State of West Virginia
Source Water Assessment and Protection Program

Source Water Assessment Report

WVAWC Montgomery District
Fayette County
PWSID: WV3301029

Prepared by:

West Virginia Department of Health and Human Resources
Bureau for Public Health
Office of Environmental Health Services
Source Water Protection Unit

Date: March 2004

Surface Water Public Water Supply Systems
Source Water Assessment and Protection Program (SWAPP)
Susceptibility Report

November 2002 Report – R.D. Zande and Associates, Inc.
March 2004 Report Revised – WV Bureau for Pubic Health

What Is The Purpose of a Susceptibility Report?

A susceptibility report identifies the most significant potential significant contaminant sources that could threaten the quality of the general public's water supply. A public water supply's susceptibility ranking does not indicate poor water quality. Regular testing of both the raw water and finished water best reflects actual water quality conditions. This susceptibility report will be used by the West Virginia Bureau for Public Health, hereinafter referred to as the WVBPH, and the public water supply systems to identify the quality of the source water and what techniques may be required to improve the water quality in the future. In addition, this report will enhance West Virginia's existing watershed approach to water quality improvement and protection. **Table 1** provides you information on your public water supply.

Table 1: Public Water Supply (PWS) Information

PWS Name	WVAWC - Montgomery District
PWS Address	P.O. Box 509 Montgomery, West Virginia 25135
PWS ID Number	WV3301029
County	Fayette
System Type	Community

What Is The Source Water Assessment and Protection Program?

The Source Water Assessment and Protection Program, also known as SWAPP, was established under the Safe Drinking Water Act, requires every state in the United States to:

- Delineate the area from which a public water supply system receives its water;
- Inventory land uses within the recharge areas of all public water supplies;
- Assess the susceptibility of drinking water sources to contamination from these land uses; and
- Publicize the results to provide support for improved protection of sources.

R.D. Zande & Associates, Inc., hereinafter referred to as RDZ, in conjunction with WVBPH, is undertaking the second and third requirements of the SWAPP. The final task will be undertaken by the WVBPH upon completion of the first three (3) tasks. The rankings of susceptibility of the WVAWC - Montgomery District's intake(s) to potential contamination are listed in **Table 2**.

Table 2: Intake Information

Facility Name	Source Name	Design Meets Regulations	Susceptibility Ranking
WVAWC - Montgomery District	Kanawha River	Yes	High

RDZ assessed the source water treated by the WVAWC - Montgomery District based upon three (3) sources of information. The three (3) sources that RDZ utilized were field reconnaissance, personnel interviews, and the analysis of water quality data. The data review, the personnel interviews, and the field reconnaissance were conducted within the Zone of Critical Concern, hereinafter referred to as ZCC. Upon completion of the necessary fieldwork and data review, the results were analyzed, and the findings were used to produce the assessment report. A brief summary of each of the information sources used is listed below.

- **Field Reconnaissance**

  On the site visit that began on November 6, 2002, RDZ began conducting the field reconnaissance survey for the Montgomery ZCC. This field reconnaissance survey consisted of the verification of existing potential significant contaminant sources, hereinafter referred to as PSCSs, through the use of Global Positioning System, also known as GPS, equipment and the identification of new PSCSs using GPS equipment. The GPS equipment utilized for the PSCSs was the Trimble Geo Explorer III-C, which generated latitude and longitude in decimal degrees. The unit also had the ability to be differentially corrected to +/- 5 meters of accuracy. The field survey at each PSCS also consisted of a minimum of 30 counts at five-second (5 sec) intervals with a position dilution of precision (PDOP) of six (6) to ensure accuracy. Seven (7) existing PSCSs were identified and surveyed and eleven (11) new PSCSs were identified and surveyed. Upon completion of the GPS locating of the existing and new PSCSs, a field information sheet, and the accompanying digital photograph(s), was completed for each PSCS. This information was then transferred to a Microsoft Access database that will be provided to the WVBPH for further source water analysis.

  A majority of the PSCSs located within the ZCC was considered to have a low threat to the source water. Of the 18 PSCSs identified in the ZCC, 67 percent (67%) were considered a low threat to the source water, while 22 percent (22%) posed a high threat. In addition to field verification of existing PSCSs, the above information is also a result of a combination of information verification methods, including business directory research, agency database research, and a windshield survey, being conducted for the Montgomery ZCC. **Figure 2** shows the locations of the identified and surveyed PSCSs.

