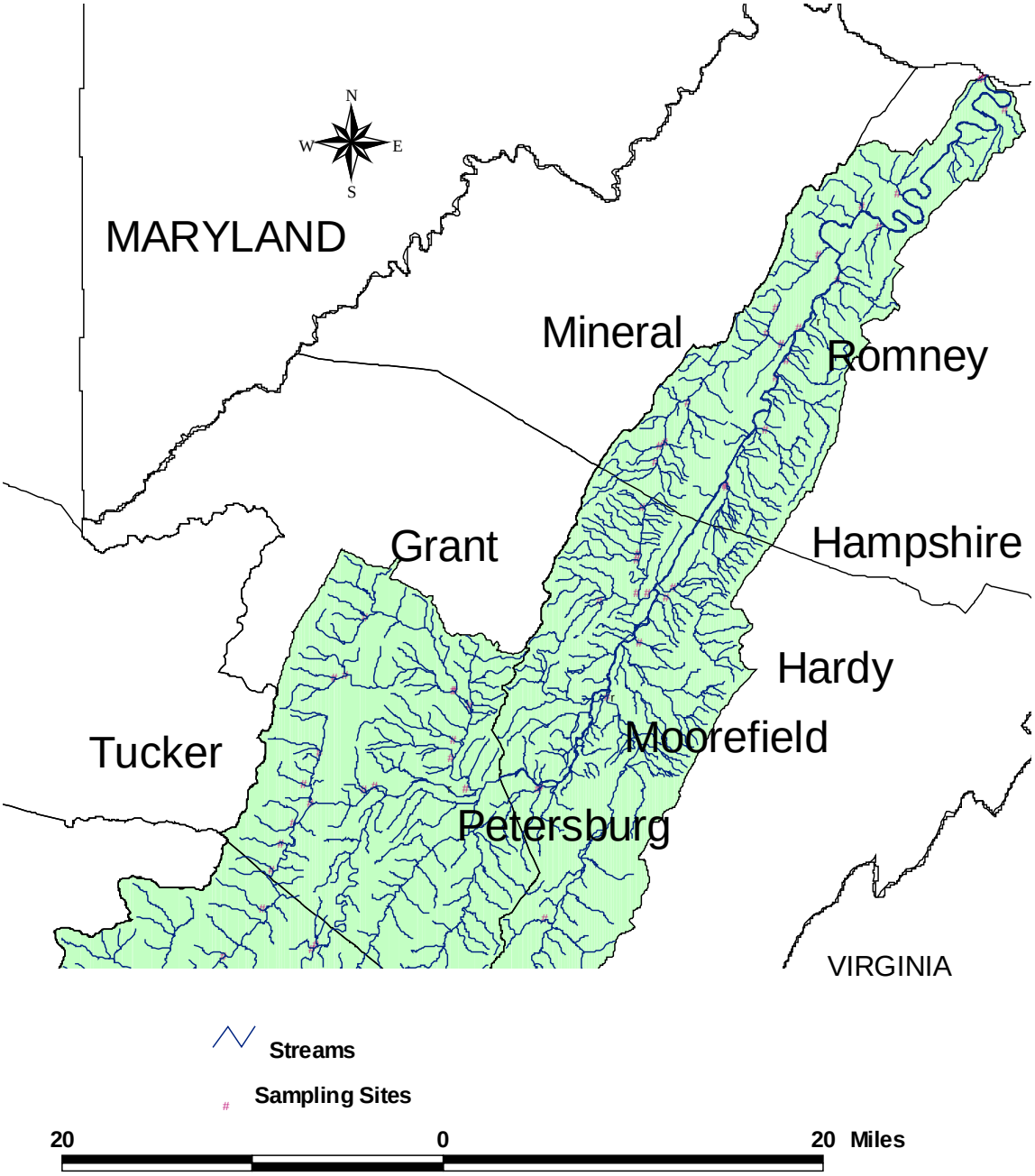
The diversity of applications provided by the RBP's was the primary reason the Program adopted it for use in assessing watersheds in West Virginia. Specifically, the Program used a slightly modified version of the Rapid Bioassessment Protocol II (RBP II). RBP II involves the collection of field data on ambient biological, chemical, and physical conditions. The following sections summarize the procedures utilized in assessing the streams in the South Branch of Potomac River Watershed. A more detailed description of the Programs' assessment procedures can be found in the Watershed Assessment Program's Q*uality Assurance Project Plan* (Smithson, 1996 working document). This document is available to interested persons.

Assessment teams consisting of 2 people each visited 115 sites within the South Branch Watershed (Figures 4 & 5, and Table 5) during August and September 1996.

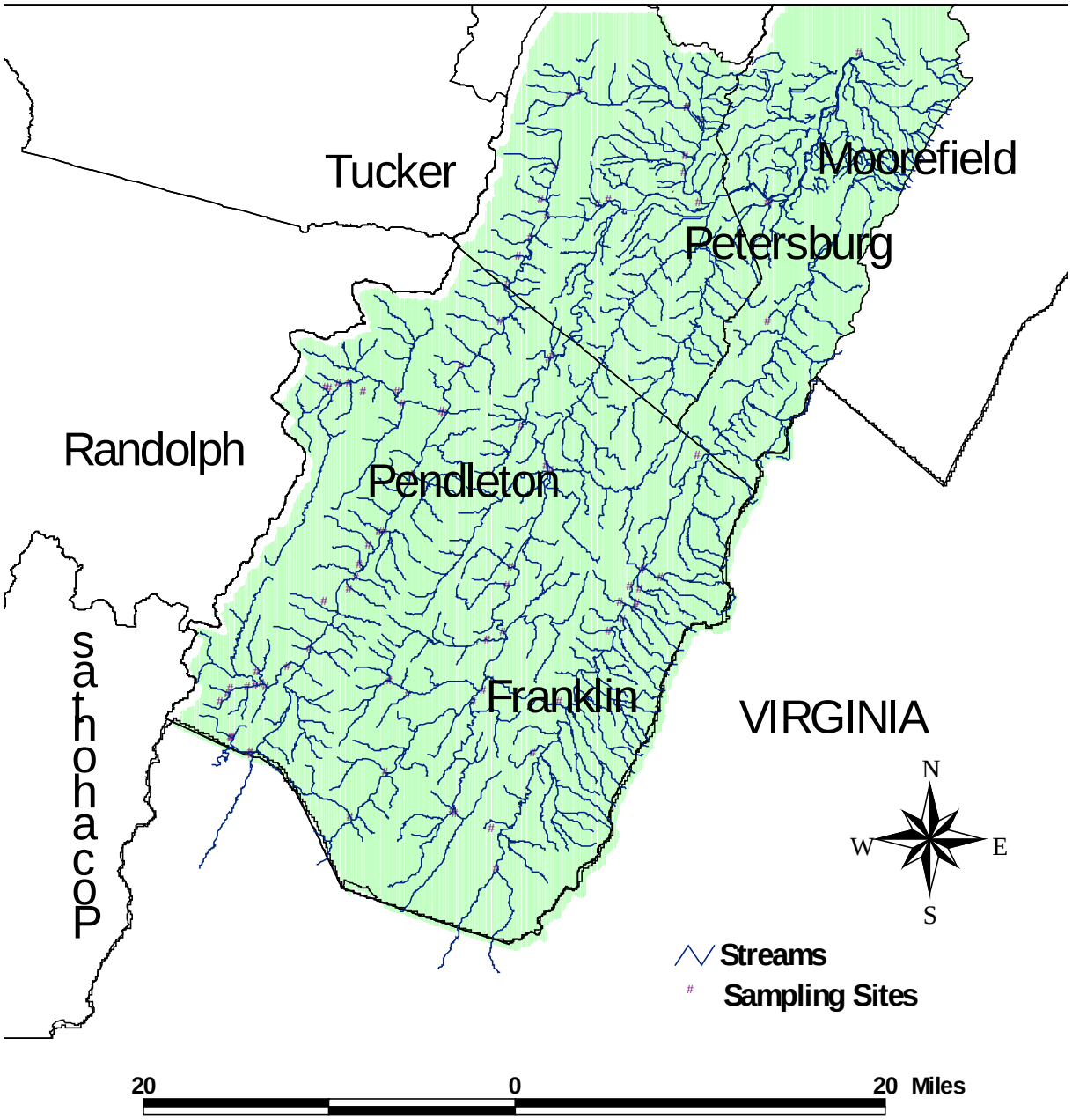
TABLE 1
South Branch of the Potomac River Sampling Site Summary

Named Streams	**282**
Sites visited	**115**
Named, not visited	**173**
Unnamed, visited	**6**
Habitat assessed	**115**
Water Quality sampled	**115**
Macrobenthos sampled	**112**

Figure 4: Sampling Sites in the South Branch of the Potomac River Watershed - Northern Portion



F igure 5: Sampling Sites in the South Branch of the Potomac River Watershed - Southern Portion



All but three sites were sampled for benthic macroinvertebrates. The South Branch of Potomac [PSB] at its mouth and at a site near Romney were not sampled for benthic macroinvertebrates because the water was too deep to safely sample using the Program's techniques. Jordan Run [PSB-28-A] was not sampled for benthic macroinvetebrates because the landowner would not grant permission for access to the site.

BIOLOGICAL MONITORING -- BENTHIC MACROINVERTEBRATES

Benthic macroinvertebrates are small animals living among the rocks and stones on the bottom of streams, rivers, and lakes. Insects comprise the largest diversity of these animals and include mayflies, stoneflies, caddisflies, midges, snails, clams, aquatic worms, crayfish and others. These animals are extremely important in the food chain 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 sensitive species. Figure 6 illustrates benthic macroinvertebrates found in West Virginia.

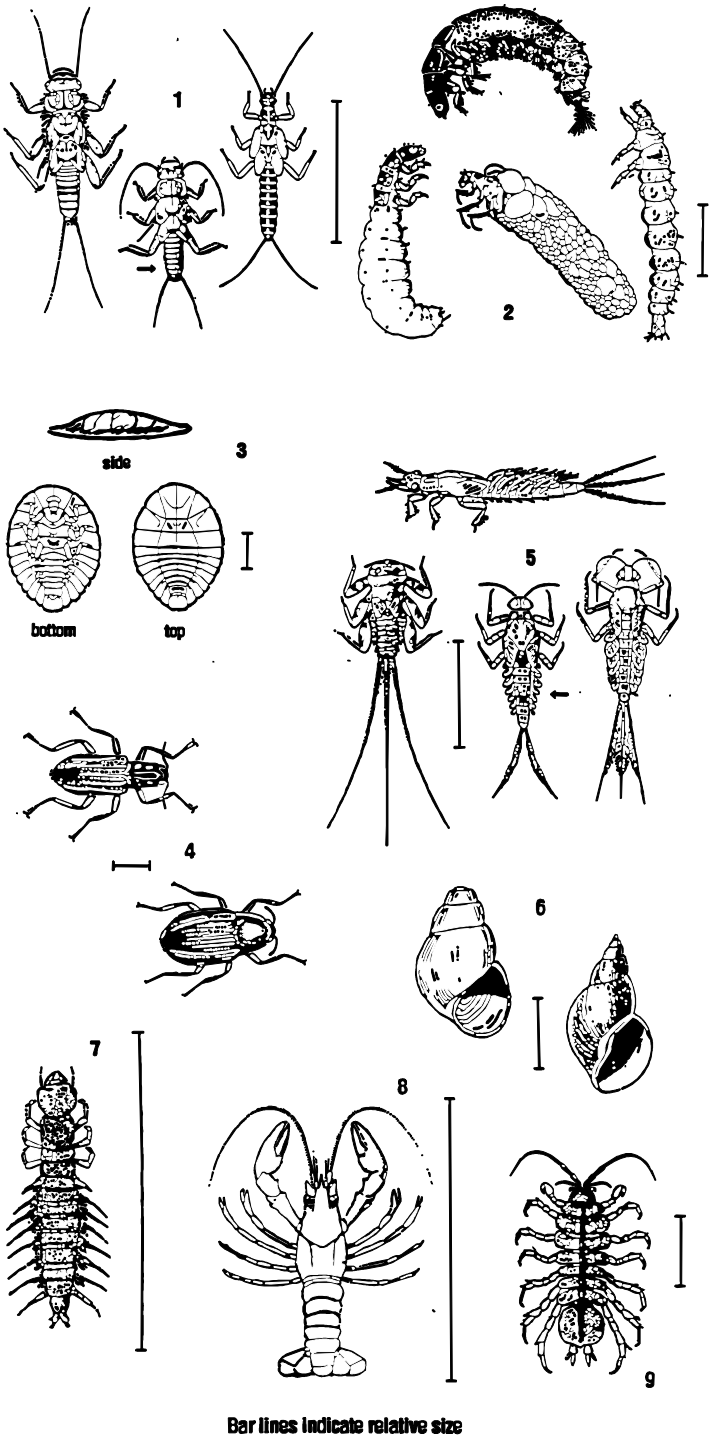
The use of benthic macroinvertebrate data for biological monitoring of streams has persisted over several decades as an integral tool for conducting ecological assessments. There are many federal, state, and private agencies/organizations currently using this group of animals as part of their biological monitoring programs. The advantages are myriad. The most recognized benefits, however, are that benthic macroinvertebrate communities can reflect overall ecological integrity (i.e., chemical, physical,

and biological integrity). They provide a holistic measure of environmental condition by integrating stresses over time, and the public better understands them (as opposed to chemical conditions) as measures of a "healthy" environment (Plafkin et al. 1989).

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 (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).

Figure 6: Stream Insects and Crustaceans



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

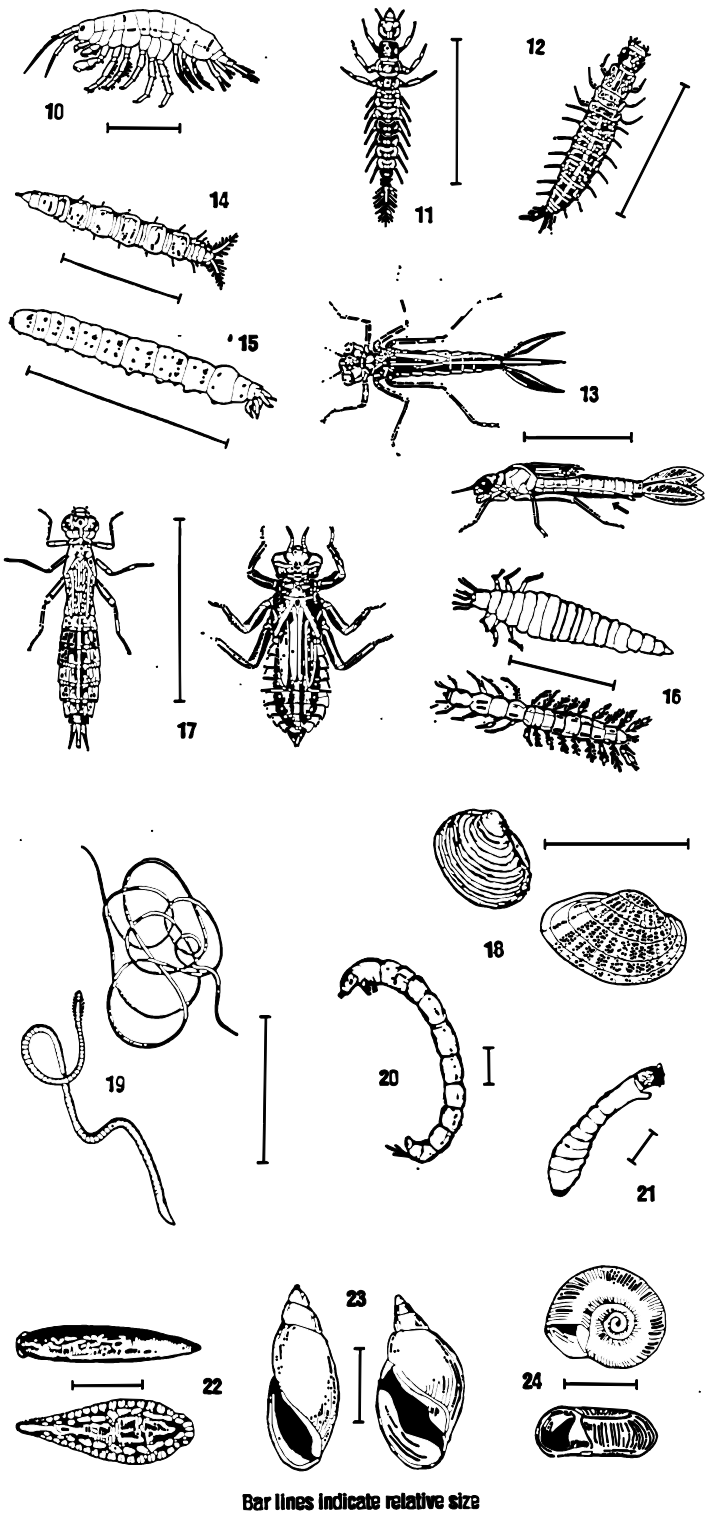
Somewhat pollution tolerant organisms can be in fair quality water.

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 Nematocara.* 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.

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. 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 South Branch of the Potomac River watershed. Determining the biological condition of each site involved calculating and summarizing six-community metrics using the benthic macroinvertebrate data. 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), Trichoptera (caddisflies). In general, 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 0 to 10 and generally decrease with improving water quality. Also called the Family Biotic Index.
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, increases with improving water quality.
6. *Ratio of scraper and filtering collectors* - Reflects the riffle/run community food base. Based on Functional Feeding Group designations for insect families (Merritt and Cummins 1984). Decreasing ratios generally indicate increasing organic enrichment (decreasing water quality).

In order to determine biological condition, the six calculated metrics from each sample station were compared to metric values derived from a set of "reference stations" located in the same region, and sampled during the same time frame. Reference stations 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 stations in this report.

To determine reference conditions for watershed (or ecoregional) studies, candidate streams are selected from maps and evaluated using existing information on water quality and personal experience.

Reference conditions were established by evaluating the habitat and physico-chemical data of each candidate site based on a list of "minimum degradation" criteria or "reference site" criteria. Assessment sites that met or exceeded the minimum criteria were given reference site status. The Program developed the degradation criteria with the assumption that these reference sites would provide a reasonable approximation of least disturbed conditions, and thus accurately describe reference conditions.

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, Non-Point 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 for the stream.

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 one-fourth (upper one-fourth for the HBI and % Dominant Taxon metrics which have values that increase with increasing perturbation) of each metric for the reference sites was used to establish the lower threshold for an optimal score for each metric. Halfway between this score and zero (or the worst score from all reference sites for HBI and % 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 5 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 biological condition score of 50 or less was considered biologically impaired and in need of further investigation and / or corrective action.

FECAL COLIFORM BACTERIA

Released to the environment in feces, disease-causing organisms may accompany fecal coliforms. Thus, the presence of fecal coliform in a water sample indicates the potential presence of human pathogens and the likelihood of a public health threat. Higher concentrations are associated with greater concerns for public health through direct contact with the water. Fecal coliform bacteria are important indicators of contamination due to fecal material found in sewage, livestock waste, and wildlife excrement.

A fecal coliform bacteria sample was collected at each assessment site. U.S. EPA sampling guidelines limit the field holding time for such samples to 6 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.

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 weekly 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.

Samples were collected at each site for analysis for specific constituents. A list of these constituents, preservation procedures, and analytical methods is included in Table 2, below.

TABLE 2
CONSTITUENT TABLE
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
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
Total Phosphorus	0.02 mg/l	4500-PE[1]	28 days
Nitrite+Nitrate-N	0.05 mg/l	353.3	28 days
Ammonia-N	0.5 mg/l	350.2	28 days
Unionized Amm-N	0.5 mg/l	350.2	28 days
Suspended Solids	5 mg/l	160.2	28 days
Chloride	1 mg/l	325.2	28 days

[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 accuracies are noted in Hydrolab Corporation's Reporter ™ Water Quality Multiprobe Operating Manual, May 1995, Application Note #109.

HABITAT ASSESSMENT

An eight page Stream Assessment Form (Appendix B) was filled out 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, utilizing a Global Positioning System (GPS) receiver when possible, and provided detailed directions so future researchers may return to the same site. A map was also sketched to aid in locating each site. The team recorded stream measurements, erosion potential, possible non-point 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 form (adopted from EPA's EMAP-SW, Klemm and Lazorchak, 1994), which produces 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:

1) Instream cover (fish)
2) Benthic substrate
3) Embeddedness
4) Velocity/Depth regimes
5) Channel alteration
6) Sediment deposition
7) Riffle frequency
8) Channel flow status
9) Bank condition
10) Bank vegetative protection
11) Bank disruptive pressure (grazing), and
12) Riparian vegetation zone width.

Each parameter was given a score ranging from 0 to 20. The 12 individual scores for each parameter were summed (maximum possible = 240) and this number was converted to a scale of 100 for the final habitat condition score for each assessment site. The following descriptive categories were used to rate each parameter:

TABLE 3: Scoring for Rapid Habitat Assessment	
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 habitat condition score and biological condition score for each site was plotted on an X-Y graph (see box on page 41) to simplify interpretation of the results.

Quality Assurance/Quality Control

Replicate sampling for all sampling procedures was performed at 2.5% of all sites, this was usually 3 sites per watershed. At preselected sites team members switched tasks to determine whether or not sampler variations were significant enough to warrant further training and/or corrective action.

Field blanks for metals and nutrients were prepared weekly by each sampling team if metals and nutrients were being analyzed from the sampling sites visited during the week. 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.

FINDINGS - HABITAT AND BENTHOLOGICAL SAMPLING

Benthic collection data is difficult, if not impossible, to interpret without comparing it to a reference site (i.e., one that is similar in location, size and time of sampling, and that has a minimum of human or other impacts) or, preferably, a collection of reference sites. All 115 sampling sites were located in the Ridge and Valley ecoregion. The sites along the mainstem of the South Branch of the Potomac River were much larger than others in the watershed. The difference in size classes makes comparisons among all the sites difficult to interpret.

The Watershed Assessment Program is presently debating the proper use of size classes in making stream comparisons. Typically, aquatic communities at stream sites of vastly different sizes are not considered comparable to one another. The reasons for this fact are myriad, but collectively they can be identified as differences in number and character of ecological niches among various sizes of streams. However, several authors have recently published data that supports the grouping of wadable streams (stream orders 1-3) (Stribling et. al. 1993) and streams with drainages of less than 500 square miles (PA DEP 1997)] with similar habitats. The Program has observed similar circumstances in some West Virginia watersheds. For example, in the Cheat River watershed there was no significant difference in metric scores among stream width categories for sites with similar biological or habitat conditions.

Despite these findings, the Program continues to separate streams into Stream Width Categories (SWC) to facilitate comparisons. Each site was assigned to 1 of the following Stream Width Categories:

SWC I less than three meters wide,

SWC II between three and 10 meters wide, or

SWC III more than 10 meters wide.

Program biologists selected the following sites as reference sites for each stream width category:

SWC I - Sams Run [PSB- 28-GG-1-A], Bud Hollow [PSB-28-EE-3-D], Back Run [PSB-28-EE-2-A], and Vance Run [PSB-28-GG-1]

SWC II - Moyer Fork [PSB-28-D], Sawmill Run [PSB-16-A], and Hemlock Run [PSB-28-EE-3-A]

SWC III - Mill Creek [PSB-9] at mouth and Seneca Creek [PSB-28-K].

Program biologists calculated the score for each site's habitat. They then calculated the percent that the bioscore for each site was of the reference condition. These two figures for the 111 sites sampled for benthic macroinvertebrates were then plotted as a coordinate on x-y graphs (Figures 7, 8, & 9). These graphs depict the range of habitat and bioscore from (a) best habitat and least impaired benthic communities (i.e., most ecologically intact) to (b) worst habitat and most impaired benthos (i.e., most degraded).

Sixty-one SWC I sites were sampled for benthic macroinvertebrates and habitat in the South Branch (see Figure 7). Several sites had identical habitat scores and bioscores, therefore the graph only shows 56 points. The tables which accompany each graph include all locations.

Stream Width Category I – Habitat and Benthological Results

Bud Hollow (PSB-28-EE-3-D), one of the reference stations, had a habitat percentage of 75% and a bioscore of 100. Sams Run (PSB-28-GG-1-A), also one of the reference station, had a Habitat Score of 88.75% and a bioscore of 91.7%. Lower Gulf Run (PSB-28-K-6-A) just exceeded Sams Run's Habitat Score with a score of 89.58, yet had a lower bioscore of 83.3.

Mudlick Run at Headwaters (PSB-18-A-{6.7} had the most degraded habitat (37.92%) and tied with one other site for the lowest bioscore (25). This stream had the only Habitat Score below 50%. The dominant land uses in the area were a salvage yard and roads. Nonpoint pollution from these land uses may have caused a negative impact on the benthic macroinvertebrates in the stream.

INTERPRETING X-Y GRAPHS

Habitat quality is an important measurement in 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 Data Summary - SWC I (<3 m)

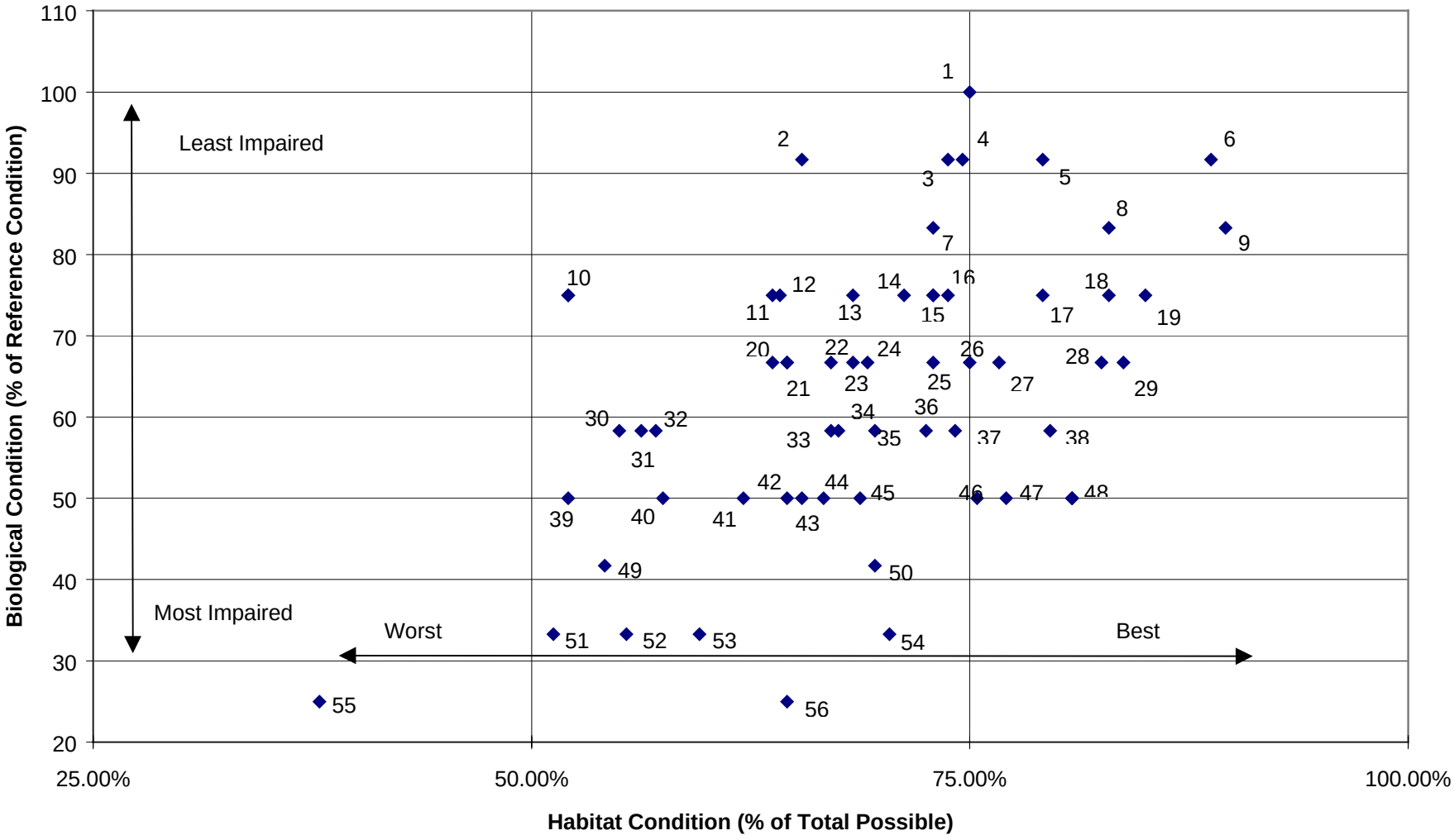


FIGURE 7 (CONTINUED):
BIOLOGICAL AND HABITAT DATA SUMMARY – SWC I
*REFERENCE STATIONS IN **BOLD AND ITALICS***

#	STREAM NAME	AN CODE	HABITAT SCORE	BIOLOGICAL SCORE
1	***BUD HOLLOW***	***PSB-28-EE-3-D***	***75.00%***	***100.0***
2	**SHUCKLEFORD RUN**	**PSB-28-J.2**	65.42%	91.7
3	MILL CREEK @ HW	PSB-9-{10.7}	73.75%	91.7
4	DICE RUN / NORTH FORK	PSB-28-Q	74.58%	91.7
5	LITTLE STAR RUN	PSB-26-D-3	79.17%	91.7
6	***SAMS RUN***	***PSB-28-GG-1-A***	***88.75%***	***91.7***
7	HAMMER RUN near CAVE	PSB-50	72.92%	83.3
8	***VANCE RUN***	***PSB-28-GG-1***	***82.92%***	***83.3***
9	LOWER GULF RUN	PSB-28-K-6-A	89.58%	83.3
10	COLD SPRING RUN	PSB-28-EE-1	52.08%	75.0
	WALNUT BOTTOM RUN	PSB-18-B	52.08%	75.0
11	LITTLE CREEK	PSB-46-A	63.75%	75.0
12	UNT / SBP @ MACNEIL	PSB-18.2	64.17%	75.0
13	SAWMILL BRANCH	PSB-28-EE-2	68.33%	75.0
14	PETERS RUN	PSB-40	71.25%	75.0
15	LONG RUN	PSB-30	72.92%	75.0
	UNT /MILL CREEK	PSB-9-F.5	72.92%	75.0
16	SALTBLOCK RUN	PSB-26-E.2	73.75%	75.0
17	UNT / SBP near KETTERMAN	PSB-30.5	79.17%	75.0
18	LEONARD SPRING RUN	PSB-28-EE-3-B	82.92%	75.0
19	***BACK RUN***	PSB-28-EE-2-A	***85.00%***	***75.0***
20	TETER GAP	PSB-28-CC	63.75%	66.7
21	FISHER RUN	PSB-21-M	64.58%	66.7
	WILLIAMS HOLLOW	PSB-19	64.58%	66.7
22	MIDDLE RIDGE HOLLOW	PSB-28-EE-3-C	67.08%	66.7
23	ELMLICK RUN	PSB-9-G	68.33%	66.7
24	CAMP RUN	PSB-9-F	69.17%	66.7
25	TWIN RUN	PSB-46-B	72.92%	66.7
26	TEETER CAMP RUN	PSB-28-EE-3	75.00%	66.7
27	BLIZZARD RUN	PSB-28-R	76.67%	66.7
28	STONEY RUN	PSB-1	82.50%	66.7
29	DEAN GAP	PSB-21-Q	83.75%	66.7
30	TURNMILL RUN	PSB-18-A-1	55.00%	58.3
31	UNT / SBP near GRACE	PSB-1.9	56.25%	58.3
32	BRUSHY RUN / LUNICE CREEK	PSB-26-C	57.08%	58.3
33	BRIERY GAP RUN	PSB-28-S	67.08%	58.3
34	FRIENDS RUN	PSB-42	67.50%	58.3
35	HAMMER RUN @ RUDDLE	PSB-39	69.58%	58.3
36	LITTLE ROUGH RUN	PSB-21-K-1	72.50%	58.3
37	STONY RUN / SOUTH FORK	PSB-21-HH	74.17%	58.3
38	FOX RUN	PSB-4	79.58%	58.3
39	MILL CREEK / NORTH FORK	PSB-28-M	52.08%	50.0
40	UNT / MUDLICK RUN	PSB-18-A-0.5	57.50%	50.0
41	HIVELY GAP	PSB-21-T	62.08%	50.0
42	ROOT RUN	PSB-28-P	64.58%	50.0
43	BLACKTHORN CR	PSB-47-B	65.42%	50.0

FIGURE 7 (CONTINUED):
BIOLOGICAL AND HABITAT DATA SUMMARY – SWC I
*REFERENCE STATIONS IN **BOLD AND ITALICS***

#	STREAM NAME	AN CODE	HABITAT SCORE	BIOLOGICAL SCORE
44	NELSON RUN	PSB-28-V	66.67%	50.0
45	UNT / SBP @ GREEN SPRINGS	PSB-0.5	68.75%	50.0
46	BRIGGS RUN	PSB-32	75.42%	50.0
47	WAGNER RUN	PSB-21-O	77.08%	50.0
48	DEVIL HOLE RUN	PSB-16	80.83%	50.0
	DUMPLING RUN	PSB-21-F	80.83%	50.0
	JOHN'S RUN	PSB-2	80.83%	50.0
49	MCDOWELL RUN	PSB-11	54.17%	41.7
50	POWERS HOLLOW	PSB-28-.5A	69.58%	41.7
51	MAYHEW RUN	PSB-9-B-2	51.25%	33.3
52	EAST DRY RUN	PSB-53	55.42%	33.3
53	JUDY RUN	PSB-28-U	59.58%	33.3
54	STONY RUN	PSB-21-R	70.42%	33.3
55	MUDLICK RUN @ HW	PSB-18-A-{6.7}	37.92%	25.0
56	SMITH CREEK	PSB-46	64.58%	25.0

Smith Creek (PSB-46) had a habitat score of 64.58% and tied with Mudlick Run at Headwaters for the lowest bioscore of 25. A paved road along one side of the reach and a cattle pasture along the opposite side reduced the habitat score. Even with the presence of the cattle pasture the fecal coliform bacteria concentration was only 35 colonies per 100 ml. No streambed alterations were listed for this reach. A sample to be analyzed for nutrients was taken immediately after a thundershower. This may have caused the levels to be elevated above normal. Total phosphorus for this site was listed as 0.48 mg/l. Nitrite + nitrate nitrogen was listed as 0.97 mg/l. No explanation for the low bioscore was found on the Stream Assessment Form. Chironomids were excessively dominant (71%) at this site. This is often an indication of organic enrichment.

Stony Run (PSB-21-R) had a habitat score of 70.42% and a bioscore of 33.3. Although the assessment team noted that periphyton was abundant in the stream, nutrients were not elevated. Fecal coliform bacteria

concentration was listed at 500 colonies per 100 milliliter considered a significant violation of the standard. (Any violation of 20% or more of the standard is considered “significant”.) The water temperature was also elevated (24° C). The presence of a pasture was the only explanation for the poor bioscore noted on the assessment form.

Judy Run (PSB-28-U) had a habitat score of 59.58% and a bioscore of 33.3. The presence of limestone bedrocks and heavy marl may explain the naturally high pH (8.4) and conductivity (326). Embeddedness and sediment were both considered marginal and may explain the low bioscore.

