CHAPTER 11. AMBIENT WATER QUALITY NETWORK PROTOCOLS

Overview

The Division of Water and Waste Management's predecessor, the Water Resources Division of the Department of Natural Resources, began the Ambient Water Quality Monitoring Program in the 1960's. Many changes have occurred to the program since then, but the basic goal remains the same: to monitor water quality at a set of West Virginia's streams over long periods of time. Natural resource managers have divided the state into 32 watersheds. Each of these watersheds is viewed as a unit for managing various environmental programs. The Ambient Water Quality Network consists primarily of sites on the main stem streams of these watersheds, mostly focusing near the downstream ends of the watersheds. A listing of the Ambient Water Quality Network stations is as follows:

1. **BST-(0.15) Tug Fork** at Fort Gay
2. **OG-(2.8) Guyandotte River** at Huntington
3. **OG-(74.1) Guyandotte River** at Pecks Mill
4. **K-(31.7) Kanawha River** at Winfield
5. **K-(74.1) Kanawha River** at Chelan
6. **KC-(11.6) Coal River** at Tornado
7. **KE-(4.3) Elk River** at Charleston
8. **KG-(8.25) Gauley River** at Beech Glen
9. **KN-(1.2) New River** at Gauley Bridge
10. **KN-(67.4) New River** at Hinton
11. **KN-(96.2) New River** at Glen Lyn
12. **KNG-(1.6) Greenbrier River** at Hinton
13. **LK-(28.9) Little Kanawha River** at Elizabeth
14. **LKH-(1.5) Hughes River** West of Freeport
15. **M-(99.4) Monongahela River** at Star City
16. **M-1-(20.6) Dunkard Creek** East of Pen tress
17. **MT-(6.1) Tygart Valley River** at Colfax
18. **MW-(12.0) West Fork** River at Enterprise
19. **MC-(3.5) Cheat River** Below Lake Lynn, Pa
20. **MC-(30.0) Cheat River** at Albright
21. **OMI-(12.3) Middle Island Creek** at Arvilla
22. **O-2-(8.8) Twelvepole Creek** South of Ceredo
23. **P-4-(2.2) Opequon Creek** East of Bedlington
24. **PC-(6.1) Cacapon River** South of Great Cacapon
25. **PSB-(13.4) South Branch** of Potomac River
26. **S-(0.9) Shenandoah River** at Harpers Ferry

The sites in the Network are currently visited every two months or six times per year. Sites (or nearby proxy sites) that are wadeable or partially wadeable during summer low

flows are sampled for benthic macroinvertebrates and full habitat assessment once a year as a part of the Long-Term Monitoring Stations program (***see CHAPTER 1. INTRODUCTION TO WATERSHED ASSESSMENT BRANCH SAMPLING ACTIVITIES. Sampling Programs of the Watershed Assessment Branch on page 1-2 for a description***).

Generally, one person will collect the samples and utilize commercial laboratories for analysis. The data are then entered into the Watershed Assessment Branch database, where they are made available for trend analysis, general water quality assessments, pollutant loading calculations, and other tasks necessary for various agencies to fulfill their commitments to environmental management.

In general, the Ambient Water Quality Monitoring Program utilizes the same sampling techniques other Watershed Assessment Branch programs. Specifically, the SOP sections that apply to this program are as follows:

CHAPTER 2. INSTRUCTIONS FOR ASSESSING THE STREAM SITE (INCLUDING SETTING UP THE SITE, SITE DOCUMENTATION, AND GUIDELINES FOR COMPLETING THE STREAM ASSESSMENT FORMS) Section C. Guidelines for Completing the Stream Assessment Forms on page 2-29

CHAPTER 3. WATER COLLECTION PROTOCOLS starting on page 3-1

CHAPTER 4. STREAM FLOW MEASUREMENT PROTOCOLS starting on page 4-1

CHAPTER 5. BENTHIC MACROINVERTEBRATE COLLECTION PROTOCOLS starting on page 5-1

CHAPTER 14. Section A. Blanks and Duplicates starting on page 14-1

Since only a few people routinely sample the Ambient Water Quality Network stations, the main purpose for the inclusion of this section in the SOP is to give any person in the Watershed Assessment Branch the ability to locate and take a sample from these stations should the need arise.

Section A. METHODS AND PROCEDURES

Brief descriptions about some of the specific sampling techniques and sample handling as they apply to the Ambient Water Quality Monitoring Program are provided below. ***See CHAPTER 3. Section B. Water Quality Sample Collection and Preservation starting on page 3-34 for more detailed information about these techniques.***

Part 1. Ambient Water Quality Network Water Parameters

Table 11-1. Current List of Ambient Water Quality Network Parameters, MDLs, Analysis Methods, and Holding Times

Parameter	MDL or Instrument Accuracy*	EPA Method	Holding Time
Acidity, Hot	5 mg/L	305.1	14 Days
Alkalinity	5 mg/L	310.1	14 Days
Aluminum, Dissolved	0.08 mg/L	202.1 / 200.7	6 Months
Aluminum, Total	0.08 mg/L	202.1 / 200.7	6 Months
Ammonia Nitrogen	0.10 mg/L	350.1	28 Days
Arsenic, Total	0.05 mg/L	200.9 / 206.2	6 Months
Barium, Total	0.002 mg/L	200.7	6 Months
Beryllium, Total	0.00008 mg/L	200.7	6 Months
Boron, Total	0.003 mg/L	200.7	6 Months
Bromide, Total	0.1 mg/L	300.0	6 Months
Cadmium, Dissolved	0.0003 mg/L	200.9	6 Months
Calcium, Total	0.02 mg/L	200.7	6 Months
Chloride	1 mg/L	325.2	28 Days
Copper, Dissolved	0.003 mg/L	200.9	6 Months
Fecal Coliform	N/A	SM9222D	24 Hours
Iron, Dissolved	0.05 mg/L	236.1	6 Months
Iron, Total	0.05 mg/L	236.1	6 Months
Lead, Dissolved	0.0005 mg/L	200.9	6 Months
Magnesium, Total	0.05 mg/L	200.7	6 Months
Manganese, Total	0.01 mg/L	243.1	6 Months
Nickel, Dissolved	0.07 mg/L	200.9	6 Months
Nitrate + Nitrite Nitrogen	0.2 mg/L	353.2	28 Days
Potassium, Total	0.05 mg/	200.7	6 Months
Phosphorus, Total	0.1 mg/L	365.1	28 Days
Selenium, Total	0.001 mg/L	200.8	6 Months
Sodium, Total	0.5 mg/L	200.7	6 Months
Silver, Dissolved	0.0003 mg/L	272.2	6 Months
Strontium, Total	0.001 mg/L	200.7	6 Months
Sulfate	5 mg/L	375.2	28 Days
Total Kjeldahl Nitrogen	1 mg/L	351.2	28 Days
Total Dissolved Solids	5 mg/L	SM2540C	7 Days
Total Suspended Solids	1 mg/L	160.2	7 Days
Zinc, Dissolved	0.03 mg/L	289.1	6 Months
Field Sp. Conductivity	+/- 0.5% of range*	YSI	Instant
Field Dissolved Oxygen	+/- 0.2 mg/L*	YSI	Instant
Field pH	+/- 0.2 units*	YSI	Instant
Field Temperature	+/- 0.15° C*	YSI	Instant

WV DEPARTMENT OF ENVIRONMENTAL PROTECTION - WATERSHED ASSESSMENT BRANCH
General Analysis Request Form, Rev. 03/2015

Circle Project(s): TMDL LTMS WAB RANDOM (AWQN) DEPLOY. LAKES FISH OTHER _____

Laboratory Name: _____

Stream Name: Ambient Site (Including Ambient/LTMS) Watershed Name: _____

AN-Code: _____ WQ Lab ID: _____ Random #: _____

Sampled By: _____ Filtered By: _____ # of Containers _____

Sample Type: Water _____ Sediment _____ Other _____ Specified Method: 40 CFR 136

Acid Lot #, Nitric: _____ Sulfuric: _____ HCl: _____

Sample Date: ___/___/___ Time: _____

Field Values[1]: Temp. _____ pH _____ D.O. _____ Cond. _____

Bold type/Cell Border = Random Parameter Suite (Total & Dissolved Al & Fe, Diss. Only Cu & Zn)

Pres.	Analysis / Item #*
(3)	**Acidity (Hot) / 2**
(3)	**Alkalinity / 3**
(3)	**Sulfate / 6**
(2)	**Chloride / 10**
(6)	**Fecal Coli., MF /12 24 hour holding**
6	Fecal Coli., MF/12 6 hour holding
(2)	**Bromide / 9**
5	Hardness / 4
3	Acidity (Cold)
3	Bicarbonate / 48
3	BOD / 29
4	COD / 31
4	TOC / 32
3	pH (lab) / 1
3	Cond. (lab) / 5

Pres.	Analysis / Item #*
(3)	**Tot. Diss. Solids / 15**
(3)	**Tot. Susp. Solids / 16**
(4)	**T. Phosphorus-P / 26**
(4)	**TKN / 20A**
(4)	**NO_2-NO_3-N / 25**
4	Low level T. Phosphorus-P / 26A
11	Diss. Phosphorus
4	TKN / 20
(4)	Ammonia-N / 21
3	Tot. Ortho PO_4 / 50
7	Diss. Ortho PO_4 / 50
9	Chlorophyl a / 38
3	NO_3-N (Nitrate) / 23
3	NO_2-N (Nitrite) / 24
3	Semi-Vol. Organics
8	Volatile Organics

Pres.	Analysis / Item #	Tot	Diss+
(5)	**Aluminum Al/ 53**	✓	✓
(5)	**Iron Fe/ 64**	✓	✓
(5)	**Manganese Mn / 67**	✓	
(5)	**Selenium Se / 72**	✓	
(5)	**Copper Cu / 63A**		✓
(5)	**Zinc Zn/ 78A**		✓
(5)	**Magnesium Mg/ 66**	✓	
(5)	**Calcium Ca / 60**	✓	
(5)	**Potassium K/ 71**	✓	
(5)	**Sodium Na/ 74**	✓	
(5)	**Beryllium Be / 57**	✓	
(5)	**Barium Ba / 56**	✓	
(5)	**Strontium Sr/77**	✓	
(5)	**Boron B/ 58**	✓	
(5)	Cadmium Cd/ 59A		✓
(5)	Lead Pb/ 65		✓
(5)	Nickel Ni/ 70A		✓
(5)	Arsenic As/ 55	✓	
(5)	Silver Ag / 73		✓
3	Hex. Chromium/36		
5	Mercury Hg / 68		
5	LL Mercury / 68A		