- **Personnel Interviews**

  Personnel interviews were conducted by RDZ on November 6, 2002 at sites where PSCSs were located and at the water treatment plant in the Montgomery ZCC. Interviews with personnel from the WVAWC - Montgomery District's water treatment plant indicated that both the raw water that was being used to provide the potable drinking water and the potable drinking water meet the requirements of the federal and state governments' guidelines.

- **PSCS Photographs**

  Per the requirements of the contract between the WVBPH and RDZ, digital photographs were taken at both the existing and newly identified PSCSs. The photographs and the Photograph Index Sheet, which will be utilized by the WVBPH in identifying the location of the PSCS while in the field, will be provided to the WVBPH in a digital format upon the submittal of this report.

- **Inaccessible Areas**

  A few inaccessible areas did exist in the Montgomery ZCC they were a result of the lack of accessible roads. There were also areas that were inaccessible due to their location on private property. Some PSCSs were inaccessible due to locked gates that prevented vehicular access.

- **Miscellaneous Notes**

  A majority of the Montgomery ZCC was greatly affected by the recent flood that occurred in July of 2001. The wastewater treatment plant located in Smither was approximately 25 percent (25%) under water.

What Is My Source Water Protection Area (SWPA)?

Unlike ground water aquifers, which have a natural protective layer above them, all surface waters are susceptible to contamination because they are exposed at the surface and lack a protective barrier from contamination. Accidental spills, releases, sudden precipitation events that result in overland runoff, or storm sewer discharges can allow pollutants to readily enter the source water and potentially contaminant the drinking water at

the WVAWC - Montgomery District's intake. Because of this, the Source Water Protection Area, hereinafter referred to as the SWPA, consists of two (2) types of delineations, which include the Watershed Delineation Area and the Zone of Critical Concern.

- **Watershed Delineation Area**

  The first type of delineation is the Watershed Delineation Area, hereinafter referred to as WSDA, which covers approximately 5,394,187 acres in the Kanawha River Watershed. The WSDA includes the entire watershed area upstream of the WVAWC - Montgomery District's intake, and includes waters from the State of West Virginia and the State of Kentucky (**Figure 1**). The perimeter of the catchment area provides the water to the WVAWC - Montgomery District's water treatment plant's supply intake. The WSDA for the Montgomery area consisted mainly of industrial or commercial sites.

- **Zone of Critical Concern**

  The second type of delineation is the Zone of Critical Concern. **Figure 2** shows the Montgomery ZCC area, which covers approximately 1,528 acres. The ZCC is a corridor along streams within the WSDA area that warrants a more detailed inventory and management due to its proximity to the surface source water intake and to the susceptibility to PSCSs. The ZCC is calculated using a mathematical model that accounts for stream flows, gradient, and area topography. The length of the ZCC is based on a five-hour (5 hour) time of travel. The ZCC width is approximately 1,000' from each bank of the principal receiving stream (for a total width of 2,000') and 500' from each bank of each tributary (for a total width of 1,000') draining into the principal receiving stream. The development around the ZCC consisted mainly of agricultural areas, pasture fields and crops, and small areas of residential communities. A few inaccessible areas within the Montgomery ZCC were a result of the lack of accessible roads. There were also areas which were inaccessible due to their location on private property. Some PSCSs were inaccessible due to locked gates that prevented vehicular access.

What Is Susceptibility?

Susceptibility is a measure of the potential for contamination of a WVAWC - Montgomery District's water treatment plant's intake from land uses and activities within the SWPA at concentrations that pose a concern to the general public. The purpose of the susceptibility analysis is to provide an indicator to what type of action a general public water system should take to further define and reduce susceptibility. This action may include recommendations for a more detailed inventory and assessment, additional monitoring work, or an indication of the type and intensity of source water and other protection activities needed.

The possibility of a release from PSCSs is greatly reduced if best management practices, also referred to as BMPs, are utilized. However, the susceptibility determination for a particular intake does not take into account whether or not BMPs are being utilized.

Susceptibility of a drinking water intake does not mean a customer will drink contaminated water. Water suppliers protect the drinking water by monitoring and treating water supplies and using BMPs and source water protection measures to ensure that safe water is delivered to the customer's water tap.

How Was the Water Supply Susceptibility Determined?

