



2006 Integrated Water Quality Monitoring and Assessment Report

Division of Water and Waste Management
West Virginia Department of Environmental Protection



WEST VIRGINIA INTEGRATED WATER QUALITY MONITORING AND ASSESSMENT REPORT 2006

prepared to fulfill the requirements of Sections 303(d) and 305(b) of the federal Clean Water Act for the period
of July 2003 through June 2005

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Section 1 – Introduction

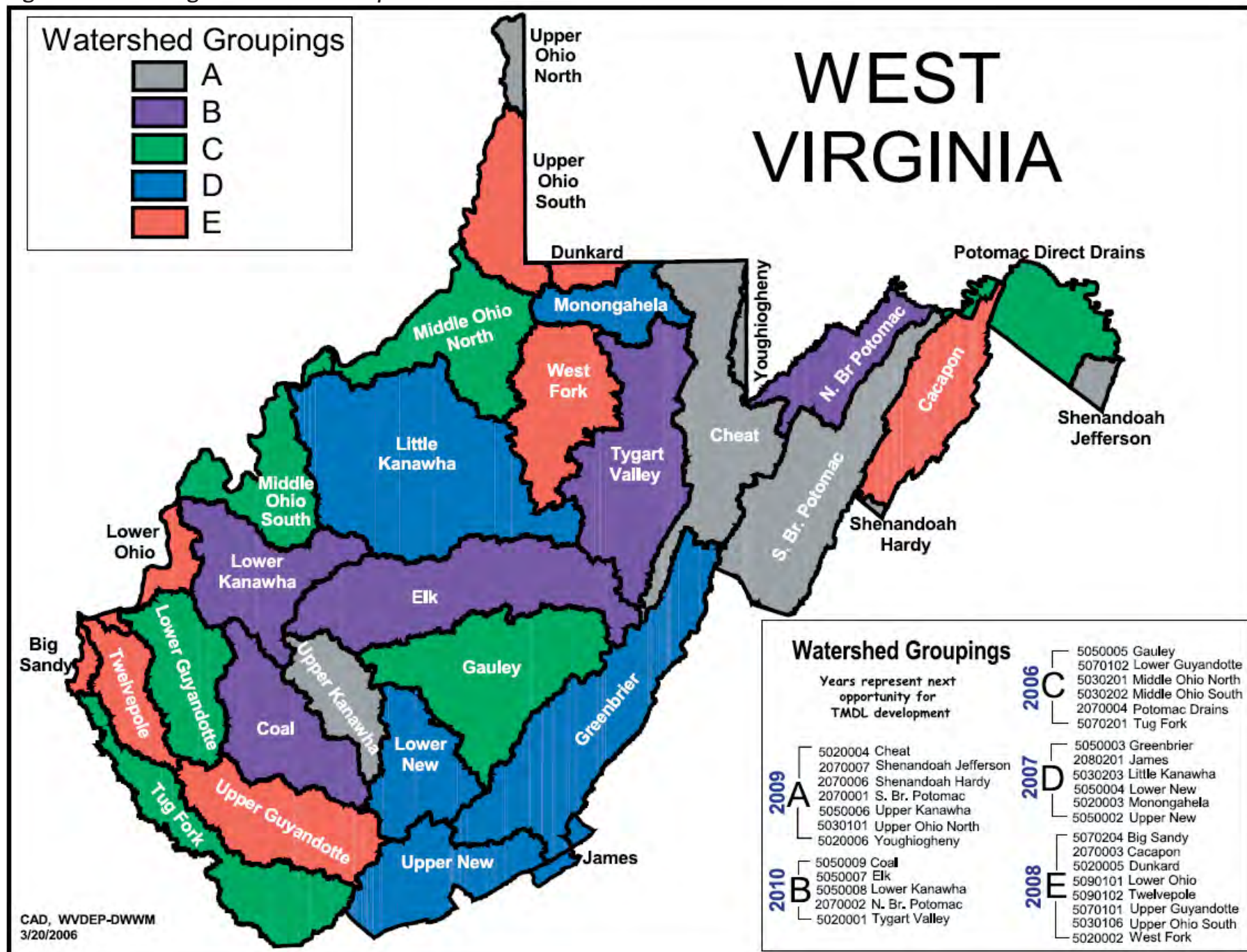
The federal Clean Water Act contains several sections requiring reporting on the quality of a state's waters. Section 305(b) requires a comprehensive biennial report and Section 303(d) requires, from time to time, a list of waters for which effluent limitations or other controls are not sufficient to meet water quality standards (impaired waters). In its regulations implementing Section 303(d), the U.S. Environmental Protection Agency (EPA) has defined "time-to-time" to mean April 1 of every even numbered year.