East Dry Run (PSB-53) had a habitat score of 55.42% and a bioscore of 33.3. Flooding during the week preceding the sampling event may have scoured the streambed of benthic macroinvertebrates.

Mayhew Run (PSB-9-B-2) had a habitat score of 51.25% and a bioscore of 33.3. The low bioscore of this very small stream (width about 0.3m or one foot) can be explained by local residents who report it as nearly dry in September of each year. Recent flooding five days before the sampling event may have scoured the stream and removed some of the macroinvertebrates. In addition this flood and two previous high water events have resulted in more than normal runoff this year.

Powers Hollow (PSB-28-.5A) had a habitat score of 69.58% and a bioscore of 41.7. The fecal coliform bacteria concentrations of 500 colonies per 100 ml., the reports of food waste in the stream, and some algae on rocks indicate the presence of nutrients. The presence of a limestone quarry upstream with trucks frequently going in and out contributes dust to the stream. All of these could negatively impact the bioscore.

McDowell Run (PSB-11) had a habitat score of 54.17% and a bioscore of 41.7. The fecal coliform bacteria concentration of 5000 colonies per 100 ml is likely explained by the surrounding cattle pastures and the cattle having access to the stream. This increase in fecal coliform bacteria concentration is often accompanied by an increase in nutrients which may explain the abundance of organic loving macroinvertebrates, which decreased the bioscore. The top two taxa represented were Chironomidae (midges) and Simuliide (black flies), both highly tolerant of organic pollution, and comprised 79% of the entire sample.

The remaining SWC I sites had some intermediate combination of habitat and benthic conditions.

Figure 8: Biological and Habitat Data Summary - SWC II (3-10m)

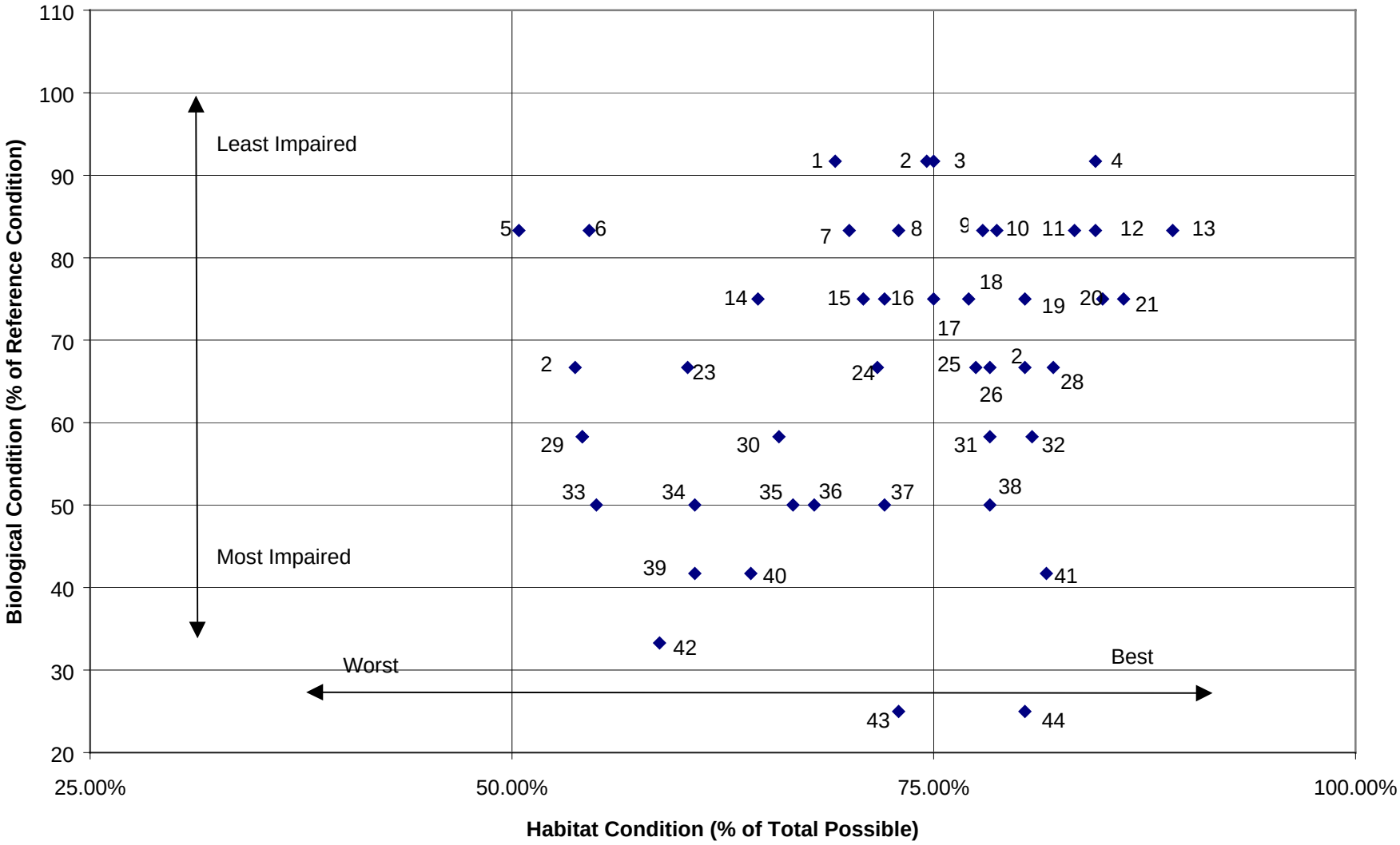


FIGURE 8 (CONTINUED): BIOLOGICAL & HABITAT DATA SUMMARY – SWC II				
#	STREAM NAME	STREAM CODE	HABITAT SCORE	BIOLOGICAL SCORE
1	SOUTH FORK @ FORT SEYBERT	PSB-21-{33.&}	89.17%	83.3
2	HEMLOCK RUN	PSB-28-EE-3-A	86.25%	75.0
3	HIGH RIDGE RUN	PSB-28-E	85.00%	75.0
4	MOYER FORK	PSB-28-D	84.58%	91.7
5	LAUREL RUN	PSB-28-A-2	84.58%	83.3
6	NORTH FORK / LUNICE CREEK	PSB-26-E	83.33%	83.3
7	KETTLE CREEK	PSB-21-I	82.08%	66.7
8	BUFFALO RUN	PSB-14	81.67%	41.7
9	BRUSHY FORK	PSB-21-II	80.83%	68.3
10	WHITES RUN	PSB-28-K-6	80.42%	75.0
11	ABERNATHY RUN	PSB-1.8	80.42%	66.7
12	MILLER RUN	PSB-21-AA	80.42%	25.0
13	MILL RUN nr ROMNEY	PSB-13	78.75%	41.7
14	LITTLE FORK	PSB-21-GG	78.33%	66.7
15	DICE RUN/SOUTH FORK	PSB-21-N	78.33%	58.3
16	BRUSHY RUN	PSB-28-K-1	78.33%	50.0
17	BIG RUN / JORDAN RUN	PSB-28-A-1	77.92%	83.3
18	ROARING CREEK	PSB-28-K-2	77.50%	66.7
19	SAWMILL RUN	PSB-16-A	77.08%	75.0
20	BIG STAR RUN	PSB-26-D-2	75.00%	91.7
21	ROUGH RUN	PSB-21-K	75.00%	75.0
22	GULF RUN	PSB-28-K-5	74.58%	91.7
23	ZEKE RUN	PSB-28-G	72.92%	83.3
24	DUMPLING RUN	PSB-9-B	72.92%	25.0
25	THORN CREEK	PSB-47	72.08%	75.0
26	SOUTH FORK / LUNICE CREEK	PSB-26-D	72.08%	50.0
27	WHITETHORN CR	PSB-47-C	71.67%	66.7
28	STRAIGHT FORK	PSB-28-HH	70.83%	75.0
29	TROUT RUN	PSB-41	70.00%	83.3
30	STRADER RUN	PSB-28-K-4	69.17%	91.7
31	CLIFFORD HOLLOW	PSB-17-A	67.92%	50.0
32	BOUSES RUN	PSB-28-Z	66.67%	50.0
33	ROBINSON RUN	PSB-26-A	65.83%	58.3
34	NORMAN RUN	PSB-26-B	64.58%	75.0
35	MILL RUN @ UPPER TRACT	PSB-34	64.17%	41.7
36	MITCHELL RUN	PSB-23-A-1	60.83%	50.0

FIGURE 8 (CONTINUED): BIOLOGICAL & HABITAT DATA SUMMARY – SWC II				
#	STREAM NAME	STREAM CODE	HABITAT SCORE	BIOLOGICAL SCORE
37	ANDERSON RUN	PSB-18	60.83%	41.7
38	HORSECAMP RUN	PSB-28-K-3	60.42%	66.7
39	BUFFALO CREEK	PSB-5	58.75%	33.3
40	JORDAN RUN	PSB-28-A	56.25%	Not Assessed
41	REEDS CREEK	PSB-33	55.00%	50.0
42	SAMUEL RUN	PSB-28-B	54.58%	83.3
43	BIG RUN / NORTH FORK	PSB-28-EE	54.17%	58.3
	DURGEON RUN	PSB-23-A	54.17%	58.3
44	MUDLICK RUN @ MOUTH	PSB-18-A-{1.0}	53.75%	66.7
45	LAUREL FORK	PSB-28-GG	50.42%	83.3

Stream Width Category II – Habitat and Benthic Results

Forty-five SWC II sites were sampled for benthos. Big Run of North Fork and Durgeon Run had identical habitat scores and bioscores so the graph only shows 44 locations.

Strader Run (WVSBP- 28-K-4), Gulf Run (PSB-K-5), and Big Star Run (PSB-26-D-2) each had a bioscore of 91.7 which tied with Moyer Fork (WVSBP-28-D), a reference site. The three streams had habitat scores of 69.17%, 74.58%, to 75.00%, respectively.

Dumpling Run (PSB-9-B) had a habitat score of 72.92% and a bioscore of 25. One taxa, Hydropsychidae (caddisflies) represented 68% of the benthic macroinvertebrates obtained in this stream. The next closest, Chironomidae (midges) represented 13% of the benthic macroinvertebrates. Based on the Modified Hillsenhoff Biotic Index of 5.47 fairly substantial organic pollution is likely in this stream. No indications of why this occurred could be determined from the Stream Assessment Form.

Miller Run (PSB-21-AA) had a habitat score of 80.42% and a bioscore of 25. Simuliidae (blackflies) dominated (48%) the collection of benthic macroinvertebrates, often an indicator of organic pollution. The substrate just above the sample point appeared to have been recently disturbed to create a small pool area. This disruption of the substrate may have negatively impacted the site enough to depress the bioscore.

Buffalo Creek (PSB-5) had a habitat score of 58.75% and a bioscore of 33.3. Obvious nonpoint sources of pollution were noted on the Stream Assessment Form. The site had an abundance of periphyton and some additional organic matter, including cattle waste, in the streambed. Chironomidae (midges) and Simuliidae (blackflies), two organisms which are tolerant of organic pollution, were the dominant (80%) organisms collected. All of these signs point to an over abundance of organic material which could have negatively impacted the bioscore.

Buffalo Run (PSB-14) had a habitat score of 81.67% and a bioscore of 41.7. According to the landowner this is the first summer in his memory that there has been water in this creek. Normally dry conditions may be sufficient reason for the low bioscore at this site.

Mill Run at Upper Tract (PSB-34) had a habitat score of 64.17% and a bioscore of 41.7. The fecal coliform bacteria concentration at this site was 1,410 colonies per 100 ml. A nearby hog pen may be the source of the fecal coliform bacteria. Organic nutrients may have negatively impacted the stream and reduced the bioscore for this site. This was indicated by the dominance of midges and aquatic worms (64%).

Anderson Run (PSB-18) had a habitat score of 60.83% and a bioscore of 41.7. The sample analyzed for Nitrate/Nitrite Nitrogen had a result of 1.4 mg/l. This level indicates the potential for runoff from the nearby corn field to have adversely impacted this site. The fecal coliform bacteria concentration for this sampling event was determined to be 318 colonies per 100 ml. During this same general period the Total Maximum Daily Limit (TMDL) Program sampled various locations on Anderson Run on four different dates and found fecal coliform bacteria concentrations of 318, 2,300, 5800, over 6,000, 20, and 1,800 colonies per 100 ml. Nitrogen and fecal coliform bacteria levels indicate some enrichment from an unknown source that may have adversely impacted Anderson Run. A TMDL has been developed for this stream since the fieldwork for this report was completed.

The remaining SWC II sites had some intermediate combination of habitat and benthic conditions.

There was little distinction among the habitat and benthological data for the 6 sampled SWC III sites (Figure 9). The similarity in scores for the non-reference sites and the reference sites indicated relatively good water quality for these streams. It should be pointed out that Seneca Creek had a bioscore of 58.3, near the impaired category. It was recently scoured by heavy rain from Hurricane Fran and a bulldozer had recently dredged and channelized the substrate. Both would tend to reduce the bioscore.

The accompanying maps (Figures 10 & 11) combine data from all Stream Width Categories. A list of the bioscores for each site is in Table 27 in Appendix A. Thirty-five sites had poor bioscores (50 or less).

Figure 9: Biological & Habitat Data Summary - SWC III (>10m)

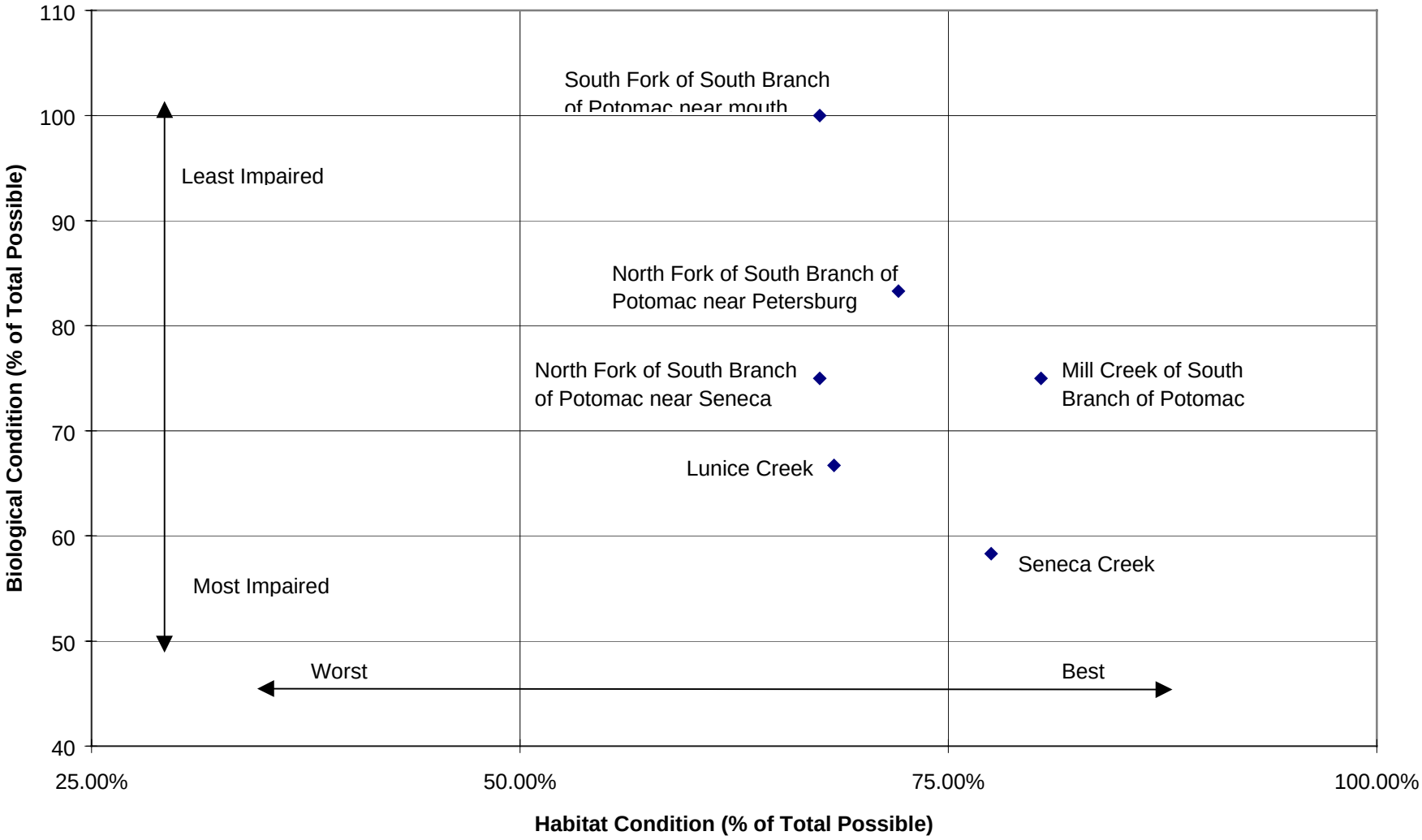


FIGURE 9 (CONTINUED): BIOLOGICAL & HABITAT DATA SUMMARY – SWC III		
STREAM NAME	HABITAT SCORE	BIOLOGICAL SCORE
SOUTH FORK near MOUTH	67.50%	100
NORTH FORK near PETERSBURG	72.08%	83.3
NORTH FORK near SENECA ROCKS	67.50%	75.0
MILL CREEK OF SOUTH BRANCH OF POTOMAC	***80.42%***	***75.0***
LUNICE CREEK	68.33%	66.7
SENECA CREEK	***77.50%***	***58.3***
SOUTH BRANCH OF POTOMAC @ MOUTH	64.58%	Not Assessed
SOUTH BRANCH OF POTOMAC near ROMNEY	77.92%	Not Assessed

Only one drainage area had a cluster of sites with poor bioscores – the Mudlick Run drainage area. In this drainage area two out of the four sites sampled had impaired bioscores:

Mudlick Run at Headwaters (PSB-18-A-{6.7}) had a score of 25.00 (a tie for worst bioscore), and

the Unnamed Tributary of Mudlick Run (PSB-18-A-0.5) had a score of 50.00.

Three additional clusters of poor bioscores were obvious. Four tributaries of the South Fork of the South Branch near Fort Seybert had poor bioscores. Tributaries along the South Fork above and below these sites had good bioscores (above 50). The four tributaries with impaired bioscores are:

Wagner Run (PSB-21-O) had a bioscore of 50.00,

Stony Run (PSB-21-R) had a bioscore of 33.33,

Hively Gap (PSB-21-T) had a bioscore of 50.00, and

Miller Run (PSB-21-AA) had a bioscore of 25.00 (a tie for lowest bioscore).

**Figure 10: Bioscores -
Northern Portion of the South Branch of Potomac**

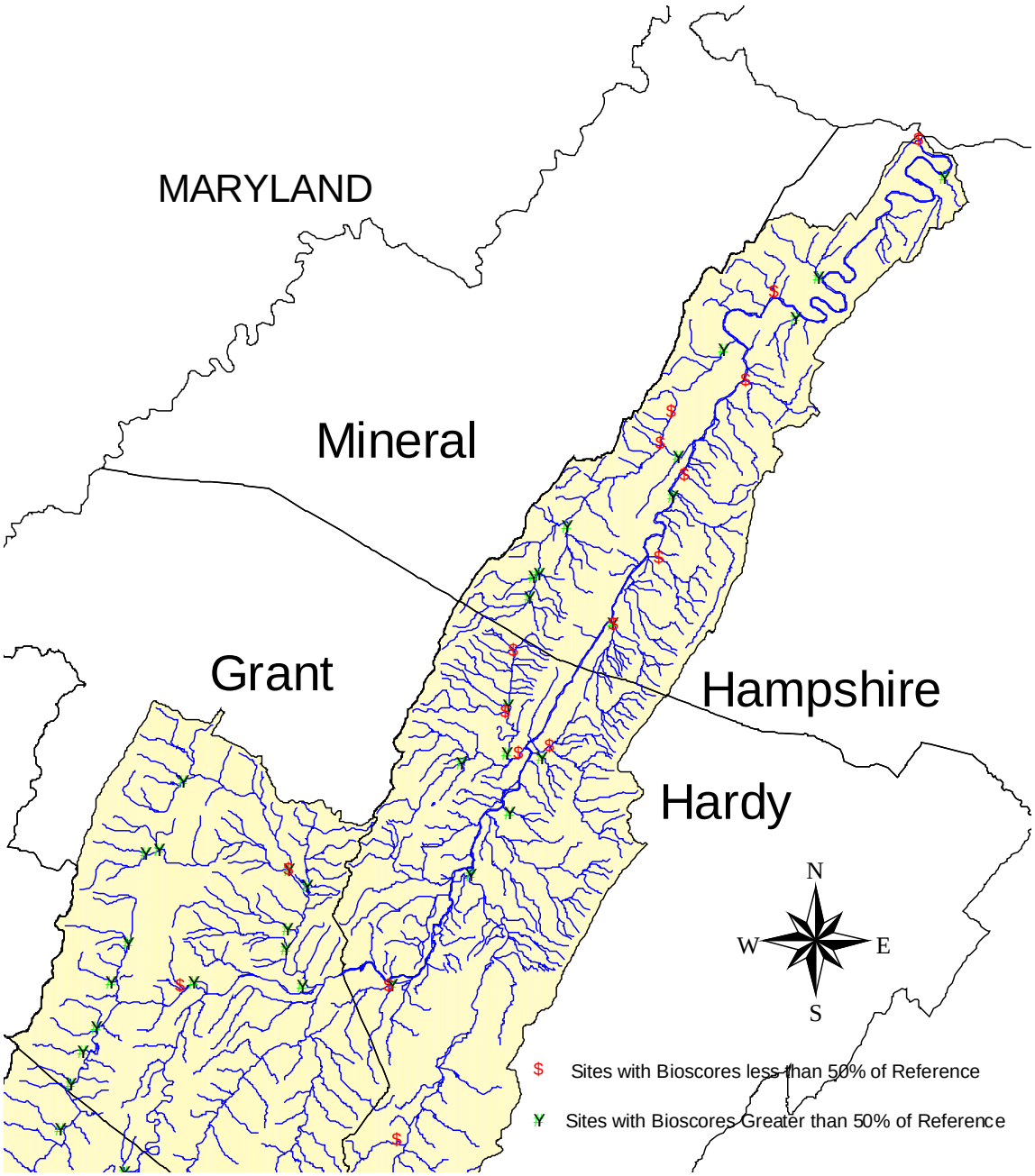


Figure 11: Bioscores -
Southern Portion of the South Branch of Potomac

Five tributaries of the North Fork of the South Branch upstream from Seneca Rocks formed a cluster. Unlike the cluster near Fort Seybert these tributaries were intermixed with sites having good bioscores. The tributaries with impaired bioscores are:

Mill Creek (PSB-28-M) had a bioscore of 50.00,
Root Creek (PSB-28-P) had a bioscore of 50.00,
Judy Run (PSB-28-U) had a bioscore of 33.30,
Nelson Run (PSB-28-V) had a bioscore of 50.00, and
Bouses Run (PSB-28-Z) had a bioscore of 50.00.

Three tributaries of the South Branch near Upper Tract also had bioscores considered impaired. These streams are:

Briggs Run (PSB-32) had a bioscore of 50.00,
Reeds Creek (PSB-33) had a bioscore of 50.00, and
Mill Run of South Branch (PSB-34) had a bioscore of 41.70.

Two other streams also tied for the worst bioscore of 25.00:
Smith Creek (PSB-46), and
Dumpling Run of Mill Creek (PSB-9-B).

FINDINGS - FECAL CONTAMINATION

The water quality standards state that for primary contact recreation (e.g., swimming, boating, fishing) the fecal coliform bacteria content is not to exceed 400 colonies/100 ml in more than 10% of all samples taken during a month. Of the 115 sites sampled, 80 (70%) met the standard (did not exceed 400 colonies per 100 ml) during this study.

On the day sampled, thirty-five sites had fecal coliform bacteria concentrations greater than 400 colonies per 100 milliliter. It is interesting that a greater percentage of large streams met the fecal coliform standard than small ones. It is possible that the larger streams simply diluted the fecal coliform contamination to levels below the standard, or that sample sites on smaller streams were closer to the sources of contamination, or the number of sites on larger streams were so few that they did not really represent the actual conditions. Specific sites and their counts are listed in Table 25.

The accompanying Chart (Figure 12) and maps (Figures 13 & 14) combine data from all stream width categories.

Clusters of sites with fecal coliform bacteria concentrations exceeding 400 colonies per 100 milliliter were identified in the following areas:

Lunice Creek drainage – five out of nine streams sampled in this drainage had fecal concentrations greater than 400 colonies per 100 milliliter:

Lunice Creek (PSB-26) 900 colonies,

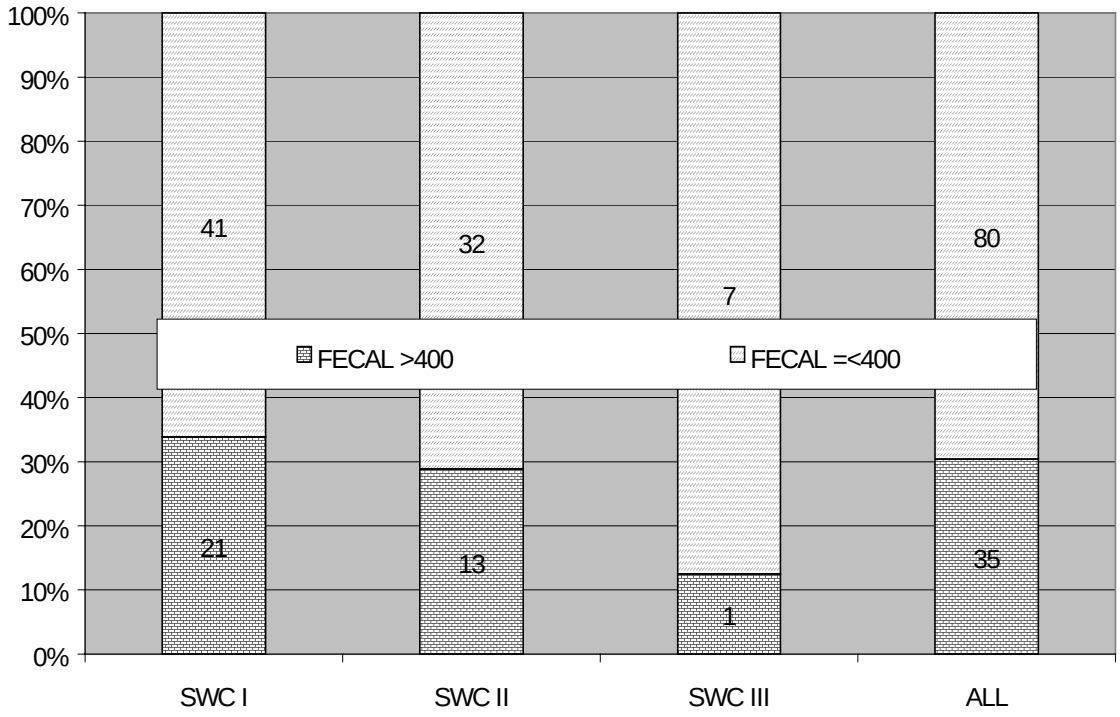
Robinson Run (PSB-26-A) 1,025 colonies,

Norman Run (PSB-26B) 1,715 colonies,

Brushy Run/Lunice Creek (PSB-26-C) 2,880 colonies, and

North Fork of Lunice Creek (PSB-26-E) 1,076 colonies.

Figure 12: Fecal Coliform Bacteria



Thorn Creek drainage – three streams were sampled in this drainage. All three had fecal concentrations greater than 400 colonies per 100 milliliter:

Thorn Creek (PSB-47) 10,440 colonies,

Blackthorn Creek (PSB-48-B) 2,760 colonies, and

Whitethorn Creek (PSB-48-C) 10,120 colonies.

Figure 13: Fecal Coliform Bacteria Concentrations - Northern Portion of the South Branch of Potomac

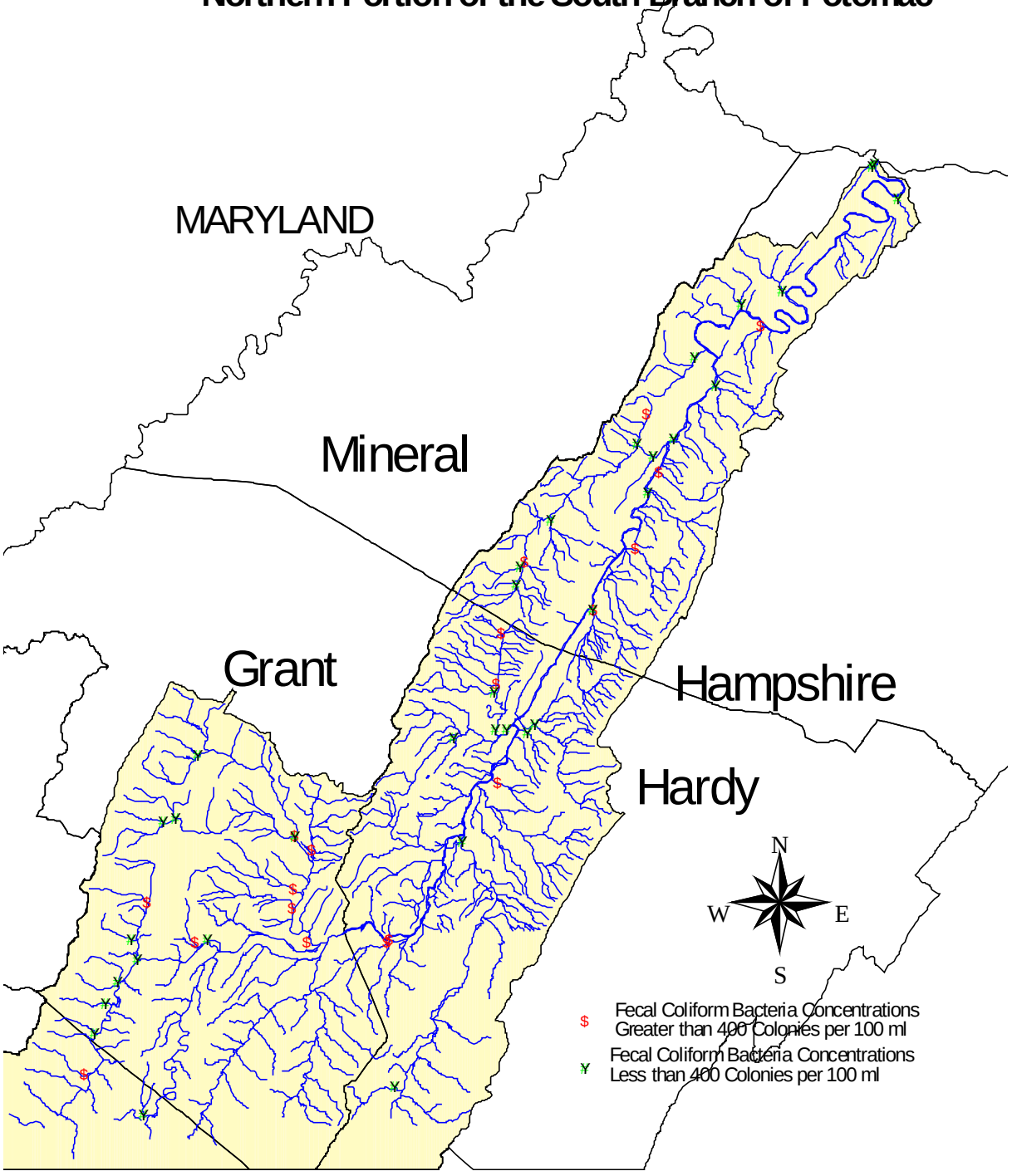
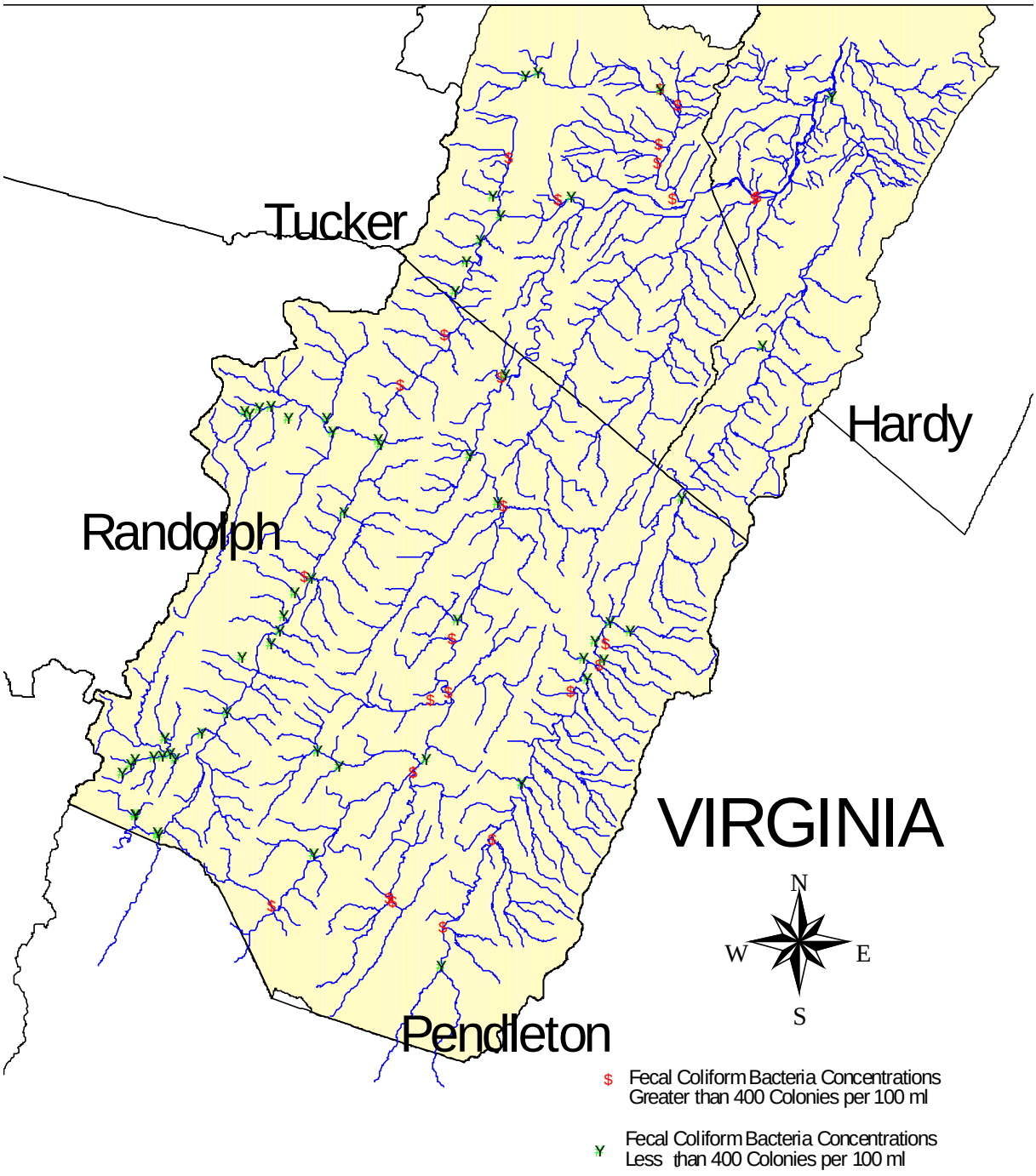


Figure 14: Fecal Bacteria Concentrations -

Southern Portion of the South Branch of Potomac



Durgeon Run drainage – both streams sampled had high fecal coliform bacteria concentrations.