The susceptibility of the WVAWC - Montgomery District's water supply is based on the following components:

- Resource Characterization;
- Summary of Raw and Finished Water Quality; and
- Summary of Chemical and Biological Water Quality.

Resource Characterization

The purpose for conducting the Resource Characterization analysis of the delineated SWPA is to obtain an understanding of its physical, biological, chemical, and hydrological characteristics. The following four (4) resource characteristics were analyzed and evaluated:

- The potential for surface runoff to occur;
- The ease that surface runoff transport material can be delivered into the stream;
- The movement through the SWAP area; and
- The biological and chemical health of the surface water resource in the SWAP area.

Potential for Surface Runoff to Occur

The soil types present in the watershed area and the associated soil properties have a direct influence on the potential for surface runoff to occur. As the infiltration rate of the soil increases (that is, as more precipitation soaks in rather than running off), the contaminant loads associated with the reduced runoff should decrease. **Table 3** provides a summary of the associated soil groups.

Table 3: Summary of Soil Associations in the WSDA*

Soil Associations	Soil Drainage	Topographic Setting
CDF – Clymer–Dekalb Complex	Well drained	Very steep
GIE – Gilpin	Moderately drained	Gently sloping
LaD – Laidig Channery	Moderately drained	Gently sloping
GID – Gilpin	Well drained	Gently sloping
CDD – Clymer-Dekalb Complex	Well drained	Moderately steep
CDE - Clymer-Dekalb Complex	Well drained	Very steep
UD – Udorthents	Moderate to well drained	Gently sloping
UA – Udifluvents	Moderate to well drained	Gently sloping
MnF – Muskingum	Well drained	Very steep
Ma – Made Land	Moderately drained	Gently sloping
MnE – Muskingum	Well drained	Very steep
MkE3 – Muskingum	Well drained	Very step
St – Strip mine spoil	Well Drained	Gently sloping

*This information is limited to the WSDA within the state boundaries of West Virginia.

Ease of movement of material into the Stream System (Rate of Overland Material Transport)

The size, shape, and slope of the SWAP area have a direct influence on material transported by surface runoff. In general, the longer the overland travel distance and travel time that surface runoff water has taken in order to reach a stream channel, the greater the chance the water has to deposit and filter the contaminants that may occur. **Table 4** provides an analysis of the size, shape, and slope, of the Montgomery WSDA.

Table 4: Hydrologic Setting

Size of WSDA (mi.^{2})	8,428
Shape of WSDA	Large & Irregular
Stream Length (Main Stem) (mi.)	11.9
Average Watershed Slope	10 to 30%

Movement of Water through the Watershed Area

A number of physical and natural factors can influence the movement of water through the SWAP area. The pattern and development of the drainage network of the SWAP area directly influence the rate of water movement. Evaluation of the hydrologic cycle will provide an indication of the amount of annual rainfall that is absorbed into the ground or becomes runoff. **Table 5** summarizes the total mileage of streams contained in the WSDA within the state boundary, the average stream gradients of the main stem, the average rainfall, the nearest relevant USGS stream gauge, the distance to the stream gauge, the topographic position of the stream gauge, the annual mean discharge, the highest daily mean flow, and the lowest daily mean flow.

Table 5: Movement of Water

Number of Stream Miles in the WSDA within West Virginia (mi.)	7,001.6
Average Stream Gradient (Main Stem)	3.4 ft./mi.
Average Rainfall (in.)	45
Nearest Relevant USGS Stream Gauge (mi.)	03193000
Distance to Relevant USGS Stream Gauge (mi.)	8.8
USGS Stream Gauge Topographic Position	Upstream
Annual Mean Discharge (cfs)	9,696 (2001)
Highest Daily Mean Flow (cfs)	163,000 (8-15-1940)
Lowest Daily Mean Flow (cfs)	970 (9-30-1953)

Review of Water Quality Data

In order to characterize the condition of the surface water within the watershed, the available chemical and biological water quality data was obtained and reviewed. This data was collected as part of the WVBPH, and the West Virginia Department of Environmental Protection, also known as the WVDEP, implementation of the Federal Safe Drinking Water Act and Clean Water Act. Water Quality Data, hereinafter referred to as WQD, was then evaluated to help provide direct indicators to a source of contamination and to direct the focus for additional source evaluations. Additionally, immediate source water protection efforts will be identified by this review.