Preservation Code

1. None - Determined on-site
2. None
3. Iced immediately
4. H_2SO_4 to pH <2, iced immediately
5. HNO_3 to pH<2
6. Sterile + 0.008% $Na_2S_2O_3$, iced immediately
7. Filtered immediately, iced immediately
8. HCl to pH<2, iced immediately
9. $MgCO_3$ & Ice, _____ml sample
10. Other (Specify)
11. Filter, H2SO4 to pH <2, iced immediately

+Dissolved metals are to be filtered immediately, and nitric acid added to pH <2

* Item # specifies method, MDL, & PQL required in current WQ Analytical Contract

REMARKS:

_____# of Filters used

Filter type (circle): Disc Cartridge

Relinquished by:	Date & Time	Received by:	Relinquished by:	Date & Time	Received by:
		Lab:			Lab:

Mail Results to: ATTN: Janice Smithson (Lab Instructions: On invoice bill to Organization Unit 9480),
WVDEP, DWWM, Watershed Assessment Branch, 601 57th Street SE, Charleston, WV 25304 Phone (304) 926-0499 ex. 1051, Fax. 926-0496
WHITE - DEP Copy CANARY -Laboratory Copy

Figure 11-1. Example of COC with Ambient Parameters Selected

Part 2. Water Sampling Techniques

Since the Ambient Water Quality Network stations vary in size from large wadeable streams to fully boatable rivers, different methods of water collection must be employed from site to site. Factors to consider when selecting a method are water depth, proximity to upstream tributaries that may not be fully mixed into the main channel, and safety.

Direct Dip/Grab Method

See CHAPTER 3. Section B. Part 1. Procedures for Collecting Water Quality Samples Direct Dip/Grab Method starting on page 3-36 for more details.

The direct dip or grab method is the preferred method to obtain a sample as it eliminates the need for extra equipment that may introduce contamination into the sample and allows the multiprobe sonde direct contact with the water column in the same flow vector as the lab water. This method may be employed if:

2. *The stream is wadeable.* Generally, this is common at some of the sites, especially during the low flow summer months.
3. *The stream is boatable and you have access to a boat.* This is rarely employed as it is often difficult to control the boat so that you can obtain all the samples in the same spot, especially when one is working. In addition, the Watershed Assessment Branch boats may not be available due to use or maintenance.
4. *Circumstances force you to sample from the bank.* This is the least preferred means of obtaining a sample as it may not characterize the main channel, especially if there is a tributary upstream that is not adequately mixing into the main channel water. You should only employ this method if you are sure that there are no such tributaries upstream. If there is a bridge nearby, it may be preferable to sample from the bridge using one of the methods discussed below.

Bridge Method

The bridge method is an indirect water quality sampling method were a proxy container is lowered from a bridge (or other similar structure) that spans the stream allowing collection of the water sample at mid-stream. It is usually reserved for sites that are too deep to safely wade out to the mid-stream/Thalweg and/or where collecting from a bank or near bank using the direct dip/grab method is not appropriate (e.g., tributaries or multiple pollution sources enter the stream and do not adequately mix into the water column).

The proxy container is lowered from the bridge via an electric drill-powered crane device (bridge crane). The bridge crane can be adjusted to allow compatibility with the height of the bridge railing/berm (*i.e.,* prevent the rope from touching the side of the bridge and potentially knocking contaminants into the sampling device or immediate sampling area). In the absence of the bridge crane, a simple rope with a latching hook can be used if the distance to the water column is not excessive. However, this presents its own issues with safety and potential contamination as it is more difficult to control the rope, especially on tall bridges.

Extra care must be taken to prevent contamination of the sample using this method. For example, the equipment must be kept clean while stored in the vehicle between sites, rinsed thoroughly with sample water before sample collection, and cleaned after sample collection. An additional source of contamination is debris being knocked into the container from the bridge. Extra care should be used to prevent the rope from bumping the edge of the bridge when retrieving (lifting) the sample. It is also important to limit the water-saturated parts of the rope from dripping into the sample container.

This method will likely not allow the direct contact of the multiprobe sonde to the water column due to the shortness of the cord between the sonde and the display unit. There are some longer cables available that could potentially allow the sonde to reach the water column from a bridge, but they are often scarce and in use with other sampling efforts (*e.g.,* Lake Sampling). In any case, keep all water measurements limited to the same sampling method (*i.e.,* if the lab water is collected using the bridge method (with a proxy container) then collect the sonde readings using the bridge method (i.e., retrieve a container of sample water and put the sonde into the proxy container to get the field readings). DO NOT MIX AND MATCH METHODS!

The size of the proxy container and amount of water quality parameters to be analyzed will dictate the total number of "trips" that the container will need to take from the bridge to the water column and back again. At the very least, 5 "trips" will be required during any sampling event: three container/equipment rinse trips, one trip to rinse out the sample containers and get the field readings from, and one trip from which the actual sample is collected.

The types of proxy containers that can be used include:

- Stainless-Steel Bucket (SSB)
- PVC Sampler
- Van Dorn Horizontal Sampler (VDHS)
- Fecal Coliform Bacteria Sampler

Each of these proxy containers have their advantages and disadvantages as well as unique guidance in how to use the container.

Stainless Steel Bucket

The most commonly utilized proxy container is a 5-gallon Stainless-Steel Bucket (SSB). Use of an SSB provides the best compromise between ease of use and capacity of sample water that can be collected in a "trip".

1. Before sampling, rinse the SSB with DI or distilled water.

2. From the bridge location, securely attach the bucket to the rope. Lower the container using the bridge crane winch or by manually lowering the rope.

3. Allow the buckets bottom to touch the stream surface. Using the rope, gently

manipulate the bucket's mouth to tilt upstream, allowing at least one gallon of rinse water to enter the bucket.

4. Pull the bucket back up to the bridge and thoroughly agitate the water inside, rinsing the inside of the bucket with stream water. Repeat Steps 2 thru 4 two more times for a total of three rinses of the proxy container.

5. Repeat Steps 2 and 3, gathering a full bucket of sample water. Pull the bucket back up to the bridge and use the sample water to rinse each of the lab sample containers (e.g., cubitainers) three times.

> ***IMPORTANT*: Extra care must be taken to prevent the SSB from heating up quickly in the summer months due to contact with the hot concrete or steel of the bridge deck. To prevent this, keep the bucket from making direct contact with the bridge deck (e.g., lay the sonde backpack down as an insulator and set the bucket on it) and keep the bucket in the shade whenever possible.**

6. If an adequate amount of sample water is still in the bucket (at least half of the bucket), use the remaining water to gather physicochemical water quality parameters using a multiprobe sonde placed directly into the bucket. If not, then send the bucket down on another trip to retrieve more sample water. After putting the sonde in the bucket, make sure to monitor the readings closely and occasionally use the sonde to stir the water to ensure it stays adequately mixed during sonde equilibration.

7. Send the bucket on another trip to the water column gathering a full bucket of sample water. Use the water from this trip to fill lab sample containers (e.g., cubitainers). Be sure to cap the sample containers as quickly as possible to avoid and contamination from the bridge (i.e., dust from passing traffic). If all the lab sample containers cannot be filled with the water from this trip, repeat as necessary.

PVC Sampler

A PVC sampler can be used instead of an SSB (***see Figure 11-2 on right***). The PVC sampler has a much smaller sampling capacity than the SSB, so its use is limited to when the total number of lab sample containers that need to be filled are limited. However, the smaller capacity does allow it to be used easily with just a rope. The directions to use it are identical to that of the SSB.

Figure 11-2. Example of PVC Sampler being used at a Bridge to Sample the Water Column

Van Dorn Horizontal Sampler

The Van Dorn Horizontal Sampler (VDHS) is a device that upon lowering into the water column, a weight (called a messenger) is dropped down a guideline (the rope) that, upon impact with the trigger mechanism, will close and seal the sampler. This has the advantage of preventing contamination from occurring while bringing the sample back up to the bridge. However, it is limited in sampling capacity and the added guideline and messenger introduces another level of difficulty of use. The VDHS can be used with a bridge crane or simple rope.

1. Before sampling, rinse the VDHS with DI (deionized) or distilled water.

2. From the selected bridge sampling location, securely attach the VDHS to the rope. Secure the ends of the VHDS to the trigger mechanism in the open position.

3. Lower the VDHS over the bridge and allow the VDHS to be rinsed in the stream. Since the trigger mechanism is in the open position, you can rinse three times by raising and lowering the VDHS in and out of the water column three times.

4. After thoroughly rinsing the VDHS, lower it into the water column. Attach the messenger (sliding weight) to the rope and drop it to the trigger the ends of the VDHS to close.

5. Raise the VDHS and release a small amount of water from each valve.

6. Discard the first fill and repeat Steps 3 thru 5, gathering enough sample water to rinse lab sample containers (e.g., cubitainers) three times. Use the remaining water to gather physicochemical water quality parameters using a multiprobe sonde placed directly into the sampler or other large container (e.g., stainless-steel bucket).

7. Repeat Steps 3 thru 5 to get the sample water to fill the lab sample containers.

Fecal Coliform Bacteria Sampler

It is not possible to use a proxy container to collect a Fecal Coliform Bacteria sample because the sampling apparatus needs to be 100% sterile and clean. Instead, one must lower the sterile fecal coliform bottle from the bridge directly into the water column using a special metal apparatus called a **Sampling Iron** that holds the bottle securely and in the open position. Additionally, the fecal coliform bottle is in a position where any water that may drip down from the rope should be prevented from entering the container. Since the sampling container is kept in an open position, extra care must be taken to prevent the rope from rubbing against the side of the bridge and knocking dust into the sample.