Durgeon Run (PSB-23-A) 610 colonies, and
Mitchell Run (PSB-23-A-1) 505 colonies.

Mudlick Run drainage – two of the four streams sampled in this drainage had fecal concentrations greater than 400 colonies per 100 milliliter:

Turnmill Run (PSB-18-A-1) 630 colonies, and.
Mudlick Run at Headwaters (PSB-18- {6.7}) 623 colonies.

In addition, McDowell Run, Devil Hole Run and Buffalo Run had fecal coliform bacteria concentrations in excess of 4,000 colonies per 100 milliliter or ten times the standard of 400 colonies per 100 milliliter.

Eleven streams had both low bioscores and high fecal coliform bacteria scores. These streams were: McDowell Run (PSB-11), Devil Hole Run (PSB-16), Mudlick Run at Headwaters (PSB-18-A-{6.7}, Wagner Run (PSB-21-O), Stony Run (PSB-21-R), Hively Gap (PSB-21-T), Mitchell Run of Durgeon Run (PSB-23-A-1), and Powers Hollow (PSB-28-.5A).

Fecal concentrations for specific sites can be found in Table 25 in Appendix A.

As stated before, assessment teams did not visit Mill Creek of South Branch Potomac at Petersburg [PSB-9]. A related program, the TMDL development project, measured fecal coliform concentrations immediately downstream of the confluence of Mill Creek's two main branches, North Mill

and South Mill creeks. On June 3, 1997, during a high water event, and on August 25, 1997, with low discharge, the concentrations of fecal coliform bacteria were greater than 6,000 and 1,900 colonies/100 ml, respectively. Both are violations of the standard.

Explaining the Findings

Why are certain sites healthy or degraded? On-site observations of land uses and habitat conditions suggest some answers. Water quality data offer a few additional clues. The following inferences about a site's condition are based on observations of benthic habitat and communities.

No single trait, much less a collection of traits, is common to all of the healthiest or to all of the most degraded sites. The following lists reflect the most common traits associated with the healthiest and the most degraded streams.

In general the healthiest sites (Sams Run, Vance Run, Lower Gulf Run, Bud Hollow, Little Star Run, Back Run, Hemlock Run, Moyer Fork, North Fork of Lunice Creek, Laurel Run, South Fork of South Branch at Fort Seybert and North Fork near Petersburg) exhibited the following characteristics:

Little or no industrial or agricultural land uses,
Some potential sources of NPS pollution,
Little or no streambed alterations,
Wide and moderately intact riparian canopy,
Moderately intact understory,
Moderately intact ground cover,
Slight or moderate erosion,
Little silt, and
Low fecal contamination.

The most degraded sites (i.e., poor habitat and impaired benthos) generally had acceptable physico-chemical characteristics. In addition these sites (Mayhew Run, Mudlick Run at headwaters, Judy Run, East Dry Run, McDowell Run, Smith Creek, Mill Creek of North Fork, Mill Run at Upper Tract, Buffalo Creek, Reeds Creek, Anderson Run, Mitchell Run and Lunice Creek) generally exhibited the following characteristics:

Obvious NPS pollution,

Excessive silt,

Fecal contamination, and

Some streambed alterations.

It should be noted that the South Branch of the Potomac River Watershed experienced extremely high water flows just prior to this survey. This high flow (courtesy of Hurricane Fran) appeared to alter stream substrate at several sites. This could have depleted macroinvertebrate communities and resulted in sites receiving lower bioscores. Several streams sampled by the Program may have received a lower bioscore as a result.

Thirty-four (30%) of the South Branch Watershed's 115 study sites yielded fecal coliform counts that exceeded the standard for water-contact recreation. In terms of the condition of their benthic animal communities, 83 sites or 72% were non-impaired (over 50 percent of the reference condition) and 32 sites or 28% were impaired (below 50 percent of the reference condition).

For long-term trend analyses, it will also be useful to compare the relative rank of benthic taxa among watersheds. The 10 taxa found at the most sites in the Watershed were:

Chironomidae (midges) - collected in 108 (108/112=96%) streams

Hydropsychidae (caddisflies) - 108 (96%),
Baetidae (mayflies) - 107 (96%),
Heptageniidae (mayflies) - 93 (83%),
Simuliidae (blackflies) - 86 (77%),
Philopotamidae (caddisflies) 76 (68%),
Capniidae/Leuctridae (stoneflies) – 70 (63%),
Tipulidae (craneflies) – 70 (63%)
Chloroperlidae (stoneflies) – 62 (55%), and
Perlidae (stoneflies) – 61 (54%).

The following 15 taxa were found only at only one site during the survey:

Siphlonuridae (mayflies),
Pleuroceridae (snails),
Planorbidae (snails),
Lymnaeidae (pond snails),
Hydrobiidae (small snails),
Hirudinidae (leechs)
Helicopsychidae (caddis flies with snail shaped shells),
Ephydridae (shore flies),
Dytiscidae (predaceous diving beetles)
Curculionidae (weevils),
Coenagrionidae (Damsellflies),
Brachycentridae (caddisflies),
Ancylidae (small snails),
Talitridae (scuds), and
Odontoceridae (caddisflies).

Implications

In the South Branch of the Potomac River watershed, 6 streams were on the 1996 303(d) list. Inclusion on the list was based on information collected at several places along the streams, during different seasons, and at various water levels. Since this report summarizes findings from only one sampling event at each site, and was limited to only one flow condition, these results will be used only to add streams to the 1998 303(d) list for Biological Impairment.

Lunice Creek [PSB-26] contained moderately high levels of nitrate + nitrite Nitrogen and a fecal coliform bacteria concentration of 900 colonies per 100 milliliter yet had an unimpaired benthic community. The only source of stressors observed at this site was a direct-pipe, that appeared to be a storm drain. This suggests that pollutants may have been flowing into the study site from upstream areas or from the single pipe. The Program recommends further study of the Lunice Creek drainage area to determine the length of reach affected and sources of stressors. This also illustrates the possibility that elevated fecal coliform bacteria concentrations may be associated with elevated nutrients, which may benefit some benthic organisms.

Although the fecal coliform bacteria concentrations for four streams {Anderson Run (PSB-18) North Fork of the South Branch (PSB-28), South Fork of the South Branch (PSB-21) and South Branch of the Potomac (PSB)} were below the standard on the date samples were collected for this study historic data and a Total Maximum Daily Load (TMDL) study indicate these four and Lunice Creek (PSB-26) and Mill Creek (PSB-9) should remain on the 303(d) list for fecal coliform.

Subsequently, the US Environmental Protection Agency completed a TMDL on each of these six streams for fecal coliform bacteria. These TMDLs require reductions in load allocations of fecal coliform bacteria from agriculture and pasture nonpoint sources in the following percentages:

South Branch of the Potomac	50.0%,
South Fork of the South Branch	43.5%,
North Fork of the South Branch	36.1%,
Lunice Creek	40.6%,
Mill Creek	37.7%, and
Anderson Run	41.5%.

Only one point source of fecal coliform bacteria had a reduction in its load allocations made by these TMDLs. This was:

Wampler Longacre – Parking Lot	100.0%.

The Program recommends continuing support of the Potomac Headwaters Water Quality Program (PHWQP). The PHWQP employs a combination of federal, state and local activities including educational, technical and financial assistance for individual landowners to reduce and prevent water quality impairments to the Potomac River. These activities include:

- Preparing guidelines for implementing BMPs for poultry producers,
- Publishing newsletters and other documents for poultry producers,
- Developing alternative nutrient management methods {Poultry Waste Energy Recovery (POWER), and Litter Composting Demonstrations},
- Establishing a Poultry Litter Marketing Hotline, and

- Conducting manure and litter analysis for nutrient management.

In addition, the Program recommends continuing support of the Water Quality Improvement Project in the North Fork of the South Branch watershed. This project is intended to encourage landowners to reduce nonpoint source discharges by adopting Best Management Practices (BMPs) such as:

- Excluding livestock from streams,
- Establishing riparian buffer zones,
- Develop alternative water sources for livestock,
- Rotate grazing using warm season grasses, and
- Using agricultural by-products to stabilize high erosion areas.

The Program also recommends continued support of the efforts of the West Virginia Department of Agriculture to develop a baseline of water quality for the South Branch of the Potomac watershed to further understand fecal coliform bacteria loading and sources in the watershed.

Two streams had violations of pH at the study sites, (an unnamed tributary of the South Branch at McNeil [PSB-18.2] with a value of 4.7 and Reeds Creek [PSB-33] with a value of 9.4). A naturally occurring sulfur bearing strata may have been the source for the acidic conditions at the site near McNeil. The field team checked the pH several places upstream and found that the pH increased to 6.4 within one mile. The site on Reeds Creek had four potential sources for the high pH reading. Reeds Creek Fish Hatchery is located upstream and may have discharged a slug of ammonia-laden water prior to the sampling event. Alternatively, the surrounding hay and cornfields may have received an application of agricultural lime prior to

the sampling event. The third potential source is limestone dust from adjoining roads. Finally, the high pH may have resulted from photosynthetic activity. This usually occurs in lakes or ponds but can occur in streams during low flow and high temperature conditions. Most likely a combination of these four sources caused the high pH on this particular day.

In addition Walnut Bottom Run [PSB-18-D] had a violation of the standard for Iron. It is unknown if some natural condition or human impact caused this violation. It is suggested that these three streams be studied further to determine the source of these stressors and develop potential remediation activities.

Thirty-two streams in the South Branch Watershed had fecal coliform bacteria levels exceeding 480 colonies per 100 milliliter. This is the equivalent of a "significant violation" (a violation in excess of 20% of the standard) of the standard of 400 colonies per 100 ml. These streams should be studied further to confirm the data and determine the sources of stressors and the length of the reach impacted. These streams and their fecal coliform bacteria counts are included in Table 4 below.

Two sites, Thorn Creek and Whitethorn Creek, were sampled just after a recent thundershower. It is possible that the high fecal coliform bacteria counts for these two streams were associated with the first flushing of bacteria off of pastures upstream. Since excessive fecal coliform bacteria usually indicates improper sewage treatment or improper animal manure management, the Program recommends that public awareness and educational campaigns on these two topics be continued with a special effort made to disseminate them in the South Branch watershed.

TABLE 4: SITES WITH SIGNIFICANT VIOLATIONS OF THE FECAL COLIFORM BACTERIA STANDARD (COLONIES PER 100 MILLILITER)	
SWC I	
Devil Hole Run [PSB-16]	5,200
McDowell Run [PSB-11]	5,000
Friends Run [PSB-42]	3,280
Brushy Run of Lunice Creek [PSB-26-C]	2,880
Blackthorn Creek [PSB-47-B]	2,760
Unnamed tributary of Mill Creek [PSB-9-F.5]	2,466
Hively Gap [PSB-21-T]	2,200
Unnamed tributary of South Branch near Grace [PSB-1.9]	2,050
Fisher Run, [PSB – 21-M]	800
Unnamed tributary of South Branch near Ketterman [PSB-30.5]	800
Peters Run [PSB – 40]	790
Turnmill Run [PSB-18-A-1]	630
Mudlick Run at Headwaters [PSB-18-A-6.7]	623
East Dry Run [PSB –53]	570
Wagner Run [PSB-21-O]	566
Shuckleford Run [PSB-28-J.2]	537
Stony Run/ South Fork [PSB-21-HH]	500
Powers Hollow [PSB-28-.5A]	500
Dice Run of North Fork [PSB-28-Q]	484
SWC II	
Thorn Creek [PSB-47]	10,440
Whitethorn Creek [PSB-47-C]	10,120
Buffalo Run [PSB-14]	6,000
Norman Run [PSB – 26-B]	1,715
Mill Run at Upper Tract [PSB-34]	1,410
North Fork of Lunice Creek [PSB-26-E]	1,076
Robinson Run [PSB-26-A]	1,025
Durgeon Run [PSB-23-A]	610
Little Fork [PSB- 21-GG]	600
Trout Run [PSB- 41]	546
Zeke Run [PSB-28-G]	506
Mitchell Run [PSB-23-A-1]	505
SWC III	
Lunice Creek [PSB-26]	900

This study also concludes that 22 streams (see table 5) are exceptionally healthy based on their optimal habitats and nonimpaired benthic communities. The Program recommends that these streams be

actively protected. Like other environmental regulatory programs, the WV DEP resources are primarily aimed at restoring degraded ecosystems. In the process, healthy streams, like these, may not be adequately protected. Since the fieldwork was conducted in this watershed a Watershed Management Framework Steering Committee has been established. Part of the responsibilities of the agencies which signed the Framework agreement is to develop procedures for pro-active protection of healthy streams. This is consistent with the DEP's mission to both "protect and enhance" the state's natural resources.

Mill Creek [PSB-9] of South Branch Potomac at Petersburg was not sampled in this study. However, as reported in the Findings section, another program reported that fecal coliform concentrations in the creek were an order of magnitude greater than the water quality standard. The Program recommends that Mill Creek be studied further to determine the length of reach affected and sources of stressors.

Any stream improvement plan must have local support. The Program asserts that local watershed associations, operating by the principles of inclusiveness and consensus, are crucial to the success of on-the-ground stream improvement projects. Subscribing to these principles, the Upper South Branch Watershed Association includes stakeholders from Pendleton, Grant and Hardy counties. Their first project has been to understand the current status of the river's water quality by summarizing known information. The Program knows of no similar association in the Hampshire County portion of the basin.

TABLE 5 ESPECIALLY HEALTHY STREAMS
SWC I
Bud Hollow [PSB-28-EE-3-D], reference
Sams Run [PSB-28-GG-1-A], reference
Vance Run [PSB-28-GG-1], reference
Back Run [PSB-28-EE-2-A], reference
Leonard Spring Run [PSB-28-EE-3-B]
Lower Gulf Run [PSB-28-K-6-A]
SWC II
Gulf Run [PSB-28-K-5]
Big Star Run [PSB-PSB-26-D-2]
Moyer Fork [PSB-28-D], reference
Big Run of Jordan Run [PSB-28-A-1]
Mill Run [PSB-13]
North Fork of Lunice Creek [PSB-26-E]
Laurel Run [PSB-28-A-2
South Fork of South Branch at Fort Seybert [PSB-21 {33.7}
Rough Run [PSB-21-K]
Sawmill Run [PSB-17-A], reference
Whites Run [PSB-28-K-6]
High Ridge Run [PSB=28-E]
Hemlock Run [PSB-28-EE-3-A], reference
SWC III
Mill Creek of South Branch Potomac at its mouth [PSB-9], reference,
Seneca Creek {PSB-28-K], reference
North Fork of South Branch near Petersburg [PSB-28 {0.5}.

The Program urges all groups interested in a watershed approach to improving our water resources to coordinate with the Watershed Network and the Watershed Management Framework Steering Committee, in

supporting the Upper South Branch Watershed Association and any others that may develop.

Lastly, a review of the watershed assessments completed during the Program's first year (1996) has suggested a change in the Program itself. In this study, most streams were sampled at the most downstream road crossing. To the extent that roads form different patterns in different watersheds, each watershed would be unintentionally studied by a unique sampling design. This would reduce the value of comparisons between watersheds as well as between sites within a watershed.

One way to reduce this and other biases, is to randomize where streams are sampled. Although randomizing all sites would reduce sampling efficiency too severely, randomizing a subset of sites is feasible and would improve inter-watershed comparability.

TABLE 6
SUGGESTED ACTION LIST

- **Study Lunice Creek and Mill Creek to determine the reaches affected and the sources of the stressors.**
- **The Program recommends continuing support of the Potomac Headwaters Water Quality Program (PHWQP), the Water Quality Improvement Project in the North Fork of the South Branch watershed, and the efforts of the West Virginia Department of Agriculture to further understand fecal coliform bacteria loading and sources in the watershed.**
- **Study the streams with high fecal coliform bacteria concentrations to determine the sources and extent of the impact.**
- **Continue the educational program on the dangers of improper sewage and animal manure management.**
- **Study Walnut Bottom, Reeds Creek, and the unnamed tributary of the South Branch at McNeil to determine the sources of the stressors and the extent of the impact.**
- **Ensure the protection of the especially healthy streams identified in this report.**

Consequently, in 1997 (the year after the South Branch was sampled) the Program started sampling a subset of spatially randomized stream sites in addition to the sites at the most downstream road crossing.

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. The Watershed Management Framework Steering Committee's Basin Coordinator, available at (304) 558-2108, can serve as a clearinghouse to these and other resources.

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APPENDIX A: TABLES

TABLE 7: NPDES PERMITS IN THE SOUTH BRANCH OF THE POTOMAC WATERSHED

Permit Number	Facility Name	Type of Permit	County	City	Receiving Waters
WVG610583	A. F. Humphreys	Sawmill	Pendleton	Franklin	UNT of South Branch
WV0024970	Town of Franklin	Sewerage System	Pendleton	Franklin	South Branch
WV0077291	Pendleton County PSD	Water Supply	Pendleton	Franklin	South Branch
WV0111821	Division of Natural Resources	Fish Hatchery	Pendleton	Franklin	Reeds Creek
WV0113301	Mountain State Fish Hatchery	Animal Aquaculture	Pendleton	Franklin	Hammer Run
WV0113794	Pendleton County PSD	Water Supply	Pendleton	Franklin	South Branch
WV0113948	Town of Franklin	Water Supply	Pendleton	Franklin	Dry Run of Thorn Creek
WVG550629	Mr. & Mrs. Wade Bowers	Mobile Home Sewerage	Pendleton		North Fork of South Branch
WVG610174	Allegheny Wood Products, Inc.	Logging Camps	Pendleton	Riverton	
WV0091821	Greer Steel Co.	Mine and Earth	Pendleton	Riverton	Mill Creek of North Fork
WV0020117	Dept. of Navy	National Security	Pendleton	Sugar Grove	South Branch
WV0037818	U. S. Naval Radio Station	Air and Water Resuce	Pendleton	Sugar Grove	South Branch
WVG550699	Pendleton Co. E&DC	Non residential Buildings	Pendleton	Upper Tract	Reeds Creek
WV0021792	Town of Petersburg	Sewerage Systems	Grant	Petersburg	Lunice Creek
WV0112500	Spring Run Hatchery	Fish Hatcheries	Grant	Dorcas	
WV0020699	City of Romney	Sewerage	Hampshire	Romney	Big Run of South Branch
WV0005495	Wampler-Longacre, Inc.	Poultry& Processing	Hardy	Moorefield	South Fork of South Branch
WV0020150	City of Moorefield	Sewerage Systems	Hardy	Moorefield	South Fork of South Branch
WV0047236	Hester Industries, Inc.	Poultry Slaughtering & Processing	Hardy	Moorefield	South Fork of South Branch
WV0070726	Moorefield Water Treatment	Water Supply	Hardy	Moorefield	South Fork of South Branch
WV0104396	Hardy County Rural Development Authority	Non residential Buildings	Hardy	Moorefield	Fort Run
WV0073342	Hinkle Trucking	Car Wash	Pendleton	Circleville	North Mill Creek
WVG550292	Pendleton County Board of Education	Schools	Pendleton	Franklin	
WVG550724	Robert J. Sites	Mobile Homes	Pendleton	Franklin	South Branch of Potomac
WVG550812	Pendleton Industries, Inc.	Non residential Buildings	Pendleton	Franklin	South Branch of Potomac
WVG610206	Tri County Concrete	Ready-Mixed Concrete	Pendleton	Franklin	South Branch of Potomac
WV0070742	Brandywine Laundromat	Coin Operated Laundries	Pendleton	Brandywine	Hawes Run

TABLE 7:
NPDES PERMITS IN THE SOUTH BRANCH OF THE POTOMAC WATERSHED

Permit Number	Facility Name	Type of Permit	County	City	Receiving Waters
WV0078042	H&J Car Wash and Laundromat	Car Wash	Pendleton	Brandywine	South Branch of Potomac
WV0079561	Hevener Motor Equipment Co.	Car Wash	Pendleton	Franklin	Trout Run
WV0089974	Pendleton County Board of Education	Schools	Pendleton	Franklin	South Branch of Potomac
WV0076431	Columbia Gas Transmission	Natural Gas Transmission	Pendleton	Mouth of Seneca	
WV0077712	WV Department of Highways	Sewerage Systems	Pendleton	Moyers	South Branch of Potomac
WV0005592	Columbia Gas Transmission	Natural Gas Transmission	Pendleton		North Fork of South Branch
WV0038920	Germany Valley Limestone.	Limestone	Pendleton	Riverton	North Fork of South Branch
WV0038920	Germany Valley Limestone	Dimension Stone	Pendleton	Riverton	
WV0080845	Hedricks 4-U Motel	Motel	Pendleton	Riverton	North Fork of South Branch

TABLE 8:
SAMPLING SITES ON THE SOUTH BRANCH OF THE POTOMAC

name	stream code	date sampled	latitude deg	min	sec	longitude deg	min	sec	County
		S.W.C. I							
UNT / SBP @ GREEN SPRINGS	PSB-0.5	27Aug96	39	31	33.70	78	35	28.34	Hampshire
STONEY RUN	PSB-1	26Aug96	39	30	5.63	78	34	13.86	Hampshire
UNT / SBP near GRACE	PSB-1.9	27Aug96	39	24	52.98	78	41	47.58	Hampshire
JOHN'S RUN	PSB-2	27Aug96	39	25	50.46	78	42	50.07	Hampshire
FOX RUN	PSB-4	27Aug96	39	23	41.04	78	45	24.71	Hampshire
MAYHEW RUN	PSB-9-B-2	11Sep96	39	21	18.55	78	48	2.29	Hampshire
CAMP RUN	PSB-9-F	27Aug96	39	17	3.55	78	53	19.50	Hampshire
UNT / MILL CREEK	PSB-9-F.5	26Aug96	39	15	15.73	78	54	45.11	Hampshire
ELMLICK RUN	PSB-9-G	27Aug96	39	14	23.25	78	55	18.06	Hampshire
MILL CREEK @ HEADWATERS	PSB-9-{10.7}	27Aug96	39	15	7.97	78	55	1.51	Hampshire
MCDOWELL RUN	PSB-11	28Aug96	39	18	54.92	78	47	25.94	Hampshire
DEVIL HOLE RUN	PSB-16	28Aug96	39	13	14.03	78	51	10.21	Hampshire
UNT / MUDLICK RUN	PSB-18-A-0.5	26Aug96	39	9	57.29	78	56	34.05	Hardy
TURNMILL RUN	PSB-18-A-1	26Aug96	39	10	13.92	78	56	25.26	Hardy
MUDLICK RUN @ HEADWATERS	PSB-18-A-{6.7}	26Aug96	39	12	18.55	78	56	8.46	Hardy
UNT/SBP @ MACNEIL	PSB-18.2	28Aug96	39	8	13.20	78	54	52.29	Hardy
WALNUT BOTTOM RUN	PSB-18-B	10Sep96	39	8	3.82	78	58	47.62	Hardy
WILLIAMS HOLLOW	PSB-19	28Aug96	39	6	8.00	78	56	31.00	Hardy
DUMPLING RUN / SOUTH FORK	PSB-21-F	19Aug96	38	53	37.00	79	2	25.00	Hardy
LITTLE ROUGH RUN	PSB-21-K-1	19Aug96	38	42	6.00	79	9	35.00	Pendleton
FISHER RUN	PSB-21-M	21Aug96	38	41	33.85	79	10	49.08	Pendleton
WAGNER RUN	PSB-21-O	20Aug96	38	40	42.35	79	11	10.39	Pendleton
DEAN GAP	PSB-21-Q	20 Aug96	38	41	1.27	79	12	2.76	Pendleton
STONY RUN	PSB-21-R	20Aug96	38	40	13.15	79	11	52.08	Pendleton
HIVELY GAP	PSB-21-T	21Aug96	38	39	39.58	79	12	45.00	Pendleton
STONY RUN / SOUTH FORK	PSB-21-HH	21Aug96	38	30	8.40	79	19	33.64	Pendleton
BRUSHY RUN / LUNICE CREEK	PSB-26-C	19Aug96	39	3	27.26	79	6	32.84	Grant
LITTLE STAR RUN	PSB-26-D-3	19Aug96	39	4	49.36	79	14	27.21	Grant
SALTBLOCK RUN	PSB-26-E-2	19Aug96	39	7	35.42	79	12	33.73	Grant
POWERS HOLLOW	PSB-28-.5A	21Aug96	38	59	41.28	79	12	51.86	Grant
SHUCKLEFORD RUN	PSB-28-J.2	10Sep96	38	52	14.40	79	21	16.50	Pendleton
LOWER GULF RUN	PSB-28-K-6-A	20Aug96	38	51	22.20	79	29	26.00	Pendleton
MILL CREEK / NORTH FORK	PSB-28-M	21Aug96	38	47	10.00	79	24	20.00	Pendleton
ROOT RUN	PSB-28-P	21Aug96	38	44	30.00	79	26	6.00	Pendleton
DICE RUN / NORTH FORK	PSB-28-Q	10Sep96	38	44	29.99	79	26	25.46	Pendleton
BLIZZARD RUN	PSB-28-R	19Aug96	38	43	54.00	79	27	1.00	Pendleton
BRIERY GAP RUN	PSB-28-S	19Aug96	38	43	1.00	79	27	38.00	Pendleton
JUDY RUN	PSB-28-U	21Aug96	38	42	22.00	79	27	50.00	Pendleton
NELSON RUN	PSB-28-V	21Aug96	38	41	52.00	79	28	16.00	Pendleton
TETER GAP	PSB-28-CC	19Aug96	38	39	5.00	79	30	38.00	Pendleton
COLD SPRING RUN	PSB-28-EE-1	20Aug96	38	37	17.00	79	33	20.00	Pendleton
SAWMILL BRANCH	PSB-28-EE-2	20Aug96	38	37	30.00	79	33	37.00	Pendleton

TABLE 8:
SAMPLING SITES ON THE SOUTH BRANCH OF THE POTOMAC

name	stream code	date sampled	latitude deg	min	sec	longitude deg	min	sec	County
BACK RUN	PSB-28-EE-2-A	20Aug96	38	38	5.00	79	33	51.00	Pendleton
TEETER CAMP RUN	PSB-28-EE-3	20Aug96	38	37	24.00	79	33	59.00	Pendleton
LEONARD SPRING RUN	PSB-28-EE-3-B	20Aug96	38	37	16.00	79	35	26.00	Pendleton
MIDDLE RIDGE HOLLOW	PSB-28-EE-3-C	20Aug96	38	37	1.00	79	35	39.00	Pendleton
BUD HOLLOW	PSB-28-EE-3-D	20Aug96	38	36	42.00	79	36	6.00	Pendleton
VANCE RUN	PSB-28-GG-1	21Aug96	38	34	58.00	79	35	31.00	Pendleton
SAMS RUN	PSB-28-GG-1-A	21Aug96	38	35	0.00	79	35	26.00	Pendleton
LONG RUN	PSB-30	28Aug96	38	52	38.65	79	15	47.69	Pendleton
UNT / SBP near KETTERMAN	PSB-30.5	28Aug96	38	52	27.70	79	16	3.51	Grant
BRIGGS RUN	PSB-32	28Aug96	38	49	23.00	79	17	45.00	Pendleton
HAMMER RUN @ RUDDLE	PSB-39	27Aug96	38	42	44.18	79	18	32.05	Pendleton
PETERS RUN	PSB-40	27Aug96	38	41	53.79	79	18	49.13	Pendleton
FRIENDS RUN	PSB-42	27Aug96	38	39	22.00	79	20	0.00	Pendleton
SMITH CREEK	PSB-46	27Aug96	38	37	2.00	79	20	21.00	Pendleton
LITTLE CREEK	PSB-46-A	10Sep96	38	36	51.40	79	24	53.10	Pendleton
TWIN RUN	PSB-46-B	10Sep96	38	37	30.40	79	25	56.99	Pendleton
BLACKTHORN CREEK	PSB-47-B	27Aug96	38	31	19.98	79	22	21.13	Pendleton
HAMMER RUN near CAVE	PSB-50	10Sep96	38	33	15.05	79	26	13.92	Pendleton
EAST DRY RUN	PSB-53	10Sep96	38	31	7.12	79	28	26.85	Pendleton
		S.W.C. II							
ABERNATHY RUN	PSB-1.8	26Aug96	39	26	24.14	78	40	37.85	Hampshire
BUFFALO CREEK	PSB-5	26Aug96	39	22	29.29	78	44	18.69	Hampshire
DUMPLING RUN / MILL CREEK	PSB-9-B	27Aug96	39	20	9.61	78	48	36.04	Hampshire
MILL RUN near ROMNEY	PSB-13	26Aug96	39	18	5.85	78	48	4.93	Hampshire
BUFFALO RUN	PSB-14	28Aug96	39	15	43.24	78	48	50.86	Hampshire
SAWMILL RUN	PSB-16-A	28Aug96	39	13	16.97	78	51	12.46	Hampshire
CLIFFORD HOLLOW	PSB-17-A	28Aug96	39	8	35.08	78	54	27.36	Hardy
ANDERSON RUN	PSB-18	26Aug96	39	8	23.62	78	55	56.69	Hardy
MUDLICK RUN @ MOUTH	PSB-18-A-{1.0}	26Aug96	39	8	22.97	78	56	33.05	Hardy
SOUTH FORK @ FORT SEYBERT	PSB-21-{33.7}	20Aug96	38	41	43.82	79	11	25.89	Pendleton
KETTLE CREEK	PSB-21-I	20Aug96	38	47	28.61	79	6	46.03	Pendleton
BRUSHY FORK	PSB-21-II	21Aug96	38	28	35.66	79	19	42.89	Pendleton
ROUGH RUN	PSB-21-K	19Aug96	38	42	29.00	79	10	38.00	Pendleton
DICE RUN / SOUTH FORK	PSB-21-N	20Aug96	38	40	56.63	79	10	58.56	Pendleton
MILLER RUN	PSB-21-AA	21Aug96	38	36	0.10	79	15	21.95	Pendleton
LITTLE FORK	PSB-21-GG	21Aug96	38	33	41.00	79	16	57.00	Pendleton
DURGEON RUN	PSB-23-A	10Sep96	38	59	37.94	79	2	30.41	Hardy
MITCHELL RUN	PSB-23-A-1	10Sep96	38	59	34.00	79	2	39.00	Hardy
ROBINSON RUN	PSB-26-A	10Sep96	39	1	4.95	79	7	39.63	Hardy
NORMAN RUN	PSB-26-B	10Sep96	39	1	50.98	79	7	32.64	Grant
SOUTH FORK / LUNICE CREEK	PSB-26-D	19Aug96	39	4	7.10	79	7	26.89	Grant
BIG STAR RUN	PSB-26-D-2	19Aug96	39	4	58.27	79	13	49.15	Grant
NORTH FORK / LUNICE CREEK	PSB-26-E	19Aug96	39	4	7.00	79	7	24.50	Grant
JORDAN RUN	PSB-28-A	20Aug96	38	59	7.58	79	15	57.85	Grant
BIG RUN / JORDAN RUN	PSB-28-A-1	20Aug96	38	59	57.14	79	16	19.65	Pendleton

TABLE 8:
SAMPLING SITES ON THE SOUTH BRANCH OF THE POTOMAC

name	stream code	date sampled	latitude deg	min	sec	longitude deg	min	sec	County
LAUREL RUN	PSB-28-A-2	20Aug96	39	1	25.11	79	15	23.25	Pendleton
SAMUEL RUN	PSB-28-B	09Sep96	38	58	11.40	79	17	2.48	Grant
MOYER FORK	PSB-28-D	09Sep96	38	57	17.86	79	17	44.69	Grant
HIGH RIDGE RUN	PSB-28-E	09Sep96	38	56	3.82	79	18	22.10	Grant
ZEKE RUN	PSB-28-G	10Sep96	38	54	17.73	79	18	54.63	Pendleton
BRUSHY RUN / SENECA CREEK	PSB-28-K-1	20Aug96	38	50	29.39	79	24	53.26	Pendleton
ROARING CREEK	PSB-28-K-2	21Aug96	38	51	1.99	79	25	9.87	Pendleton
HORSECAMP RUN	PSB-28-K-3	20Aug96	38	51	5.00	79	27	11.70	Pendleton
STRADER RUN	PSB-28-K-4	20Aug96	38	51	31.98	79	28	5.38	Pendleton
GULF RUN	PSB-28-K-5	20Aug96	38	51	28.92	79	28	41.40	Pendleton
WHITES RUN	PSB-28-K-6	20Aug96	38	51	16.00	79	29	12.00	Pendleton
BOUSES RUN	PSB-28-Z	19Aug96	38	41	19.00	79	29	47.00	Pendleton
BIG RUN / NORTH FORK	PSB-28-EE	21Aug96	38	38	17.00	79	31	59.00	Pendleton
HEMLOCK RUN	PSB-28-EE-3-A	20Aug96	38	37	20.00	79	34	29.00	Pendleton
LAUREL FORK	PSB-28-GG	20Aug96	38	34	14.00	79	34	21.00	Pendleton
STRAIGHT FORK	PSB-28-HH	20Aug96	38	34	10.00	79	34	18.00	Pendleton
REEDS CREEK	PSB-33	28Aug96	38	47	26.98	79	16	20.97	Pendleton
MILL RUN @ UPPER TRACT	PSB-34	28Aug96	38	47	16.00	79	16	0.00	Pendleton
TROUT RUN	PSB-41	27Aug96	38	39	40.00	79	19	7.00	Pendleton
THORN CREEK	PSB-47	27Aug96	38	36	28.28	79	20	59.63	Pendleton
WHITETHORN CREEK	PSB-47-C	27Aug96	38	31	12.44	79	22	8.00	Pendleton
		S.W.C. III							
SBP @ MOUTH	PSB-00-{00.5}	26Aug96	39	31	29.71	78	35	35.40	Hampshire
SBP near ROMNEY	PSB-00-{032.2}	27Aug96	39	20	20.54	78	46	39.50	Hampshire
MILL CREEK / SBP @ MOUTH	PSB-9-{02.2}	26Aug96	39	19	39.42	78	47	46.55	Hampshire
SOUTH FORK near MOUTH	PSB-21-{01.0}	19Aug96	39	3	45.00	78	58	28.00	Hardy
LUNICE CREEK	PSB-26	19Aug96	38	59	38.00	79	6	53.00	Grant
NORTH FORK near PETERSBURG	PSB-28-{00.5}	21Aug96	38	59	50.87	79	12	13.93	Grant
NORTH FORK near SENECA ROCKS	PSB-28-{18.8}	20Aug96	38	49	56.52	79	22	23.54	Pendleton
SENECA CREEK	PSB-28-K	20Aug96	38	50	6.29	79	22	29.60	Pendleton