Available water quality data includes test results from treated drinking water, finished water, and untreated source water, also known as raw water, that was conducted by the water supplier. Additional water data, including ambient water chemistry, biological criteria, and monitoring, and habitat was also evaluated. The sampling requirements for public water systems vary depending on the type of system and the federal regulated testing requirements. As a result, the lack of water quality impacts may indicate the lack of a certain sampling measures rather than a lack of potential contamination.

Summary of Raw and Finished Water Quality Results from Public Water System

Water sampling conducted for the WVAWC - Montgomery District indicates that the Montgomery plant has met the federal and state standards for drinking water. However, the total trihalomethanes of 53 parts per billion (ppb) was recorded. Tap water samples were collected for lead and copper from 20 houses in the service area. Both the lead and copper samples tested were below the established parameters. All of the substances tested for in the WVAWC - Montgomery District's area were below the MCL set by the USEPA.

Summary of Chemical and Biological Water Quality Results from the West Virginia DEP

The following is a summary of the water quality data for the WVAWC - Montgomery District. The following is a list of inorganic compounds that were consistently detected on the required monthly testing for the past five (5) years: nitrate, chloride, fluoride, sulfate, aluminum, barium, zinc, magnesium, sodium, and potassium. None of the following inorganic compounds had a concentration above established parameters: sulfate, chloride, and sodium. Sodium did, however, have the highest level of concentration detection. Tests for volatile organic compounds, including bromodichloromethane and chloroform, were also performed. Chloroform had the highest concentration at 11.9 micrograms per milliliter, even though this concentration is still within the same testing parameters.

Summary of Other Available Chemical and Biological Water Quality Data

Additional WQD from outside sources other than the water treatment plants or the WVBPH were not available.

Potential Significant Contaminant Sources (PSCSs):

Inventory of Potential Significant Contaminant Sources

The purpose for providing an inventory of certain types of land uses, a listing of PSCSs, and activities within the SWAP area is to aid in reducing the risk posed to the general public's drinking water supply. The following provides information regarding the methodology used to generate the inventories.

The inventory portion of the SWAP consists of two (2) steps:

- The first step is the broad inventory based primarily on regulated and existing databases. The inventory consists of a general land use analysis, the identification of regulated activities in the delineated WSDAs, and an analysis of road and rail crossings adjacent to the streams in the WSDA.

- The second step is the detailed inventory of PSCSs in the ZCC. The detailed source inventory is conducted to verify existing PSCSs and to identify new PSCSs that were not captured in the broad regulated source inventory and to field verify the PSCSs in the ZCC. PSCSs located during the inventory are found on **Figure 2**.

A detailed risk-assessment of the PSCSs was beyond the scope of this survey because of minimal data and resources. Local decision makers should do the detailed risk analysis because they are better suited to make the bridge from assessment work to protective strategies. The West Virginia SWAP program can provide guidance to the decision makers and help in prioritizing the PSCSs.

Summary of the Detailed Inventory

Table 6 is a summary of the detailed inventory of PSCSs in the ZCC. The detailed source inventory was conducted to identify PSCSs that were not identified in the existing database review and to verify the location of the PSCSs within the ZCC.

Table 6: Summary of PSCSs within the ZCC

Potential Contaminant Source	Total PSCSs	Percent (%)
Agriculture	0	0
Residential	0	0
Municipal	5	28
Commercial	5	28
Industrial	8	44

- **Transportation Network**

A summary of the transportation network is shown in **Table 7**. This information can be used to aid in planning for transportation related accidents that could result in contamination of the source water in the delineated WSDA. **Table 8** is a summary of the transportation network stream crossings in the WSDA. Please note that miles of railroad tracks could be less due to decommissioning of the previously mentioned railroad tracks. In addition, the 1,454 stream crossings provide the opportunity for an accidental spill / release of materials to get directly into the stream drainage network. Source water protection efforts should be directed towards the establishment of an effective and efficient emergency response plan if one does not currently exist.

Table 7: Transportation Network Summary for WSDA*

	Within 100 feet of Stream	Total
Miles of Interstate (mi.)	7.4	122.1
Miles of Primary Roads (mi.)	31.8	973.4
Miles of Secondary Roads (mi.)	3.1	97.2
Miles of Railroads (mi.)	91.9	829.1

*This information is limited to the WSDA within the state boundaries of West Virginia.

Table 8: Transportation Network Stream Crossings in the WSDA*

	Interstate	Primary Roads	Secondary Roads	Railroads
Number of Stream Crossings	94	543	54	763

*This information is limited to the WSDA within the state boundaries of West Virginia.