Bridge Sampling Safety

Taking a water sample from a bridge is an inherently dangerous activity. Hazards are abundant and change with time of day, season and local weather conditions. They

include boats, jet skis, passing cars and trucks, bridge height, power lines, strong winds, ice, rain, unsteady footing, and pedestrians. Wearing a safety vest and PFD is highly recommended when sampling from any bridge location. Always be aware of your surroundings, and any potential hazards in the area. Avoiding falls from the bridge and contact with traffic must be the sampler's primary focus when taking this type of sample. Check for/be aware of anything below when on the bridge and anything above you when under it. Anything placed on the berm is subject to falling off the bridge and becoming a projectile, so avoid this if possible. Traffic cones should be used when parking on a bridge or when a sufficient walkway or emergency lane does not exist at the sampling site. Failure to consider potential hazardous situations while bridge sampling could lead to a serious injury of either the sampler(s) and/or passersby.

Part 3. Water Sample Preservation/Filtering & Handling

All water sample preservation/filtering and handling techniques are identical to those presented in ***CHAPTER 3. Section B. Part 2. Sample Preservation (Filtration, Fixation, & Holding) on page 3-39***.

Part 4. Measuring Stream Flow

Small Streams

Stream flow can be measured at some of the smaller Ambient Water Quality Network sites by hand held flow meter. Measurements should be made during low flow periods, typically in the summer months at the following sites:

O-2-(8.8) Twelvepole Creek
OMI-(12.3) Middle Island Creek
M-1-(20.6) Dunkard Creek
P-4-(2.2) Opequon Creek
PC-(6.1) Cacapon River

Flow measurements should be made whenever the water depth and velocity allow it and per techniques described in ***CHAPTER 4. STREAM FLOW MEASUREMENT starting on page 4-1***. Be sure to wear a personal flotation device when measuring flow. Calculate the total discharge and record on the appropriate form (***see CHAPTER 2. Section B. APPENDIX #1 - Stream Discharge (Flow) on page 2-116***).

Large Streams

Most of the larger Ambient streams have been purposefully stationed at or very close to a United States Geological Survey (USGS) gauging station. USGS maintains a website to access current and historical stream discharge and stream stage data from these stream gages. The web addresses for West Virginia daily stream gage data are:

http://waterdata.usgs.gov/wv/nwis/current?type=dailystagedischarge
http://wv.usgs.gov/
http://waterwatch.usgs.gov/?m=real&r=wv

See Figure 11-3 and Figure 11-4 on the next two pages for examples of USGS website data displays.

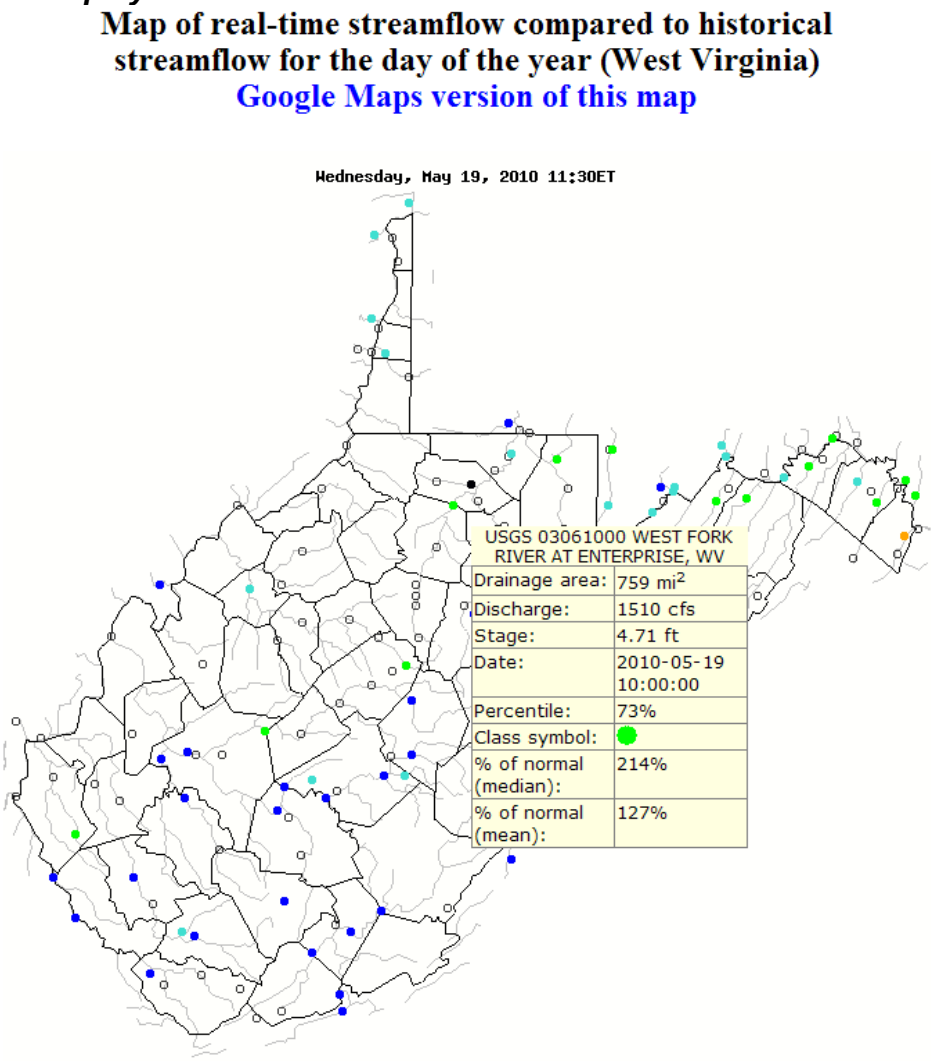

Figure 11-3. Example of USGS stream flow website (*http://waterwatch.usgs.gov/?m=real&r=wv*)

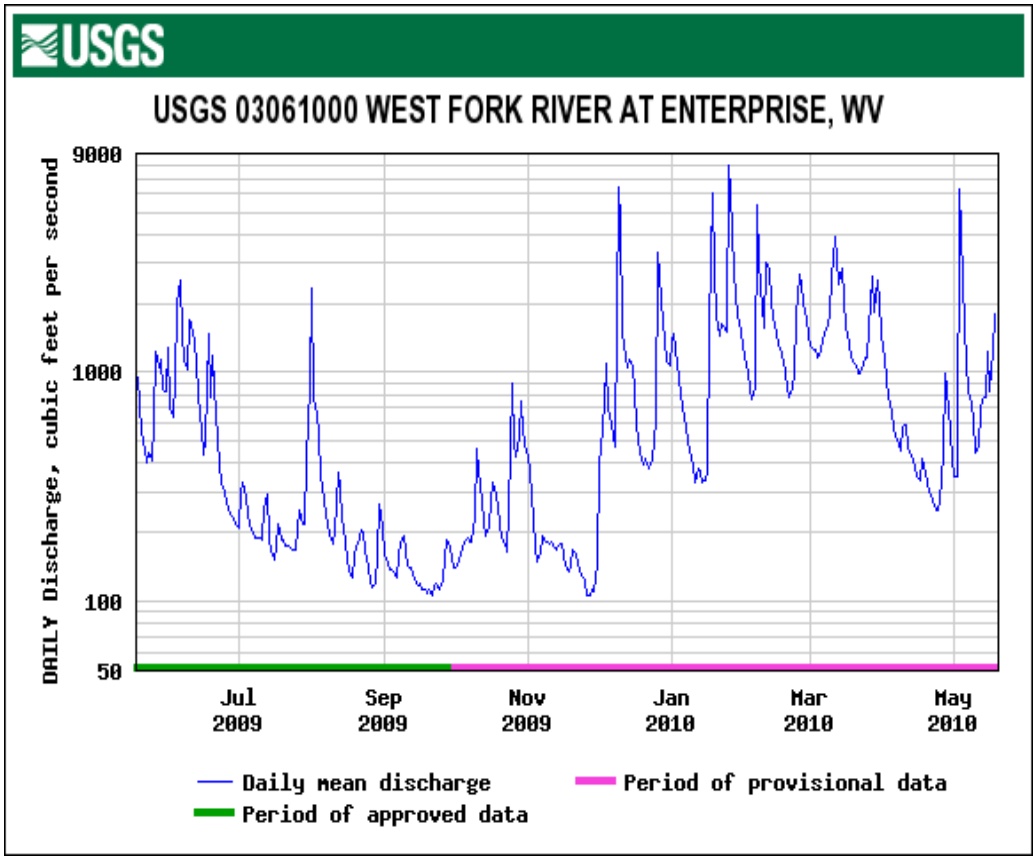

Figure 11-4. Example of USGS Stream Gage Output Graph

Refer to the specific station monitoring information (***see Section C. AMBIENT SAMPLING STATION DESCRIPTIONS starting on the next page for the location and USGS ID number***). Once you have accessed a specific gage, you will need to use the real time and table options to view hourly gage data. Record the USGS gage number, discharge and/or stage readings, for the date and time sampled, onto the form (***see CHAPTER 2. Section B. APPENDIX #1 - Stream Discharge (Flow) on page 2-116***). Hourly data are available for up to 60 days, from the date a site is visited. Daily averages are available up to two years.

Section B. DATA REVIEW & HANDLING

When the Ambient Water Quality results are received from the laboratory, all the sampling data is entered into the Watershed Assessment Branch database. During this process, all water quality results are compared to the analysis request form and field habitat forms to make sure all site and sampling information is correct and all requested analyses were performed Minimum detection limits of each are checked for compliance with current water quality criteria. Next, the results are reviewed for violations of water quality criteria and notes of these are made for future reference. Any unusual numbers should be confirmed with the laboratory and data entry mistakes corrected.

Section C. AMBIENT SAMPLING STATION DESCRIPTIONS

BST-(0.15) Tug Fork River

USGS Quadrangle: Louisa, KY **Basin:** Tug Fork **County:** Wayne
Coordinates: Latitude – 38° 07’ 1.12” N Longitude – 82° 35’ 56.07” W

Figure 11-5. 2003 Aerial Photo of the BST-(0.15) Tug Fork Ambient Sample Site in Fort Gay, WV. Channel on Right is Tug Fork; Left is Levisa Fork. Note that there is a boat ramp into the Levisa Fork just north of the bridge (Middle Left Edge of Photo).

Directions to Sample Site

Sample site is located at Fort Gay in Wayne County on the WV Route 37 Bridge, which crosses into Louisa, KY. Parking for this site is located along KY Route 3, between the Tug Fork Bridge and the Levisa Fork Bridge, at the end of the bridge sidewalk.