This document is intended to fulfill West Virginia's requirements for listing impaired waters under Section 303(d) of the Clean Water Act and the Water Quality Planning and Management Regulations, 40CFR130.7. In addition to the list of impaired waters, it explains the data evaluated in the preparation of the list and methodology used to identify impaired waterbodies. Information is provided that allows the tracking of previously listed waters that are not contained on the 2006 list. EPA has recommended that the 2006 requirements be accomplished in a single report that combines the comprehensive Section 305(b) report on water quality and the Section 303(d) List of waters that are not meeting water quality standards. The suggested format of this "Integrated Report" includes provisions for states to place their waters in one of the five categories described below:

- 💧 Category 1 – fully supporting all designated uses
- 💧 Category 2 – fully supporting some designated uses, but no or insufficient information exists to assess the other designated uses
- 💧 Category 3 – insufficient or no information exists to determine if any of the uses are being met
- 💧 Category 4 – waters that are impaired or threatened but do not need a Total Maximum Daily Load (TMDL)
 - 💧 Category 4a – waters that already have an approved TMDL but are still not meeting standards
 - 💧 Category 4b – waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses
 - 💧 Category 4c – waters that have been determined to be impaired, but not by a pollutant
- 💧 Category 5 – waters that have been assessed as impaired and are expected to need a TMDL

This Integrated Report is the combination of the 2006 Section 303(d) List and the 2006 Section 305(b) report. This report includes data collected and analyzed up to June 30, 2005, from the state's 32 major watersheds (Figure 1) by the Department of Environmental Protection's (DEP's) Watershed Branch and other federal, state, private and nonprofit organizations. Waters that are included on the 2006 Section 303(d) List are placed in Category 5 of this report.

Figure 1 – West Virginia Watershed Map



Section 2 – West Virginia Water Quality Standards

Water quality standards are the backbone of the 303(d) and 305(b) processes of the federal Clean Water Act. Instream data are compared with water quality standards to determine the use attainment status of streams and lakes. In West Virginia, the water quality standards are codified as 47CSR2 – Legislative Rules of the Department of Environmental Protection – Requirements Governing Water Quality Standards, and at 60CSR5 – Legislative Rules of the Department of Environmental Protection – Antidegradation Implementation Procedures. Impairment assessments conducted for the draft West Virginia 2006 303(d) List are based upon water quality standards that have received the EPA approval and are currently considered effective for Clean Water Act purposes.

A waterbody is considered impaired if it violates water quality standards or does not meet its designated uses. It is then placed on the 303(d) List and scheduled for TMDL development. Use attainment is determined by the comparison of the instream values of various water quality parameters to the numeric or narrative criteria specified for the designated use (See the Assessment Methodology section for more information on use attainment determination).

Some examples of designated uses are water contact recreation, propagation and maintenance of fish and other aquatic life, and public water supply. Designated uses are described in detail in Section 6.2 of 47CSR2 and are summarized in Table 1. Each of the designated uses has associated criteria that describe specific conditions that must be met to ensure that the water can support that use. For example, the “propagation and maintenance of fish and other aquatic life” use requires that the pH remain within the range of 6.0 to 9.0 standard units at all times. This is an example of a numeric criterion. Numeric criteria are provided in Appendix E of the water quality standards.