TABLE 9:
STUDY REACH CHARACTERISTICS

Steam name	Stream width (m)	Riffle depth (m)	Run depth (m)	Pool depth (m)
S.W.C. I				
UNT / SBP @ GREEN SPRINGS	1.50	0.05	0.10	0.20
STONEY RUN	1.50	0.30		
UNT / SBP near GRACE	2.50	0.05	0.08	1.00
JOHN'S RUN	1.25	0.05	0.06	1.30
FOX RUN	3.00	0.10	0.20	0.25
MAYHEW RUN	0.30	0.10	0.10	
CAMP RUN	3.00	0.25		0.35
UNT / MILL CREEK	1.50	0.01		0.10
ELMLICK RUN	3.00	0.20		0.30
MILL CREEK @ HEADWATERS	1.00	0.05		0.20
MCDOWELL RUN	3.00	0.03		0.40
DEVIL HOLE RUN	3.00	0.25		0.30
UNT / MUDLICK RUN	1.00	0.10	0.10	0.20
TURNMILL RUN	2.50	0.20	0.10	0.30
MUDLICK RUN AT HEADWATERS	2.00	0.10	0.10	0.80
UNT / SBP @ MACNEIL	2.00	0.07	0.10	0.50
WALNUT BOTTOM RUN	1.00	0.10	0.10	0.80
WILLIAMS HOLLOW	2.00	0.10	0.10	0.70
DUMPLING RUN / SOUTH FORK	3.00	0.10	0.50	0.60
LITTLE ROUGH RUN	2.50	0.10	0.30	0.70
FISHER RUN	3.00	0.10	0.10	0.10
WAGNER RUN	2.00	0.10	0.10	0.30
DEAN GAP	2.50	0.10	0.20	0.30
STONY RUN	1.50	0.10	0.20	0.30
HIVELY GAP	2.50	0.10	0.10	0.20
STONY RUN / SOUTH FORK	3.00	0.10	0.20	0.20
BRUSHY RUN / LUNICE CREEK	3.00	0.05	0.10	0.40
LITTLE STAR RUN	3.00	0.08	0.20	
SALTBLOCK RUN	2.00	0.05	0.07	
POWERS HOLLOW	3.00	0.08	0.10	0.15
SHUCKLEFORD RUN	1.00	0.10	0.20	
LOWER GULF RUN	2.50	0.10	0.15	0.30
MILL CREEK / NORTH FORK	3.00	0.10	0.25	
ROOT RUN	2.00	0.10	0.20	
DICE RUN/NORTH FORK	2.00	0.10	0.20	
BLIZZARD RUN	3.00	0.10	0.20	0.60
BRIERY GAP RUN	3.00	0.10	0.20	
JUDY RUN	1.00	0.10	0.20	
NELSON RUN	3.00	0.10	0.20	
TETER GAP	3.00	0.10	0.20	
COLD SPRING RUN	1.00	0.10	0.20	
SAWMILL BRANCH	3.00	0.10	0.20	
BACK RUN	2.00	0.10		0.35
TEETER CAMP RUN	3.00	0.10	0.30	
LEONARD SPRING RUN	1.50	0.10	0.25	
MIDDLE RIDGE HOLLOW	1.00	0.10	0.20	
BUD HOLLOW	1.00	0.10	0.20	
VANCE RUN	3.00	0.10	0.30	

TABLE 9:
STUDY REACH CHARACTERISTICS

Steam name	Stream width (m)	Riffle depth (m)	Run depth (m)	Pool depth (m)
SAMS RUN	2.00	0.10	0.25	
LONG RUN	1.00	0.10	0.10	0.30
UNT / SBP near KETTERMAN	1.50	0.10	0.10	0.50
BRIGGS RUN	1.50	0.10	0.10	0.20
HAMMER RUN @ RUDDLE	3.00	0.10	0.20	
PETERS RUN	1.00	0.10	0.20	
FRIENDS RUN	1.00	0.10	0.20	0.40
SMITH CREEK	1.00	0.10	0.15	
LITTLE CREEK	2.00	0.10	0.25	
TWIN RUN	3.00	0.10	0.20	
BLACKTHORN CREEK	3.00	0.10	0.30	
HAMMER RUN near CAVE	3.00	0.10	0.30	
EAST DRY RUN	3.00	0.10	0.20	
S.W.C. I Average	2.15 (n=61)	0.10 (n=61)	0.18 (n=53)	0.41 (=33)
S.W.C. I Minimum	0.30	0.01	0.06	0.10
S.W.C. I Maximum	3.00	0.30	0.50	1.30
S.W.C. II				
ABERNATHY RUN	8.00	0.20		1.00
BUFFALO CREEK	6.00	0.10	0.20	
DUMPLING RUN / MILL CREEK	7.00	0.04		0.30
MILL RUN near ROMNEY	8.00	0.01	0.50	1.00
BUFFALO RUN	5.00	0.07	0.50	
SAWMILL RUN	4.00	0.30		0.50
CLIFFORD HOLLOW	4.00	0.10	0.10	
ANDERSON RUN	8.00	0.10	0.30	0.70
MUDLICK RUN @ MOUTH	6.00	0.10	0.30	0.60
SOUTH FORK @ FT. SEYBERT	8.00		0.50	2.50
KETTLE CREEK	4.00	0.10	0.20	0.20
BRUSHY FORK	3.50	0.10	0.30	0.30
ROUGH RUN	6.00	0.10	0.30	1.00
DICE RUN / SOUTH FORK	3.50	0.10	0.10	0.10
MILLER RUN	3.50	0.10	0.20	0.50
LITTLE FORK	4.50	0.10	0.20	0.40
DURGEON RUN	6.00	0.07	0.15	0.50
MITCHELL RUN	4.00	0.14	0.20	0.75
ROBINSON RUN	7.00	0.15	0.25	1.00
NORMAN RUN	5.00	0.15	0.20	0.50
SOUTH FORK / LUNICE CREEK	7.00	0.10	0.25	0.40
BIG STAR RUN	10.00	0.05	0.10	0.30
NORTH FORK / LUNICE CREEK	10.00	0.10	0.15	1.00
JORDAN RUN	10.00	N/A	N/A	N/A
BIG RUN / JORDAN RUN	5.00	0.10	0.20	
LAUREL RUN	5.00	0.15	0.25	0.75
SAMUEL RUN	4.00	0.08	0.12	
MOYER FORK	7.00	0.10	0.16	0.50
HIGH RIDGE RUN	7.00	0.12	0.25	0.75
ZEKE RUN	7.00	0.10	0.25	
BRUSHY RUN / SENECA CREEK	10.00	0.20	0.30	
ROARING CREEK	10.00	0.10	0.30	1.00

TABLE 9:
STUDY REACH CHARACTERISTICS

Steam name		Stream width (m)	Riffle depth (m)	Run depth (m)	Pool depth (m)
HORSECAMP RUN		10.00	0.10	0.15	0.75
STRADER RUN		4.00	0.07	0.10	0.30
GULF RUN		4.00	0.04	0.06	0.25
WHITES RUN		10.00	0.15	0.20	0.50
BOUSES RUN		4.00	0.10	0.30	
BIG RUN / NORTH FORK		7.00	0.30	0.30	0.80
HEMLOCK RUN		4.00	0.10	0.30	0.40
LAUREL FORK		8.00	0.10	0.30	
STRAIGHT FORK		4.00	0.10	0.25	
REEDS CREEK		6.00	0.10	0.10	
MILL RUN @ UPPER TRACT		6.00	0.10	0.20	
TROUT RUN		5.00	0.10	0.20	
THORN CREEK		4.00	0.15	0.20	
WHITETHORN CREEK		4.00	0.15	0.25	
S.W.C. II	Average	6.15 (n=46)	0.11 (n=44)	0.23 (n=42)	0.65 (n=30)
	Minimum	3.50	0.01	0.06	0.10
	Maximum	10.00	0.30	0.50	2.50
S.W.C. III					
SBP @ MOUTH		75.00		3.00	
SBP near ROMNEY		100.00		1.00	
MILL CREEK / SBP @ MOUTH		20.00	0.25	0.30	
SOUTH FORK near MOUTH		15.00	0.30	0.60	3.00
LUNICE CREEK		12.00	0.25	0.50	1.00
NORTH FORK near PETERSBURG		35.00	0.20	0.30	5.00
NORTH FORK near SENECA ROCKS		30.00	0.20	0.35	
SENECA CREEK		25.00	0.10	0.50	
S.W.C. III	Average	39.00 (n=8)	0.22 (n=6)	0.82 (n=8)	3.00 (n=3)
	Minimum	12.00	0.10	0.30	1.00
	Maximum	100.00	0.30	3.00	5.00
ALL STREAMS	Average	6.41 (n=115)	0.11 (n=111)	0.25 (n=103)	0.64 (n=66)
	Minimum	0.30	0.01	0.06	0.10
	Maximum	100.00	0.30	3.00	5.00

Blanks indicate habitat type not present N/A = not accessable

TABLE 10:
EROSION AND NONPOINT SOURCE POLLUTION

Stream name	Watershed erosion	Nonpoint source pollution
S.W.C. I		
UNT / SBP @ GREEN SPRINGS	Slight	Potential
STONEY RUN	Slight	Potential
UNT / SBP near GRACE	Moderate	Obvious
JOHN'S RUN	Slight	Obvious
FOX RUN	None	No Evidence
MAYHEW RUN	Moderate	Obvious
CAMP RUN	None	No Evidence
UNT / MILL CREEK	None	Potential
ELMLICK RUN	None	Potential
MILL CREEK @ HEADWATERS	Slight	Potential
MCDOWELL RUN	Heavy	Obvious
DEVIL HOLE RUN	None	No Evidence
UNT / MUDLICK RUN	Moderate	Potential
TURNMILL RUN	Moderate	Obvious
MUDLICK RUN AT HEADWATERS	Heavy	Obvious
UNT / SBP @ MACNEIL	Slight	Obvious
WALNUT BOTTOM RUN	Heavy	Obvious
WILLIAMS HOLLOW	Moderate	Obvious
DUMPLING RUN / SOUTH FORK	Slight	Potential
LITTLE ROUGH RUN	None	Potential
FISHER RUN	Slight	Obvious
WAGNER RUN	Moderate	Obvious
DEAN GAP	Slight	Potential
STONY RUN	Slight	Potential
HIVELY GAP	Slight	Obvious
STONY RUN / SOUTH FORK	Slight	Potential
BRUSHY RUN / LUNICE CREEK	Heavy	Obvious
LITTLE STAR RUN	Slight	Obvious
SALTBLOCK RUN	Slight	Obvious
POWERS HOLLOW	Slight	Obvious
SHUCKLEFORD RUN	Heavy	Potential
LOWER GULF RUN	Slight	No Evidence
MILL CREEK / NORTH FORK	Slight	Obvious
ROOT RUN	Moderate	Obvious
DICE RUN/NORTH FORK	Moderate	Obvious
BLIZZARD RUN	Slight	Obvious
BRIERY GAP RUN	Moderate	Obvious
JUDY RUN	Slight	Obvious
NELSON RUN	Heavy	Obvious
TETER GAP	Moderate	Obvious
COLD SPRING RUN	Heavy	Potential
SAWMILL BRANCH	Heavy	Obvious
BACK RUN	Slight	No Evidence

TABLE 10:
EROSION AND NONPOINT SOURCE POLLUTION

Stream name	Watershed erosion	Nonpoint source pollution
TEETER CAMP RUN	Moderate	No Evidence
LEONARD SPRING RUN	Moderate	Potential
MIDDLE RIDGE HOLLOW	Moderate	No Evidence
BUD HOLLOW	Moderate	Potential
VANCE RUN	Moderate	Potential
SAMS RUN	Moderate	No Evidence
LONG RUN	Slight	Obvious
UNT / SBP near KETTERMAN	Moderate	Obvious
BRIGGS RUN	Slight	Obvious
HAMMER RUN @ RUDDLE	None	Obvious
PETERS RUN	Slight	Obvious
FRIENDS RUN	Moderate	Obvious
SMITH CREEK	Slight	Obvious
LITTLE CREEK	Heavy	Obvious
TWIN RUN	Moderate	Obvious
BLACKTHORN CREEK	Moderate	Obvious
HAMMER RUN near CAVE	Heavy	Obvious
EAST DRY RUN	Heavy	Obvious
S.W.C. II		
ABERNATHY RUN	None	No Evidence
BUFFALO CREEK	Moderate	Obvious
DUMPLING RUN / MILL CREEK	None	Potential
MILL RUN near ROMNEY	Slight	Potential
BUFFALO RUN	None	Potential
SAWMILL RUN	None	No Evidence
CLIFFORD HOLLOW	Slight	Obvious
ANDERSON RUN	Heavy	Obvious
MUDLICK RUN @ MOUTH	Heavy	Obvious
SOUTH FORK @ FORT SEYBERT	Slight	Potential
KETTLE CREEK	None	Potential
BRUSHY FORK	Slight	Potential
ROUGH RUN	Slight	Obvious
DICE RUN / SOUTH FORK	None	Potential
MILLER RUN	Slight	Potential
LITTLE FORK	Slight	Potential
DURGEON RUN	Heavy	Obvious
MITCHELL RUN	Heavy	Obvious
ROBINSON RUN	Moderate	Obvious
NORMAN RUN	Moderate	Potential
SOUTH FORK / LUNICE CREEK	Moderate	Obvious
BIG STAR RUN	Slight	Obvious
NORTH FORK / LUNICE CREEK	Slight	Obvious
JORDAN RUN	Moderate	Obvious
BIG RUN / JORDAN RUN	Slight	Obvious
LAUREL RUN	Slight	Potential
SAMUEL RUN	Heavy	Potential

TABLE 10:
EROSION AND NONPOINT SOURCE POLLUTION

Stream name	Watershed erosion	Nonpoint source pollution
MOYER FORK	Slight	Potential
HIGH RIDGE RUN	Heavy	Obvious
ZEKE RUN	Moderate	Potential
BRUSHY RUN / SENECA CREEK	Moderate	Obvious
ROARING CREEK	Moderate	Potential
HORSECAMP RUN	Heavy	Obvious
STRADER RUN	Slight	Potential
GULF RUN	Slight	No Evidence
WHITES RUN	None	Potential
BOUSES RUN	Heavy	Obvious
BIG RUN / NORTH FORK	Heavy	Obvious
HEMLOCK RUN	Slight	No Evidence
LAUREL FORK	Heavy	Obvious
STRAIGHT FORK	Moderate	Obvious
REEDS CREEK	Slight	Potential
MILL RUN @ UPPER TRACT	Moderate	Potential
TROUT RUN	Moderate	Obvious
THORN CREEK	Moderate	Obvious
WHITETHORN CREEK	Moderate	Obvious
S.W.C. III		
SOUTH BRANCH POTOMAC @ MOUTH	None	Potential
SOUTH BRANCH POTOMAC near ROMNEY	Slight	Potential
MILL CREEK / SBP @ MOUTH	None	No Evidence
SOUTH FORK near MOUTH	Slight	Obvious
LUNICE CREEK	Moderate	Potential
NORTH FORK near PETERSBURG	Moderate	Obvious
NORTH FORK near SENECA ROCKS	Heavy	Obvious
SENECA CREEK	Moderate	Obvious

TABLE 11:
RESIDENTIAL AND RECREATIONAL LANDUSES

Stream name	RE	LA	BD1	CO	PD1	R1	BC1	PC	PL	BD2	SW	FI	PD2	FT	TR	R2	BC2
S.W.C. I																	
UNT/SBP @ GREEN SPRINGS	✔	✔				✔	✔										
STONEY RUN						✔	✔										
UNT/SBP near GRACE	✔	✔				✔	✔										
JOHN'S RUN	✔	✔				✔	✔										
FOX RUN																	
MAYHEW RUN	✔	✔				✔											
CAMP RUN																	
UNT/MILL CREEK	✔	✔					✔										
ELMLICK RUN	✔	✔				✔											
MILL CREEK @ HW																	
MCDOWELL RUN																	
DEVIL HOLE RUN	✔					✔	✔										
UNT/ MUDLICK RUN																	
TURNMILL RUN																	
MUDLICK RN @HW	✔	✔															
UNT/ BP @ MACNEIL	✔	✔				✔	✔										
WALNUT BOTTOM																	
WILLIAMS HOLLOW		✔				✔	✔										
DUMPLING RUN	✔	✔				✔											
LITTLE ROUGH RUN	✔	✔				✔											
FISHER RUN																	
WAGNER RUN	✔	✔															
DEAN GAP	✔	✔				✔											
STONY RUN	✔	✔				✔											
HIVELY GAP	✔	✔				✔											
STONY RUN / SOUTH FORK	✔	✔				✔	✔										
BRUSHY RUN / LUNICE CREEK	✔	✔				✔	✔										
LITTLE STAR RUN						✔											
SALTBLOCK RUN	✔	✔				✔	✔										
POWERS HOLLOW	✔	✔				✔	✔										
SHUCKLEFORD RUN						✔	✔										
LOWER GULF RUN																✔	✔
MILL CREEK / NORTH FORK						✔											
ROOT RUN	✔	✔				✔											
DICE RUN / NORTH FORK	✔						✔										
BLIZZARD RUN																	
BRIERY GAP RUN	✔					✔											
JUDY RUN						✔											
NELSON RUN																	
TETER GAP						✔											
COLD SPRING RUN																	
SAWMILL BRANCH						✔	✔										
BACK RUN																	

TABLE 11:
RESIDENTIAL AND RECREATIONAL LANDUSES

Stream name	RE	LA	BD1	CO	PD1	R1	BC1	PC	PL	BD2	SW	FI	PD2	FT	TR	R2	BC2
TEETER CAMP RN						✔											
LEONARD SPRING RUN														✔			
MIDDLE RIDGE HOLLOW																	
BUD HOLLOW														✔		✔	
VANCE RUN															✔		
SAMS RUN																	
LONG RUN									✔					✔		✔	✔
UNT/SBP near KETTERMAN																✔	✔
BRIGGS RUN																✔	✔
HAMMER RUN @ RUDDLE	✔	✔				✔	✔										
PETERS RUN						✔	✔										
FRIENDS RUN	✔	✔															
SMITH CREEK	✔					✔	✔										
LITTLE CREEK	✔	✔				✔											
TWIN RUN						✔	✔										
BLACKTHORN CR																	
HAMMER RUN near CAVE	✔					✔	✔										
EAST DRY RUN	✔	✔				✔	✔										
S.W.C. II																	
ABERNATHY RUN						✔											
BUFFALO CREEK																	
DUMPLING RUN	✔	✔				✔	✔										
MILL RUN near ROMNEY	✔					✔	✔	✔	✔					✔			✔
BUFFALO RUN	✔	✔				✔	✔										
SAWMILL RUN	✔					✔	✔										
CLIFFORD HOLLOW						✔	✔										
ANDERSON RUN																✔	
MUDLICK RUN @ MOUTH																	
SOUTH FK @ FT. SEYBERT	✔	✔															
KETTLE CREEK																	
BRUSHY FORK	✔	✔				✔											
ROUGH RUN	✔	✔				✔											
DICE RUN/S. FORK																✔	
MILLER RUN	✔	✔				✔											
LITTLE FORK																✔	
DURG ON RUN												✔		✔			
MITCHELL RUN	✔																
ROBINSON RUN																	
NORMAN RUN																	
SOUTH FORK / LUNICE CREEK						✔	✔										
BIG STAR RUN						✔	✔										
NORTH FORK / LUNICE CREEK																	
JORDAN RUN	✔	✔	✔			✔	✔	✔	✔			✔				✔	
BIG RUN/JORDAN	✔	✔				✔	✔										
LAUREL RUN																	

TABLE 11:
RESIDENTIAL AND RECREATIONAL LANDUSES

Stream name	RE	LA	BD1	CO	PD1	R1	BC1	PC	PL	BD2	SW	FI	PD2	FT	TR	R2	BC2
SAMUEL RUN						✔	✔										
MOYER FORK						✔											
HIGH RIDGE RUN						✔											
ZEKE RUN						✔	✔										
BRUSHY RUN	✔	✔				✔	✔										
ROARING CREEK						✔	✔										
HORSECAMP RUN						✔	✔									✔	
STRADER RUN																✔	
GULF RUN						✔											
WHITES RUN								✔	✔			✔		✔		✔	✔
BOUSES RUN	✔	✔				✔	✔										
BIG RUN / NORTH FORK	✔	✔				✔	✔										
HEMLOCK RUN																	
LAUREL FORK																	
STRAIGHT FORK	✔	✔															
REEDS CREEK																	
MILL RUN @ UPPER TRACT		✔															
TROUT RUN																✔	
THORN CREEK	✔	✔															
WHITETHORN CR						✔											
S.W.C. III																	
SBP @ MOUTH	✔																
SBP near ROMNEY						✔	✔										
MILL CREEK / SBP						✔	✔										
SOUTH FORK near MOUTH																	
LUNICE CREEK						✔	✔					✔		✔			
NORTH FORK. near PETERSBURG	✔	✔	✔			✔						✔		✔		✔	
NORTH FORK. near SENECA ROCKS		✔				✔	✔										
SENECA CREEK								✔	✔			✔		✔		✔	✔

SBP = South Branch of Potomac
✔ = present
LA = lawns,
CO = construction,
R1 = roads (residential),
PC = park, camping,
BD2 = boat dock (recreational),
FI = fishing,
FT = foot trail,
R2 = roads (recreational),

UNT = Unnamed Tributary
RE = residences,
BD1 = boat dock (residential),
PD1 = pipe or drain (residential),
BC1 = bridge or culvert (residential),
PL = parking lot,
SW = swimming,
PD2 = pipe or drain (recreational),
TR = ATV, horse, bike trail,
BC2 = bridge or culvert (recreational)

TABLE 12:
AGRICULTURAL LANDUSES

STREAM NAME	RC	PS	HAY	OR	PY	CA	IR	PD	FR	BC
S.W.C. I										
UNT / SBP @ GREEN SPRINGS		✔	✔							
STONEY RUN										
UNT / SBP NEAR GRACE		✔				✔				
JOHN'S RUN		✔				✔				
FOX RUN		✔	✔						✔	✔
MAYHEW RUN			✔							
CAMP RUN			✔						✔	✔
UNT / MILL CREEK			✔							
ELMLICK RUN										✔
MILL CREEK @ HEADWATERS		✔				✔			✔	✔
MCDOWELL RUN	✔	✔				✔			✔	✔
DEVIL HOLE RUN										
UNT / MUDLICK RUN		✔	✔							
TURNMILL RUN		✔				✔				
MUDLICK RUN AT HEADWATERS										
UNT / SBP @ MACNEIL										
WALNUT BOTTOM RUN		✔				✔				✔
WILLIAMS HOLLOW		✔				✔				
DUMPLING RUN / SOUTH FORK										
LITTLE ROUGH RUN										
FISHER RUN	✔	✔								
WAGNER RUN	✔	✔				✔				
DEAN GAP										
STONY RUN		✔	✔							✔
HIVELY GAP		✔			✔				✔	✔
STONY RUN / SOUTH FORK										
BRUSHY RUN / LUNICE CREEK										
LITTLE STAR RUN		✔								
SALTBLOCK RUN	✔	✔								
POWERS HOLLOW										
SHUCKLEFORD RUN										
LOWER GULF RUN										
MILL CREEK / NORTH FORK										
ROOT RUN										
DICE RUN / NORTH FORK										
BLIZZARD RUN										
BRIERY GAP RUN										
JUDY RUN		✔								
NELSON RUN		✔							✔	
TETER GAP		✔							✔	✔
COLD SPRING RUN										
SAWMILL BRANCH										
BACK RUN										
TEETER CAMP RUN										

TABLE 12:
AGRICULTURAL LANDUSES

STREAM NAME	RC	PS	HAY	OR	PY	CA	IR	PD	FR	BC
LEONARD SPRING RUN										
MIDDLE RIDGE HOLLOW										
BUD HOLLOW										
VANCE RUN										
SAMS RUN										
LONG RUN										
UNT/SBP near KETTERMAN										
BRIGGS RUN										
HAMMER RUN @ RUDDLE										
PETERS RUN										
FRIENDS RUN										
SMITH CREEK										
LITTLE CREEK		✔								
TWIN RUN										
BLACKTHORN CREEK		✔	✔						✔	✔
HAMMER RUN near CAVE			✔							
EAST DRY RUN			✔							
S.W.C. II										
ABERNATHY RUN	✔									
BUFFALO CREEK		✔	✔			✔			✔	✔
DUMPLING RUN / MILL CREEK										
MILL RUN near ROMNEY										
BUFFALO RUN										
SAWMILL RUN										
CLIFFORD HOLLOW		✔				✔				
ANDERSON RUN	✔									
MUDLICK RUN @ MOUTH		✔				✔				✔
SOUTH FORK @ FORT SEYBERT	✔									
KETTLE CREEK			✔							
BRUSHY FORK	✔		✔							
ROUGH RUN						✔				
DICE RUN / SOUTH FORK	✔	✔				✔				
MILLER RUN			✔		✔					
LITTLE FORK		✔								
DURGEON RUN	✔	✔				✔			✔	
MITCHELL RUN	✔	✔				✔			✔	
ROBINSON RUN	✔								✔	
NORMAN RUN	✔	✔				✔				
SOUTH FORK / LUNICE CREEK	✔	✔			✔	✔			✔	
BIG STAR RUN					✔					
NORTH FORK / LUNICE CREEK		✔								
JORDAN RUN										
BIG RUN / JORDAN RUN	✔	✔				✔				
LAUREL RUN		✔				✔				
SAMUEL RUN					✔					
MOYER FORK										

TABLE 12: AGRICULTURAL LANDUSES

STREAM NAME	RC	PS	HAY	OR	PY	CA	IR	PD	FR	BC
HIGH RIDGE RUN										
ZEKE RUN										
BRUSHY RUN / SENECA CREEK		✔				✔				
ROARING CREEK										
HORSECAMP RUN										
STRADER RUN										
GULF RUN										
WHITES RUN										
BOUSES RUN										
BIG RUN / NORTH FORK									✔	
HEMLOCK RUN										
LAUREL FORK										
STRAIGHT FORK										
REEDS CREEK	✔		✔						✔	
MILL RUN @ UPPER TRACT									✔	✔
TROUT RUN										
THORN CREEK										
WHITETHORN CREEK										
S.W.C. III										
SBP @ MOUTH		✔							✔	
SBP near ROMNEY	✔									
MILL CREEK/SBP @ MOUTH										
SOUTH FORK near MOUTH										
LUNICE CREEK										
NORTH FORK near PETERSBURG										
NORTH FORK near SENECA ROCKS			✔							
SENECA CREEK										

SBP = SOUTH BRANCH OF POTOMAC
✔ = PRESENT
PA = PASTURE
PY = POULTRY
IR = IRRITATION
FR = FARM ROAD
UNT = UNNAMED TRIBUTARY
RC = ROW CROPS
OR = ORCHARD
CA = CATTLE ACCESS
PD = PIPE OR DRAIN
BC = BRIDGE OR CULVERT

TABLE 13:
INDUSTRIAL LANDUSES

Stream Name	IP	SM	DM	CP	QU	OG	PP	LG	SM	SL	WWT	PWT	PD	PL	RO	BC
S.W.C. I																
UNT/SBP@GREEN SPRINGS																
STONEY RUN																
UNT / SBP near GRACE																
JOHN'S RUN																
FOX RUN																
MAYHEW RUN																
CAMP RUN																
UNT / MILL CREEK																
ELMLICK RUN																
MILL CREEK @ HW																
MCDOWELL RUN																
DEVIL HOLE RUN																
UNT /MUDLICK RUN																
TURNMILL RUN																
MUDLICK RUN @ HW													✔		✔	✔
UNT/SBP @ MACNEIL																
WALNUT BOTTOM																
WILLIAMS HOLLOW																
DUMPLING RUN																
LITTLE ROUGH RUN																
FISHER RUN																
WAGNER RUN																
DEAN GAP																
STONY RUN																
HIVELY GAP																
STONY RUN / SOUTH FORK																
BRUSHY RUN/ LUNICE																
LITTLE STAR RUN																
SALTBLOCK RUN																
POWERS HOLLOW					✔											
SHUCKLEFORD RUN																
LOWER GULF RUN																
MILL CREEK / NORTH FORK					✔											
ROOT RUN																
DICE RUN / NORTH FORK																
BLIZZARD RUN									✔						✔	
BRIERY GAP RUN																
JUDY RUN																
NELSON RUN																
TETER GAP																
COLD SPRING RUN																
SAWMILL BRANCH																
BACK RUN																
TEETER CAMP RUN																

TABLE 13: INDUSTRIAL LANDUSES

Stream Name	IP	SM	DM	CP	QU	OG	PP	LG	SM	SL	WWT	PWT	PD	PL	RO	BC
LEONARD SPRING RUN																
MIDDLE RIDGE HOLLOW																
BUD HOLLOW																
VANCE RUN																
SAMS RUN																
LONG RUN																
UNT / SBP near KETTERMAN																
BRIGGS RUN																
HAMMER RUN, @ RUDD																
PETERS RUN																
FRIENDS RUN																
SMITH CREEK																
LITTLE CREEK																
TWIN RUN																
BLACKTHORN CREEK																
HAMMER RUN near CAVE																
EAST DRY RUN																
S.W.C. II																
ABERNATHY RUN																
BUFFALO CREEK																
DUMPLING RUN					✔									✔	✔	✔
MILL RUN near ROMNEY																
BUFFALO RUN																
SAWMILL RUN																
CLIFFORD HOLLOW																
ANDERSON RUN																
MUDLICK RUN @ MOUTH																
SOUTHFORK @FORT SEYBERT																
KETTLE CREEK																
BRUSHY FORK																
ROUGH RUN																
DICE RUN / SOUTH FORK																
MILLER RUN																
LITTLE FORK																
DURGEON RUN																
MITCHELL RUN																
ROBINSON RUN																
NORMAN RUN																
SOUTH FORK / LUNICE CREEK																
BIG STAR RUN																
NORTH FORK / LUNICE CREEK																
JORDAN RUN																
BIG RUN / JORDAN RUN																
LAUREL RUN																

TABLE 13: INDUSTRIAL LANDUSES

Stream Name	IP	SM	DM	CP	QU	OG	PP	LG	SM	SL	WWT	PWT	PD	PL	RO	BC
SAMUEL RUN												✔				
MOYER FORK																
HIGH RIDGE RUN																
ZEKE RUN																
BRUSHY RUN																
ROARING CREEK																
HORSECAMP RUN																
STRADER RUN																
GULF RUN																
WHITES RUN																
BOUSES RUN																
BIG RUN / NORTH FORK																
HEMLOCK RUN																
LAUREL FORK																
STRAIGHT FORK																
REEDS CREEK																
MILL RUN @ UPPER TRACT														✔		
TROUT RUN																
THORN CREEK																
WHITETHORN CREEK																
S.W.C. III																
SBP @ MOUTH								✔								
SBP near ROMNEY																
MILL CREEK / SBP @ MOUTH					✔											
SOUTH FORK near MOUTH											✔		✔		✔	✔
LUNICE CREEK																
NORTH FORK near PETERSBURG																
NORTHFORK near SENECA ROCKS																
SENECA CREEK																

UNT=UNNAMED TRIBUTARY
✔=PRESENT
SM = SURFACE MINE
CP = COAL PREP
OG = OIL, GAS WELL
LG = LOGGING
SL = SANITARY LANDFILL
PWT = PUBLIC WATER TREATMENT
PL = PARKING LOT
BC = BRIDGE OR CULVERT

SBP=SOUTH BRANCH OF POTOMAC
IP = INDUSTRIAL PLANT
DM = DEEP MINE
QU = QUARRY
PP = POWER PLANT
SAW = SAWMILL
WWT = WASTE WATER TREATMENT
PD = PIPE OR DRAIN
RO = ROAD

TABLE 14:
STREAM BED ALTERATIONS

stream name	liming	rip-rap	dredging	channelization	fill	dam
S.W.C. I						
UNT / SBP @ GREEN SPRINGS						
STONEY RUN						
UNT / SBP near GRACE						
JOHN'S RUN						
FOX RUN						
MAYHEW RUN						
CAMP RUN						
UNT / MILL CREEK						
ELMLICK RUN						
MILL CREEK @ HEADWATERS						
MCDOWELL RUN						
DEVIL HOLE RUN						
UNT / MUDLICK RUN						
TURNMILL RUN						
MUDLICK RUN AT HEADWATERS		✔				
UNT / SBP @ MACNEIL						
WALNUT BOTTOM RUN						
WILLIAMS HOLLOW		✔				
DUMPLING RUN / SOUTH FORK						
LITTLE ROUGH RUN				✔		
FISHER RUN						
WAGNER RUN		✔				
DEAN GAP		✔				
STONY RUN		✔				
HIVELY GAP		✔				
STONY RUN / SOUTH FORK						
BRUSHY RUN / LUNICE CREEK						
LITTLE STAR RUN						
SALTBLOCK RUN						
POWERS HOLLOW		✔				
SHUCKLEFORD RUN						
LOWER GULF RUN						
MILL CREEK / NORTH FORK		✔		✔		
ROOT RUN						
DICE RUN / NORTH FORK						
BLIZZARD RUN		✔	✔	✔		
BRIERY GAP RUN		✔	✔	✔		
JUDY RUN						
NELSON RUN						
TETER GAP		✔	✔	✔		
COLD SPRING RUN		✔		✔		
SAWMILL BRANCH						
BACK RUN						

TABLE 14:
STREAM BED ALTERATIONS

stream name	liming	rip-rap	dredging	channelization	fill	dam
TEETER CAMP RUN						
LEONARD SPRING RUN						
MIDDLE RIDGE HOLLOW						
BUD HOLLOW						
VANCE RUN						
SAMS RUN						
LONG RUN		✔	✔		✔	
UNT / SBP near KETTERMAN		✔	✔	✔	✔	
BRIGGS RUN		✔	✔	✔	✔	
HAMMER RUN @ RUDDLE						
PETERS RUN				✔		
FRIENDS RUN						
SMITH CREEK						
LITTLE CREEK						
TWIN RUN						
BLACKTHORN CREEK		✔				
HAMMER RUN near CAVE						
EAST DRY RUN						
S.W.C. II						
ABERNATHY RUN						
BUFFALO CREEK						
DUMPLING RUN / MILL CREEK						
MILL RUN near ROMNEY						
BUFFALO RUN						
SAWMILL RUN						
CLIFFORD HOLLOW		✔	✔	✔		
ANDERSON RUN					✔	
MUDLICK RUN @ MOUTH		✔			✔	
SOUTH FORK @ FORT SEYBERT						
KETTLE CREEK						
BRUSHY FORK		✔				
ROUGH RUN				✔		
DICE RUN / SOUTH FORK						
MILLER RUN		✔				
LITTLE FORK		✔				
DURGEON RUN						
MITCHELL RUN		✔		✔		
ROBINSON RUN						
NORMAN RUN						
SOUTH FORK / LUNICE CREEK				✔		
BIG STAR RUN						
NORTH FORK / LUNICE CREEK						
JORDAN RUN		✔		✔		
BIG RUN / JORDAN RUN				✔		
LAUREL RUN						
SAMUEL RUN				✔		✔

TABLE 14:
STREAM BED ALTERATIONS

stream name	liming	rip-rap	dredging	channelization	fill	dam
MOYER FORK						
HIGH RIDGE RUN						
ZEKE RUN						
BRUSHY RUN / SENECA CREEK		✔	✔	✔		
ROARING CREEK						
HORSECAMP RUN		✔	✔	✔		
STRADER RUN		✔	✔	✔		
GULF RUN						
WHITES RUN				✔		
BOUSES RUN		✔	✔	✔	✔	
BIG RUN / NORTH FORK		✔	✔	✔	✔	
HEMLOCK RUN						
LAUREL FORK		✔		✔		
STRAIGHT FORK		✔		✔		
REEDS CREEK		✔	✔	✔		
MILL RUN @ UPPER TRACT						
TROUT RUN						
THORN CREEK		✔				
WHITETHORN CREEK						
S.W.C. III						
SBP @ MOUTH		✔				
SBP near ROMNEY						
MILL CREEK / SBP @ MOUTH						
SOUTH FORK near MOUTH		✔				
LUNICE CREEK						
NORTH FORK near PETERSBURG			✔	✔		
NORTH FORK near SENECA ROCKS		✔	✔	✔		✔
SENECA CREEK		✔		✔		