Description of Sampling Point

Sample is collected midstream, from the bridge sidewalk, on the upstream side. Be aware of the permitted discharge on right descending bank.

Sampling Technique

This sample can only be obtained using the Bridge Crane Method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Kermit, WV / USGS #03214500

Special Instructions

Wear orange safety vest and PFD!!!

O-2-(8.8) Twelvepole Creek

USGS Quadrangle: Burnaugh, KY **Basin**: Twelvepole **County**: Wayne
Coordinates: Latitude – 38° 21’ 20.31” N Longitude – 82° 30’ 30.56” W

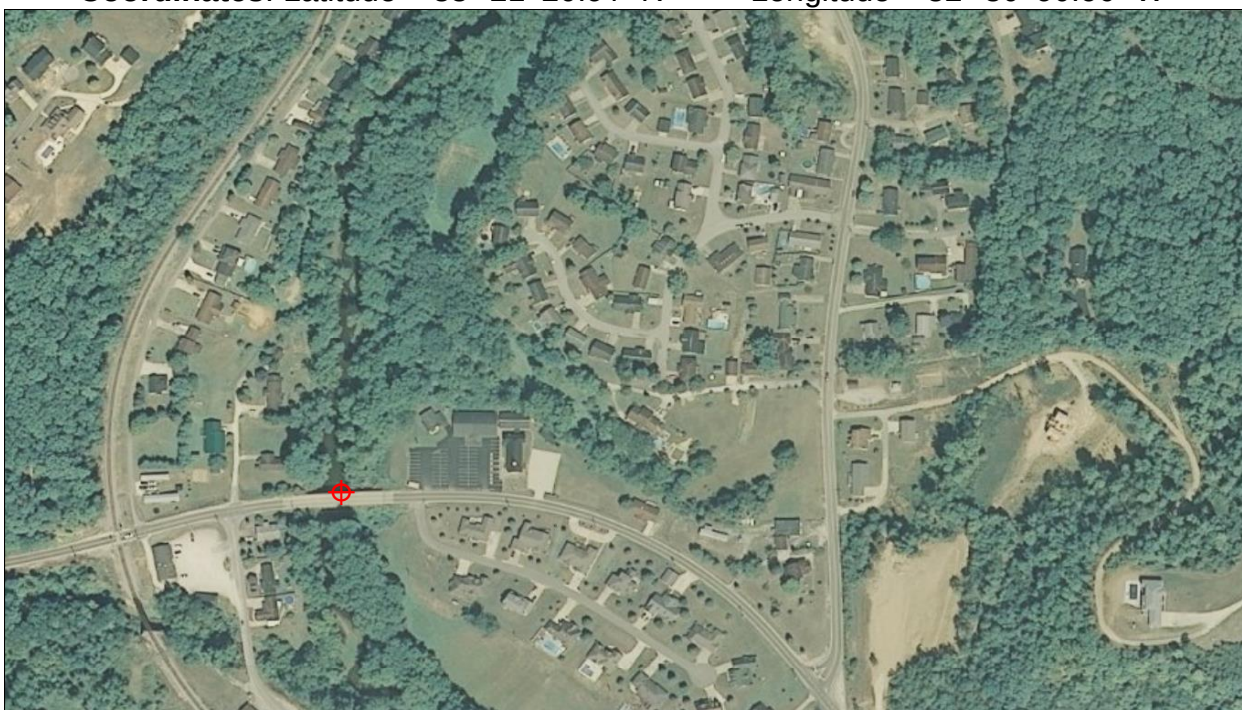

Figure 11-6. 2003 Aerial Photo of the O-2-(8.8) Twelvepole Creek Ambient Sample Site in Wayne Co., WV.

Directions to Sample Site
Sample site is located on WV Route 75 Bridge just west of the intersection with Wayne County Route 7. Refer to map for additional information. Parking is available at a church just east of the bridge.

Description of Sampling Point
During low flow a grab sample can be taken at riffle approximately 150 meters downstream of bridge. During high flow sample is collected midstream, from the bridge, on the downstream side.

Sampling Technique
Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained in summer low flows at same riffle as described above.
High Flow: Bridge Crane Method.

Flow
Low Flow: Measure at riffle downstream of bridge. The substrate of the creek is deep sandy silt.
High Flow: During normal to high flows access USGS website – Gage site: Wayne, WV / USGS #03207020

Special Instructions
Wear orange safety vest and PFD!!! Traffic cones recommended. Be careful of steep, slick banks when accessing the low flow sampling location.

OG-(2.8) Guyandotte River

USGS Quadrangle: Barboursville, WV **Basin:** Lower Guyandotte **County:** Cabell
Coordinates: Latitude – 38° 24' 48.4 N" Longitude – 82° 21' 39.83" W

Figure 11-7. 2003 Aerial Photo of the OG-(2.8) Guyandotte River Ambient Sample Site in Huntington, WV.

Directions to Sample Site

Sample site is located on the Cabell County Route 26 Bridge, which is accessed from I-64 via the Huntington 29th St. East exit (#15). Parking is available at the used auto sales business at the southeast end of the bridge.

Description of Sampling Point

Sample is collected midstream, from the bridge sidewalk, on the upstream side.

Sampling Technique

This sample can only be obtained using the Bridge Crane Method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Branchland, WV / USGS #03204000

Special Instructions

Wear orange safety vest and PFD!!!

OG-(74.1) Guyandotte River

USGS Quadrangle: Henlawson, WV **Basin**: Lower Guyandotte **County**: Logan
Coordinates: Latitude – 37° 55 35.48 N Longitude – 81° 58 54.0 W

Figure 11-8. 2003 Aerial Photo of the OG-(74.1) Guyandotte River Ambient Sample Site in Pecks Mill, WV.

Directions to Sample Site

Sample site is located upstream of the WV Route 10 Bridge and Mill Creek at Pecks Mill in Logan County. Access to the sample point is as follows: from WV Route 10 in Pecks Mill turn onto County Route 8, travel approximately 0.1 mile and turn right onto County Route 12, follow County Route 12 till you see a pull off area on the right, from this point walk over the bank and follow Mill Creek across RR tracks to the Guyandotte River.

Description of Sampling Point

Sample is collected at midstream of Guyandotte River 15 meters upstream of Mill Creek.

Sampling Technique

Direct dip/grab method. Wadeable benthic sample can be obtained in summer low flows at same riffle.

Flow

Access USGS website for flow information – Gage site: Logan, WV / USGS #03203600

Special Instructions

Wear orange safety vest and PFD!!!

K-(31.7) Kanawha River

USGS Quadrangle: Winfield, WV **Basin**: Lower Kanawha **County**: Putnam
Coordinates: Latitude – 38° 31’ 28.3” N Longitude – 81° 54’ 42.79” W

Directions to Sample Site
Sample site is located, on US Route 35 at the AEP Winfield Hydropower Plant on the southeast side of the Locks & Dam structure, at Winfield in Putnam County. Parking is allowed inside the fenced area.

Description of Sampling Point
Sample is collected at the midpoint of the power plant intake.

Sampling Technique
Direct dip/grab method. Wadeable benthic sample cannot be obtained.

Flow
Access USGS website for flow information – Gage site: Winfield, WV / #03201405

Special Instructions
Call the Winfield Power Plant at (304) 586-3006 to arrange access. Safety training is required for each visit and provided inside plant. ***Safety equipment required: Hardhat, PFD, & Safety glasses.***

Figure 11-9. 2003 Aerial Photo of the K-(31.7) Kanawha River Ambient Sample Site at Winfield Locks & Dam, WV.

Figure 11-10. Photos of the Winfield Locks & Dam parking area (left) and Dam Intake Sample Area (right).

K-(74.1) Kanawha River

USGS Quadrangle: Cedar Grove, WV **Basin**: Upper Kanawha **County**: Kanawha
Coordinates: Latitude – 38° 11’ 50.69” N Longitude – 81° 29’ 49.02” W

Figure 11-11. 2003 Aerial Photo of the K-(74.1) Kanawha River Ambient Sample Site at Chelyan, WV (left) and Photo of the Kanawha River Sample Site from Boat Dock in Chelyan, WV (right).

Directions to Sample Site

Sample site is located at Chelyan, downstream of the Kanawha River Bridge, along WV Route 61 in Kanawha County.

Description of Sampling Point

Sample is collected midstream utilizing watercraft, launching from the old boat ramp adjacent to the WV Department of Highways office when feasible. When sampling conditions don’t permit boat sampling, a grab sample may be taken upstream of the boat ramp on left descending bank.

Sampling Technique

Direct dip/grab method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Kanawha Falls, WV / USGS #03193000

Special Instructions

Follow watercraft safety guidelines. Wear PFD!!!

KC-(11.6) Coal River

USGS Quadrangle: Alum Creek, WV **Basin**: Coal **County**: Kanawha
Coordinates: Latitude – 38° 20’ 21.03” N Longitude – 81° 50’ 27.96” W

Figure 11-12. 2003 Aerial Photo of the KC-(11.6) Coal River Ambient Sample Site at Tornado, WV.

Directions to Sample Site
Sample site is located on the County Route 9 Bridge, near Tornado in Kanawha County.
Description of Sampling Point
Sample is collected midstream, from the bridge sidewalk, on the downstream side.
Sampling Technique
This sample is primarily obtained using the Bridge Crane Method. A proxy wadeable benthic sample can be obtained from bottom of old lock channel downstream of site on right descending bank next to Upper Falls of Coal River during summer low flows.
Flow
Access USGS website for flow information – Gage site: Tornado, WV / #03200500
Special Instructions
Wear orange safety vest and PFD!!! The Upper Falls area is notorious for downing accidents due to heavy deposits of sand below the falls and an extremely fast and deep pool in the old lock channel on the right descending bank.

KE-(4.3) Elk River

USGS Quadrangle: Big Chimney, WV **Basin**: Elk **County**: Kanawha
Coordinates: Latitude – 38° 23' 10.96" N Longitude – 81° 35' 3.36" W

Directions to Sample Site
Sample site is located at Coonskin Park, which is accessed from WV Route 114 in Kanawha County. Park at the boat ramp and walk the Elk River Trail downstream on left descending bank. This point is situated in a slight bend in the river.