Numeric criteria consist of a concentration value, exposure duration and an allowable exceedance frequency. The water quality standards prescribe numeric criteria for the “propagation of fish and other aquatic life” use in two forms: acute criteria that are designed to prevent lethality, and chronic criteria that prevent retardation of growth and reproduction. The numeric criteria for acute aquatic life protection are specified as one-hour average concentrations that are not to be exceeded more than once in a three-year period. The criteria for chronic aquatic life protection are specified as four-day average concentrations that are not to be exceeded more than once in a three-year period. The exposure time criterion for human health protection is unspecified but there are no allowable exceedances.

Water quality criteria also can be written in a narrative form. For example, the water quality standards contain a provision that states that wastes, present in any waters of the state, shall not adversely alter the integrity of the waters or cause significant adverse impact to the chemical, physical, hydrologic, or biological components of aquatic ecosystems. Narrative criteria are contained in Section 3 of 47CSR2. More information regarding the use of narrative criteria for the 2006 Section 303(d) List is contained in Section 5 under the discussions of decision criteria for biological impairment data and fish consumption advisories.

Recent water quality standards revisions relative to manganese and dissolved aluminum have altered the impairment decisions reflected in the West Virginia 2004 Section 303(d) List. On June 29, 2005, EPA approved a revision that alters the zone of applicability of the manganese water quality criterion for the public water supply designated use. The criterion is now applicable only in the five-mile zone upstream of known public or

Table 1 – West Virginia Designated Uses

Category	Use Subcategory	Use Category	Description
A	Public Water	Human Health	Waters, which, after conventional treatment, are used for human consumption.
B1	Warm Water Fishery	Aquatic Life	Propagation and maintenance of fish and other aquatic life in streams or stream segments that contain populations composed of all warm water aquatic life.
B2	Trout Waters	Aquatic Life	Propagation and maintenance of fish and other aquatic life in streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.
B4	Wetlands	Aquatic Life	Propagation and maintenance of fish and other aquatic life in wetlands. Wetlands generally include swamps, marshes, bogs and similar areas.
C	Water Contact Recreation	Human Health	Swimming, fishing, water skiing and certain types of pleasure boating such as sailing in very small craft and outboard motor boats.
D1	Irrigation	All Other	All stream segments used for irrigation.
D2	Livestock Watering	All Other	All stream segments used for livestock watering.
D3	Wildlife	All Other	All stream segments and wetlands used by wildlife.
E1	Water Transport	All Other	All stream segments modified for water transport and having permanently maintained navigation aides.
E2	Cooling Water	All Other	All stream segments having one or more users for industrial cooling.
E3	Power Production	All Other	All stream segments extending from a point 500 feet upstream from the intake to a point one-half mile below the wastewater discharge point.
E4	Industrial	All Other	All stream segments with one or more industrial users. It does not include water for cooling.

private water supply intakes used for human consumption. On January 9, 2006, EPA approved a revision that suspended the 0.087 mg/l chronic aquatic life dissolved aluminum criterion for warmwater fisheries, and replaced it with a 0.750 mg/l criterion.

The manganese revision necessitated DEP's identification of intakes and re-evaluation of prior impairment decisions. DEP secured the Bureau for Public Health's database of water supply intakes and determined locations where surface waters are currently used for human consumption. Based upon the intake location, five-mile distances were delineated in an upstream direction along watercourses to determine streams within the zone of applicability of the criterion. DEP then assessed compliance with the criterion by reviewing available information from streams within the zone.

The revised aluminum criteria are effective for Clean Water Act purposes; assessments of warmwater streams pursuant to dissolved aluminum are based on the 0.750 mg/l criterion. Trout water aluminum assessments are based on the applicable 0.087 mg/l criterion. The 2006 Section 303(d) List includes 26 waters, comprising 272 stream miles, that are impaired pursuant to the new dissolved aluminum criteria.