✔ = present

TABLE 15:
RIPARIAN CANOPY (OVER 5.0 METERS HIGH)

STREAM NAME	Left Descending Band				Right Descending Bank			
	zone width (m)	veg type	big trees	small trees	zone width (m)	veg type	big trees	Small Trees
S.W.C. I								
UNT / SBP @ GREEN SPRINGS	2.0	M	1	2	10.0	D	1	2
STONEY RUN	18.0	D	1	4	9.0	D	1	3
UNT / SBP near GRACE	18.0	M	1	3	18.0	M	0	3
JOHN'S RUN	18.0	D	1	2	10.0	D	3	2
FOX RUN	7.0	D	0	3	18.0	D	1	3
MAYHEW RUN	2.0	D	0	0	2.0	D	0	1
CAMP RUN	4.0	D	1	2	6.0	D	1	2
UNT / MILL CREEK	3.0	D	1	2	3.0	D	1	2
ELMLICK RUN	0.0	D	0	2	1.0	D	0	2
MILL CREEK @ HEADWATERS	0.0	N	0	0	0.0	D	0	1
MCDOWELL RUN	0.0	D	0	1	0.0	D	0	1
DEVIL HOLE RUN	18.0	D	0	2	3.0	D	1	2
UNT / MUDLICK RUN	0.0	N	0	0	0.0	N	0	0
TURNMILL RUN	0.0	N	0	0	0.0	N	0	0
MUDLICK RUN AT HEADWATERS	0.0	N	0	0	0.0	N	0	0
UNT / SBP @ MACNEIL	5.0	D	1	2	3.0	D	1	2
WALNUT BOTTOM RUN	0.0	N	0	0	0.0	N	0	0
WILLIAMS HOLLOW	7.0	D	1	3	18.0	D	3	1
DUMPLING RUN / SOUTH FORK	10.0	D	1	2	10.0	D	1	2
LITTLE ROUGH RUN	5.0	D	1	2	5.0	D	1	2
FISHER RUN	3.0	D	0	0	3.0	D	1	2
WAGNER RUN	15.0	D	2	2	15.0	D	2	2
DEAN GAP	15.0	D	1	3	15.0	D	1	3
STONY RUN	3.0	D	1	1	3.0	D	1	1
HIVELY GAP	8.0	D	0	3	5.0	D	0	3
STONY RUN / SOUTH FORK	4.0	D	1	1	18.0	D	1	3
BRUSHY RUN / LUNICE CREEK	0.0	N	0	0	0.0	N	0	0
LITTLE STAR RUN	18.0	D	0	3	5.0	D	1	1
SALTBLOCK RUN	1.0	D	0	0	2.0	D	0	1
POWERS HOLLOW	10.0	D	1	3	5.0	D	0	3
SHUCKLEFORD RUN	18.0	D	2	4	18.0	D	3	3
LOWER GULF RUN	18.0	M	2	4	18.0	D	2	3
MILL CREEK / NORTH FORK	5.0	D	1	1	0.0	N	0	0
ROOT RUN	18.0	M	4	3	7.0	D	2	1
DICE RUN / NORTH FORK	18.0	M	2	3	18.0	M	2	3
BLIZZARD RUN	18.0	M	1	2	7.0	M	1	2
BRIERY GAP RUN	5.0	D	1	1	3.0	D	1	1
JUDY RUN	4.0	D	2	1	8.0	D	2	2
NELSON RUN	3.0	D	0	1	7.0	M	2	2
TETER GAP	5.0	D	1	1	18.0	D	1	1

TABLE 15:
RIPARIAN CANOPY (OVER 5.0 METERS HIGH)

STREAM NAME	Left Descending Band				Right Descending Bank			
	zone width (m)	veg type	big trees	small trees	zone width (m)	veg type	big trees	Small Trees
COLD SPRING RUN	4.0	M	1	1	17.0	M	2	3
SAWMILL BRANCH	12.0	M	2	2	10.0	M	3	3
BACK RUN	18.0	M	4	3	18.0	M	4	3
TEETER CAMP RUN	12.0	D	4	3	18.0	M	3	3
LEONARD SPRING RUN	18.0	M	4	2	17.0	M	4	2
MIDDLE RIDGE HOLLOW	18.0	M	4	2	18.0	M	4	2
BUD HOLLOW	18.0	M	4	2	17.0	M	4	2
VANCE RUN	16.0	M	4	3	18.0	M	4	3
SAMS RUN	18.0	M	4	3	18.0	M	4	3
LONG RUN	9.0	D	1	3	9.0	D	1	2
UNT / SBP near KETTERMAN	9.0	D	2	2	9.0	D	2	2
BRIGGS RUN	9.0	D	2	2	9.0	M	1	2
HAMMER RUN @ RUDDLE	1.0	D	0	1	1.0	D	0	1
PETERS RUN	0.0	D	0	0	18.0	D	1	1
FRIENDS RUN	2.0	D	1	1	0.0	D	0	0
SMITH CREEK	5.0	D	3	2	0.0	D	1	1
LITTLE CREEK	8.0	M	1	3	8.0	D	1	3
TWIN RUN	18.0	M	2	1	18.0	M	4	2
BLACKTHORN CREEK	0.0	D	0	0	1.0	D	1	1
HAMMER RUN near CAVE	16.0	M	3	3	18.0	M	3	3
EAST DRY RUN	9.0	M	1	3	4.0	M	1	2
S.W.C. II								
ABERNATHY RUN	5.0	D	1	3	15.0	D	1	3
BUFFALO CREEK	6.0	D	0	3	16.0	D	0	3
DUMPLING RUN/MILL CREEK	4.0	D	1	1	2.0	D	0	1
MILL RUN near ROMNEY	4.0	D	1	3	15.0	D	1	3
BUFFALO RUN	8.0	D	1	3	18.0	D	1	3
SAWMILL RUN	10.0	M	0	2	18.0	D	1	3
CLIFFORD HOLLOW	12.0	D	0	1	8.0	D	1	2
ANDERSON RUN	4.0	D	1	0	4.0	D	2	1
MUDLICK RUN @ MOUTH	0.0	N	0	0	0.0	N	0	0
SOUTH FORK @ FORT SEYBERT	18.0	D	1	3	18.0	D	0	2
KETTLE CREEK	18.0	D	1	2	6.0	D	1	1
BRUSHY FORK	18.0	M	0	3	7.0	D	0	1
ROUGH RUN	18.0	D	1	2	6.0	M	1	3
DICE RUN / SOUTH FORK	10.0	D	0	1	18.0	M	1	2
MILLER RUN	18.0	D	1	3	6.0	D	1	2
LITTLE FORK	10.0	D	0	1	10.0	D	1	2
DURGEON RUN	3.0	D	1	2	3.0	D	0	3
MITCHELL RUN	0.0	N	0	0	0.0	D	0	1
ROBINSON RUN	5.0	D	0	1	5.0	D	1	2
NORMAN RUN	15.0	D	1	3	5.0	D	1	1
SOUTH FORK / LUNICE CREEK	0.0	D	0	0	10.0	D	0	2
BIG STAR RUN	10.0	D	3	1	5.0	D	2	1

TABLE 15:
RIPARIAN CANOPY (OVER 5.0 METERS HIGH)

STREAM NAME	Left Descending Band				Right Descending Bank			
	zone width (m)	veg type	big trees	small trees	zone width (m)	veg type	big trees	Small Trees
NORTH FORK / LUNICE CREEK	18.0	D	3	2	15.0	D	3	1
JORDAN RUN	0.0	D	3	1	15.0	D	2	3
BIG RUN / JORDAN RUN	8.0	D	2	2	10.0	D	2	2
LAUREL RUN	10.0	D	2	1	18.0	D	2	2
SAMUEL RUN	0.0	D	0	1	0.0	D	0	0
MOYER FORK	18.0	D	3	2	15.0	D	2	2
HIGH RIDGE RUN	18.0	D	3	2	18.0	D	2	2
ZEKE RUN	18.0	D	3	3	18.0	D	3	3
BRUSHY RUN / SENECA CREEK	18.0	D	3	2	18.0	D	3	2
ROARING CREEK	18.0	M	3	3	8.0	D	3	3
HORSECAMP RUN	0.0	D	1	1	15.0	D	1	2
STRADER RUN	6.0	D	2	2	18.0	D	3	3
GULF RUN	18.0	M	3	3	5.0	D	0	1
WHITES RUN	10.0	D	1	2	18.0	D	2	3
BOUSES RUN	9.0	D	1	1	3.0	D	1	1
BIG RUN / NORTH FORK	10.0	D	1	2	3.0	D	0	1
HEMLOCK RUN	18.0	D	1	3	18.0	D	1	3
LAUREL FORK	0.0	N	0	0	5.0	D	1	1
STRAIGHT FORK	9.0	D	1	2	5.0	D	1	1
REEDS CREEK	0.0	N	0	0	0.0	N	0	0
MILL RUN @ UPPER TRACT	0.0	D	1	1	0.0	D	1	1
TROUT RUN	6.0	M	3	1	8.0	D	3	1
THORN CREEK	4.0	D	1	1	12.0	M	4	3
WHITETHORN CREEK	3.0	M	1	2	5.0	D	1	2
S.W.C. III								
SBP @ MOUTH	2.0	D	1	3	0.0	ND	ND	ND
SBP near ROMNEY	18.0	D	1	3	18.0	D	1	3
MILL CREEK / SBP @ MOUTH	18.0	D	1	3	15.0	D	1	3
SOUTH FORK near MOUTH	18.0	D	1	3	3.0	D	1	2
LUNICE CREEK	18.0	D	1	3	3.0	D	1	2
NORTH FORK near PETERSBURG	10.0	D	2	1	18.0	D	4	2
NORTH FORK near SENECA ROCKS	12.0	D	2	1	18.0	D	3	2
SENECA CREEK	8.0	D	3	3	18.0	D	3	3

UNT = Unnamed Tributary
SBP = South Branch Of Potomac
ND = Not Accessible

Veg Type = Vegetation Type
C = Coniferous
D = Deciduous
M = Mixed (At Least 10 % Of Each Type)

Tree Values
0 = Absent
1 = Sparse (0-10% Of Canopy)
2 = Moderate (10-40%)
3 = Heavy (40-75%)
4 = Very Heavy (>75%)

TABLE 16:
RIPARIAN UNDERSTORY (0.5 to 5.0 METERS HIGH)

stream name	Left Descending Bank			Right Descending Bank		
	Veg type	Shrub/ saplings	Nonwoody herbs	Veg type	Shrub saplings	Nonwoody herbs
S.W.C. I						
UNT / SBP @ GREEN SPRINGS	D	2	2	D	3	2
STONEY RUN	D	3	1	D	3	1
UNT / SBP near GRACE	M	2	4	M	3	4
JOHN'S RUN	D	2	3	M	3	3
FOX RUN	D	3	2	D	2	2
MAYHEW RUN	D	3	3	D	3	3
CAMP RUN	D	3	3	D	3	3
UNT / MILL CREEK	D	1	1	D	1	1
ELMLICK RUN	D	1	0	D	0	1
MILL CREEK @ HEADWATERS	N	0	0	N	0	0
MCDOWELL RUN	D	1	0	D	1	0
DEVIL HOLE RUN	D	3	2	D	2	1
UNT / MUDLICK RUN	D	1	1	D	1	1
TURNMILL RUN	D	1	1	D	1	1
MUDLICK RUN AT HEADWATER	D	2	2	D	0	0
UNT / SBP @ MACNEIL	D	2	2	D	1	3
WALNUT BOTTOM RUN	D	1	0	D	1	0
WILLIAMS HOLLOW	D	3	1	D	1	1
DUMPLING RUN / SOUTH FORK	D	2	1	D	2	2
LITTLE ROUGH RUN	D	1	3	D	1	2
FISHER RUN	D	0	4	D	2	4
WAGNER RUN	D	3	3	D	3	2
DEAN GAP	D	2	3	D	2	2
STONY RUN	D	2	2	D	2	2
HIVELY GAP	D	2	3	D	1	3
STONY RUN / SOUTH FORK	D	2	2	D	2	1
BRUSHY RUN / LUNICE CREEK	D	0	1	D	0	1
LITTLE STAR RUN	D	1	3	D	1	1
SALTBLOCK RUN	D	1	3	D	2	1
POWERS HOLLOW	D	3	3	D	2	2
SHUCKLEFORD RUN	D	3	2	D	1	1
LOWER GULF RUN	D	1	2	D	2	0
MILL CREEK / NORTH FORK	D	1	2	N	0	0
ROOT RUN	M	4	3	D	1	2
DICE RUN / NORTH FORK	M	3	1	M	3	1
BLIZZARD RUN	M	3	1	D	3	1
BRIERY GAP RUN	D	2	2	D	1	2
JUDY RUN	D	3	4	D	3	4
NELSON RUN	D	1	4	D	2	3
TETER GAP	D	2	1	D	2	2
COLD SPRING RUN	M	1	1	M	4	4
SAWMILL BRANCH	M	2	2	M	1	2
BACK RUN	M	3	3	M	3	3
TEETER CAMP RUN	D	2	3	D	3	2

TABLE 16:
RIPARIAN UNDERSTORY (0.5 to 5.0 METERS HIGH)

stream name	Left Descending Bank			Right Descending Bank		
	Veg type	Shrub/ saplings	Nonwoody herbs	Veg type	Shrub saplings	Nonwoody herbs
LEONARD SPRING RUN	M	2	2	M	2	2
MIDDLE RIDGE HOLLOW	M	2	3	M	3	3
BUD HOLLOW	M	3	2	M	3	3
VANCE RUN	M	3	1	M	2	1
SAMS RUN	M	2	1	M	2	2
LONG RUN	D	3	2	D	3	2
UNT / SBP near KETTERMAN	D	2	1	D	2	1
BRIGGS RUN	D	1	1	M	2	1
HAMMER RUN @ RUDDLE	D	1	2	D	1	2
PETERS RUN	D	0	1	D	2	2
FRIENDS RUN	D	2	2	D	1	0
SMITH CREEK	D	2	2	D	2	1
LITTLE CREEK	D	2	1	D	2	1
TWIN RUN	M	1	2	M	2	1
BLACKTHORN CREEK	D	1	1	D	1	1
HAMMER RUN near CAVE	M	1	1	M	1	2
EAST DRY RUN	D	3	2	D	1	4
S.W.C. II						
ABERNATHY RUN	D	2	3	D	2	3
BUFFALO CREEK	D	2	3	D	3	2
DUMPLING RUN / MILL CREEK	D	1	4	D	1	4
MILL RUN near ROMNEY	D	2	3	D	3	2
BUFFALO RUN	D	3	1	D	3	1
SAWMILL RUN	D	3	2	D	3	2
CLIFFORD HOLLOW	D	2	1	D	3	1
ANDERSON RUN	D	1	2	D	1	1
MUDLICK RUN @ MOUTH	D	1	1	D	0	1
SOUTH FORK @ FORT SEYBERT	D	2	2	D	2	2
KETTLE CREEK	D	1	3	D	1	3
BRUSHY FORK	D	3	3	D	2	4
ROUGH RUN	D	3	2	D	2	1
DICE RUN / SOUTH FORK	D	3	2	D	2	2
MILLER RUN	D	4	0	D	4	0
LITTLE FORK	D	2	4	D	2	2
DURGEON RUN	D	1	2	D	1	4
MITCHELL RUN	D	1	2	D	0	2
ROBINSON RUN	D	3	3	D	2	3
NORMAN RUN	D	2	3	D	1	4
SOUTH FORK / LUNICE CREEK	D	2	3	D	3	3
BIG STAR RUN	D	2	2	D	1	2
NORTH FORK / LUNICE CREEK	D	2	2	D	1	3
JORDAN RUN	D	0	1	D	2	2
BIG RUN / JORDAN RUN	D	3	2	D	1	1
LAUREL RUN	D	1	1	D	2	1
SAMUEL RUN	D	1	1	D	1	2

TABLE 16:
RIPARIAN UNDERSTORY (0.5 to 5.0 METERS HIGH)

stream name	Left Descending Bank			Right Descending Bank		
	Veg type	Shrub/ saplings	Nonwoody herbs	Veg type	Shrub saplings	Nonwoody herbs
MOYER FORK	D	2	2	D	2	3
HIGH RIDGE RUN	D	2	1	D	1	0
ZEKE RUN	D	3	3	D	2	2
BRUSHY RUN / SENECA CREEK	D	1	1	D	2	1
ROARING CREEK	D	2	0	D	2	3
HORSECAMP RUN	D	1	1	D	1	2
STRADER RUN	D	2	2	D	2	1
GULF RUN	D	2	1	D	1	3
WHITES RUN	D	2	2	D	2	2
BOUSES RUN	D	3	2	D	1	2
BIG RUN / NORTH FORK	D	2	1	D	1	0
HEMLOCK RUN	M	1	0	M	1	0
LAUREL FORK	N	0	0	D	1	2
STRAIGHT FORK	D	2	3	D	1	1
REEDS CREEK	N	0	0	N	0	0
MILL RUN @ UPPER TRACT	D	1	2	D	1	2
TROUT RUN	M	1	1	M	2	2
THORN CREEK	D	1	1	M	2	2
WHITETHORN CREEK	M	3	4	D	1	4
S.W.C. III						
SBP @ MOUTH	D	2	3	ND	ND	ND
SBP near ROMNEY	D	3	3	D	3	3
MILL CREEK / SBP @ MOUTH	D	2	2	D	3	3
SOUTH FORK near MOUTH	D	2	2	D	2	2
LUNICE CREEK	D	2	3	D	1	2
NORTH FORK near PETERSBURG	D	2	1	D	2	2
NORTH FORK near SENECA ROCKS	D	1	1	D	1	2
SENECA CREEK	D	2	2	D	2	2

UNT = Unnamed Tributary
SBP = South Branch Of Potomac
ND = Not Accessible

Veg Type = Vegetation Type
C = Coniferous
D = Deciduous
M = Mixed (At Least 10 % Of Each Type)

Shrub Sapling Values
0 = Absent
1 = Sparse (0-10% Of Canopy)
2 = Moderate (10-40%)
3 = Heavy (40-75%)
4 = Very Heavy (>75%)

TABLE 17:
RIPARIAN GROUNDCOVER (LESS THAN 0.5 METERS)

Stream name	left			right			
	shrubs seedlings	nonwoody herbs, grasses	bare soil	shrubs seedlings	nonwoody herbs, grasses	bare soil	stream shade
S.W.C. I							
UNT / SBP @ GREEN SPRINGS	0	4	0	3	3	0	3
STONEY RUN	3	1	1	4	1	1	4
UNT / SBP near GRACE	4	4	0	4	4	0	2
JOHN'S RUN	2	2	0	2	2	1	2
FOX RUN	2	3	1	1	3	0	4
MAYHEW RUN	2	3	1	2	3	1	4
CAMP RUN	3	4	1	3	4	1	3
UNT / MILL CREEK	1	4	0	1	4	0	3
ELMLICK RUN	0	3	1	0	3	1	2
MILL CREEK @ HEADWATERS	0	4	1	0	4	0	1
MCDOWELL RUN	0	3	3	0	3	3	1
DEVIL HOLE RUN	1	2	0	1	3	0	4
UNT / MUDLICK RUN	0	2	3	1	2	2	1
TURNMILL RUN	0	2	2	0	2	2	1
MUDLICK RUN AT HEADWATERS	0	2	1	0	2	3	1
UNT / SBP @ MACNEIL	1	3	2	1	2	2	3
WALNUT BOTTOM RUN	1	2	2	1	2	3	1
WILLIAMS HOLLOW	1	1	1	0	2	1	4
DUMPLING RUN / SOUTH FORK	1	2	2	1	3	1	4
LITTLE ROUGH RUN	1	3	0	1	3	2	4
FISHER RUN	0	2	0	1	2	0	4
WAGNER RUN	1	2	0	1	1	0	4
DEAN GAP	1	2	0	1	2	0	4
STONY RUN	1	3	0	1	3	0	2
HIVELY GAP	1	1	0	1	1	1	4
STONY RUN / SOUTH FORK	1	2	0	2	2	0	4
BRUSHY RUN / LUNICE CREEK	0	4	1	1	4	3	1
LITTLE STAR RUN	1	3	1	1	2	1	3
SALTBLOCK RUN	1	2	0	1	2	0	0
POWERS HOLLOW	2	3	2	1	2	2	4
SHUCKLEFORD RUN	1	1	2	1	3	3	3
LOWER GULF RUN	1	2	0	0	2	2	4
MILL CREEK / NORTH FORK	1	4	3	0	1	3	3
ROOT RUN	2	1	1	1	4	1	4
DICE RUN / NORTH FORK	1	4	1	1	3	1	4
BLIZZARD RUN	1	1	1	1	1	1	4
BRIERY GAP RUN	1	2	1	1	2	2	2
JUDY RUN	2	3	1	2	4	1	3
NELSON RUN	1	4	1	2	3	0	1
TETER GAP	1	2	1	1	1	2	2
COLD SPRING RUN	1	1	4	1	2	1	1
SAWMILL BRANCH	1	3	2	2	2	2	3

TABLE 17:
RIPARIAN GROUNDCOVER (LESS THAN 0.5 METERS)

Stream name	left			right			
	shrubs seedlings	nonwoody herbs, grasses	bare soil	shrubs seedlings	nonwoody herbs, grasses	bare soil	stream shade
BACK RUN	2	3	1	2	3	1	4
TEETER CAMP RUN	3	3	2	2	3	2	4
LEONARD SPRING RUN	2	1	1	2	4	1	4
MIDDLE RIDGE HOLLOW	2	3	1	2	3	1	4
BUD HOLLOW	1	2	1	2	3	1	4
VANCE RUN	1	1	1	1	3	1	4
SAMS RUN	2	1	1	2	3	1	4
LONG RUN	1	3	1	1	3	1	2
UNT / SBP near KETTERMAN	1	2	1	1	2	1	3
BRIGGS RUN	2	3	1	2	3	1	2
HAMMER RUN @ RUDDLE	1	4	1	1	4	0	1
PETERS RUN	1	4	1	1	1	0	2
FRIENDS RUN	1	4	1	0	4	0	2
SMITH CREEK	1	3	1	1	4	1	1
LITTLE CREEK	1	4	2	1	4	2	2
TWIN RUN	1	4	1	2	2	1	3
BLACKTHORN CREEK	0	4	1	0	4	1	1
HAMMER RUN near CAVE	1	1	2	1	1	3	3
EAST DRY RUN	1	2	2	1	4	2	2
S.W.C. II							
ABERNATHY RUN	1	2	1	1	3	1	4
BUFFALO CREEK	2	3	2	2	2	2	3
DUMPLING RUN / MILL CREEK	0	3	1	0	3	1	1
MILL RUN near ROMNEY	2	3	3	3	3	2	4
BUFFALO RUN	2	2	1	2	2	1	4
SAWMILL RUN	2	2	0	2	3	0	4
CLIFFORD HOLLOW	1	3	1	1	3	1	2
ANDERSON RUN	1	2	2	1	1	3	3
MUDLICK RUN @ MOUTH	0	2	2	0	2	2	1
SOUTH FORK @ FORT SEYBERT	1	2	0	2	2	0	1
KETTLE CREEK	0	3	1	0	3	0	1
BRUSHY FORK	1	1	0	1	1	0	1
ROUGH RUN	1	2	1	1	1	0	4
DICE RUN / SOUTH FORK	1	1	0	1	2	0	4
MILLER RUN	1	1	0	1	1	0	4
LITTLE FORK	1	2	0	1	3	0	1
DURGEON RUN	0	2	2	1	2	1	3
MITCHELL RUN	0	0	3	0	2	2	1
ROBINSON RUN	1	3	1	1	4	0	1
NORMAN RUN	1	3	2	1	3	1	2
SOUTH FORK / LUNICE CREEK	1	3	1	1	1	0	2
BIG STAR RUN	1	2	0	1	2	1	3
NORTH FORK / LUNICE CREEK	1	4	0	1	2	1	3
JORDAN RUN	1	1	3	2	2	2	1

TABLE 17:
RIPARIAN GROUNDCOVER (LESS THAN 0.5 METERS)

Stream name	left			right			
	shrubs seedlings	nonwoody herbs, grasses	bare soil	shrubs seedlings	nonwoody herbs, grasses	bare soil	stream shade
BIG RUN / JORDAN RUN	2	2	1	2	2	1	3
LAUREL RUN	1	3	0	1	1	1	4
SAMUEL RUN	1	1	3	1	3	1	1
MOYER FORK	2	3	2	1	3	2	4
HIGH RIDGE RUN	1	1	2	1	1	3	4
ZEKE RUN	1	2	1	2	4	1	4
BRUSHY RUN / SENECA CREEK	1	1	4	1	1	3	3
ROARING CREEK	1	1	2	2	3	2	3
HORSECAMP RUN	0	1	3	1	2	4	1
STRADER RUN	1	2	4	1	2	1	3
GULF RUN	1	2	1	1	3	1	4
WHITES RUN	1	2	1	1	3	0	4
BOUSES RUN	1	3	1	1	2	1	2
BIG RUN / NORTH FORK	1	2	4	0	1	4	1
HEMLOCK RUN	1	2	1	1	2	1	4
LAUREL FORK	0	0	4	1	2	3	1
STRAIGHT FORK	2	4	2	1	2	3	1
REEDS CREEK	0	4	1	0	4	0	1
MILL RUN @ UPPER TRACT	1	2	1	0	3	2	2
TROUT RUN	1	1	2	1	3	1	4
THORN CREEK	1	3	2	1	2	2	2
WHITETHORN CREEK	1	3	1	1	4	0	1
S.W.C. III							
SBP @ MOUTH	2	3	1	ND	ND	ND	1
SBP near ROMNEY	2	3	1	2	3	1	1
MILL CREEK / SBP @ MOUTH	2	3	1	2	3	1	4
SOUTH FORK near MOUTH	1	2	0	1	2	3	2
LUNICE CREEK	2	3	1	1	3	1	1
NORTH FORK near PETERSBURG	1	2	3	2	3	1	1
NORTH FORK near SENECA ROCKS	1	1	3	1	1	2	1
SENECA CREEK	1	2	2	2	1	0	1

UNT = Unnamed Tributary
SBP = South Branch Of Potomac
ND = Not Accessible

Veg Type = Vegetation Type
C = Coniferous
D = Deciduous
M = Mixed (At Least 10 % Of Each Type)

Tree Values
0 = Absent
1 = Sparse (0-10% Of Canopy)
2 = Moderate (10-40%)
3 = Heavy (40-75%)
4 = Very Heavy (>75%)

TABLE 18:
SUBSTRATE COMPOSITIONS

STREAM NAME	% bedrock	% boulder	% cobble	% gravel	% sand	% silt	% clay
S.W.C. I							

TABLE 18: SUBSTRATE COMPOSITIONS

STREAM NAME	% bedrock	% boulder	% cobble	% gravel	% sand	% silt	% clay
UNT / SBP @ GREEN SPRINGS	0	10	30	30	20	10	0
STONEY RUN	0	0	90	5	5	0	0
UNT /SBP near GRACE	0	0	20	20	40	20	0
JOHN'S RUN	0	0	35	35	20	10	0
FOX RUN	0	5	70	10	10	5	0
MAYHEW RUN	0	0	20	40	30	10	0
CAMP RUN	0	0	50	20	20	10	0
UNT / MILL CREEK	0	0	70	15	10	5	0
ELMLICK RUN	0	5	60	10	20	5	0
MILL CREEK @ HEADWATERS	0	5	70	15	10	0	0
MCDOWELL RUN	0	5	80	5	5	5	0
DEVIL HOLE RUN	0	5	65	10	15	5	0
UNT / MUDLICK RUN	0	5	45	35	5	5	5
TURNMILL RUN	70	0	10	10	5	5	0
MUDLICK RUN AT HEADWATERS	0	0	15	45	20	20	0
UNT / SBP @ MACNEIL	0	25	30	50	20	5	5
WALNUT BOTTOM RUN	0	0	10	30	20	10	30
WILLIAMS HOLLOW	0	5	40	25	25	5	0
DUMPLING RUN / SOUTH FORK	0	30	20	25	25	0	0
LITTLE ROUGH RUN	0	2	70	25	3	0	0
FISHER RUN	0	0	34	50	15	1	0
WAGNER RUN	0	0	60	35	0	5	0
DEAN GAP	0	15	60	20	3	2	0
STONY RUN	0	0	80	20	0	0	0
HIVELY GAP	0	0	35	42	20	3	0
STONY RUN / SOUTH FORK	0	0	70	22	5	3	0
BRUSHY RUN / LUNICE CREEK	0	0	20	30	30	20	0
LITTLE STAR RUN	0	25	40	25	10	0	0
SALTBLOCK RUN	0	30	40	20	10	0	0
POWERS HOLLOW	0	20	25	20	20	15	0
SHUCKLEFORD RUN	0	10	40	30	10	5	0
LOWER GULF RUN	20	25	25	20	5	5	0
MILL CREEK / NORTH FORK	0	10	30	30	25	5	0
ROOT RUN	30	10	30	20	0	10	0
DICE RUN / NORTH FORK	0	20	30	30	5	5	0
BLIZZARD RUN	15	20	50	10	5	0	0
BRIERY GAP RUN	0	25	45	25	5	0	0
JUDY RUN	10	20	20	30	10	10	0
NELSON RUN	0	40	30	20	0	10	0
TETER GAP	0	10	35	35	15	5	0
COLD SPRING RUN	5	25	30	15	25	0	0
SAWMILL BRANCH	0	40	40	15	5	0	0
BACK RUN	15	30	25	25	5	0	0
TEETER CAMP RUN	15	15	40	25	5	0	0
LEONARD SPRING RUN	10	45	30	10	5	0	0
MIDDLE RIDGE HOLLOW	10	40	35	15	0	0	0
BUD HOLLOW	20	20	30	25	5	0	0
VANCE RUN	40	20	10	15	5	0	0

TABLE 18: SUBSTRATE COMPOSITIONS

STREAM NAME	% bedrock	% boulder	% cobble	% gravel	% sand	% silt	% clay
SAMS RUN	15	35	40	10	0	0	0
LONG RUN	0	25	35	25	10	5	0
UNT / SBP near KETTERMAN	0	35	30	25	10	0	0
BRIGGS RUN	0	30	40	25	5	0	0
HAMMER RUN @ RUDDLE	0	0	40	35	10	5	0
PETERS RUN	35	25	15	10	10	5	0
FRIENDS RUN	5	25	30	25	10	5	0
SMITH CREEK	5	10	50	25	5	5	0
LITTLE CREEK	0	30	30	35	5	0	0
TWIN RUN	0	15	35	30	15	5	0
BLACKTHORN CREEK	0	15	50	30	5	0	0
HAMMER RUN near CAVE	5	10	40	30	10	5	0
EAST DRY RUN	0	15	25	40	15	5	0
average	5.3	14.5	39.3	24.3	11.4	4.6	0.7
S. W. C. I minimum	0	0	10	5	0	0	0
n=60 maximum	70	45	90	50	40	20	30
S.W.C. II							
ABERNATHY RUN	0	15	50	10	10	15	0
BUFFALO CREEK	0	0	70	15	10	5	0
DUMPLING RUN / MILL CREEK	0	0	75	15	10	5	0
MILL RUN near ROMNEY	5	5	60	10	10	10	0
BUFFALO RUN	0	10	80	5	5	0	0
SAWMILL RUN	45	0	30	10	10	5	0
CLIFFORD HOLLOW	10	25	30	15	15	5	0
ANDERSON RUN	20	5	40	20	10	5	0
MUDLICK RUN @ MOUTH	0	0	30	30	20	20	0
SOUTH FORK @ FORT SEYBERT	0	0	65	35	0	0	0
KETTLE CREEK	0	0	65	35	0	0	0
BRUSHY FORK	40	0	30	25	3	2	0
ROUGH RUN	0	3	60	25	10	2	0
DICE RUN / SOUTH FORK	0	0	72	25	3	0	0
MILLER RUN	0	0	70	23	5	2	0
LITTLE FORK	0	0	75	25	0	0	0
DURGEON RUN	0	0	15	25	60	5	0
MITCHELL RUN	0	10	50	20	20	5	0
ROBINSON RUN	0	10	40	30	20	5	0
NORMAN RUN	0	5	15	40	30	0	15
SOUTH FORK / LUNICE CREEK	10	10	40	30	10	0	0
BIG STAR RUN	0	10	40	40	10	0	0
NORTH FORK / LUNICE CREEK	0	15	50	25	10	0	0
JORDAN RUN	0	20	50	20	10	0	0
BIG RUN/JORDAN RUN	0	30	40	20	5	5	0
LAUREL RUN	0	30	40	20	10	0	0
SAMUEL RUN	0	10	35	40	15	0	0
MOYER FORK	25	30	30	15	5	0	0
HIGH RIDGE RUN	75	10	10	5	5	0	0
ZEKE RUN	20	10	30	20	15	5	0
BRUSHY RUN / SENECA CREEK	0	30	50	20	0	0	0

TABLE 18: SUBSTRATE COMPOSITIONS

STREAM NAME		% bedrock	% boulder	% cobble	% gravel	% sand	% silt	% clay
ROARING CREEK		40	15	15	20	10	0	0
HORSECAMP RUN		0	30	40	30	0	0	0
STRADER RUN		0	20	45	25	0	10	0
GULF RUN		40	20	15	10	15	15	0
WHITES RUN		0	20	40	30	5	5	0
BOUSES RUN		5	25	35	30	5	0	0
BIG RUN / NORTH FORK		0	10	40	40	5	5	0
HEMLOCK RUN		35	20	30	10	5	0	0
LAUREL FORK		0	25	50	25	0	0	0
STRAIGHT FORK		15	15	40	20	10	0	0
REEDS CREEK		0	0	25	35	30	10	0
MILL RUN @ UPPER TRACT		15	5	25	15	20	0	0
TROUT RUN		5	25	30	30	10	5	0
THORN CREEK		5	20	30	30	10	5	0
WHITETHORN CREEK		0	10	50	25	15	0	0
S. W. C. II N=46	average	8.9	12.0	42.3	23.2	10.6	3.4	0.3
	minimum	0	0	10	5	0	0	0
	maximum	8	30	80	40	60	20	15
S.W.C. III								
SBP @ MOUTH		35	10	5	10	20	20	0
SBP near ROMNEY		N/A	N/A	N/A	N/A	N/A	N/A	N/A
MILL CREEK / SBP @ MOUTH		0	15	50	20	10	5	0
SOUTH FORK near MOUTH		0	0	85	15	0	0	0
LUNICE CREEK		10	5	40	0	0	0	0
NORTH FORK near PETERSBURG		0	20	40	40	0	0	0
NORTH FORK near SENECA ROCKS		0	10	40	20	20	10	0
SENECA CREEK		0	25	30	30	5	10	0
S. W. C. III	average	6.4	12.1	41.4	22.1	9.3	7.9	0.0
N=8	minimum	0	0	5	10	0	0	0
	maximum	35	25	85	40	20	20	0