Figure 11-13. 2003 Aerial Photo of the KE-(4.3) Elk River Ambient Sample Site at Charleston, WV.

Description of Sampling Point
Sample is collected from the furthest boulder out from the left bank that you can safely sample from.

Sampling Technique
Direct dip/grab method. A proxy wadeable benthic sample can be obtained from shoals just below Mink Shoals Run approximately 0.6 miles upstream during summer low flows.

Flow
Access USGS website for flow information – Gage site: Queen Shoals, WV / #03197000

Special Instructions
Wear PFD!!!

Figure 11-14. Photo of the Elk River Sampling Site from Upstream at Coonskin Park (left) and Looking Upstream from the site (right).

KG-(8.25) Gauley River

USGS Quadrangle: Gauley Bridge, WV **Basin**: Gauley **County**: Fayette
Coordinates: Latitude – 38° 13’ 35.57” N Longitude – 81° 09’ 10.19” W

Figure 11-15. 2003 Aerial Photo of the KG-(8.25) Gauley River Ambient Sample Site at Beech Glen, WV.

Directions to Sample Site
Sample site is located west of Jodie in Beech Glen at the Fayette/Nicholas County line, under the CR 60/3 bridge. Alternately the site can be sampled from the CR 60/3 bridge during high flows.

Description of Sampling Point
Sample is collected midstream, upstream of the mouth of Rich Creek on the upstream side of the bridge.

Sampling Technique
Low Flow: Direct dip/grab method.
High Flow: Bridge Crane Method.
A proxy wadeable benthic sample can be obtained from riffle downstream approximately 0.1 miles at top of island during summer low flows.

Flow
Access USGS website for flow information – Gage site: Belva, WV / USGS #03192000

Special Instructions
The bridge to access the sampling point experiences a large volume of coal truck traffic.
Wear orange safety vest and PFD!!!

KN-(1.2) New River

USGS Quadrangle: Gauley Bridge, WV **Basin**: Lower New **County**: Fayette
Coordinates: Latitude – 38° 09' 7.4" N Longitude – 81° 10' 47.7" W

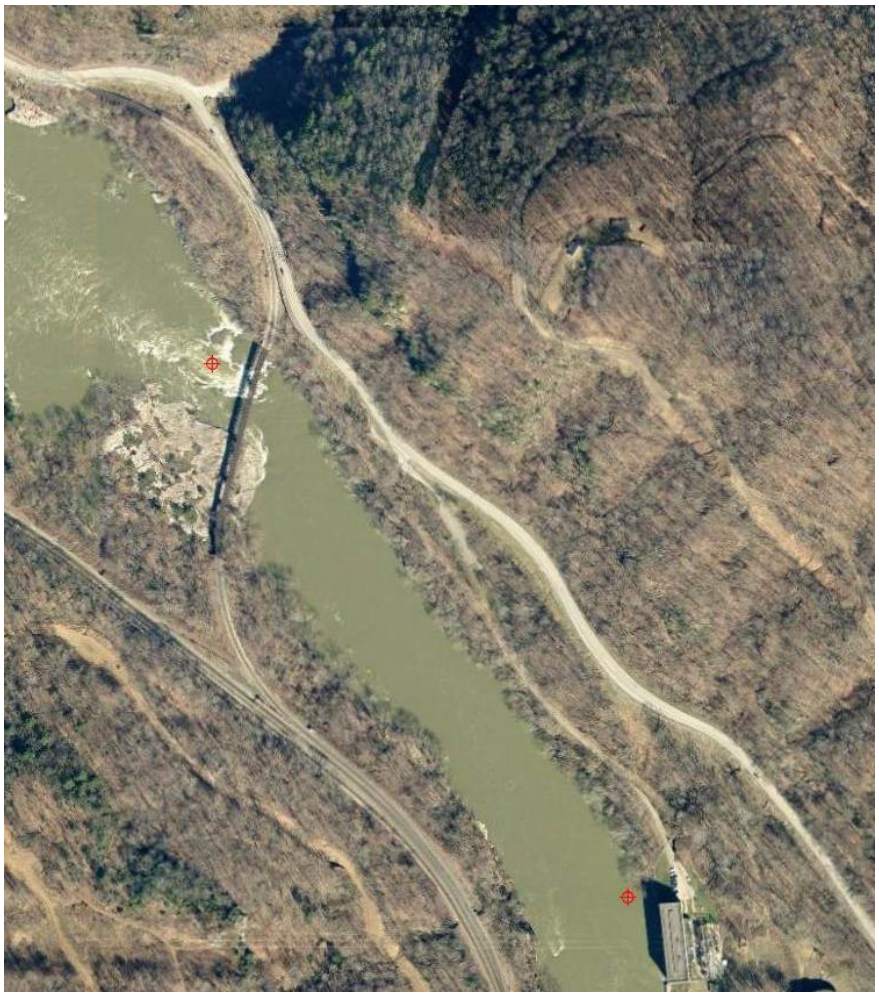

Figure 11-16. 2010 Aerial Photo of the KN-(1.2) New River Ambient Sample Site near Gauley Bridge, WV. Note the previous location upstream at the Elkem Power Station at 1.55

Directions to Sample Site

Sample site is located just downstream/beneath a railroad trestle downstream of the Elkem Power Station. Parking is located at the Cathedral Falls roadside park, along US Route 60 immediately after the railroad crossing on the left (leaving Gauley Bridge).

Description of Sampling Point

Sample is collected from the right descending bank or as far out as one can safely get. Past sampling for this site has occurred mid-stream directly from the Railroad Trestle and on the right descending bank just upstream at the Elkem Power Station at MP 1.55.

Sampling Technique

Direct dip method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Thurmond, WV / USGS #03185400

Special Instructions

Wear PFD!!! This location may experience a rapid increase in flow and depth at any time due to a release from the aqueduct. Heed all warnings posted at the parking area.

KN-(67.4) New River

USGS Quadrangle: Hinton, WV **Basin**: Upper New **County**: Summers
Coordinates: Latitude – 37° 39' 4.53" N Longitude – 80° 53' 11.9" W

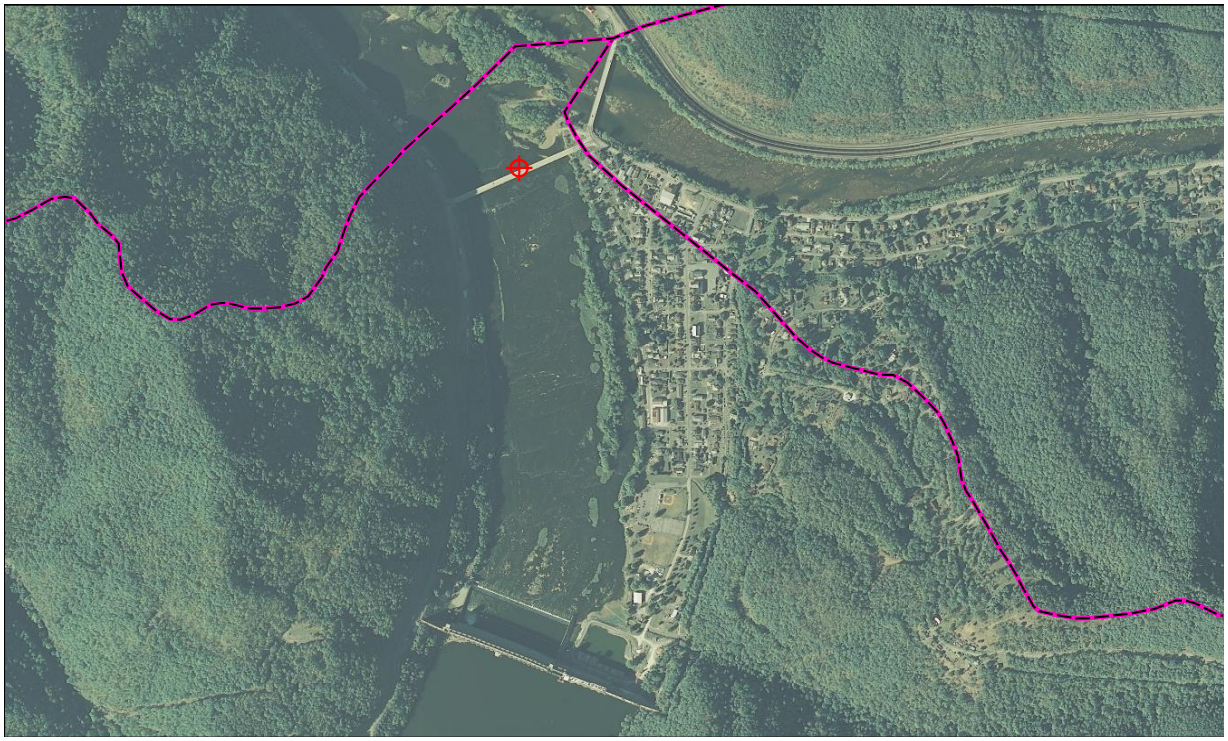

Figure 11-17. 2003 Aerial Photo of the KN-(67.4) New River Ambient Sample Site in Hinton, WV.

Directions to Sample Site
Sample site is located on the WV Route 3 Bridge at Hinton in Summers County. Parking for this site is at the old USGS Gage on the east side of the bridge.

Description of Sampling Point
Sample is collected from the bridge sidewalk, at midstream on the downstream side. During low flows, sample can be collected from the same location by wading out from right descending bank. Be aware of CSO outfall on Right Descending Bank near bridge.

Sampling Technique
Low Flow: Direct dip/grab method.
High Flow: Bridge Crane Method.
Wadeable benthic sample can be obtained from riffles immediately below bridge in right descending half of channel during summer low flows.

Flow
Access USGS website for flow information – Gage site: Hinton, WV / USGS #03184500

Special Instructions
Wear orange safety vest and PFD!!! This location may experience a rapid increase in flow and depth at any time due to a release from the dam. Heed all warnings posted at the area.

KNG-(1.6) Greenbrier River

USGS Quadrangle: Talcott, WV **Basin**: Greenbrier **County**: Summers
Coordinates: Latitude – 37° 39' 08.24" N Longitude – 81° 51' 40.31" W

Figure 11-18. 2003 Aerial Photo of the KNG-(1.6) Greenbrier River Ambient Sample Site in Hinton, WV.