Ohio River Criteria

For the Ohio River, both the Ohio River Valley Water Sanitation Commission (ORSANCO) and West Virginia water quality criteria were considered, as agreed upon in the ORSANCO compact. Where both ORSANCO and West Virginia standards contain a criterion for a particular parameter, instream values were compared against the more stringent criterion. The DEP supports ORSANCO's efforts to promote consistent decisions by the various jurisdictions with authority to develop 305(b) reports and 303(d) lists for the Ohio River.



DEP's Mike Whitman sampling
Kings Creek in Hancock County.
Photo by Joe Cochran

Section 3 – Surface Water Monitoring and Assessment

This section describes West Virginia's strategy to monitor and assess the surface waters of the state. The DEP's Division of Water and Waste Management (DWWM) collects most of the state's water quality data. The Watershed Branch of DWWM is responsible for general water quality monitoring and watershed assessment. The remainder of this section describes the monitoring and assessments according to waterbody type.

Streams and Rivers

West Virginia has a comprehensive strategy for monitoring the flowing waters of the state, by far the most prevalent surface waterbody type in the state. The Watershed Branch utilizes a tiered approach, collecting data from long-term monitoring stations, targeted sites within watersheds on a rotating basin schedule, randomly selected sites, and sites chosen to further define impaired stream segments in support of TMDL development. The following paragraphs present these approaches in further detail.

The ambient water quality monitoring network

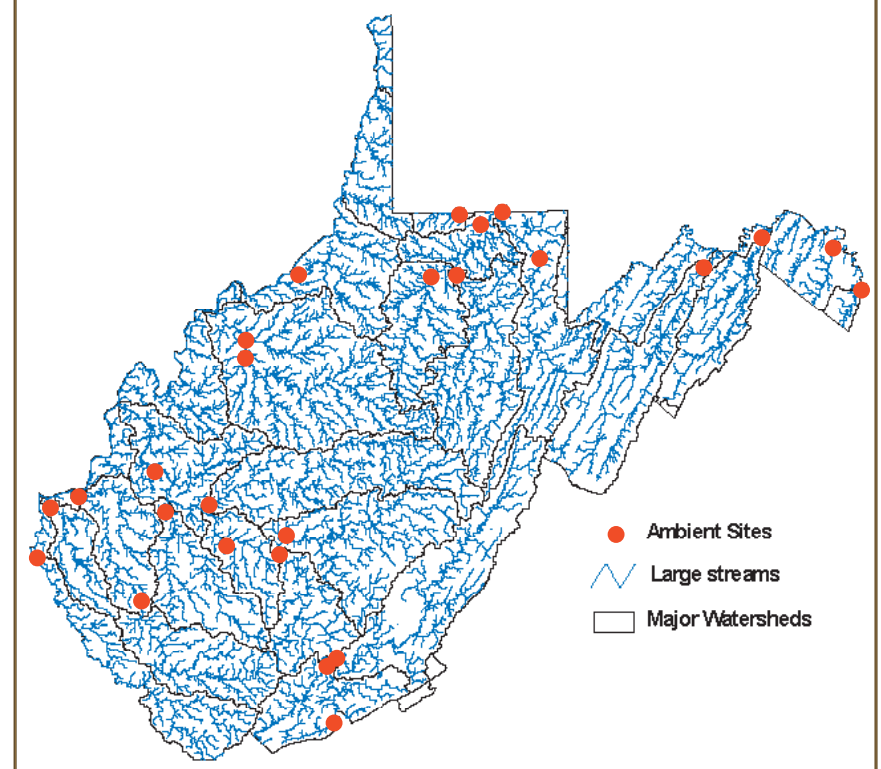
The ambient water quality monitoring network concept was established in the early 1960s. The network currently consists of 26 fixed stations that, starting in 2006, are sampled bi-monthly. Sampling stations are located at the mouths of the state's larger rivers and additional sites are situated to isolate the impacts from major industrial complexes and other potential sources of impairment. The data provides information for trend analyses, general water quality assessments and pollutant loading calculations, and allows water resources managers to quickly gauge the health of the state's major waterways.