- **General Land Use**

The general land use analysis will provide an indication of which land uses are predominate throughout the SWAP area, near the WVAWC - Montgomery District's water intake, or adjacent to the rivers, streams, lakes, and reservoirs. The land use in the SWAP area is shown in **Table 9**. The total acreage contained within the Montgomery WSDA is approximately 5,394,187 acres and the total acreage contained within the Montgomery ZCC is approximately 1,528 acres.

Table 9: General Land Use*

LAND USE	WSDA (acres)	WSDA (%)	ZCC Area (acres)	ZCC (%)
Shrub Land	14,610.88	0.49	0.00	0.00
Woodland	2,384,431.63	80.04	812.86	53.24
Water	34,482.37	1.16	263.76	17.28
Roads	694.55	0.02	0.00	0.00
Power lines	5,433.18	0.18	53.38	3.50
Urban	60,650.38	2.03	320.70	21.01
Agriculture	442,034.71	14.82	16.24	1.06
Barren	25,460.79	0.85	59.83	3.92
Wetland	12,043.52	0.40	0.00	0.00

*This information is limited to the WSDA within the state boundaries of West Virginia.

SWAPP Area Assessment and Protection Activities

Analysis of the Resource Characterization and potential significant contaminant sources of the SWAP area for the WVAWC - Montgomery District indicates that the water supply is susceptible to possible future contamination based on the following:

- ✓ The steep topographic setting, and the size of the WSDA present an increased potential for contamination. In addition, the 1,454 stream crossings provide the opportunity for an accidental release/spill of material to easily get directly into the stream drainage network. Source water protection efforts should be directed toward the establishment of an effective and efficient emergency response plan if one does not currently exist.

Recommendations:

- ✓ Protection efforts should focus on the collection of additional information on the point and non-point sources present to evaluate the risk;
- ✓ Work with the Department of Health and Human Resources, other state agencies and local officials to make sure your intake is included in local regulations and inspections efforts;
- ✓ Restrict access to the intake area and post the area with Drinking Water Protection Area signs;
- ✓ Address any biological contaminant issues; and
- ✓ Protection options need to be actively considered to further evaluate and manage all potential contaminant sources and the WVAWC - Montgomery District public water supply should place a high priority on protecting its supply source.

NEXT STEP – SWAP Protection Plan

The next step in source water protection planning is to prepare a SWAP protection plan. The SWAP protection plan incorporates this source water delineation assessment report and three additional sections: Contingency Planning, Alternative Sources, and Management Planning.

Contingency Planning

A contingency plan documents the system's planned response to interruption of the source water supply.

Alternative Sources

Information pertaining to alternative water sources focusing on long-term source replacement should the system be required to develop a new source of water due to contamination (or other reasons). This section outlines the most likely sources that can be used as an alternate water source.

Management Planning

Management planning is the most important element of SWAP. The management plan identifies specific activities that will be pursued by the system to protect their water resources. The system will benefit by taking a proactive approach to source water protection in their watersheds. It is anticipated that most of the management effort will focus on coordination with government agencies and periodic surveys of the watersheds. It may be necessary to conduct a limited number of special studies to determine actual risk and consequences for selected contaminant sources. This information may be needed before decisions can be made on management activities.

Need additional information?

Additional information or sources of information can be obtained by calling or visiting the BPH web site at www.wvdhhr.org/bph/swap or phoning 304-558-2981.

Disclaimer - The coverage's presented in this program are under constant revision as new sites or facilities are added. They may not contain all the potential or existing sites or facilities. The West Virginia Bureau for Public Health is not responsible for the use or interpretation of this information. Please report any inaccuracies on either the map or inventory by phoning 304-558-2981.