Directions to Sample Site
Sample site is located at Wiggins Bridge, on County Route 13, which connects with WV Route 3 approximately 1.5 miles east of Hinton in Summers County. Parking is located on the south side of the bridge at a gravel pit beside a fenced road to the river.

Description of Sampling Point
Sample is collected midstream from the bridge, on the downstream side. During low flows, sample can be collected from the same location by wading.

Sampling Technique
Low Flow: Direct dip/grab method.
High Flow: Bridge Crane Method.
A proxy wadeable benthic sample can be obtained at cobble riffle upstream approximately 1.0 miles during summer low flows.

Flow
Access USGS website for flow information – Gage site: Hilldale, WV / USGS #03184000

Special Instructions
Wear your orange safety vest and PFD!!! Traffic cones recommended.

KN-(96.2) New River

USGS Quadrangle: Peterstown
Basin: Upper New
County: Giles, VA
Coordinates:
Latitude – 37° 23' 15.2" N
Longitude – 80° 52' 5.8" W

Directions to Sample Site

Sample site is located upstream of Smith Branch north of Glen Lyn, VA. Directions are as follows: Just after crossing the WV/VA state line on Rt. 460 E, take the next left, before crossing bridge over New River. Go 0.9 miles and go right onto gravel road going alongside the river. Go 1.3 miles and pull into campsite on right.

Description of Sampling Point

Sample is collected close to midstream by wading along the large fractured bedrock slabs. Ensure sample is taken upstream of Smith Branch and as close to mid-stream as flow levels allow.

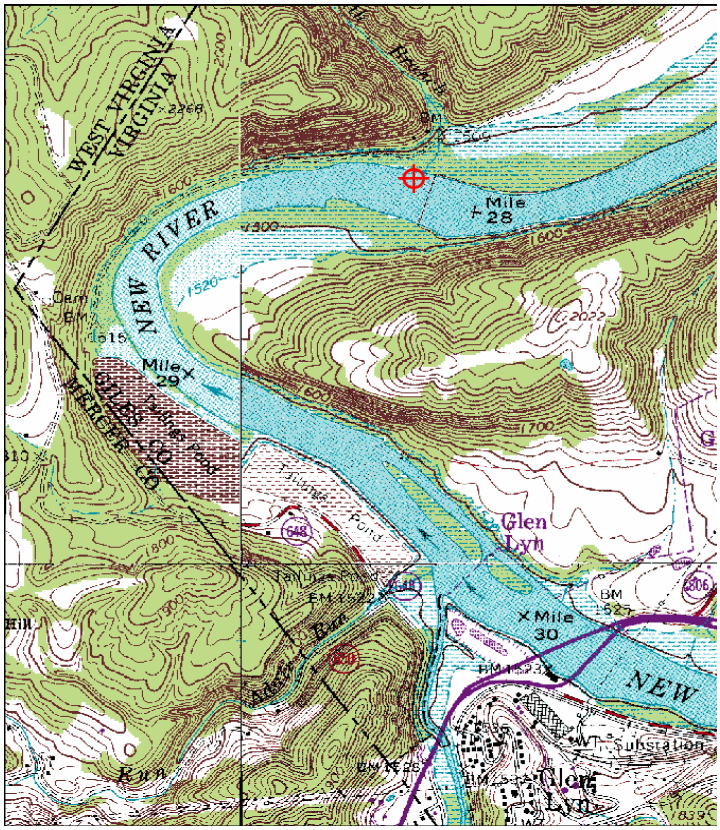

Figure 11-19. USGS 24k Topographic Map of the KN-(96.2) New River Ambient Sample Site north of Glen Lyn, VA.

Sampling Technique

Direct dip/grab method. Wadeable benthic sample can be obtained from riffle below Smith Branch on left descending bank during summer low flows.

Flow

Access USGS website for flow information – Gage site: Glen Lyn, VA / USGS #03176500

Special Instructions

Wear your PFD!!! VA Scientific Collection Permit with 24 hour notification is required to sample at this location.

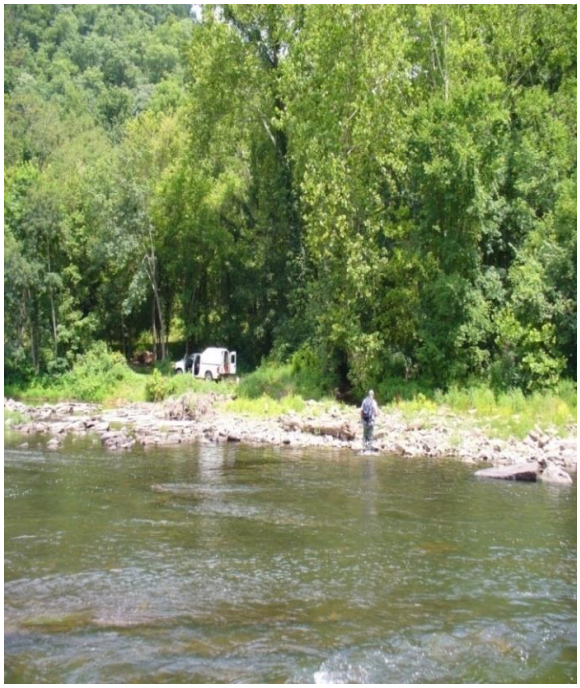

Figure 11-20. Photo from X-Site looking toward Left Descending Bank at Mouth of Smith Branch and Parking Area.

LK-(28.9) Little Kanawha River

USGS Quadrangle: Elizabeth, WV **Basin**: Little Kanawha **County**: Wirt
Coordinates: Latitude – 39° 03’ 18.4” N Longitude – 81° 23’ 25.84” W

Directions to Sample Site

Sample site is located on the WV Route 5 Bridge, southeast of Elizabeth in Wirt County. Parking is located on the east side of the bridge, at a small convenience store.

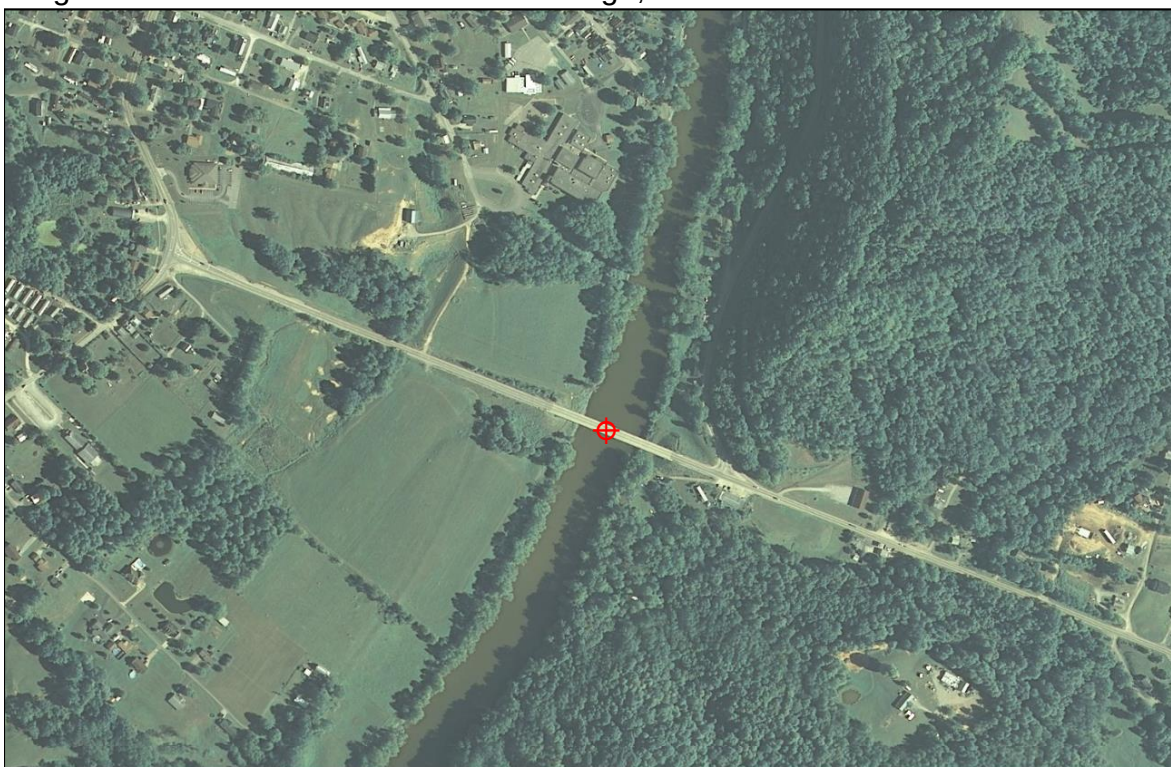

Figure 11-21. 2003 Aerial Photo of the LK-(28.9) Little Kanawha River Ambient Sample Site near Elizabeth, WV.

Description of Sampling Point

Sample is collected at midstream, from the bridge sidewalk, on the upstream side.

Sampling Technique

Bridge Crane Method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Palestine, WV / USGS #03155000

Special Instructions

Wear your orange safety vest and PFD!!!

LKH-(1.5) Hughes River

USGS Quadrangle: Kanawha, WV **Basin**: Little Kanawha **County**: Wirt
Coordinates: Latitude – 39° 07’ 54.29” N Longitude – 81° 22’ 38.21” W

Figure 11-22. 2003 Aerial Photo of the KLH-(1.5) Hughes River Ambient Sample Site near Greencastle, WV.

Directions to Sample Site
Sample site is located on Wirt County Route 6 Bridge East of Greencastle.
Description of Sampling Point
Sample is collected at midstream, from the bridge, on the downstream side. During low flows, sample may be collected at the riffle 120 m downstream of the bridge.
Sampling Technique
Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from same riffle during summer low flows.
High Flow: Bridge Crane Method.
Flow
Flow is measured only during low flow at the riffle described above.
Special Instructions
The sampling point is a one-lane bridge, be very careful!!! Parking for the sampling site is at the church parking lot on the east side of the bridge. Walk to the flow measurement site on the gravel road between the church and the river. ***Wear your orange safety vest and PFD!!! Traffic cones recommended. Banks can be slick!***

OMI-(12.3) Middle Island Creek

USGS Quadrangle: Bens Run, WV **Basin**: Middle Ohio North **County**: Pleasants
Coordinates: Latitude – 39° 26’ 08.18” N Longitude – 81° 04’ 16.91” W

Figure 11-23. 2003 Aerial Photo of the OMI-(12.3) Middle Island Creek Ambient Sample Site in Arvilla, WV.