Probabilistic (random) sampling

Probabilistic sampling began in 1997. This program utilizes sites that are selected randomly by EPA's facility in Corvallis, Ore. The data collected at these sites can be subjected to statistical analysis to provide an overall characterization of a watershed. This analysis can then be used to predict the probability of a condition occurring within a watershed. The initial probabilistic sampling cycle, which concluded in 2001, was conducted in accordance with the five-year framework cycle. Thirty sites were sampled within each watershed. A second round of probabilistic sampling, initiated in 2002, modified the framework cycle to a statewide approach. The objective for the second round is to collect 30 samples from each watershed over a five-year period (six sites are collected from each watershed annually). Importantly, at the end of the five-year cycle, each of the state's major watersheds will continue to be independently characterizable.

This departure from the framework cycle minimizes the effects of extreme conditions, such as periodic droughts and flooding and allows for

Figure 2 – West Virginia's Ambient Monitoring Sites



annual updates of statewide stream conditions. Data collection protocols are similar to those applied to watershed assessment sampling. However, probabilistic sampling includes more rigorous water quality and habitat analysis. In addition to benthos, periphyton is also collected for biological community analysis.

Targeted sampling

Targeted sampling has been a component of West Virginia's assessment toolbox since the Watershed Assessment Program's inception in late 1995.

Streams are sampled according to a five-year rotating basin approach. Sites are selected from the watersheds targeted for each particular year. Each site is subjected to a one-time evaluation of riparian and instream habitat, basic water quality parameters, and benthic macroinvertebrate and periphyton communities.

Sites are selected to meet a variety of the stakeholders' needs and include the following classifications:

- 💧 Impaired streams
- 💧 Reference (minimally impacted) streams
- 💧 Spatial trends (multiple sites on streams exceeding 15 miles in length)
- 💧 Areas of concern as identified by the public and stakeholders
- 💧 Previously unassessed streams

Pre-TMDL development sampling

As DEP started the process to assume TMDL development responsibility from EPA, the need for more and newer data in developing useful TMDLs was obvious. The objective of this effort is to collect sufficient data for TMDL modelers to develop stream restoration plans. Pre-TMDL sampling follows the framework cycle, i.e., impaired streams from watersheds in hydrologic group A will be sampled in the same year as the targeted sampling.

The 303(d) List is the basis for initial site selection and additional sites are added to allow identification of the suspected sources of impairment. Benthic macroinvertebrate sampling is conducted in 303(d) listed streams having aquatic life impairments. Assessment of water quality impaired streams is more intensive and consists of monthly sampling for parameters of concern. This method captures data under a broad variety of weather conditions and flow regimes. Pre-TMDL sampling also includes an effort to locate the specific sources of impairment, with particular attention to identify non-point land use stressors as well as any permitted facilities that may not be meeting their requirements. For more information, see TMDL Development Process – Section 10.

Biological Indicators

Benthic macroinvertebrates are collected from riffle substrate in wadeable streams and identified to genus level. This assemblage of aquatic life organisms provides a direct means of assessing the aquatic life use support and can be collected and identified cost effectively. It has the advantage over one-time water quality samples in that the benthic community is affected by and provides indications of past water quality conditions. The DEP currently uses the West Virginia Stream Condition Index, a family-level multimetric index developed specifically for use in West Virginia. This is the primary means of assessing attainment of the aquatic life use. The DEP is working in cooperation with EPA to develop a genus level index and a predictive model.

Citizen monitoring

The fourth stream assessment project is the West Virginia Save Our Streams volunteer monitoring program. Initiated in 1989, this program encourages citizens to become involved in the improvement and protection of the state's streams. The focus is largely on nonpoint source pollution abatement. Save Our Streams has two objectives. First, it provides the state with enhanced ability to monitor and protect its surface waters through increased water quality and benthos data collection. Second, it improves water quality through educational outreach to the state's citizens. After citizens are actively involved in stream monitoring and restoration activities, they can initiate improvement projects within their own watersheds. Training workshops are conducted annually to provide quality assurance. A recent improvement in data accessibility for the program has been the development of an online Volunteer Assessment Database. As an example of the functions of the new database, volunteer stream reports are now available online at <http://www.wvdep.org/dwwm/wvsos/vad/index.htm>. Volunteer monitors can register on the database and enter their own data online, or continue to submit the information to the coordinator for a quality assurance review. The coordinator also is the database administrator, and has tools to verify the quality of the information before it is approved. The database is available for public viewing without registration. In addition, the program prepares an annual "State of Our Streams" report.