N/A = not accessible

TABLE 19:
SEDIMENT ODORS AND OILS

STREAM NAME	Sediment odors							sediment oils			
	nor	sew	pet	chm	ana	non	Other	abs	sli	mod	pro
S.W.C. I											
UNT/ SBP @ GREEN SPRINGS	✔							✔			
STONEY RUN						✔		✔			
UNT / SBP near GRACE	✔										
JOHN'S RUN	✔							✔			
FOX RUN						✔		✔			
MAYHEW RUN	✔							✔			
CAMP RUN						✔		✔			
UNT/MILL CREEK						✔		✔			
ELMLICK RUN		✔					TRASH	✔			
MILL CREEK @ HW						✔		✔			
MCDOWELL RUN							COWS	✔			
DEVIL HOLE RUN						✔		✔			
UNT/MUDLICK RUN	✔							✔			
TURNMILL RUN	✔							✔			
MUDLICK RUN @HW	✔							✔			
UNT / SBP @ MCNIEL	✔							✔			
WALNUT BOTTOM	✔							✔			
WILLIAMS HOLLOW	✔							✔			
DUMPLING RUN	✔							✔			
LITTLE ROUGH RUN	✔							✔			
FISHER RUN	✔							✔			
WAGNER RUN	✔							✔			
DEAN GAP	✔							✔			
STONY RUN	✔							✔			
HIVELY GAP	✔							✔			
STONY RUN / SOUTH FORK	✔							✔			
BRUSHY RUN / LUNICE CREEK	✔							✔			
LITTLE STAR RUN	✔							✔			
SALTBLOCK RUN	✔							✔			
POWERS HOLLOW	✔							✔			
SHUCKLEFORD RUN						✔		✔			
LOWER GULF RUN	✔							✔			
MILL CREEK / NORTH FORK						✔		✔			
ROOT RUN						✔		✔			
DICE RUN / NORTH FORK						✔		✔			
BLIZZARD RUN	✔							✔			
BRIERY GAP RUN	✔							✔			
JUDY RUN						✔		✔			
NELSON RUN						✔		✔			
TETER GAP	✔							✔			
COLD SPRING RUN	✔							✔			
SAWMILL BRANCH						✔		✔			
BACK RUN						✔					
TEETER CAMP RUN	✔							✔			
LEONARD SPRING RUN						✔		✔			
MIDDLE RIDGE HOLOW						✔		✔			

TABLE 19: SEDIMENT ODORS AND OILS

STREAM NAME	Sediment odors							sediment oils			
	nor	sew	pet	chm	ana	non	Other	abs	sli	mod	pro
BUD HOLLOW						✔		✔			
VANCE RUN						✔		✔			
SAMS RUN						✔		✔			
LONG RUN	✔							✔			
UNT / SBP near KETTERMAN	✔							✔			
BRIGGS RUN	✔							✔			
HAMMER RUN @ RUD						✔		✔			
PETERS RUN						✔		✔			
FRIENDS RUN						✔		✔			
SMITH CREEK					✔			✔			
LITTLE CREEK						✔		✔			
TWIN RUN						✔		✔			
BLACKTHORN CR	✔							✔			
HAMMER RUN near CAVE						✔		✔			
EAST DRY RUN	✔							✔			
S.W.C. II											
ABERNATHY RUN						✔		✔			
BUFFALO CREEK						✔					
DUMPLING RUN						✔		✔			
MILL RUN near ROMNEY						✔		✔			
BUFFALO RUN						✔		✔			
SAWMILL RUN						✔		✔			
CLIFFORD HOLLOW	✔							✔			
ANDERSON RUN	✔							✔			
MUDLICK RUN @ MOUTH	✔							✔			
SOUTH FORK @ FORT SEYBERT	✔							✔			
KETTLE CREEK	✔							✔			
BRUSHY FORK	✔							✔			
ROUGH RUN	✔							✔			
DICE RUN / SOUTH FORK	✔							✔			
MILLER RUN	✔							✔			
LITTLE FORK	✔							✔			
DURGEON RUN	✔							✔			
MITCHELL RUN	✔							✔			
ROBINSON RUN	✔							✔			
NORMAN RUN	✔							✔			
SOUTH FORK / LUNICE CREEK	✔							✔			
BIG STAR RUN	✔							✔			
NORTH FORK / LUNICE CREEK	✔							✔			
JORDAN RUN	✔							✔			
BIG RUN / JORDAN RUN						✔		✔			
LAUREL RUN	✔							✔			
SAMUEL RUN	✔							✔			
MOYER FORK	✔							✔			
HIGH RIDGE RUN	✔							✔			
ZEKE RUN						✔		✔			
BRUSHY RUN	✔							✔			

TABLE 19:
SEDIMENT ODORS AND OILS

STREAM NAME	Sediment odors							sediment oils			
	nor	sew	pet	chm	ana	non	Other	abs	sli	mod	pro
ROARING CREEK	✔							✔			
HORSECAMP RUN	✔							✔			
STRADER RUN	✔							✔			
GULF RUN	✔							✔			
WHITES RUN	✔							✔			
BOUSES RUN	✔							✔			
BIG RUN / NORTH FORK	✔							✔			
HEMLOCK RUN	✔							✔			
LAUREL FORK						✔		✔			
STRAIGHT FORK						✔		✔			
REEDS CREEK	✔							✔			
MILL RUN @ UPPER TRACT	✔							✔			
TROUT RUN						✔		✔			
THORN CREEK						✔		✔			
WHITETHORN CREEK						✔		✔			
S.W.C. III											
SBP @ MOUTH						✔		✔			
SBP near ROMNEY						✔		✔			
MILL CREEK / SBP	✔							✔			
SOUTH FORK near MOUTH	✔							✔			
LUNICE CREEK	✔							✔			
NORTH FORK near PETERSBURG	✔							✔			
NORTH FORK near SENECA ROCK	✔							✔			
SENECA CREEK	✔							✔			

✔ **= Present**

Sediment Odors:
nor = normal
sew = sewage
pet = petroleum
chm = chemical
ana = anaerobic (organic decomposition)
non = none

Sediment Oils:
abs = absent
sli = slight
mod = moderate
pro = profuse

TABLE 20:
SEDIMENT DEPOSITS

Stream name	sediment deposits									
	sld	saw	pap	san	shl	mar	sil	lim	met	other
S.W.C. I										
UNT / SBP @ GREEN SPRINGS				✔			✔			
STONEY RUN							✔			
UNT / SBP near GRACE										
JOHN'S RUN							✔			
FOX RUN				✔						
MAYHEW RUN				✔						
CAMP RUN				✔			✔			
UNT / MILL CREEK				✔						
ELMLICK RUN				✔			✔			
MILL CREEK @ HW				✔						
MCDOWELL RUN							✔			PERIPHYTON
DEVIL HOLE RUN										
UNT / MUDLICK RUN							✔			
TURNMILL RUN				✔			✔			
MUDLICK RUN @HW				✔			✔			
UNT / SBP @ MCNIEL				✔					✔	
WALNUT BOTTOM							✔			CLAY
WILLIAMS HOLLOW				✔						
DUMPLING RUN				✔						
LITTLE ROUGH RUN										
FISHER RUN							✔			
WAGNER RUN							✔			
DEAN GAP							✔			
STONY RUN							✔			
HIVELY GAP							✔			
STONY RUN / SOUTH FK							✔			
BRUSHY RUN/ LUNICE				✔			✔			
LITTLE STAR RUN				✔			✔			
SALTBLOCK RUN				✔			✔			
POWERS HOLLOW				✔			✔			SHALE CHIPS
SHUCKLEFORD RUN				✔			✔			
LOWER GULF RUN				✔			✔			
MILL CREEK / NORTH FORK						✔		✔		
ROOT RUN						✔				
DICE RUN / NORTH FORK				✔			✔			
BLIZZARD RUN										
BRIERY GAP RUN										
JUDY RUN						✔				
NELSON RUN						✔				
TETER GAP				✔			✔			
COLD SPRING RUN				✔						
SAWMILL BRANCH				✔						
BACK RUN				✔						
TEETER CAMP RUN				✔						
LEONARD SPRING RUN				✔						
MIDDLE RIDGE HOLOW										
BUD HOLLOW				✔						

TABLE 20:
SEDIMENT DEPOSITS

Stream name	sediment deposits									
	sld	saw	pap	san	shl	mar	sil	lim	met	other
VANCE RUN				✔						
SAMS RUN										
LONG RUN							✔			
UNT / SBP near KETTERMAN				✔						
BRIGGS RUN										
HAMMER RUN @ RUDDLE				✔		✔				
PETERS RUN				✔		✔				
FRIENDS RUN				✔		✔				
SMITH CREEK						✔				
LITTLE CREEK				✔						
TWIN RUN				✔			✔			
BLACKTHORN CREEK				✔						
HAMMER RUN near CAVE				✔						
EAST DRY RUN				✔						
S.W.C. II										
ABERNATHY RUN							✔			
BUFFALO CREEK				✔			✔			COW MANURE
DUMPLING RUN				✔			✔			PERIPHYTON
MILL RUN near ROMNEY							✔			
BUFFALO RUN										
SAWMILL RUN				✔			✔			
CLIFFORD HOLLOW				✔			✔			
ANDERSON RUN				✔			✔			
MUDLICK RUN @ MOUTH				✔			✔			
SOUTH FORK @ FORT SEYBERT							✔			
KETTLE CREEK										
BRUSHY FORK							✔			
ROUGH RUN				✔			✔			
DICE RUN / SOUTH FORK										
MILLER RUN							✔			
LITTLE FORK							✔			
DURGEON RUN				✔			✔			
MITCHELL RUN				✔						
ROBINSON RUN				✔			✔			
NORMAN RUN				✔						
SOUTH FORK / LUNICE CREEK				✔						
BIG STAR RUN				✔			✔			
NORTH FORK / LUNICE CREEK				✔						
JORDAN RUN				✔			✔			
BIG RUN / JORDAN RUN				✔			✔			
LAUREL RUN				✔			✔			
SAMUEL RUN				✔						
MOYER FORK				✔						
HIGH RIDGE RUN				✔						
ZEKE RUN				✔			✔			
BRUSHY RUN				✔			✔			
ROARING CREEK				✔			✔			
HORSECAMP RUN				✔			✔			
STRADER RUN				✔			✔			

TABLE 20: SEDIMENT DEPOSITS

Stream name	sediment deposits									
	sld	saw	pap	san	shl	mar	sil	lim	met	other
GULF RUN				✔			✔			
WHITES RUN				✔			✔			
BOUSES RUN										
BIG RUN/NORTH FK										
HEMLOCK RUN										
LAUREL FORK										
STRAIGHT FORK				✔						
REEDS CREEK				✔						
MILL RUN @ UPPER TR				✔			✔			
TROUT RUN				✔		✔				
THORN CREEK						✔		✔		
WHITETHORN CR				✔						
S.W.C. III										
SBP @ MOUTH				✔			✔			
SBP near ROMNEY										
MILL CREEK / SBP							✔			
SOUTH FORK near MOUTH							✔			
LUNICE CREEK				✔			✔			
NORTH FORK near PETERSBURG				✔			✔			
NORTH FORK near SENECA ROCKS				✔			✔			
SENECA CREEK				✔			✔			

Sediment Deposits:

✔ = present
sld = sludge
saw = sawdust
pap = paper fiber
san = sand
shl = dead mollusks shells
mar = marl
sil = silt
lim = lime fines
met = metal hydroxides

TABLE 21:
RAPID HABITAT ASSESSMENT

stream name	cov	Sub	emb	vel	altr	sed	riff	flow	bank	bank veg	grz	rip veg	total
S.W.C. I													
UNT / SBP @ GREEN SPRINGS	17	16	16	14	14	14	18	12	15	16	11	2	165
STONEY RUN	16	18	18	13	19	19	17	18	15	16	19	10	198
UNT / SBP near GRACE	3	7	10	11	15	5	9	16	5	15	19	20	135
JOHN'S RUN	13	18	18	17	14	14	17	13	18	19	19	14	194
FOX RUN	18	19	19	17	16	15	15	12	17	16	19	8	191
MAYHEW RUN	6	13	6	9	14	11	5	8	15	18	15	3	123
CAMP RUN	12	11	10	17	13	12	13	14	18	16	15	5	166
UNT /MILL CREEK	16	17	14	17	15	13	15	16	18	17	13	4	175
ELMLICK RUN	15	16	14	17	13	15	14	17	16	15	9	2	164
MILL CREEK @ HW	14	19	17	17	13	14	18	15	18	17	12	3	177
MCDOWELL RUN	13	17	6	16	13	16	16	17	6	6	2	0	130
DEVIL HOLE RUN	18	18	15	15	18	19	20	16	18	18	14	5	194
UNT / MUDLICK RUN	13	15	14	10	11	15	16	12	11	8	8	5	138
TURNMILL RUN	7	5	15	10	19	16	18	16	7	7	7	5	132
MUDLICK RUN @ HW	6	9	5	11	15	12	10	9	3	4	5	2	91
UNT / SBP @ MACNEIL	14	15	13	13	15	10	16	18	12	13	10	5	154
WALNUT BOTTOM RUN	6	16	9	14	18	10	16	13	5	9	6	3	125
WILLIAMS HOLLOW	13	16	11	14	15	16	16	10	15	14	9	6	155
DUMPLING RUN	20	18	16	18	17	14	20	19	16	13	13	10	194
LITTLE ROUGH RUN	17	17	18	14	13	18	18	17	13	13	12	4	174
FISHER RUN	11	9	17	10	16	17	16	15	15	16	10	3	155
WAGNER RUN	17	18	15	12	11	13	19	14	17	18	17	14	185
DEAN GAP	18	17	17	16	15	16	18	18	16	18	17	15	201
STONY RUN	16	17	17	12	13	16	19	18	17	14	7	3	169
HIVELY GAP	12	10	15	10	15	13	18	9	14	16	13	4	149
STONY RUN / SOUTH FORK	17	17	14	10	15	12	20	18	19	17	14	5	178
BRUSHY RUN / LUNICE CREEK	14	15	12	16	13	10	15	17	9	10	6	0	137
LITTLE STAR RUN	18	19	18	15	18	17	20	19	15	12	14	5	190
SALTBLOCK RUN	17	19	16	15	13	15	19	19	16	16	11	1	177
POWERS HOLLOW	16	18	12	15	14	10	18	18	14	15	13	4	167
SHUCKLEFORD RUN	14	16	14	10	18	10	19	16	3	5	16	16	157
LOWER GULF RUN	19	18	17	18	18	18	19	16	16	18	19	19	215
MILL CREEK / NORTH FORK	12	15	6	10	12	8	18	16	10	5	9	4	125
ROOT RUN	14	14	16	10	11	10	17	16	15	14	10	8	155
DICE RUN / NORTH FORK	16	16	16	10	15	15	18	17	12	10	18	16	179
BLIZZARD RUN	18	18	19	15	12	18	19	12	14	17	12	10	184
BRIERY GAP RUN	18	18	18	10	6	17	19	15	16	7	12	5	161
JUDY RUN	15	12	10	10	12	8	18	15	13	16	10	4	143
NELSON RUN	15	17	11	10	18	8	18	17	14	17	11	4	160
TETER GAP	14	15	13	10	11	15	17	15	15	9	15	4	153
COLD SPRING RUN	15	16	12	9	8	10	17	13	8	4	10	3	125
SAWMILL BRANCH	19	17	16	10	11	15	19	16	10	9	13	9	164
BACK RUN	19	19	14	10	19	16	19	17	16	15	20	20	204
TEETER CAMP RUN	18	18	16	10	19	15	18	15	10	13	16	12	180
LEONARD SPRING RUN	19	17	16	10	19	15	19	17	15	18	19	15	199
MIDDLE RIDGE HOLLOW	19	18	16	10	19	17	18	16	11	11	20	20	161
BUD HOLLOW	16	15	16	10	19	15	16	14	12	13	19	15	180
VANCE RUN	20	19	17	10	19	18	18	17	15	15	16	15	199
SAMS RUN	20	19	18	10	20	16	19	18	15	18	20	20	213

TABLE 21:
RAPID HABITAT ASSESSMENT

stream name	cov	Sub	emb	vel	altr	sed	riff	flow	bank	bank veg	grz	rip veg	total
LONG RUN	16	18	17	10	12	17	18	12	16	14	16	9	175
UNT / SBP near KETTERMAN	18	17	19	15	12	18	19	14	16	14	16	12	190
BRIGGS RUN	19	18	19	10	14	19	19	8	15	15	13	12	181
HAMMER RUN @ RUDDLE	12	16	15	10	15	14	18	18	18	19	10	2	167
PETERS RUN	20	18	15	10	12	14	19	17	15	15	15	1	171
FRIENDS RUN	17	16	13	10	15	14	19	16	14	15	10	3	162
SMITH CREEK	15	18	14	10	15	14	18	8	15	17	10	1	155
LITTLE CREEK	17	17	16	10	15	12	19	16	7	8	8	8	153
TWIN RUN	16	17	15	10	16	14	19	18	14	12	15	9	175
BLACKTHORN CR	16	17	15	10	12	15	18	19	14	10	9	2	157
HAMMER RUN nr CAVE	16	16	17	10	15	15	19	17	8	5	16	15	175
EAST DRY RUN	16	15	13	10	12	12	19	15	3	5	9	4	133
S.W.C. I n = 61 average	15.3	16.05	14.5	12.1	14.7	14.1	17.3	15.28	13.21	13.15	13.00	7.75	166.1
S.W.C. I n = 61 minimum	3	5	5	9	6	5	5	8	3	4	2	0	91
S.W.C. I n = 61 maximum	20	19	19	18	20	19	20	19	19	19	20	20	215
S.W.C. II													
ABERNATHY RUN	16	18	18	18	14	18	17	15	16	17	18	8	193
BUFFALO CREEK	16	16	16	10	15	8	16	10	10	10	6	4	141
DUMPLING RUN	16	17	15	15	15	12	18	13	17	18	14	5	175
MILL RUN nr ROMNEY	17	18	16	15	18	19	16	18	13	16	18	5	189
BUFFALO RUN	17	18	18	17	10	18	16	16	19	19	18	10	196
SAWMILL RUN	13	12	15	16	20	18	14	13	19	18	20	9	185
CLIFFORD HOLLOW	17	16	13	10	14	16	18	9	16	14	13	7	163
ANDERSON RUN	13	14	11	15	15	12	16	15	11	10	9	5	146
MUDLICK RUN @ MOUTH	10	12	11	12	14	14	15	11	10	9	6	5	129
SOUTH FORK @ FORT SEYBERT	19	19	18	19	18	18	17	17	18	18	17	16	214
KETTLE CREEK	16	19	17	13	19	19	20	20	15	16	13	8	197
BRUSHY FORK	17	15	17	15	18	16	16	17	19	17	17	10	194
ROUGH RUN	18	19	16	16	6	16	17	19	15	16	15	7	180
DICE RUN/SOUTH FORK	16	18	17	10	13	17	18	18	18	18	15	10	188
MILLER RUN	18	18	15	16	13	15	18	19	18	17	16	10	193
LITTLE FORK	16	19	15	10	13	14	20	20	16	17	16	10	188
DURGEON RUN	8	10	6	17	16	6	13	17	10	11	12	4	130
MITCHELL RUN	16	18	15	17	14	10	18	18	9	4	7	0	146
ROBINSON RUN	13	15	12	16	13	11	14	18	16	15	11	4	158
NORMAN RUN	15	14	11	16	18	10	16	18	10	10	12	5	155
SOUTH FORK / LUNICE CREEK	18	19	16	18	12	14	17	18	14	15	10	2	173
BIG STAR RUN	17	19	18	15	12	16	20	19	15	10	14	5	180
NORTH FORK / LUNICE CREEK	19	19	18	17	17	18	19	19	16	15	15	11	200
JORDAN RUN	16	19	17	15	10	10	17	17	6	5	3	0	135
BIG RUN / JORDAN RUN	18	19	16	15	15	15	20	19	15	15	13	7	187
LAUREL RUN	19	20	17	19	17	18	20	18	17	14	15	9	203
SAMUEL RUN	11	15	15	16	13	9	16	17	5	6	8	0	131
MOYER FORK	18	19	18	18	18	13	19	19	15	16	16	14	203
HIGH RIDGE RUN	17	10	16	15	18	18	19	20	15	18	19	19	204
ZEKE RUN	16	16	14	15	15	14	19	15	9	5	18	19	175
BRUSHY RUN	18	19	18	18	13	16	20	19	10	5	16	16	188
ROARING CREEK	20	18	14	19	16	11	18	17	14	15	15	9	186
HORSECAMP RUN	17	19	19	17	6	16	19	19	5	4	4	0	145
STRADER RUN	19	20	17	16	7	18	19	18	14	5	8	5	166

TABLE 21:
RAPID HABITAT ASSESSMENT

stream name		cov	Sub	emb	vel	altr	sed	riff	flow	bank	bank veg	grz	rip veg	total
GULF RUN		18	16	17	17	15	16	17	17	16	15	11	4	179
WHITES RUN		17	19	17	18	15	16	19	19	16	16	14	7	193
BOUSES RUN		18	18	19	10	8	16	18	14	14	10	10	5	160
BIG RUN / NORTH FORK		15	11	18	15	3	19	17	12	18	2	0	0	130
HEMLOCK RUN		15	17	19	10	19	20	19	15	19	16	20	18	207
LAUREL FORK		15	18	16	10	1	17	18	14	7	2	3	0	121
STRAIGHT FORK		15	17	17	10	12	18	19	16	14	10	13	9	170
REEDS CREEK		7	10	7	8	11	16	11	19	7	17	18	1	132
MILL RUN @ UPPER TRACT		11	13	10	10	12	14	17	17	16	13	15	4	154
TROUT RUN		16	18	14	15	15	12	19	17	11	10	17	4	168
THORN CREEK		18	16	16	10	18	16	18	19	15	16	11	5	173
WHITETHORN CR		16	16	16	10	15	13	18	19	15	17	12	5	172
S.W.C. II n = 46	average	15.9	16.63	15.46	14.5	13.7	14.9	17.5	16.80	13.76	12.65	12.85	6.96	171.6
	minimum	7	10	6	8	1	6	11	9	5	2	0	0	121
	maximum	20	20	19	19	20	20	20	20	19	19	20	19	214
S.W.C. III														
SBP @ MOUTH		11	13	12	14	20	18	8	15	18	17	14	5	155
SBP near ROMNEY		16	18	16	15	15	14	7	16	16	19	18	17	187
MILL CREEK / SBP		19	15	16	18	16	12	17	13	16	19	20	12	193
SOUTH FORK near MOUTH		17	17	18	19	7	15	18	19	10	12	7	3	162
LUNICE CREEK		15	16	13	16	14	15	16	17	12	13	11	6	164
NORTH FORK near PETERSBURG		17	19	15	15	14	12	18	19	13	14	11	6	173
NORTH FORK near SENECA ROCKS		17	18	14	19	6	11	18	19	16	6	12	6	162
SENECA CREEK		18	20	17	19	10	16	19	19	13	5	16	14	186
S.W.C. III n = 8	Average	16.3	17.00	15.13	16.8	12.7	14.1	15.1	17.13	14.25	13.13	13.63	8.63	172.7
	Minimum	11	13	12	14	6	11	7	13	10	5	7	3	155
	Maximum	19	20	18	19	20	18	19	19	18	19	20	17	193
ALL STREAMS n = 115	Average	15.6	16.35	14.94	13.5	14.1	14.4	17.3	15.9	13.6	13	13	7.4	169
	Minimum	3	5	5	8	1	5	5	8	3	2	0	0	91
	Maximum	20	20	19	19	20	20	20	20	19	19	20	20	215

Key: Categories scored 0-20, total score possible = 240

cov = instream cover
sub = epifaunal substrate
emb = embeddedness
vel = # of velocity/depth regimes present (i.e. fast/shallow)
altr = channel alteration
sed = sediment deposition
riff = frequency of riffles
flow = channel flow status
bank = erosional condition of banks
bank veg = vegetative protection
grz = grazing or other disruptive pressure
rip veg = riparian vegetation zone width (least buffered side)

TABLE 22:
INDICATORS OF WATER QUALITY

STREAM NAME	Water odors							surface oils				water clarity					color
	nor	sew	pet	che	ana	no	Other	slick	shn	glob	flek	clr	slht	mod	turb	opa	
S.W.C. I																	
UNT/SBP @ GREENSPRINGS	✔											✔					
STONEY RUN						✔						✔					
UNT / SBP near GRACE	✔											✔					
JOHN'S RUN	✔											✔					
FOX RUN						✔						✔					
MAYHEW RUN	✔											✔					
CAMP RUN						✔						✔					
UNT / MILL CREEK						✔						✔					
ELMLICK RUN						✔						✔					
MILL CREEK @ HW						✔						✔					
MCDOWELL RUN							COW MANURE					✔					
DEVIL HOLE RUN						✔											
UNT / MUDLICK RUN	✔											✔					
TURNMILL RUN	✔											✔					
MUDLICK RUN @ HW	✔											✔					
UNT/SBP @ MACNEIL	✔						IRON						✔				
WALNUT BOTTOM	✔											✔					
WILLIAMS HOLLOW							DECAYING LEAVES					✔					
DUMPLING RUN	✔											✔					
LITTLE ROUGH RUN	✔											✔					
FISHER RUN	✔											✔					
WAGNER RUN	✔					✔						✔					
DEAN GAP	✔											✔					
STONY RUN	✔											✔					
HIVELY GAP							MUSTY					✔					
STONY RUN / SOUTH FORK	✔											✔					
BRUSHY RUN / LUNICE CREEK	✔												✔				
LITTLE STAR RUN	✔					✔						✔					
SALTBLOCK RUN	✔											✔					
POWERS HOLLOW	✔											✔					
SHUCKLEFORD RUN						✔						✔					
LOWER GULF RUN	✔											✔					
MILL CREEK / NORTH FORK						✔						✔					
ROOT RUN	✔											✔					
DICE RUN / NORTH FORK						✔						✔					
BLIZZARD RUN	✔											✔					
BRIERY GAP RUN	✔											✔					
JUDY RUN						✔						✔					
NELSON RUN						✔						✔					
TETER GAP	✔											✔					
COLD SPRING RUN	✔					✔						✔					
SAWMILL BRANCH	✔					✔						✔					
BACK RUN						✔						✔					
TEETER CAMP RUN						✔						✔					
LEONARD SPRING RUN						✔						✔					
MIDDLE RIDGE HOLLOW						✔						✔					
BUD HOLLOW						✔						✔					
VANCE RUN						✔						✔					
SAMS RUN						✔						✔					
LONG RUN	✔												✔				
UNT / SBP near KETTERMAN	✔											✔					
BRIGGS RUN	✔											✔					
HAMMER RUN @ RUDDLE						✔											
PETERS RUN						✔						✔					

TABLE 22:
INDICATORS OF WATER QUALITY

STREAM NAME	Water odors							surface oils				water clarity					color
	nor	sew	pet	che	ana	no	Other	slick	shn	glob	flek	clr	slht	mod	turb	opa	
FRIENDS RUN						✔						✔					
SMITH CREEK	✔											✔					
LITTLE CREEK						✔						✔					
TWIN RUN						✔							✔				
BLACKTHORN CREEK						✔								✔			
HAMMER RUN near CAVE						✔							✔				
EAST DRY RUN		✔										✔					
S.W.C. II																	
ABERNATHY RUN						✔						✔					
BUFFALO CREEK						✔						✔					
DUMPLING RUN						✔						✔					
MILL RUN near ROMNEY						✔						✔					
BUFFALO RUN						✔						✔					
SAWMILL RUN						✔						✔					
CLIFFORD HOLLOW							SLIGHT SEPTIC					✔					
ANDERSON RUN	✔														✔		
MUDLICK RUN @ MOUTH	✔											✔					
SOUTH FORK @ FORT SEYBERT	✔											✔					
KETTLE CREEK	✔											✔					
BRUSHY FORK	✔											✔					
ROUGH RUN	✔											✔					
DICE RUN / SOUTH FORK	✔											✔					
MILLER RUN	✔											✔					
LITTLE FORK	✔											✔					
DURG ON RUN	✔													✔			
MITCHELL RUN	✔													✔			
ROBINSON RUN	✔												✔				
NORMAN RUN	✔												✔				
SOUTH FORK / LUNICE CREEK	✔					✔						✔					
BIG STAR RUN	✔											✔					
NORTH FORK / LUNICE CREEK	✔											✔					
JORDAN RUN	✔											✔					
BIG RUN / JORDAN RUN	✔											✔					
LAUREL RUN	✔											✔					
SAMUEL RUN	✔											✔					
MOYER FORK	✔												✔				
HIGH RIDGE RUN	✔												✔				
ZEKE RUN						✔						✔					
BRUSHY RUN	✔											✔					
ROARING CREEK	✔											✔					
HORSECAMP RUN	✔											✔					
STRADER RUN	✔											✔					
GULF RUN	✔											✔					
WHITES RUN	✔											✔					
BOUSES RUN	✔											✔					
BIG RUN / NORTH FORK	✔												✔				
HEMLOCK RUN	✔					✔						✔					
LAUREL FORK						✔						✔					
STRAIGHT FORK	✔					✔						✔					
REEDS CREEK	✔											✔					
MILL RUN @ UPPER TRACT	✔											✔					
TROUT RUN						✔								✔			
THORN CREEK						✔								✔			
WHITETHORN CR	✔					✔								✔			

TABLE 22:
INDICATORS OF WATER QUALITY

STREAM NAME	Water odors							surface oils				water clarity					color
	nor	sew	pet	che	ana	no	Other	slick	shn	glob	flek	clr	slht	mod	turb	opa	
S.W.C. III																	
SBP @ MOUTH						✔						✔					GREEN
SBP near ROMNEY																	
MILL CREEK / SBP						✔						✔					
SOUTH FORK near MOUTH	✔											✔					
LUNICE CREEK	✔											✔					
NORTH FORK near PETERSBURG	✔											✔					
NORTH FORK near SENECA ROCKS	✔											✔					
SENECA CREEK	✔											✔					

✔ = present

WATER ODORS
nor = normal
sew = sewage
pet = petroleum
che = chemical
ana = anaerobic (organic decompostion)
no = none

SURFACE OILS
slick = slick
shn = sheen
glob = globs
flek = flecks

WATER CLARITY
clr = clear
slht = slight turbidity
mod = moderate turbidity
turb = turbid
opa = opaque

TABLE 23:
PHYSICAL AND CHEMICAL CHARACTERISTICS OF WATER AT ALL SITES

STREAM NAME	Temperature (C)	pH	Oxygen (mg/l)	conductivity (µhmos/cm)
S.W.C. I				
UNT / SBP @ GREEN SPRINGS	18.7	7.6	6.8	311
STONEY RUN	18.5	7.3	8.3	140
UNT / SBP near GRACE	22.0	7.3	6.2	168
JOHN'S RUN	19.6	6.5	7.3	202
FOX RUN	19.7	7.7	7.4	131
MAYHEW RUN	19.8	6.6	6.3	97
CAMP RUN	20.0	8.3	8.8	331
UNT / MILL CREEK	20.8	8.3	9.1	389
ELMLICK RUN	19.6	8.1	8.3	300
MILL CREEK @ HEADWATERS	20.3	8.3	9.3	227
MCDOWELL RUN	19.2	7.3	6.9	124
DEVIL HOLE RUN	18.6	7.5	8.0	109
UNT / MUDLICK RUN	28.1	8.0	7.3	436
TURNMILL RUN	19.4	8.1	8.9	423
MUDLICK RUN @ HEADWATERS	23.2	7.4	8.0	232
UNT / SBP @ MCNIEL	21.8	4.7	7.1	377
WALNUT BOTTOM RUN	25.3	8.1	9.3	423
WILLIAMS HOLLOW	20.6	7.0	8.2	330
DUMPLING RUN / SOUTH FORK	15.1	8.4	9.6	358
LITTLE ROUGH RUN	20.0	7.0	8.3	70
FISHER RUN	19.2	7.1	8.2	172
WAGNER RUN	20.7	6.2	7.2	60
DEAN GAP	20.2	8.2	8.5	355
STONY RUN	24.8	8.3	8.6	55
HIVELY GAP	21.3	8.6	11.3	440
STONY RUN/SOUTH FORK	24.0	6.9	7.6	47
BRUSHY RUN / LUNICE CREEK	24.2	8.2	8.6	261
LITTLE STAR RUN	17.5	7.5	8.4	53
SALTBLOCK RUN	22.2	7.6	7.8	68
POWERS HOLLOW	16.5	8.2	9.1	155
SHUCKLEFORD RUN	17.4	7.9	8.6	185
LOWER GULF RUN	15.1	7.9	9.0	78
MILL CREEK / NORTH FORK	14.9	8.4	9.5	318
ROOT RUN	22.1	8.4	8.5	333
DICE RUN / NORTH FORK	16.3	7.8	8.8	136
BLIZZARD RUN	16.0	7.6	8.7	69
BRIERY GAP RUN	16.5	7.5	8.8	71
JUDY RUN	20.8	8.4	7.7	326
NELSON RUN	19.9	8.4	8.7	322
TETER GAP	20.7	8.4	8.0	282
COLD SPRING RUN	13.3	7.1	8.6	18
SAWMILL BRANCH	14.4	8.2	9.3	153
BACK RUN	14.6	7.7	8.9	79
TEETER CAMP RUN	13.7	8.0	9.1	59
LEONARD SPRING RUN	13.4	7.5	9.2	17
MIDDLE RIDGE HOLLOW	12.8	7.0	8.9	17

TABLE 23:
PHYSICAL AND CHEMICAL CHARACTERISTICS OF WATER AT ALL SITES

STREAM NAME		Temperature (C)	pH	Oxygen (mg/l)	conductivity (µhmos/cm)
BUD HOLLOW		12.9	7.1	9.2	17
VANCE RUN		13.4	6.9	9.3	27
SAMS RUN		13.9	7.0	9.0	18
LONG RUN		15.2	7.2	7.8	184
UNT/ SBP near KETTERMAN		17.4	7.9	8.4	136
BRIGGS RUN		15.7	7.9	9.0	130
HAMMER RUN @ RUDDLE		13.8	8.0	9.4	343
PETERS RUN		16.7	8.2	8.6	229
FRIENDS RUN		21.6	8.5	8.4	383
SMITH CREEK		21.7	8.6	8.9	306
LITTLE CREEK		16.4	7.2	8.4	48
TWIN RUN		15.5	7.4	8.8	66
BLACKTHORN CREEK		19.7	7.9	8.0	160
HAMMER RUN near CAVE		14.1	7.5	9.4	78
EAST DRY RUN		15.9	8.1	8.9	218
S.W.C. I n=61	average	18.4	7.7	8.5	190
	minimum	8.0	4.7	6.2	17
	maximum	28.1	8.6	11.3	440
S.W.C. II					
ABERNATHY RUN		19.8	8.2	9.5	285
BUFFALO CREEK		22.7	7.5	9.0	146
DUMPLING RUN / MILL CREEK		20.1	7.9	9.3	283
MILL RUN near ROMNEY		19.0	7.3	8.1	72
BUFFALO RUN		18.0	7.0	8.1	79
SAWMILL RUN		20.0	7.4	8.3	125
CLIFFORD HOLLOW		19.2	7.1	8.6	98
ANDERSON RUN		23.5	8.1	8.5	452
MUDLICK RUN @ MOUTH		22.3	8.2	8.0	432
SOUTH FORK @ FT. SEYBERT		20.7	7.6	9.5	181
KETTLE CREEK		18.5	7.3	9.0	96
BRUSHY FORK		25.7	7.4	7.7	74
ROUGH RUN		18.2	7.4	8.7	74
DICE RUN / SOUTH FORK		20.0	6.8	8.6	79
MILLER RUN		21.8	7.0	8.0	57
LITTLE FORK		21.1	7.1	8.4	49
DURGEON RUN		20.8	6.8	7.3	120
MITCHELL RUN		21.5	7.1	7.4	86
ROBINSON RUN		23.1	7.5	7.4	175
NORMAN RUN		19.6	7.2	7.7	168
SOUTH FORK / LUNICE CREEK		24.3	8.4	9.1	144
BIG STAR RUN		18.7	7.6	8.4	50
NORTH FORK / LUNICE CREEK		21.2	8.1	8.5	161
JORDAN RUN		17.8	8.2	8.9	106
BIG RUN / JORDAN RUN		15.9	7.8	9.1	79
LAUREL RUN		15.9	7.9	9.0	77
SAMUEL RUN		17.1	7.2	7.3	92
MOYER FORK		17.0	7.3	8.3	69
HIGH RIDGE RUN		16.4	7.3	8.6	58