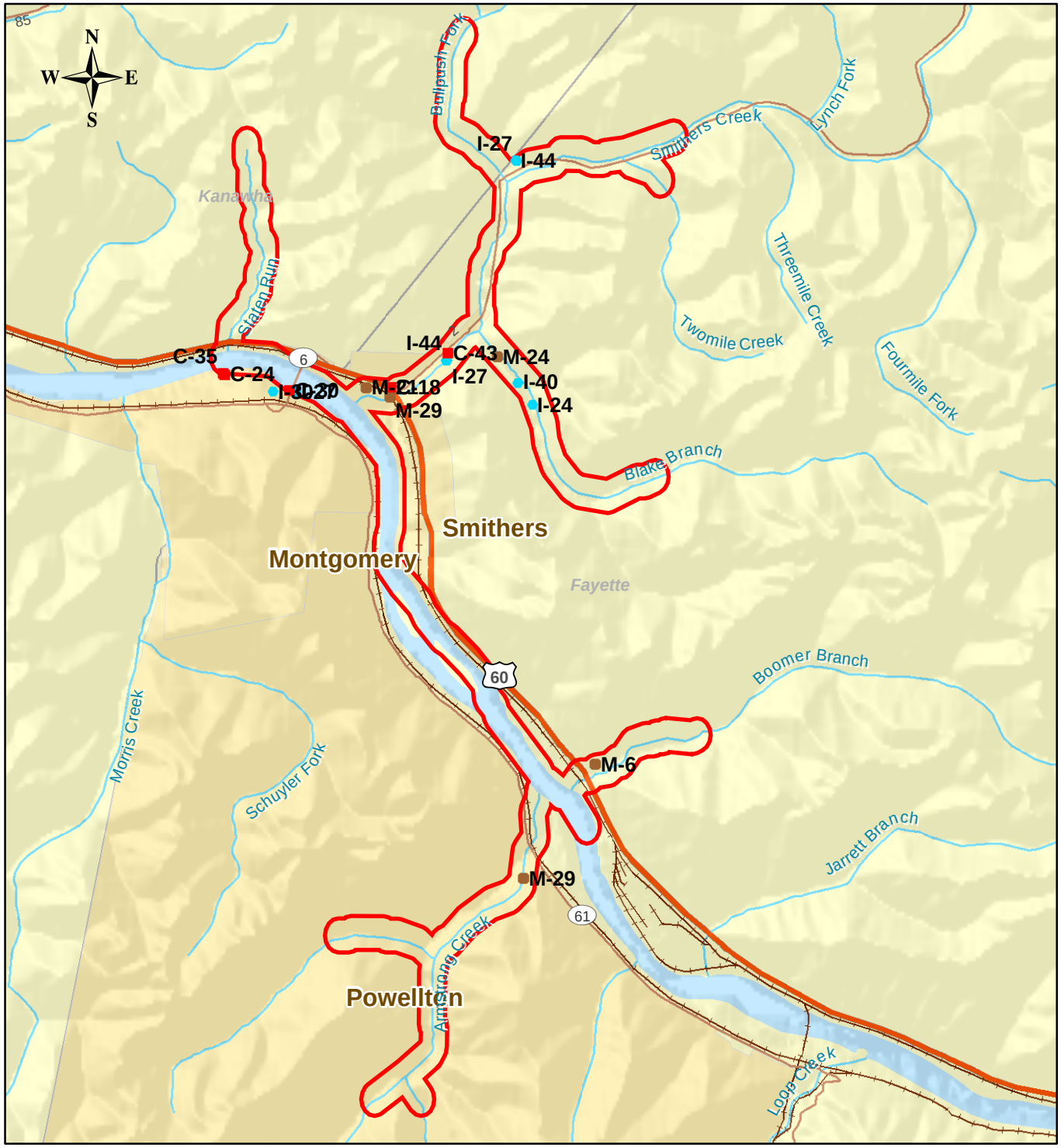
Glossary:

Best Management Practices (BMPs) are operational procedures used to prevent or reduce pollution.

Public Water System (PWS) is a system for the provision to the public of pipe water for human consumption, if such system has at least 15 services or regularly serves an average of at least 25 individuals daily at least 60 days of the year.

Water Quality Data is used to help assess both the potential pathogen contamination and other compliance monitoring (Nitrates) parameters associated with public water supplies.

Potential Significant Contaminant Source (PSCS) is a facility or activity that stores, uses, or produces chemicals or elements, and has the potential to release contaminants identified in the state program within a source water protection area in an amount, which could contribute significantly to the contaminants of the source waters of the public water supply.