Directions to Sample Site

Sample site is located on Pleasants County Route 7 Bridge at Arvilla. Parking for sample collection is available on the west end of the bridge along County Route 7/2.

Description of Sampling Point

Sample is collected at midstream, from the bridge, on the upstream side.

Sampling Technique

Bridge Crane Method. A proxy wadeable benthic sample can be obtained at riffle downstream approximately 0.5 miles during summer low flows.

Flow

Flow is measured during low flows at riffle described above. Access to site is by Pleasants County Route 34.

Access USGS website for flow information – Gage site: Little, WV/ USGS # 03114500

Special Instructions

Wear orange safety vest and PFD!!! Traffic cones recommended. Bank at proxy site is steep.

M-(99.4) Monongahela River

USGS Quad: Morgantown North, WV **Basin**: Monongahela **County**: Monongalia
Coordinates: Latitude – 39° 39’ 28.88” N Longitude – 79° 59’ 35.33” W

Figure 11-24. 2003 Aerial Photo of the M-(99.4) Monongahela River Ambient Sample Site in Star City, WV.

Directions to Sample Site
Sample site is located on the WV Route 7 Bridge at Star City.
Description of Sampling Point
Sample is collected at midstream, from the bridge sidewalk, on the upstream side.
Sampling Technique
Bridge Crane Method. Wadeable benthic sample cannot be obtained.
Flow
Access USGS website for flow information – Gage site: Morgantown Lock & Dam, WV / USGS #03062450
Special Instructions
Wear orange safety vest and PFD!!! Bridge is very high. Although there is a large sidewalk on the bridge, traffic volume is large and fast. Also, be aware of any boating activity below.

M-1-(20.6) Dunkard Creek

USGS Quadrangle: Osage, WV **Basin**: Dunkard **County**: Monongalia
Coordinates: Latitude – 39° 42’ 55.47” N Longitude – 80° 06’ 39.96” W

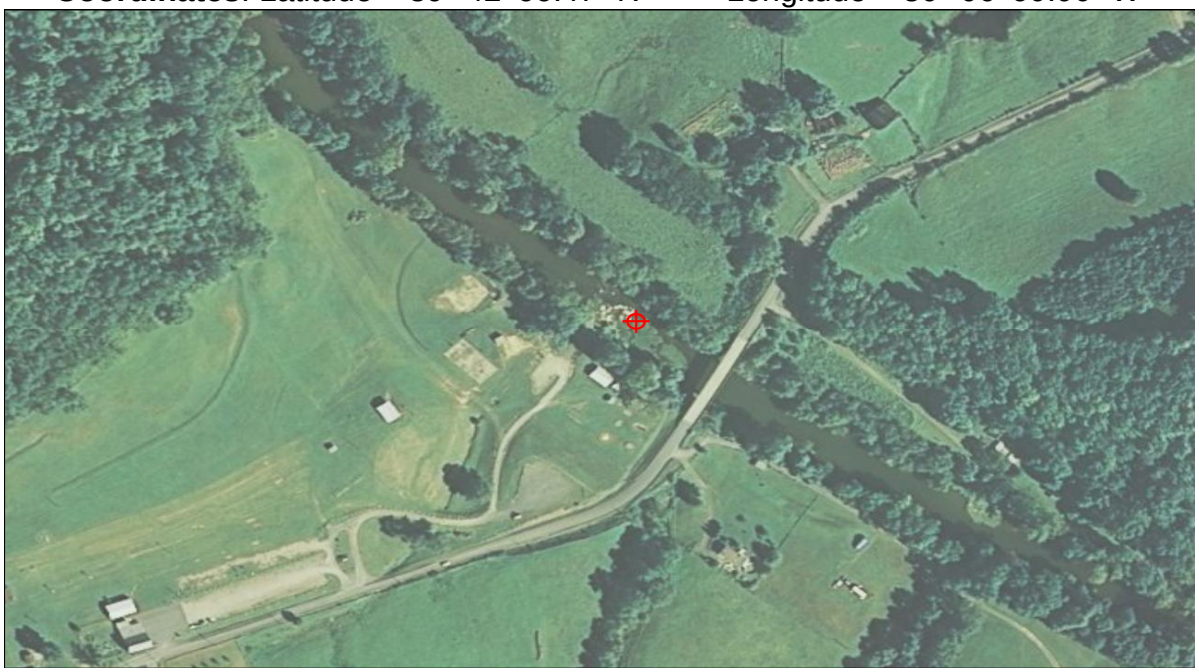

Figure 11-25. 2003 Aerial Photo of the M-1-(20.6) Dunkard Creek Ambient Sample Site at Mason-Dixon Historical Park, WV.

Directions to Sample Site

Sample site is located just downstream or on Monongalia County Route 39 Bridge, near the Mason-Dixon Historical Park east of Pentress. This will be the second bridge you encounter after turning off WV Route 7. Parking is available at the Historical Park at a site above the playground.

Description of Sampling Point

Sampling occurs primarily at the riffle approximately 75 meters below bridge. During high flows the sample can be collected at midstream, from the bridge, on the upstream side.

Sampling Technique

Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from same riffle during summer low flows.
High Flow: Bridge Crane Method.

Flow

Flow is measured, during low flow, at riffle described above.

Special Instructions

Wear your orange safety vest and PFD!!! Traffic cones recommended if sampling from the bridge.

MT-(6.2) Tygart Valley River

USGS Quadrangle: Fairmont West, WV **Basin**: Tygart Valley **County**: Marion
Coordinates: Latitude – 39° 26’ 16.2” N Longitude – 80° 07’ 56.4” W

Figure 11-26. 2003 Aerial Photo of the MT-(6.2) Tygart Valley River Ambient Sample Site at Colfax, WV.

Directions to Sample Site

Sample site is located on Marion County Route 62 Bridge at Colfax, which is accessed via US Route 250 south of Fairmont. Parking is available on the west side of the bridge. A low flow direct dip/grab site is at riffle downstream approximately 0.1 miles from bridge. Continue down road alongside the river to small pull off on right. Walk down bank and wade out as far as flow level permits.

Description of Sampling Point

Sample is collected at midstream, from the bridge, on the downstream side during high flows. During low flows, go to the downstream site and wade as far as flow level permits.

Sampling Technique

Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from same riffle during summer low flows.
High Flow: Bridge Crane Method.

Flow

Access USGS website for flow information – Gage site: Colfax, WV / USGS #03057000

Special Instructions

Wear orange safety vest and PFD!!! Traffic cones recommended.

MW-(12.0) West Fork River

USGS Quadrangle: Shinnston, WV **Basin**: West Fork **County**: Harrison
Coordinates: Latitude – 39° 25’ 25.02” N Longitude – 80° 16’ 32.91” W

Figure 11-27. 2003 Aerial Photo of the MW-(12.0) West Fork River Ambient Sample Site at Enterprise, WV.

Directions to Sample Site
Sample site is located on a bridge that intersects US Route 19 at Enterprise in Harrison County. Parking is available on the bridge berm. Turn on vehicle emergency flashers.

Description of Sampling Point
Sample is collected at midstream, from the bridge, on the downstream side.

Sampling Technique
Bridge Crane Method. A proxy wadeable benthic sample can be obtained at riffle upstream approximately 0.1 miles on opposite side of confluence of Laurel Run on right descending bank during summer low flows.

Flow
Access USGS website for flow information – Gage site: Enterprise, WV / USGS #03061000

Special Instructions
Wear orange safety vest and PFD!!! Traffic cones recommended. Traffic volume is not high, but speeders are common.

MC-(3.5) Cheat River

USGS Quadrangle: Lake Lynn, WV **Basin**: Cheat **County**: Fayette, PA
Coordinates: Latitude – 39° 43’ 17.18” N Longitude – 79° 51’ 27.79 W

Figure 11-28. 2003 Aerial Photo of the MC-(3.5) Cheat River Ambient Sample Site in Lake Lynn, PA.

Directions to Sample Site

Sample site is located at the tail waters of Lake Lynn, which is best accessed from, Point Marion, PA, via US Route 119. From US Route 119 in Point Marion, turn onto River Road and follow Cheat River upstream to the tail water access parking area.

Description of Sampling Point

Sample is collected off the right descending bank below the parking area.

Sampling Technique

Direct dip/grab method. Wadeable benthic sample cannot be obtained.

Flow

Access USGS website for flow information – Gage site: Lake Lynn, PA / USGS #03071600

Special Instructions

This location may experience a rapid increase in flow and depth at any time due to a release from the dam. Heed all warnings posted at the parking area. Wear orange safety vest and PFD!!!

MC-(30.0) Cheat River

USGS Quadrangle: Kingwood, WV **Basin**: Cheat **County**: Preston
Coordinates: Latitude – 39° 29’ 41.13” N Longitude – 79° 38’ 42.99” W

Figure 11-29. 2003 Aerial Photo of the MC-(30.0) Cheat River Ambient Sample Site in Albright, WV.

Directions to Sample Site
Sample site is located on the WV Route 26 Bridge, at Albright in Preston County. Parking is available at the east end of the bridge.

Description of Sampling Point
Sample is collected at midstream, from the bridge, on the upstream side. During low flows, direct dip/grab method may be used in run upstream of bridge.

Sampling Technique
Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from riffle upstream of bridge approximately 100 meters during summer low flows.
High Flow: Bridge Crane Method.

Flow
Access USGS website for flow information – Gage site: Albright, WV / USGS #03070260

Special Instructions
Wear orange safety vest and PFD!!!