TABLE 23:
PHYSICAL AND CHEMICAL CHARACTERISTICS OF WATER AT ALL SITES

STREAM NAME		Temperature (C)	pH	Oxygen (mg/l)	conductivity (µhmos/cm)
ZEKE RUN		17.2	7.7	8.2	121
BRUSHY RUN / SENECA CREEK		19.2	8.3	8.6	104
ROARING CREEK		16.0	8.2	8.8	135
HORSECAMP RUN		16.9	8.7	9.1	122
STRADER RUN		16.1	8.1	8.6	107
GULF RUN		15.6	7.6	8.9	55
WHITES RUN		15.7	8.4	8.4	83
BOUSES RUN		17.3	8.0	8.5	174
BIG RUN / NORTH FORK		15.2	7.8	9.1	81
HEMLOCK RUN		13.5	7.0	9.0	14
LAUREL FORK		15.8	7.0	8.5	20
STRAIGHT FORK		19.5	7.6	8.2	72
REEDS CREEK		20.5	9.4	13.2	203
MILL RUN @ UPPER TRACT		19.0	8.6	9.6	347
TROUT RUN		16.2	8.3	9.2	194
THORN CREEK		18.6	8.0	7.9	161
WHITETHORN CREEK		20.2	7.8	7.8	154
S.W.C. II n= 46	average	19.0	7.7	8.6	132
	minimum	13.5	6.8	7.3	14
	maximum	25.7	9.4	13.2	452
S.W.C. III					
SOUTH BRANCH POTOMAC @ MOUTH		25.6	8.5	9.2	227
SOUTH BRANCH POTOMAC near ROMNEY		24.5	8.9	9.2	235
MILL CREEK / SBP @ MOUTH		19.3	8.1	11.1	345
SOUTH FORK near MOUTH		22.5	8.1	9.5	196
LUNICE CREEK		20.5	8.1	8.8	201
NORTH FORK near PETERSBURG		19.6	8.2	8.6	160
NORTH FORK near SENECA ROCKS		18.3	8.6	9.2	140
SENECA CREEK		17.4	8.6	9.5	119
S.W.C. III n=8	average	21.0	8.4	9.4	203
	minimum	17.4	8.1	8.6	119
	maximum	25.6	8.9	11.1	345
ALL STREAMS n = 115	average	18.9	7.7	8.6	162
	minimum	8.0	4.7	6.2	17
	maximum	28.1	9.4	13.2	452

TABLE 24:
CHEMICAL CHARACTERISTICS OF WATER AT SITES POSSIBLY IMPACTED BY NUTRIENTS AND ACID MINE DRAINAGE

STREAM NAME	total phosphorus (mg/l)	ammonia (mg/l)	nitrite/nitrate (mg/l)	TKN (mg/l)	Al (mg/l)	Fe (mg/l)	sulfate (mg/l)
S.W.C. I							
UNT / SBP @ GREEN SPRINGS	BDL		0.11				
STONEY RUN	BDL		0.72				
UNT / SBP near GRACE	0.03		BDL				
JOHN'S RUN	BDL		0.07				
FOX RUN	BDL		0.40				
MAYHEW RUN	BDL		0.23				
CAMP RUN	BDL		0.27				
UNT / MILL CREEK	BDL		0.23				
ELMLICK RUN	BDL		0.16				
MILL CREEK @ HEADWATERS	BDL	BDL	0.20				
MCDOWELL RUN	BDL	BDL	0.13				
DEVIL HOLE RUN	BDL		0.09				
UNT / SBP @ MACNEIL	BDL		0.19		6.9	1.9	250
WALNUT BOTTOM RUN	0.02		0.30	BDL			
WILLIAMS HOLLOW	BDL		0.22				
LITTLE ROUGH RUN	BDL		0.28				
FISHER RUN	BDL		1.60				
WAGNER RUN	BDL		0.27				
STONY RUN	BDL		0.14				
HIVELY GAP	0.06		0.15				
STONY RUN / SOUTH FORK	BDL		0.22				
BRUSHY RUN / LUNICE CREEK	BDL	BDL	0.22				
LITTLE STAR RUN	BDL		0.20				
SALTBLOCK RUN	0.02	BDL	0.23				
POWERS HOLLOW	BDL	BDL	0.15				
SHUCKLEFORD RUN	BDL		0.28				
LOWER GULF RUN	0.04		0.61				
DICE RUN/NORTH FORK	0.02		0.39				
NELSON RUN	BDL		0.09				
TETER GAP	BDL		0.32				
LONG RUN	0.04		BDL				
UNT / SBP near KETTERMAN	BDL		0.09				
BRIGGS RUN	0.03		0.10				
HAMMER RUN @ RUDDLE	0.05		0.61				
PETERS RUN	0.11		0.32				
FRIENDS RUN	0.04		0.43				
SMITH CREEK	0.48		0.97				
LITTLE CREEK	BDL		0.09				
TWIN RUN	BDL		0.25				
BLACKTHORN CREEK	0.08		0.52				

TABLE 24:
CHEMICAL CHARACTERISTICS OF WATER AT SITES POSSIBLY IMPACTED BY NUTRIENTS AND ACID MINE DRAINAGE

STREAM NAME	total phosphorus (mg/l)	ammonia (mg/l)	nitrite/nitrate (mg/l)	TKN (mg/l)	Al (mg/l)	Fe (mg/l)	sulfate (mg/l)
HAMMER RUN, near CAVE	0.02		0.13				
EAST DRY RUN	BDL		0.41				
S.W.C. II							
ABERNATHY RUN	BDL		0.09				
BUFFALO CREEK	BDL	BDL	0.24				
DUMPLING RUN/MILL CREEK	BDL		0.05				
MILL RUN near ROMNEY	BDL		0.13				
BUFFALO RUN	BDL		BDL				
SAWMILL RUN	BDL		0.12				
CLIFFORD HOLLOW	BDL		0.18				
ANDERSON RUN	0.03		1.40	BDL			
MUDLICK RUN @ MOUTH	0.03		0.70	0.9			
SOUTH FORK @ FORT SEYBERT	BDL		0.90				
KETTLE CREEK	BDL		0.26				
BRUSHY FORK	BDL		0.19				
ROUGH RUN	BDL		0.18				
DICE RUN / SOUTH FORK	BDL		0.63				
MILLER RUN	BDL		0.14				
LITTLE FORK	BDL		0.14				
DURG ON RUN	0.03	BDL	0.82				
MITCHELL RUN	BDL	BDL	0.49				
ROBINSON RUN	BDL		0.48				
NORMAN RUN	0.04	BDL	0.29				
SOUTH FORK / LUNICE CREEK	0.03	BDL	0.23				
BIG STAR RUN	BDL	BDL	0.15				
NORTH FORK / LUNICE CREEK	0.05	BDL	0.35				
JORDAN RUN	BDL		0.28				
BIG RUN / JORDAN RUN	0.02	BDL	0.33				
LAUREL RUN	BDL		0.26				
SAMUEL RUN	BDL		0.36				
ZEKE RUN	BDL		0.22				
BRUSHY RUN / SENECA CREEK	BDL		0.20				
ROARING CREEK	BDL	BDL	0.23				
HORSECAMP RUN	BDL		0.49				
BIG RUN / NORTH FORK	BDL		0.30				
STRAIGHT FORK	BDL		0.11				
REEDS CREEK	0.08		0.72	BDL			
MILL RUN @ UPPER TRACT	BDL		0.43				
TROUT RUN	0.05		0.27				
THORN CREEK	0.12		0.51				
WHITETHORN CREEK	0.07		0.56				
S.W.C. III							

TABLE 24:
CHEMICAL CHARACTERISTICS OF WATER AT SITES POSSIBLY IMPACTED BY NUTRIENTS AND ACID MINE DRAINAGE

STREAM NAME	total phosphorus (mg/l)	ammonia (mg/l)	nitrite/nitrate (mg/l)	TKN (mg/l)	Al (mg/l)	Fe (mg/l)	sulfate (mg/l)
SOUTH BR POTOMAC @ MOUTH	BDL		0.63				
SBP near ROMNEY	BDL		0.55				
MILL CREEK / SBP @ MOUTH	BDL		0.69				
SOUTH FORK near MOUTH	BDL		1.00				
LUNICE CREEK	0.03	BDL	0.51				
NORTH FORK near PETERSBURG	BDL		0.18				
NORTH FORK near SENECA ROCKS	BDL		0.30				
SENECA CREEK	0.08		0.19				

Key: TKN = total Kjeldahl nitrogen,
BDL = below detection limit
Blanks indicate data not collected.

TABLE 25:
FECAL COLIFORM BACTERIA

STREAM NAME	colonies/100 ml	Stream name	colonies/100 ml
S.W.C. I		**SWC II**	
UNT / SBP@ GREEN SPRINGS	34	ABERNATHY RUN	135
STONEY RUN	21	BUFFALO CREEK	254
UNT / SBP near GRACE	2050	DUMPLING RUN / MILL CREEK	171
JOHN'S RUN	200	MILL RUN near ROMNEY	14
FOX RUN	47	BUFFALO RUN	6000
MAYHEW RUN	440	SAWMILL RUN	320
CAMP RUN	379	CLIFFORD HOLLOW	314
UNT / MILL CREEK	2466	ANDERSON RUN	318
ELMLICK RUN	361	MUDLICK RUN @ MOUTH	253
MILL CREEK @ HEADWATERS	374	SOUTH FORK @ FORT SEYBERT	121
MCDOWELL RUN	5000	KETTLE CREEK	45
DEVIL HOLE RUN	5200	BRUSHY FORK	200
UNT / MUDLICK RUN	32	ROUGH RUN	33
TURNMILL RUN	630	DICE RUN / SOUTH FORK	156
MUDLICK RUN AT HEADWATERS	623	MILLER RUN	300
UNT / SBP @ MACNEIL	0	LITTLE FORK	600
WALNUT BOTTOM RUN	8	DURGEON RUN	610
WILLIAMS HOLLOW	480	MITCHELL RUN	505
DUMPLING RUN / SOUTH FORK	44	ROBINSON RUN	1025
LITTLE ROUGH RUN	32	NORMAN RUN	1715
FISHER RUN	800	SOUTH FORK / LUNICE CREEK	42
WAGNER RUN	566	BIG STAR RUN	147
DEAN GAP	52	NORTH FORK / LUNICE CREEK	1076
STONY RUN	198	JORDAN RUN	81
HIVELY GAP	2200	BIG RUN / JORDAN RUN	207
STONY RUN / SOUTH FORK	500	LAUREL RUN	435
BRUSHY RUN / LUNICE CREEK	2880	SAMUEL RUN	78
LITTLE STAR RUN	79	MOYER FORK	48
SALTBLOCK RUN	101	HIGH RIDGE RUN	28
POWERS HOLLOW	500	ZEKE RUN	506
SHUCKLEFORD RUN	537	BRUSHY RUN / SENECA CREEK	175
LOWER GULF RUN	5	ROARING CREEK	72
MILL CREEK / NORTH FORK	50	HORSECAMP RUN	33
ROOT RUN	67	STRADER RUN	19
DICE RUN/NORTH FORK	484	GULF RUN	55
BLIZZARD RUN	14	WHITES RUN	4
BRIERY GAP RUN	20	BOUSES RUN	8
JUDY RUN	50	BIG RUN/NORTH FORK	1
NELSON RUN	16	HEMLOCK RUN	9
TETER GAP	197	LAUREL FORK	0
COLD SPRING RUN	12	STRAIGHT FORK	22
SAWMILL BRANCH	0	REEDS CREEK	352
BACK RUN	2	MILL RUN, @ UPPER TRACT	1410
TEETER CAMP RUN	1	TROUT RUN	546

TABLE 25:
FECAL COLIFORM BACTERIA

STREAM NAME		colonies/100 ml
LEONARD SPRING RUN		0
MIDDLE RIDGE HOLLOW		1
BUD HOLLOW		8
VANCE RUN		5
SAMS RUN		0
LONG RUN		148
UNT / SBP near KETTERMAN		800
BRIGGS RUN		50
HAMMER RUN @ RUDDLE		219
PETERS RUN		790
FRIENDS RUN		3280
SMITH CREEK		35
LITTLE CREEK		346
TWIN RUN		360
BLACKTHORN CREEK		2760
HAMMER RUN, near CAVE		224
EAST DRY RUN		570
S.W.C. I	average	612.2
n = 61	minimum	0
	maximum	5200

Stream name		colonies/100 ml
THORN CREEK		10440
WHITETHORN CREEK		10120
S.W.C. II	average	847.9
n = 46	minimum	0
	maximum	10440
S.W.C. III		
SBP @ MOUTH		156
SBP near ROMNEY		229
MILL CREEK / SBP @ MOUTH		167
SOUTH FORK near MOUTH		68
LUNICE CREEK		900
NORTH FORK near PETERSBURG		200
NORTH FORK near SENECA ROCKS		70
SENECA CREEK		35
S.W.C. III	average	228
n = 8	minimum	35
	maximum	900
All Streams	average	679.8
N=115	minimum	0
	maximum	10440

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
UNT / SBP @ GREEN SPRINGS PSB-0.5	Asellidae	1	Philopotamidae	5
	Gammaridae	1	Capniidae/Leuctridae	37
	Baetidae	3	Corydalidae	1
	Ephemerellidae	1	Simuliidae	27
	Heptageniidae	1	Chironomidae	16
	Hydropsychidae	17		
STONEY RUN PSB-1	Cambaridae	1	Philopotamidae	10
	Asellidae	1	Capniidae/Leuctridae	24
	Baetidae	13	Psephenidae	4
	Leptophlebiidae	1	Corydalidae	1
	Ephemerellidae	9	Chironomidae	13
	Heptageniidae	1	Simuliidae	1
	Hydropsychidae	25	Tipulidae	1
ABERNATHY RUN PSB-1.8	Oligochaeta	1	Psephenidae	3
	Gammaridae	133	Elmidae	1
	Heptageniidae	1	Corydalidae	1
	Baetidae	1	Chironomidae	9
	Hydropsychidae	52	Simuliidae	8
	Philopotamidae	28	Tipulidae	1
	Capniidae/Leuctridae	2		
UNT / SBP near GRACE PSB-1.9	Baetidae	14	Calopterygidae	1
	Caenidae	2	Elmidae	4
	Hydropsychidae	24	Dryopidae	2
	Philopotamidae	4	Corydalidae	5
	Perlidae	2	Sialidae	2
	Chloroperlidae	2	Chironomidae	34
	Aeshnidae	2	Simuliidae	6
MCDOWELL RUN PSB-11	Baetidae	7	Psephenidae	1
	Heptageniidae	4	Chironomidae	51
	Hydropsychidae	1	Tipulidae	1
	Philopotamidae	1	Simuliidae	15
	Rhyacophilidae	1	Empidiodae	1
	Perlidae	1		
JOHN'S RUN PSB-2	Baetidae	28	Chloroperlidae	25
	Ephemerellidae	1	Perlidae	1
	Heptageniidae	6	Calopterygidae	2
	Hydropsychidae	15	Elmidae	2
	Philopotamidae	3	Simuliidae	64
	Capniidae/Leuctridae	1	Chironomidae	32

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
MILL RUN near ROMNEY PSB-13	Oligochaeta	3	Chloroperlidae	13
	Cambaridae	1	Capniidae/Leuctridae	2
	Baetidae	11	Perlidae	1
	Heptageniidae	9	Psephenidae	1
	Hydropsychidae	9	Chironomidae	28
	Philopotamidae	40	Simuliidae	4
	Rhyacophilidae	1	Athericidae	1
	Pteronarcyidae	1		
BUFFALO RUN PSB-14	Turbellaria	1	Capniidae/Leuctridae	16
	Oligochaeta	12	Peltoperlidae	1
	Baetidae	39	Tipulidae	4
	Isonychiidae	1	Ceratopogonidae	1
	Hydropsychidae	6	Simuliidae	6
	Philopotamidae	4	Chironomidae	4
DEVIL HOLE RUN PSB-16	Oligochaeta	5	Chloroperlidae	14
	Baetidae	13	Perlidae	5
	Heptageniidae	1	Perlodidae	1
	Hydropsychidae	8	Simuliidae	2
	Philopotamidae	23	Chironomidae	19
	Capniidae/Leuctridae	4		
SAWMILL RUN PSB-16-A	Talitridae	4	Perlidae	1
	Baetidae	12	Dryopidae	1
	Heptageniidae	5	Elmidae	4
	Isonychiidae	7	Corydalidae	4
	Hydropsychidae	13	Tipulidae	2
	Philopotamidae	6	Simuliidae	12
	Chloroperlidae	12	Chironomidae	13
CLIFFORD HOLLOW PSB-17-A	Heptageniidae	1	Capniidae/Leuctridae	1
	Baetidae	50	Psephenidae	1
	Hydropsychidae	12	Chironomidae	29
	Philopotamidae	1	Simuliidae	1
	Chloroperlidae	48		
ANDERSON RUN PSB-18	Baetidae	21	Psephenidae	4
	Caenidae	7	Chironomidae	35
	Heptageniidae	7	Tipulidae	1
	Hydropsychidae	6	Simuliidae	8
	Elmidae	6		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
UNT / MUDLICK RUN PSB-18-A-0.5	Baetidae	22	Elmidae	19
	Caenidae	8	Psephenidae	1
	Heptageniidae	10	Chironomidae	34
	Isonychiidae	2	Simuliidae	1
	Hydroptilidae	11	Athericidae	1
TURNMILL RUN PSB-18-A-1	Heptageniidae	5	Capniidae/Leuctridae	42
	Isonychiidae	2	Gomphidae	1
	Ephemerellidae	1	Elmidae	21
	Caenidae	1	Psephenidae	1
	Leptophlebiidae	1	Chironomidae	20
	Hydropsychidae	13	Simuliidae	1
	Philopotamidae	2	Tipulidae	2
MUDLICK RUN @ MOUTH PSB-18-A-{6.7}	Baetidae	18	Philopotamidae	1
	Heptageniidae	8	Elmidae	11
	Leptophlebiidae	2	Psephenidae	16
	Isonychiidae	4	Corydalidae	3
	Caenidae	3	Chironomidae	37
	Ephemerellidae	1	Simuliidae	4
	Hydropsychidae	22		
MUDLICK RUN @ HEADWATERS PSB-18-A-{6.7}	Ephemerellidae	1	Elmidae	9
	Baetidae	6	Hydrophilidae	1
	Isonychiidae	1	Chironomidae	101
	Hydropsychidae	3	Simuliidae	21
WALNUT BOTTOM RUN PSB-18-B	Baetidae	48	Polycentropodidae	1
	Leptophlebiidae	3	Capniidae/Leuctridae	6
	Heptageniidae	4	Elmidae	23
	Caenidae	1	Psephenidae	1
	Isonychiidae	9	Corydalidae	1
	Hydropsychidae	32	Chironomidae	30
	Philopotamidae	17	Ceratopogonidae	1
UNT / SBP @ MACNIEL PSB-18.2	Heptageniidae	4	Chloroperlidae	32
	Caenidae	1	Capniidae/Leuctridae	2
	Baetidae	8	Elmidae	2
	Hydropsychidae	16	Chironomidae	3
	Philopotamidae	2	Tipulidae	1
	Polycentropodidae	1		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
WILLIAMS HOLLOW PSB-19	Oligochaeta	1	Psephenidae	3
	Baetidae	24	Elmidae	4
	Hydropsychidae	20	Veliidae	1
	Philopotamidae	1	Corydalidae	5
	Capniidae/Leuctridae	1	Chironomidae	31
	Chloroperlidae	38	Tipulidae	2
	Perlidae	1	Simuliidae	2
SOUTH FORK near MOUTH PSB-21-(01.0}	Baetidae	30	Polycentropodidae	1
	Caenidae	2	Perlidae	2
	Heptageniidae	15	Elmidae	2
	Tricorythidae	2	Psephenidae	1
	Isonychiidae	14	Corydalidae	1
	Hydropsychidae	2	Simuliidae	36
	Philopotamidae	9	Chironomidae	10
SOUTH FORK @ FORT SEYBERT PSB-21-{33.7}	Physidae	1	Helicopsychidae	1
	Planorbidae	2	Chloroperlidae	1
	Hydrobiidae	73	Perlidae	2
	Baetidae	20	Coenagrionidae	1
	Caenidae	1	Pleuroceridae	1
	Ephemerellidae	3	Elmidae	2
	Heptageniidae	14	Psephenidae	4
	Tricorythidae	2	Corydalidae	1
	Isonychiidae	38	Tipulidae	6
	Hydropsychidae	23	Simuliidae	3
	Philopotamidae	2	Chironomidae	6
MILLER RUN PSB-21-AA	Nemertea	4	Corydalidae	3
	Physidae	3	Ceratopogonidae	1
	Baetidae	23	Simuliidae	70
	Hydropsychidae	25	Chironomidae	16
DUMPLING RUN / SOUTH FORK PSB-21-F	Nematoda	1	Perlodidae	1
	Cambaridae	1	Elmidae	21
	Gammaridae	243	Corydalidae	1
	Baetidae	23	Tipulidae	1
	Heptageniidae	6	Ceratopogonidae	1
	Hydropsychidae	4	Simuliidae	3
	Rhyacophilidae	2	Tabanidae	1
	Philopotamidae	2	Chironomidae	4
	Capniidae/Leuctridae	2		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
LITTLE FORK PSB-21-GG	Oligochaeta	19	Perlidae	1
	Baetiscidae	1	Corydalidae	2
	Ephemerellidae	2	Tipulidae	2
	Heptageniidae	6	Simuliidae	19
	Isonychiidae	11	Tabanidae	2
	Hydropsychidae	70	Chironomidae	6
	Philopotamidae	1		
STONY RUN / SOUTH FORK PSB-21-HH	Oligochaeta	8	Philopotamidae	72
	Ancylidae	1	Perlidae	1
	Baetidae	37	Psephenidae	1
	Ephemerellidae	1	Corydalidae	3
	Heptageniidae	9	Simuliidae	24
	Isonychiidae	2	Chironomidae	3
	Hydropsychidae	110		
BRUSHY FORK PSB-21-II	Oligochaeta	4	Perlidae	1
	Baetidae	24	Elmidae	1
	Heptageniidae	4	Psephenidae	1
	Isonychiidae	73	Simuliidae	2
	Hydropsychidae	10	Chironomidae	20
	Philopotamidae	3		
KETTLE CREEK PSB-21-I	Oligochaeta	1	Chloroperlidae	3
	Baetidae	26	Perlidae	4
	Ephemerellidae	2	Pteronarcyidae	1
	Heptageniidae	10	Psephenidae	1
	Isonychiidae	16	Athericidae	8
	Hydropsychidae	40	Tipulidae	4
	Hydroptilidae	2	Empididae	1
	Philopotamidae	2	Simuliidae	15
	Capniidae/Leuctridae	1	Chironomidae	38
ROUGH RUN PSB-21-K	Baetidae	14	Perlidae	1
	Caenidae	1	Corydalidae	1
	Heptageniidae	5	Athericidae	1
	Hydropsychidae	19	Tipulidae	2
	Rhyacophilidae	1	Empididae	1
	Philopotamidae	4	Simuliidae	8
	Chloroperlidae	13	Chironomidae	20

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
LITTLE ROUGH RUN PSB-21-K-1	Oligochaeta	3	Perlidae	2
	Baetidae	7	Psephenidae	1
	Heptageniidae	9	Corydalidae	2
	Hydropsychidae	11	Tipulidae	1
	Philopotamidae	7	Simuliidae	9
	Capniidae/Leuctridae	1	Chironomidae	31
	Chloroperlidae	21		
FISHER RUN PSB-21-M	Oligochaeta	3	Isonychiidae	6
	Baetidae	8	Caenidae	33
	Caenidae	1	Philopotamidae	1
	Ephemerellidae	2	Chloroperlidae	1
	Heptageniidae	46	Psephenidae	15
	Leptophlebiidae	2	Chironomidae	15
DICE RUN / SOUTH FORK PSB-21-N	Oligochaeta	12	Polycentropodidae	1
	Baetidae	39	Chloroperlidae	1
	Ephemerellidae	2	Perlidae	2
	Heptageniidae	2	Corydalidae	1
	Hydropsychidae	13	Simuliidae	11
	Philopotamidae	2	Chironomidae	12
WAGNER RUN PSB-21-O	Oligochaeta	9	Capniidae/Leuctridae	3
	Cambaridae	2	Chloroperlidae	12
	Baetidae	51	Perlodidae	3
	Heptageniidae	3	Psephenidae	1
	Isonychiidae	1	Simuliidae	17
	Hydropsychidae	14	Chironomidae	17
	Polycentropodidae	2		
DEAN GAP PSB-21-Q	Nemertea	1	Chloroperlidae	6
	Baetidae	11	Perlidae	1
	Caenidae	2	Gomphidae	1
	Heptageniidae	7	Elmidae	4
	Isonychiidae	5	Tipulidae	1
	Glossosomatidae	1	Ceratopogonidae	1
	Hydropsychidae	11	Simuliidae	4
	Polycentropodidae	1	Tabanidae	1
	Capniidae/Leuctridae	9	Chironomidae	28
STONY RUN PSB-21-R	Turbellaria	1	Baetidae	34
	Oligochaeta	1	Hydropsychidae	6
	Physidae	2	Simuliidae	30
	Asellidae	1	Chironomidae	17

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
HIVELY GAP PSB-21-T	Oligochaeta	1	Gomphidae	1
	Nematoda	12	Elmidae	14
	Cambaridae	1	Psephenidae	5
	Heptageniidae	3	Corydalidae	1
	Leptophlebiidae	5	Tipulidae	6
	Hydropsychidae	19	Simuliidae	1
	Capniidae/Leuctridae	10	Tabanidae	2
	Perlidae	1	Chironomidae	65
DURGEON RUN PSB-23-A	Oligochaeta	2	Elmidae	13
	Baetidae	28	Dryopidae	1
	Heptageniidae	1	Simuliidae	8
	Hydropsychidae	6	Chironomidae	3
	Chloroperlidae	1		
MITCHELL RUN PSB-23-A-1	Asellidae	3	Capniidae/Leuctridae	1
	Baetidae	42	Psephenidae	2
	Heptageniidae	3	Elmidae	1
	Isonychiidae	2	Chironomidae	8
	Hydropsychidae	19	Simuliidae	33
	Philopotamidae	2	Tipulidae	1
LUNICE CREEK PSB-26	Oligochaeta	4	Hydropsychidae	9
	Cambaridae	1	Elmidae	5
	Baetidae	10	Corydalidae	5
	Caenidae	9	Athericidae	2
	Heptageniidae	6	Chironomidae	3
	Isonychiidae	49		
ROBINSON RUN PSB-26-A	Isonychiidae	14	Philopotamidae	9
	Heptageniidae	10	Elmidae	8
	Baetidae	12	Psephenidae	3
	Caenidae	1	Chironomidae	8
	Hydropsychidae	22	Simuliidae	8
NORMAN RUN PSB-26-B	Cambaridae	2	Philopotamidae	3
	Isonychiidae	23	Limnephilidae	1
	Baetidae	18	Elmidae	8
	Heptageniidae	38	Psephenidae	1
	Caenidae	1	Corydalidae	2
	Leptophlebiidae	1	Chironomidae	11
	Hydropsychidae	49		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
BRUSHY RUN / LUNICE CREEK PSB-26-C	Turbellaria	1	Hydroptilidae	1
	Baetidae	6	Philopotamidae	1
	Caenidae	1	Elmidae	46
	Heptageniidae	2	Psephenidae	3
	Leptophlebiidae	6	Tipulidae	3
	Isonychiidae	8	Simuliidae	4
	Hydropsychidae	22	Chironomidae	8
SOUTH FORK / LUNICE CREEK PSB-26-D	Cambaridae	1	Elmidae	1
	Baetidae	37	Hydrophilidae	1
	Caenidae	3	Empididae	2
	Isonychiidae	6	Simuliidae	44
	Hydropsychidae	6	Chironomidae	5
BIG STAR RUN PSB-26-D-2	Oligochaeta	1	Chloroperlidae	1
	Baetidae	17	Peltoperlidae	1
	Heptageniidae	3	Perlidae	3
	Leptophlebiidae	14	Pteronarcyidae	1
	Isonychiidae	17	Psephenidae	1
	Hydropsychidae	14	Tipulidae	3
	Philopotamidae	13	Simuliidae	1
	Capniidae/Leuctridae	19	Chironomidae	11
LITTLE STAR RUN PSB-26-D-3	Baetidae	18	Capniidae/Leuctridae	8
	Ephemerellidae	1	Chloroperlidae	2
	Heptageniidae	10	Peltoperlidae	7
	Leptophlebiidae	1	Perlidae	10
	Isonychiidae	9	Pteronarcyidae	2
	Hydropsychidae	12	Tipulidae	13
	Philopotamidae	15	Chironomidae	14
	Odontoceridae	1		
NORTH FORK / LUNICE CREEK PSB-26-E	Baetidae	15	Elmidae	3
	Caenidae	12	Psephenidae	2
	Heptageniidae	4	Athericidae	3
	Isonychiidae	15	Tipulidae	1
	Hydropsychidae	30	Empididae	1
	Philopotamidae	1	Simuliidae	13
	Capniidae/Leuctridae	2	Chironomidae	4
	Perlidae	1		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
SALTBLOCK RUN PSB-26-E-2	Nemertea	9	Perlidae	2
	Oligochaeta	2	Dryopidae	1
	Cambaridae	1	Elmidae	37
	Baetidae	2	Psephenidae	9
	Heptageniidae	9	Corydalidae	5
	Isonychiidae	43	Tipulidae	1
	Hydropsychidae	70	Simuliidae	3
	Philopotamidae	15	Chironomidae	5
NORTH FORK NEAR SENECA ROCKS PSB-28- {18.8}	Nematoda	1	Hydropsychidae	5
	Oligochaeta	3	Perlidae	2
	Baetidae	94	Gomphidae	1
	Ephemerellidae	2	Psephenidae	1
	Heptageniidae	25	Corydalidae	1
	Leptophlebiidae	1	Chironomidae	17
	Isonychiidae	19		
NORTH FORK near PETERSBURG PSB-28 -{00.5}	Oligochaeta	1	Polycentropodidae	1
	Baetidae	59	Perlidae	6
	Ephemerellidae	1	Psephenidae	7
	Heptageniidae	24	Corydalidae	2
	Isonychiidae	40	Tipulidae	1
	Hydropsychidae	7	Simuliidae	9
	Hydroptilidae	1	Chironomidae	32
POWERS HOLLOW PSB-28-.5A	Oligochaeta	17	Peltoperlidae	1
	Baetidae	3	Gomphidae	1
	Heptageniidae	1	Tipulidae	2
	Isonychiidae	1	Simuliidae	2
	Hydropsychidae	7	Chironomidae	16
	Philopotamidae	1		
BIG RUN / JORDAN RUN PSB-28-A-1	Oligochaeta	1	Peltoperlidae	10
	Baetidae	40	Perlidae	3
	Caenidae	1	Pteronarcyidae	1
	Heptageniidae	2	Elmidae	1
	Leptophlebiidae	16	Psephenidae	3
	Hydropsychidae	18	Tipulidae	9
	Philopotamidae	14	Simuliidae	5
	Capniidae/Leuctridae	19	Tabanidae	1
	Chloroperlidae	2	Chironomidae	21