Map Key

Potential Contaminant Sources

- Agriculture
- Commercial
- Industrial
- Municipal
- Residential
- Zone of Critical Concern

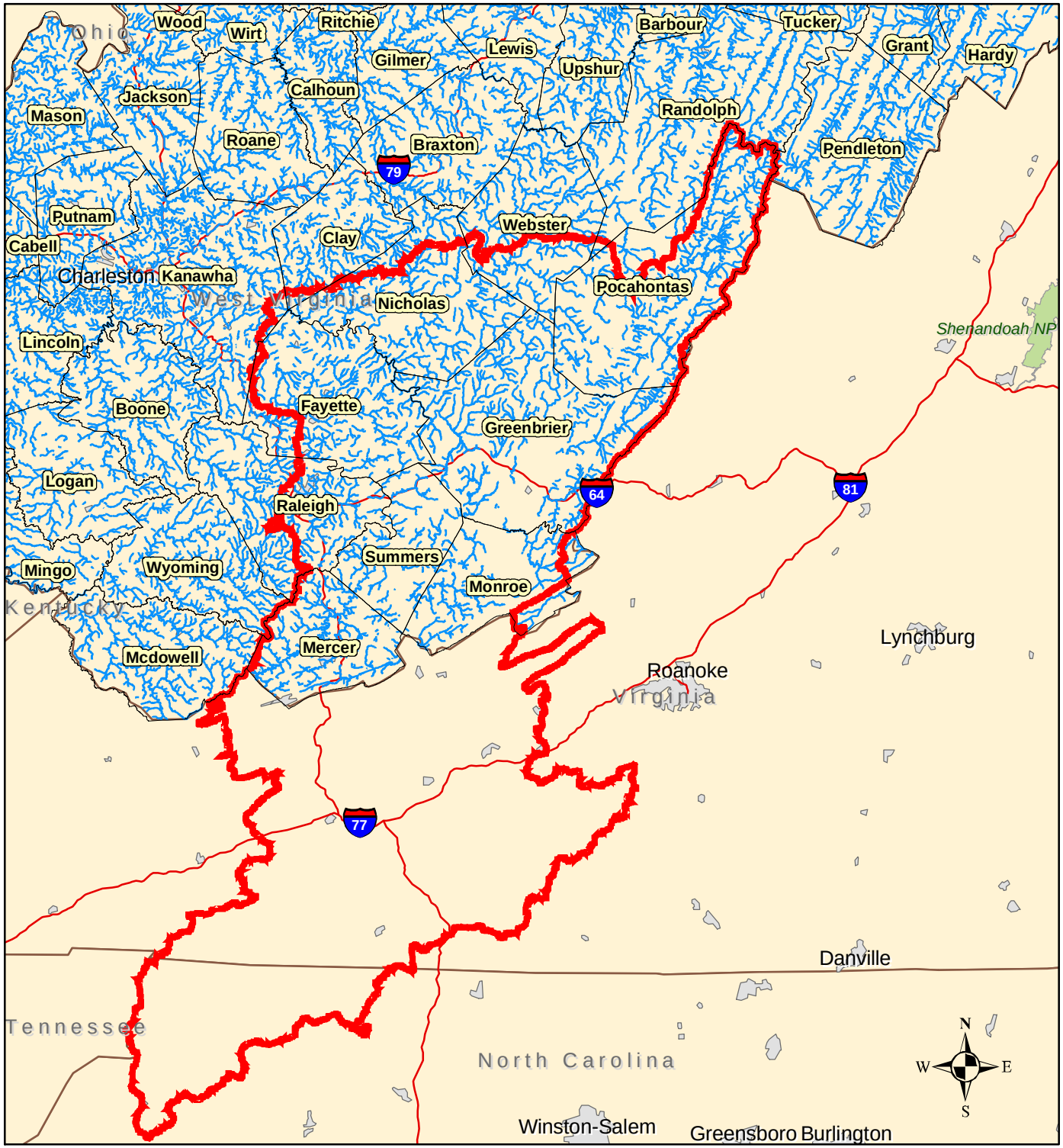
This map is provided as a public service by the West Virginia Bureau for Public Health. The Bureau makes NO representation regarding completeness or accuracy of the data hereon. Efforts are made to verify and update the data used to generate this map. However, with data sets of this size and nature, eliminating all errors is difficult. Thus, the user assumes total responsibility for verification.

Source locations not included for reasons of security

WVAWC Montgomery District Zone of Critical Concern WV3301029 Fayette County

Scale: 1:52,000
Drawn by: JEM
07/18/05

0 0.5 1 Miles



Map Key

Watershed Delineation Area

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Source locations not included for reasons of security

WVAWC Montgomery District Watershed Delineation Area WV3301029 Fayette County

Scale: 1:1,650,000
Drawn by: ACS
03/19/04

0 360,000 Feet