P-4-(2.2) Opequon Creek

USGS Quadrangle: Hedgesville, WV **Basin**: Potomac Direct Drain **County**: Berkeley
Coordinates: Latitude – 39° 31' 02.96" N Longitude – 77° 53' 21.87" W

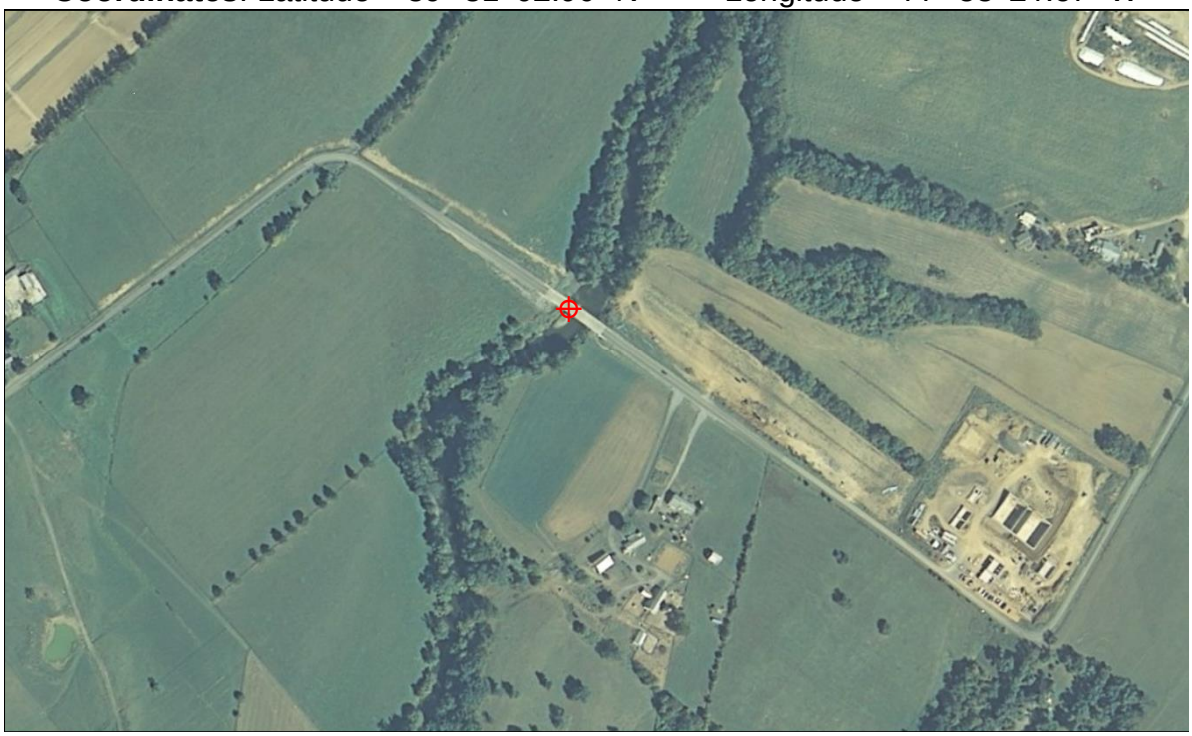

Figure 11-30. 2003 Aerial Photo of the P-4-(2.2) Opequon Creek Ambient Sample Site near Bedington, WV.

Directions to Sample Site
Sample site is located on Berkeley County Route 12 Bridge east of Bedington. Parking is available on the west end of the bridge along County Route 12.

Description of Sampling Point
Sample is collected at the Thalweg, from the bridge, on the upstream side or by wading out to same point during low flows.

Sampling Technique
Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from riffle under bridge during summer low flows.
High Flow: Bridge Crane Method.

Flow
Flow is measured, during low flows, at a shallow point upstream of the bridge.
Access USGS website for flow information during normal to high flows – Gage site: Martinsburg, WV / USGS #01616500

Special Instructions
Wear orange safety vest and PFD!!! Traffic cones recommended when sampling from bridge. Note the permitted discharge below the bridge on the left descending bank.

PC-(6.1) Cacapon River

USGS Quadrangle: Great Cacapon, WV
Basin: Cacapon
County: Morgan
Coordinates:
Latitude – 39° 34’ 55.43” N
Longitude – 78° 18’ 31.72” W

Directions to Sample Site

Sample site is located on Morgan County Route 7 Bridge south of Great Cacapon. Parking is available on the north end of the bridge.

Description of Sampling Point

Sample is collected midstream, from the bridge, on the downstream side.

Sampling Technique

Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained from riffle under bridge during summer low flows.

Figure 11-32. Photo from CR 7 bridge at the PC-(6.1) Cacapon River Ambient Sample Site south of Great Cacapon, WV.

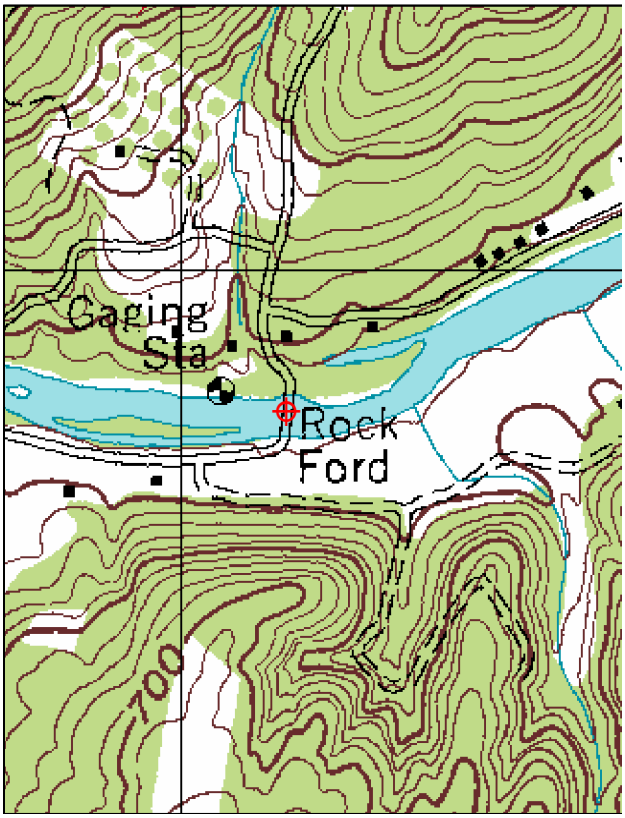

Figure 11-31. USGS 24k Topographic Map of the PC-(6.1) Cacapon River Ambient Sample Site south of Great Cacapon, WV.

High Flow: Bridge is low, without railing. Direct dip/grab method may be used by lying down and reaching over edge of bridge. Otherwise use a VDHS or SSB with rope.

Flow

Flow is measured, during low flows, at a riffle immediately downstream of the bridge. Access USGS website for flow information during normal to high flows – Gage site: Great Cacapon, WV / USGS #01611500

Special Instructions

Wear orange safety vest and PFD!!! Be aware of traffic while sampling from bridge.

PSB-(13.4) South Branch Potomac River

USGS Quad: Springfield, WV **Basin**: South Branch Potomac **County**: Hampshire
Coordinates: Latitude – 39° 26’ 51.74” N Longitude – 78° 39’ 15.25” W

Figure 11-33. 2003 Aerial Photo of the PSB-(13.4) South Branch Potomac River Ambient Sample Site near Springfield, WV.

Directions to Sample Site

Sample site is located on or immediately below Hampshire County Route 3 Bridge, east of Springfield.

Description of Sampling Point

Sample is collected at midstream, from the bridge, on the downstream side or by wading out as far as the flow will allow during low flows.

Sampling Technique

Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained at riffle immediately downstream of bridge at top end of island during summer low flows.
High Flow: Bridge Crane Method.

Flow

Access USGS website for flow information – Gage site: Springfield, WV / USGS #01608500

Special Instructions

Wear orange safety vest and PFD!!! Traffic cones recommended when sampling from bridge.

S-(0.9) Shenandoah River

USGS Quadrangle: Harpers Ferry, WV **Basin**: Shenandoah **County**: Jefferson
Coordinates: Latitude – 39° 19’ 12.36” N Longitude – 77° 44’ 31.97” W

Figure 11-34. 2003 Aerial Photo of the S-(0.9) Shenandoah River Ambient Sample Site near Harpers Ferry, WV.

Directions to Sample Site

Sample site is located on US Route 340 Bridge at Harpers Ferry in Jefferson County. Parking is available at the west end of the bridge.

Description of Sampling Point

Sample is collected at midstream, from the bridge sidewalk, on the downstream side or by wading out to midstream above the bridge during low flow.

Sampling Technique

Low Flow: Direct dip/grab method. Wadeable benthic sample can be obtained at riffle approximately 100 meters upstream of bridge off the left descending bank during summer low flows.

High Flow: Bridge Crane Method.

Flow

Access USGS website for flow information – Gage site: Millville, WV / USGS #01636500

Special Instructions

Wear orange safety vest and PFD!!! Be aware of high volume of traffic on bridge. Riffles above bridge also have a high volume of recreational users during warm months. Be careful to try and sample undisturbed substrate.

Ambient Water Quality Network Quality Assurance/Quality Control

Once a year, all field participants in the WAB attend mandatory training sessions. The purpose of these sessions is to ensure that all field personnel are familiar with sampling protocols and calibrated to sampling standards. Whilst a specific session on Ambient Water Quality Network sampling is not covered, other sessions (*e.g.,* site documentation and completing the stream assessment forms, water collection protocols, stream flow measurement, field blanks and duplicates, *etc*.) are covered. Individuals who are more experienced in sampling the Ambient Water Quality Network will be teamed up to give hands-on training to less experienced to ensure reinforcement of training and accurate results before they can sample these stations. This document is also provided to all program personnel for review and use in the field.

Sample labels are to be accurate and complete and contain all the pertinent information. Sampling equipment will be checked for contaminants and excess dirt or moisture cleaned before and after each sampling event. Lot numbers of all preservatives are recorded on the Analysis Request Form for each sample submitted and entered into the database to allow for easy tracking. Sample transfer to the lab shall also be documented using the Chain-of-Custody (COC) portion of the Analysis Request Form.

Duplicate sampling and field blanks must be performed at a minimum of 2.5% of Ambient Water Quality Network sites for each sampling round. The field blank and duplicate data are looked at by Watershed Assessment Branch staff and scrutinized to find any possible discrepancies, contamination, or faults in the sampling methods and techniques. Any problems are brought to the attention of the program management and steps are made to immediately correct the problem. Data that is related to the problem are flagged with notes concerning the details of the situation so that decisions can be made whether to include the data in any further assessments or analysis. Procedures for performing duplicates and field blanks are presented in ***CHAPTER 14. Section A. Blanks and Duplicates starting on page 14-1.***