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
LAUREL RUN PSB-28-A-2	Baetidae	24	Chloroperlidae	1
	Heptageniidae	7	Peltoperlidae	6
	Leptophlebiidae	12	Perlidae	17
	Isonychiidae	13	Pteronarcyidae	2
	Hydropsychidae	41	Psephenidae	1
	Philopotamidae	5	Tipulidae	9
	Polycentropodidae	1	Chironomidae	16
	Capniidae/Leuctridae	10		
SAMUEL RUN PSB-28-B	Oligochaeta	4	Chloroperlidae	1
	Asellidae	15	Peltoperlidae	5
	Baetidae	3	Perlodidae	1
	Ephemerellidae	1	Perlidae	1
	Hydropsychidae	13	Elmidae	1
	Philopotamidae	2	Chironomidae	3
	Capniidae/Leuctridae	2	Tipulidae	1
	Pteronarcyidae	1		
MOYER FORK PSB-28-D	Baetidae	9	Peltoperlidae	19
	Leptophlebiidae	4	Perlidae	6
	Ephemerellidae	2	Pteronarcyidae	4
	Heptageniidae	1	Chloroperlidae	10
	Hydropsychidae	10	Nemouridae	1
	Philopotamidae	1	Tipulidae	2
	Capniidae/Leuctridae	8	Chironomidae	1
TETER GAP PSB-28-CC	Oligochaeta	5	Chloroperlidae	1
	Lymnaeidae	1	Aeshnidae	1
	Baetidae	16	Tipulidae	3
	Heptageniidae	8	Chironomidae	32
	Leptophlebiidae	1	Simuliidae	2
	Hydropsychidae	11	Athericidae	1
	Philopotamidae	1	Empididae	1
	Perlidae	2		
HIGH RIDGE RUN PSB-28-E	Ephemerellidae	4	Pteronarcyidae	1
	Leptophlebiidae	3	Perlodidae	3
	Baetidae	2	Polycentropodidae	2
	Ephemeridae	1	Peltoperlidae	3
	Hydropsychidae	44	Chloroperlidae	1
	Rhyacophilidae	4	Corydalidae	2
	Perlidae	27		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
BIG RUN / NORTH FORK PSB-28-EE	Baetidae	63	Capniidae/Leuctridae	4
	Heptageniidae	18	Perlidae	3
	Isonychiidae	7	Athericidae	1
	Hydropsychidae	12	Empididae	1
	Rhyacophilidae	1	Chironomidae	3
COLD SPRING RUN PSB-28-EE-1	Gammaridae	13	Chloroperlidae	3
	Baetidae	17	Peltoperlidae	9
	Heptageniidae	30	Perlodidae	13
	Hydropsychidae	17	Athericidae	2
	Rhyacophilidae	1	Empididae	1
	Philopotamidae	20	Simuliidae	8
	Capniidae/Leuctridae	4	Chironomidae	21
SAWMILL BRANCH PSB-28-EE-2	Baetidae	83	Capniidae/Leuctridae	2
	Ephemerellidae	5	Chloroperlidae	1
	Heptageniidae	6	Peltoperlidae	1
	Leptophlebiidae	5	Perlidae	3
	Hydropsychidae	11	Athericidae	1
	Rhyacophilidae	1	Chironomidae	3
	Philopotamidae	6		
BACK RUN PSB-28-EE-2-A	Baetidae	62	Perlidae	6
	Glossosomatidae	1	Pteronarcyidae	3
	Hydropsychidae	10	Perlodidae	3
	Capniidae/Leuctridae	4	Elmidae	1
	Chloroperlidae	6	Simuliidae	1
	Peltoperlidae	9	Chironomidae	1
TEETER CAMP RUN PSB-28-EE-3	Gammaridae	1	Capniidae/Leuctridae	7
	Baetidae	82	Perlidae	1
	Heptageniidae	1	Chloroperlidae	1
	Hydropsychidae	12	Tipulidae	2
	Philopotamidae	7	Simuliidae	25
	Pteronarcyidae	3	Chironomidae	14
	Peltoperlidae	2	Empididae	3
	Nemouridae	1		
HEMLOCK RUN PSB-28-EE-3-A	Gammaridae	4	Chloroperlidae	5
	Baetidae	46	Perlidae	1
	Ephemerellidae	3	Perlodidae	6
	Heptageniidae	9	Simuliidae	1
	Hydropsychidae	14	Chironomidae	6
	Capniidae/Leuctridae	10		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
LEONARD SPRING RUN PSB-28-EE-3-B	Gammaridae	45	Capniidae/Leuctridae	5
	Baetidae	7	Chloroperlidae	5
	Ephemerellidae	1	Peltoperlidae	7
	Heptageniidae	6	Pteronarcyidae	4
	Hydropsychidae	2	Perlodidae	2
	Philopotamidae	5		
MIDDLE RIDGE HOLLOW PSB-28-EE-3-C	Gammaridae	55	Capniidae/Leuctridae	12
	Baetidae	4	Chloroperlidae	2
	Heptageniidae	12	Peltoperlidae	5
	Hydropsychidae	3	Perlodidae	3
	Philopotamidae	2	Chironomidae	3
BUD HOLLOW PSB-28-EE-3-D	Cambaridae	2	Chloroperlidae	3
	Gammaridae	32	Peltoperlidae	1
	Baetidae	11	Pteronarcyidae	2
	Ephemerellidae	1	Perlodidae	3
	Heptageniidae	5	Elmidae	1
	Hydropsychidae	11	Tipulidae	4
	Capniidae/Leuctridae	12	Chironomidae	4
ZEKE RUN PSB-28-G	Baetidae	5	Perlidae	15
	Ephemerellidae	1	Pteronarcyidae	2
	Leptophlebiidae	2	Perlodidae	3
	Isonychiidae	2	Psephenidae	2
	Hydropsychidae	34	Corydalidae	1
	Philopotamidae	4	Tipulidae	1
	Capniidae/Leuctridae	2	Empididae	1
	Chloroperlidae	1	Simuliidae	2
	Peltoperlidae	19	Chironomidae	2
LAUREL FORK PSB-28-GG	Baetidae	70	Ephydridae	14
	Heptageniidae	6	Corydalidae	2
	Leptophlebiidae	8	Athericidae	2
	Ephemerellidae	1	Chironomidae	16
	Hydropsychidae	26	Simuliidae	1
	Philopotamidae	26	Tipulidae	1
	Rhyacophilidae	1		
VANCE RUN PSB-28-GG-1	Cambaridae	1	Chloroperlidae	4
	Gammaridae	8	Peltoperlidae	22
	Baetidae	14	Perlidae	1
	Ephemeridae	4	Pteronarcyidae	4
	Heptageniidae	5	Perlodidae	13
	Hydropsychidae	30	Tipulidae	2
	Capniidae/Leuctridae	1	Chironomidae	12

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
SAMS RUN PSB-28-GG-1-A	Nemertea	1	Chloroperlidae	2
	Gammaridae	15	Pteronarcyidae	4
	Baetidae	57	Perlodidae	10
	Ephemerellidae	4	Elmidae	1
	Heptageniidae	19	Tipulidae	1
	Hydropsychidae	32	Simuliidae	2
	Philopotamidae	1	Chironomidae	4
	Capniidae/Leuctridae	12		
STRAIGHT FORK PSB-28-HH	Baetidae	18	Peltoperlidae	1
	Heptageniidae	3	Psephenidae	2
	Leptophlebiidae	2	Elmidae	2
	Hydropsychidae	14	Corydalidae	2
	Philopotamidae	9	Tipulidae	2
	Perlidae	1	Chironomidae	34
	Capniidae/Leuctridae	3	Simuliidae	8
SHUCKLEFORD RUN PSB-28-J.2	Baetidae	2	Perlidae	9
	Heptageniidae	1	Peltoperlidae	5
	Leptophlebiidae	4	Psephenidae	2
	Hydropsychidae	10	Chironomidae	7
	Philopotamidae	1	Tipulidae	1
	Chloroperlidae	2	Simuliidae	1
	Capniidae/Leuctridae	4		
SENECA CREEK PSB-28-K	Baetidae	52	Peltoperlidae	3
	Heptageniidae	4	Elmidae	2
	Isonychiidae	4	Athericidae	1
	Hydropsychidae	5	Tipulidae	2
	Philopotamidae	2	Simuliidae	14
	Capniidae/Leuctridae	6	Chironomidae	31
BRUSHY RUN / SENECA CREEK PSB-28-K-1	Baetidae	9	Chloroperlidae	1
	Heptageniidae	4	Peltoperlidae	7
	Isonychiidae	4	Perlidae	3
	Hydropsychidae	19	Perlodidae	3
	Philopotamidae	2	Simuliidae	6
	Capniidae/Leuctridae	8	Chironomidae	35
ROARING CREEK PSB-28-K-2	Turbellaria	2	Peltoperlidae	12
	Oligochaeta	1	Pteronarcyidae	2
	Gammaridae	1	Perlodidae	12
	Baetidae	94	Athericidae	1
	Hydropsychidae	9	Tipulidae	4
	Capniidae/Leuctridae	7	Chironomidae	6
	Chloroperlidae	10		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
HORSECAMP RUN PSB-28-K-3	Baetidae	86	Chloroperlidae	3
	Heptageniidae	12	Perlidae	2
	Leptophlebiidae	1	Pteronarcyidae	1
	Hydropsychidae	25	Perlodidae	3
	Rhyacophilidae	2	Tipulidae	1
	Philopotamidae	15	Simuliidae	4
	Capniidae/Leuctridae	3	Chironomidae	56
STRADER RUN PSB-28-K-4	Turbellaria	3	Capniidae/Leuctridae	5
	Oligochaeta	2	Chloroperlidae	6
	Gammaridae	4	Peltoperlidae	5
	Baetidae	50	Perlidae	5
	Heptageniidae	5	Perlodidae	1
	Leptophlebiidae	23	Tipulidae	1
	Hydropsychidae	6	Simuliidae	2
	Philopotamidae	12	Chironomidae	7
GULF RUN PSB-28-K-5	Turbellaria	9	Chloroperlidae	30
	Gammaridae	1	Peltoperlidae	1
	Baetidae	27	Pteronarcyidae	1
	Ephemerellidae	4	Baetiscidae	3
	Heptageniidae	26	Psephenidae	1
	Hydropsychidae	11	Corydalidae	1
	Philopotamidae	2	Tipulidae	1
	Limnephilidae	4	Chironomidae	5
	Capniidae/Leuctridae	10		
LOWER GULF RUN PSB-28-K-6-A	Hirudinidae	1	Capniidae/Leuctridae	6
	Gammaridae	5	Chloroperlidae	5
	Baetidae	47	Perlidae	2
	Ephemerellidae	3	Pteronarcyidae	1
	Leptophlebiidae	6	Perlodidae	4
	Hydropsychidae	21	Psephenidae	1
	Rhyacophilidae	1	Tipulidae	2
	Philopotamidae	9	Chironomidae	1
WHITES RUN PSB-28-K-6	Oligochaeta	1	Chloroperlidae	3
	Baetidae	71	Peltoperlidae	3
	Ephemerellidae	1	Perlidae	2
	Heptageniidae	2	Perlodidae	2
	Leptophlebiidae	1	Psephenidae	1
	Hydropsychidae	14	Simuliidae	3
	Philopotamidae	4	Chironomidae	5
	Capniidae/Leuctridae	2		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
MILL CREEK / NORTH FORK PSB-28-M	Asellidae	1	Ephemerellidae	3
	Gammaridae	28	Heptageniidae	11
	Baetidae	90	Hydropsychidae	4
	Ephemerellidae	90	Tipulidae	1
ROOT RUN PSB-28-✔	Oligochaeta	5	Hydropsychidae	18
	Gammaridae	2	Philopotamidae	7
	Baetidae	55	Simuliidae	45
	Heptageniidae	4	Chironomidae	16
	Isonychiidae	2		
DICE RUN / NORTH FORK PSB-28-Q	Oligochaeta	1	Chloroperlidae	2
	Baetidae	9	Peltoperlidae	11
	Ephemerellidae	2	Perlidae	2
	Heptageniidae	4	Pteronarcyidae	3
	Leptophlebiidae	24	Perlodidae	1
	Hydropsychidae	36	Tipulidae	2
	Rhyacophilidae	1	Simuliidae	2
	Philopotamidae	11	Chironomidae	3
	Capniidae/Leuctridae	4		
BLIZZARD RUN PSB-28-R	Baetidae	47	Peltoperlidae	4
	Ephemerellidae	2	Perlidae	7
	Heptageniidae	5	Perlodidae	3
	Hydropsychidae	20	Tipulidae	1
	Rhyacophilidae	1	Empididae	2
	Philopotamidae	3	Chironomidae	1
	Chloroperlidae	1		
BRIERY GAP RUN PSB-28-S	Baetidae	42	Perlidae	1
	Heptageniidae	6	Tipulidae	1
	Hydropsychidae	11	Simuliidae	16
	Philopotamidae	4	Chironomidae	3
	Peltoperlidae	11		
JUDY RUN PSB-28-U	Oligochaeta	56	Perlidae	1
	Asellidae	1	Psephenidae	1
	Gammaridae	3	Corydalidae	1
	Baetidae	28	Simuliidae	7
	Heptageniidae	2	Chironomidae	10
	Hydropsychidae	4		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
NELSON RUN PSB-28-V	Oligochaeta	2	Chloroperlidae	1
	Baetidae	136	Nemouridae	1
	Heptageniidae	3	Psephenidae	2
	Hydropsychidae	11	Empididae	2
	Hydroptilidae	1	Simuliidae	1
	Philopotamidae	1	Chironomidae	12
	Capniidae/Leuctridae	1		
BOUSES RUN PSB-28-Z	Baetidae	87	Peltoperlidae	4
	Heptageniidae	1	Psephenidae	1
	Hydropsychidae	13	Dytiscidae	1
	Perlidae	1	Simuliidae	3
	Pteronarcyidae	1	Chironomidae	2
LONG RUN PSB-30	Gammaridae	16	Perlidae	3
	Baetidae	26	Chloroperlidae	7
	Heptageniidae	10	Peltoperlidae	1
	Leptophlebiidae	1	Elmidae	15
	Ephemerellidae	4	Psephenidae	2
	Hydropsychidae	6	Corydalidae	1
	Glossosomatidae	10	Veliidae	1
	Polycentropodidae	1	Chironomidae	12
	Philopotamidae	2	Tipulidae	2
	Capniidae/Leuctridae	11		
UNNAMED TRIBUTARY OF SOUTH BRANCH OF THE POTOMAC NEAR KETTLEMAN PSB-30.5	Oligochaeta	7	Capniidae/Leuctridae	3
	Asellidae	1	Peltoperlidae	1
	Baetidae	31	Elmidae	1
	Isonychiidae	3	Curculionidae	1
	Hydropsychidae	9	Chironomidae	22
	Philopotamidae	4	Simuliidae	5
	Polycentropodidae	1		
BRIGGS RUN PSB-32	Gammaridae	6	Peltoperlidae	3
	Baetidae	139	Perlodidae	3
	Heptageniidae	2	Chloroperlidae	1
	Hydropsychidae	11	Elmidae	1
	Philopotamidae	4	Chironomidae	6
	Rhyacophilidae	2	Simuliidae	1
	Capniidae/Leuctridae	12		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
REEDS CREEK PSB-33	Baetidae	139	Elmidae	11
	Ephemerellidae	2	Hydrophilidae	1
	Heptageniidae	5	Corydalidae	2
	Caenidae	3	Chironomidae	73
	Isonychiidae	3	Athericidae	1
	Hydropsychidae	12	Tipulidae	9
	Limnephilidae	1	Simuliidae	3
MILL RUN @ UPPER TRACT PSB-34	Oligochaeta	7	Capniidae/Leuctridae	3
	Baetidae	10	Elmidae	1
	Heptageniidae	3	Chironomidae	51
	Hydropsychidae	12	Empididae	1
	Philopotamidae	1	Simuliidae	2
HAMMER RUN @ RUDDLE PSB-39	Baetidae	112	Gomphidae	1
	Isonychiidae	6	Psephenidae	1
	Caenidae	1	Elmidae	4
	Ephemerellidae	0	Corydalidae	3
	Hydropsychidae	111	Chironomidae	226
	Glossosomatidae	2	Athericidae	1
	Polycentropodidae	1	Tipulidae	4
	Rhyacophilidae	1	Tabanidae	1
	Capniidae/Leuctridae	21	Simuliidae	45
	Perlodidae	1	Chironomidae	1
FOX RUN PSB-4	Baetidae	27	Perlidae	13
	Leptophlebiidae	22	Psephenidae	9
	Heptageniidae	4	Corydalidae	1
	Sphaeriidae	17	Chironomidae	37
	Capniidae/Leuctridae	17	Tipulidae	4
	Chloroperlidae	8	Simuliidae	3
PETERS RUN PSB-40	Cambaridae	1	Perlidae	2
	Gammaridae	32	Chloroperlidae	34
	Baetidae	136	Nemouridae	1
	Heptageniidae	25	Psephenidae	13
	Leptophlebiidae	1	Elmidae	8
	Isonychiidae	3	Sialidae	1
	Ephemerellidae	2	Chironomidae	26
	Hydropsychidae	59	Simuliidae	15
	Rhyacophilidae	3	Tipulidae	2
	Capniidae/Leuctridae	31		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
TROUT RUN PSB-41	Gammaridae	5	Chloroperlidae	1
	Baetidae	38	Perlidae	1
	Heptageniidae	4	Elmidae	1
	Leptophlebiidae	5	Corydalidae	1
	Isonychiidae	6	Chironomidae	16
	Ephemerellidae	1	Tipulidae	1
	Hydropsychidae	23	Athericidae	1
	Capniidae/Leuctridae	51	Simuliidae	5
FRIENDS RUN PSB-42	Baetidae	114	Perlidae	2
	Isonychiidae	35	Elmidae	3
	Heptageniidae	4	Hydropsychidae	2
	Hydropsychidae	20	Chironomidae	140
	Philopotamidae	2	Athericidae	1
	Polycentropodidae	1	Tipulidae	3
	Chloroperlidae	1	Empididae	2
	Capniidae/Leuctridae	1	Simuliidae	10
SMITH CREEK PSB-46	Baetidae	21	Chloroperlidae	2
	Heptageniidae	6	Perlidae	1
	Isonychiidae	4	Elmidae	1
	Leptophlebiidae	4	Chironomidae	120
	Hydropsychidae	4	Athericidae	2
	Philopotamidae	1	Tipulidae	2
LITTLE CREEK PSB-46-A	Oligochaeta	1	Perlidae	6
	Heptageniidae	3	Capniidae/Leuctridae	2
	Baetidae	1	Pteronarcyidae	1
	Leptophlebiidae	6	Perlodidae	1
	Ephemerellidae	2	Aeshnidae	1
	Ephemeridae	1	Corydalidae	2
	Hydropsychidae	49	Tipulidae	1
	Polycentropodidae	2	Chironomidae	6
	Rhyacophilidae	1	Simuliidae	1
	Philopotamidae	1		
TWIN RUN PSB-46-B	Baetidae	11	Perlidae	5
	Isonychiidae	8	Nemouridae	1
	Ephemeridae	2	Peltoperlidae	1
	Heptageniidae	3	Elmidae	1
	Hydropsychidae	79	Chironomidae	9
	Rhyacophilidae	1	Athericidae	1
	Philopotamidae	11	Tipulidae	3
	Capniidae/Leuctridae	5	Simuliidae	1

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
THORN CREEK PSB-47	Baetidae	13	Pteronarcyidae	2
	Isonychiidae	2	Elmidae	21
	Heptageniidae	6	Psephenidae	5
	Caenidae	4	Corydalidae	6
	Hydropsychidae	79	Chironomidae	44
	Brachycentridae	12	Tipulidae	25
	Limnephilidae	1	Athericidae	13
	Perlidae	4	Simuliidae	2
BLACKTHORN CREEK PSB-47-B	Baetidae	8	Elmidae	5
	Caenidae	25	Corydalidae	1
	Heptageniidae	18	Chironomidae	19
	Isonychiidae	14	Tipulidae	11
	Hydropsychidae	28	Simuliidae	1
	Capniidae/Leuctridae	1	Athericidae	1
	Perlidae	1		
WHITETHORN CREEK PSB-47-C	Baetidae	24	Perlidae	3
	Isonychiidae	31	Elmidae	16
	Ephemerellidae	1	Psephenidae	7
	Caenidae	49	Corydalidae	6
	Ephemeridae	1	Chironomidae	80
	Heptageniidae	47	Athericidae	18
	Hydropsychidae	74	Tipulidae	20
	Philopotamidae	28	Tabanidae	1
	Hydroptilidae	1	Simuliidae	1
	Capniidae/Leuctridae	6		
BUFFALO CREEK PSB-5	Baetidae	13	Corydalidae	3
	Hydropsychidae	4	Chironomidae	106
	Perlidae	1	Simuliidae	42
	Chloroperlidae	12	Tipulidae	2
	Elmidae	1		
HAMMER RUN near CAVE PSB-50	Baetidae	19	Perlidae	5
	Heptageniidae	5	Perlodidae	3
	Isonychiidae	2	Peltoperlidae	1
	Hydropsychidae	38	Hydrophilidae	1
	Philopotamidae	7	Chironomidae	3
	Pteronarcyidae	3	Tipulidae	3
	Chloroperlidae	2	Simuliidae	3
	Capniidae/Leuctridae	5		
EAST DRY RUN PSB-53	Baetidae	2	Tipulidae	1
	Heptageniidae	1	Chironomidae	1
	Hydropsychidae	100		

TABLE 26: MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
DUMPLING RUN/ MILL CREEK PSB-9-B	Nemertea	2	Elmidae	2
	Oligochaeta	7	Corydalidae	1
	Cambaridae	1	Chironomidae	16
	Baetidae	3	Tipulidae	5
	Hydropsychidae	83	Simuliidae	1
MAYHEW RUN PSB-9-B-2	Cambaridae	1	Capniidae/Leuctridae	2
	Asellidae	1	Chironomidae	39
	Ephemerellidae	3	Simuliidae	3
	Hydropsychidae	4	Tipulidae	2
	Polycentropodidae	4	Empididae	1
	Chloroperlidae	4		
CAMP RUN PSB-9-F	Baetidae	41	Chloroperlidae	10
	Heptageniidae	17	Gomphidae	2
	Isonychiidae	4	Elmidae	7
	Leptophlebiidae	5	Psephenidae	1
	Hydropsychidae	12	Chironomidae	13
	Philopotamidae	7	Tipulidae	2
	Capniidae/Leuctridae	35	Simuliidae	16
UNT / MILL CREEK PSB-9-F.5	Sphaeriidae	1	Chloroperlidae	12
	Baetidae	41	Gomphidae	1
	Heptageniidae	3	Elmidae	7
	Leptophlebiidae	1	Psephenidae	1
	Isonychiidae	4	Corydalidae	1
	Hydropsychidae	20	Tipulidae	1
	Philopotamidae	4	Simuliidae	4
	Capniidae/Leuctridae	19	Chironomidae	10
ELMLICK RUN PSB-9-G	Baetidae	60	Gomphidae	3
	Heptageniidae	8	Elmidae	7
	Isonychiidae	4	Psephenidae	3
	Leptophlebiidae	1	Corydalidae	7
	Hydropsychidae	54	Veliidae	1
	Philopotamidae	50	Chironomidae	27
	Polycentropodidae	1	Simuliidae	10
	Capniidae/Leuctridae	3	Tipulidae	9
	Chloroperlidae	4	Tabanidae	1
	Perlidae	1		

TABLE 26:
MACROINVERTEBRATES IDENTIFIED FROM A 100 ORGANISM SUBSAMPLE

STREAM NAME AND AN CODE	TAXON	NUMBER	TAXON	NUMBER
MILL CREEK @ HEADWATERS PSB-9-{10.7}	Cambaridae	1	Peltoperlidae	1
	Baetidae	11	Elmidae	8
	Caenidae	1	Psephenidae	3
	Heptageniidae	5	Corydalidae	4
	Isonychiidae	11	Chironomidae	4
	Hydropsychidae	34	Tipulidae	1
	Philopotamidae	11	Simuliidae	1
	Chloroperlidae	3	Tabanidae	4
	Capniidae/Leuctridae	10	Athericidae	1
MILL CREEK / SBP @ MOUTH PSB-9-{02.2}	Oligochaeta	1	Chloroperlidae	1
	Baetidae	15	Capniidae/Leuctridae	4
	Caenidae	5	Elmidae	9
	Heptageniidae	5	Psephenidae	4
	Isonychiidae	8	Corydalidae	5
	Siphlonuridae	1	Chironomidae	45
	Hydropsychidae	10	Tipulidae	5
	Philopotamidae	6	Simuliidae	7

TABLE 27:
BENTHIC COMMUNITY METRICS

Stream Name	Taxa Richness	EPT	M.HBI	% Dom. Taxon	EPT/ EPT + Chir.	Scrapers(S)/ S + FC	Bioscore
S.W.C. I							
UNT / SBP @ GREEN SPRINGS	11	6	4.39	33.6	0.30	0.00	50.00
STONEY RUN	14	7	4.04	23.8	0.40	0.10	66.70
UNT / SBP near GRACE	14	6	5.32	32.7	0.20	0.20	58.30
JOHN'S RUN	12	8	4.90	35.6	0.20	0.10	50.00
FOX RUN	13	8	4.09	21.6	0.20	0.30	58.30
MAYHEW RUN	12	5	5.75	60	0.10	0.00	33.30
CAMP RUN	14	8	4.01	23.8	0.40	0.40	66.70
UNT / MILL CREEK	16	8	4.07	31.5	0.40	0.30	75.00
ELMLICK RUN	18	10	4.49	23.7	0.30	0.10	66.70
MILL CREEK @ HEADWATERS	18	9	4.04	29.8	0.70	0.30	91.70
MCDOWELL RUN	11	6	6.20	60.7	0.10	0.20	41.70
DEVIL HOLE RUN	11	8	4.14	24.2	0.30	0.00	50.00
UNT / MUDLICK RUN	10	5	5.50	31.2	0.10	1.00	50.00
TURNMILL RUN	14	8	4.04	37.2	0.30	0.60	58.30
MUDLICK RUN AT HEADWATERS	8	4	6.52	70.6	0.00	0.30	25.00
UNT / SBP @ MACNEIL	11	8	2.69	44.4	0.20	0.40	75.00
WALNUT BOTTOM RUN	14	9	4.84	27.1	0.20	0.40	75.00
WILLIAMS HOLLOW	13	6	3.86	28.6	0.20	0.20	66.70
DUMPLING RUN / SOUTH FORK	17	7	4.17	76.7	0.60	0.80	50.00
LITTLE ROUGH RUN	13	7	4.43	29.5	0.20	0.30	58.30
FISHER RUN	12	9	4.59	38.3	0.40	0.70	66.70
WAGNER RUN	13	8	5.11	37.8	0.30	0.10	50.00
DEAN GAP	18	10	4.81	29.5	0.30	0.40	66.70
STONY RUN	8	2	5.70	41.5	0.20	0.00	33.30
HIVELY GAP	16	5	5.58	47.4	0.10	0.50	50.00
STONY RUN / SOUTH FORK	13	7	5.08	51.9	0.70	0.10	58.30
BRUSHY RUN / LUNICE CREEK	14	8	4.74	41.1	0.50	0.70	58.30
LITTLE STAR RUN	15	13	3.63	14.6	0.50	0.30	91.70
SALTBLOCK RUN	16	6	4.21	32.7	0.50	0.40	75.00
POWERS HOLLOW	11	6	7.04	32.7	0.30	0.10	41.70
SHUCKLEFORD RUN	14	10	3.61	19.6	0.60	0.20	91.70
LOWER GULF RUN	16	11	3.99	40.9	0.90	0.00	83.30
MILL CREEK / NORTH FORK	7	4	4.66	65.2	1.00	0.70	50.00
ROOT RUN	9	5	5.49	35.7	0.20	0.10	50.00
DICE RUN / NORTH FORK	17	13	3.69	30.5	0.80	0.10	91.70
BLIZZARD RUN	13	10	4.31	48.5	0.90	0.20	66.70
BRIERY GAP RUN	9	6	4.68	44.2	0.70	0.20	58.30
JUDY RUN	11	4	7.61	49.1	0.30	0.20	33.30

TABLE 27:
BENTHIC COMMUNITY METRICS

Stream Name	Taxa Richness	EPT	M.HBI	% Dom. Taxon	EPT/ EPT + Chir.	Scrapers(S)/ S + FC	Bioscore
NELSON RUN	13	8	5.10	78.2	0.40	0.30	50.00
TETER GAP	15	7	5.72	37.2	0.20	0.40	66.70
COLD SPRING RUN	14	9	4.14	18.9	0.30	0.40	75.00
SAWMILL BRANCH	13	11	4.47	64.8	0.80	0.30	75.00
BACK RUN	12	9	3.95	57.9	0.90	0.20	75.00
TEETER CAMP RUN	15	10	4.90	50.6	0.40	0.00	66.70
LEONARD SPRING RUN	11	10	3.30	50.6	1.00	0.50	75.00
MIDDLE RIDGE HOLLOW	10	8	3.66	54.5	0.70	0.70	66.70
BUD HOLLOW	14	9	3.77	34.8	0.70	0.40	100.00
VANCE RUN	14	10	3.71	24.8	0.50	0.10	83.30
SAMS RUN	16	10	4.13	33.9	0.70	0.40	91.70
LONG RUN	19	12	4.01	19.5	0.50	0.80	75.00
UNT / SBP near KETTERMAN	12	7	5.68	35.2	0.20	0.10	75.00
BRIGGS RUN	13	9	4.62	72.8	0.60	0.20	50.00
HAMMER RUN @ RUDDLE	20	10	5.70	41.5	0.00	0.00	58.30
PETERS RUN	19	11	4.21	34.4	0.30	0.40	75.00
FRIENDS RUN	17	9	5.46	40.9	0.10	0.20	58.30
SMITH CREEK	12	8	6.13	71.4	0.10	0.60	25.00
LITTLE CREEK	19	13	4.44	55.7	0.70	0.10	75.00
TWIN RUN	16	11	4.42	55.6	0.60	0.00	`66.70
BLACKTHORN CREEK	13	7	4.96	21.1	0.30	0.40	50.00
HAMMER RUN near CAVE	15	11	4.11	38	0.80	0.10	83.30
EAST DRY RUN	5	3	4.99	95.2	0.80	0.00	33.30
average	13.49	8.07	4.68	41.56	0.43	0.28	58.33
S.W.C. I minimum	5	2	2.69	14.6	0.0	0.0	25.00
n = 61 maximum	20	13	7.61	95.2	1.0	1.0	100.00
S.W.C. II							
ABERNATHY RUN	13	5	4.28	55.2	0.40	0.10	66.70
BUFFALO CREEK	9	4	5.97	57.61	0.04	0.02	33.30
DUMPLING RUN/MILL CREEK	10	2	5.47	68.6	0.11	0.00	25.00
MILL RUN near ROMNEY	15	9	4.18	32	0.24	0.16	41.70
BUFFALO RUN	12	6	5.45	32.5	0.20	0.00	41.70
SAWMILL RUN	14	7	4.38	13.54	0.35	0.24	75.00
CLIFFORD HOLLOW	9	6	3.69	34.72	0.17	0.13	50.00
ANDERSON RUN	9	4	5.83	36.84	0.10	0.55	41.70
MUDLICK RUN @ MOUTH	13	8	5.23	28.5	0.18	0.56	66.70
SOUTH FORK @ FT. SEYBERT	22	11	5.00	35.3	0.65	0.43	83.30
KETTLE CREEK	19	11	4.72	22.5	0.20	0.20	66.70
BRUSHY FORK	11	6	3.80	51	0.20	0.30	58.30
ROUGH RUN	14	8	4.51	21.98	0.29	0.14	75.00

TABLE 27:
BENTHIC COMMUNITY METRICS

Stream Name	Taxa Richness	EPT	M.HBI	% Dom. Taxon	EPT/ EPT + Chir.	Scrapers(S)/ S + FC	Bioscore
DICE RUN/SOUTH FORK	12	8	5.67	39.39	0.40	0.07	58.30
MILLER RUN	8	2	5.74	48.3	0.10	0.00	25.00
LITTLE FORK	13	7	5.48	49.3	0.54	0.06	66.70
DURGEON RUN	9	4	5.29	44.4	0.60	0.50	58.30
MITCHELL RUN	12	6	5.32	35.9	0.40	0.10	50.00
ROBINSON RUN	10	6	4.51	23.2	0.40	0.40	58.30
NORMAN RUN	13	8	4.37	31	0.40	0.50	75.00
SOUTH FORK/LUNICE CREEK	10	4	5.41	41.5	0.40	0.00	50.00
BIG STAR RUN	16	11	3.62	15.8	0.50	0.10	91.70
NORTH FK/LUNICE CREEK	15	8	4.75	28	0.67	0.17	83.30
JORDAN RUN	Macrobenthos not collected						
BIG RUN/JORDAN RUN	18	11	4.17	24	0.30	0.10	83.30
LAUREL RUN	16	12	3.99	24.6	0.40	0.10	83.30
SAMUEL RUN	15	10	5.46	27.8	0.80	0.10	83.30
MOYER FORK	14	12	2.55	24.4	0.90	0.10	91.70
HIGH RIDGE RUN	13	12	3.35	45.4	1.00	0.00	75.00
ZEKE RUN	18	12	3.45	34.3	0.90	0.00	83.30
BRUSHY RUN/SENECA CREEK	12	10	4.88	34.7	0.20	0.10	5000
ROARING CREEK	14	8	4.16	53.1	0.30	0.00	66.70
HORSECAMP RUN	14	11	5.09	40.2	0.20	0.20	66.70
STRADER RUN	16	10	4.01	36.5	0.60	0.20	91.70
GULF RUN	17	11	3.15	21.9	1.00	0.60	91.70
WHITES RUN	15	11	4.65	61.7	0.70	0.10	75.00
BOUSES RUN	10	6	4.87	76.3	0.80	0.80	50.00
BIG RUN/NORTH FORK	10	7	4.46	55.8	0.70	0.60	58.30
HEMLOCK RUN	11	8	4.19	43.8	0.60	0.40	75.00
LAUREL FORK	13	8	4.40	40.2	0.30	0.10	83.30
STRAIGHT FORK	14	8	5.24	33.7	0.20	0.20	75.00
REEDS CREEK	14	7	5.40	52.5	0.09	0.50	50.00
MILL RUN @ UPPER TRACT	10	5	6.38	56	0.09	0.20	41.70
TROUT RUN	16	9	3.93	31.9	0.36	0.20	83.30
THORN CREEK	17	9	4.62	32.9	0.20	0.30	75.00
WHITETHORN CREEK	19	11	4.79	19.3	0.12	0.40	66.70
S. W. C. II n=45 average	13.42	7.98	4.66	38.18	0.41	0.22	69.57
S. W. C. II n=45 minimum	8	2	2.55	13.54	0.04	0.00	25
S. W. C. II n=45 maximum	22	12	6.38	76	1.00	0.80	91.7
S.W.C. III							
SOUTH BR POTOMAC @ MOUTH	Macrobenthos not collected						
SOUTH BR POTOMAC near ROMNEY	Macrobenthos not collected						

TABLE 27: BENTHIC COMMUNITY METRICS

Stream Name		Taxa Richness	EPT	M.HBI	% Dom. Taxon	EPT/ EPT + Chir.	Scrapers(S)/ S + FC	Bioscore
MILL CREEK/SOUTH BR POT @ MOUTH		16	9	5.21	34.4	0.20	0.40	75.00
SOUTH FORK near MOUTH		14	9	4.80	28.3	0.50	0.30	100.00
LUNICE CREEK		11	5	3.74	47.6	0.60	0.60	66.70
NORTH FORK near PETERSBURG		14	8	4.47	30.9	0.20	0.70	83.30
NORTH FORK near SENECA ROCKS		13	7	4.70	54.7	0.30	0.80	75.00
SENECA CREEK		12	7	5.17	41.3	0.20	0.20	58.30
S.W.C. n=6	average	13.33	7.50	4.68	39.53	0.33	0.50	65.47
	minimum	11	5	3.74	28.3	0.20	0.20	58.30
	maximum	16	9	5.21	54.7	0.60	0.80	100.00
ALL STREAMS n = 112	average	13.45	8.00	4.67	40.09	0.42	0.27	64.96
	minimum	5	2	2.55	13.5	0.00	0.00	25.00
	maximum	22	13	7.61	95.2	1.00	1.00	100.00

Taxa Richness	total number of different macroinverebrate taxa identified
EPT	number of Ephemeropteran (mayfly), Plecopteran (stonefly), and Tricopteran (caddisfly) families identified
M.HBI	Modified Hilsenhoff Biotic Integrity - an index indicating relative pollution tolerance of macrobenthos identified
% Dom. Taxon	percent of total number of organisms which are of the numerically dominant taxon
EPT/EPT + Chir	ratio of number of EPT taxa to sum of number of EPT taxa + number of Chironomid individuals
Scraper/ S+ FC	ratio of the number of individual scrapers to the sum of the number of individual scrapers + filtering collectors

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 aciditites 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 µm mesh screen. Examples include insects, snails, and worms.

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

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 eutrophic

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 1 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.

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 -macroinvertebrate sampling methodology used in streams with very low gradient that lack riffle habitat suitable for The Program's preferred procedure (see Appendix B).

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 the Office of Water Resources conducts this activity.

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 0-14, a pH of 1 describes the strongest acid, 14 represents the strongest base, and 7 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 disturbed (by human activitiess) condition; used for comparison with other sites within that area. Site must meet the agency's minimum degradation criteria (Appendix D).

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 form a forest's middle layer (defined as 0.5 to 5 meters high for this assessment).

unimpaired -(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.

USGS -United States Geological Survey.

water-contact recreation -the type of designated use in which a person (e.g., angler, swimmer, 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.

OFFICE OF WATER RESOURCES MISSION:

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