Lakes and Reservoirs

West Virginia does not make a distinction between lakes and reservoirs. By state definition, a publicly owned lake is any lake, reservoir, or pond that meets the definition of "waters of the state," is owned by a government agency or public utility, and is managed as a recreational resource for the general public.

The DEP conducted lake water quality assessments from 1989 through 1996. This program was funded by the federal Clean Lakes Program, which was phased out in 1995. With additional financial support being provided to enhance state's monitoring strategies, DEP is adding a lake monitoring component in 2006. This program will initially focus on water quality, collecting field parameters (dissolved oxygen, pH, temperature, and conductivity), nutrient data, clarity, and Chlorophyll A. Multiple sites per lake will be sampled and will include profile data for temperature and dissolved oxygen.

Many of West Virginia's largest reservoirs are controlled by the U.S. Army Corps of Engineers. Although the Corps' primary mission is to manage structures to provide navigation and flood control, the agency also is committed to water quality management. Data generated by the Corps has been used for assessment purposes.



Plum Orchard Lake
in Fayette County.
Photo by Jason Morgan

Additional lake information is available from the West Virginia Division of Natural Resources (DNR). The DNR, one of the signatory agencies in the Partnership for Statewide Watershed Management, conducts fish community surveys on many of the state's reservoirs.

Wetlands

There are no water quality assessments currently being conducted for West Virginia's wetlands. The DNR has pursued funding to develop a standard data collection and analysis protocol that incorporates water and soil quality, habitat, and biological measures. Personnel from DEP and DNR are participating in the Mid-Atlantic Wetlands Workgroup to gain insight from existing programs in surrounding states.

Table 2 – Current and Future Monitoring Activities

💧 26 Ambient sites will be monitored bi-monthly from July 2005 through June 2007
💧 A third round of probabilistic monitoring will begin in the spring of 2007. The second round of sampling was completed in June 2006. The specifics of the framework for the upcoming effort are under development.
💧 TMDL development for Group E – 242 sites were sampled from July 2005 through June 2006. (Fifteen sites from the Twelvepole Watershed, 75 sites from the Dunkard Creek Watershed, and 152 sites from the Upper Ohio River Watershed)
💧 TMDL development for Group A – 24 sites from the Youghiogheny River Watershed were sampled from July 2005 through June 2006 and 207 sites will be sampled from the Cheat River Watershed from July 2006 through June 2007. Another 111 sources of acidic mine discharges have been identified in the Cheat Watershed and will be sampled under varying conditions.
💧 Group E Targeted Sampling – 257 targeted sites on 146 streams were sampled.
💧 Group A Targeted Sampling – Approximately 200 sites will be sampled during the 2006 summer sampling season.
💧 Lakes – Ten lakes within Group A will be sampled four times during the 2006 growing season (May through October) and Group B Lakes will be sampled in 2007.

Section 4 – Data Management

Assessed Data

All readily available data was used during the evaluation process. The agency sought water quality information from various state and federal agencies, colleges and universities, private individuals, businesses, organizations and others. News releases and public notices were published in state newspapers and letters were sent to state colleges and universities soliciting data for the list. Specific requests for data were made to state and federal agencies known by DEP to be generators of water quality data. Table 3 identifies the entities that contributed water quality data. DEP's staff reviewed data from external sources to ensure that collection and analytical methods, quality assurance and quality control and method detection levels were consistent with approved procedures.

Table 3 – Data Providers for the 2006 303(d) List and Integrated Report

Massey Energy Co. - Green Valley	Massey Energy Co. - Peerless Eagle	USDA Forest Service
Mettiki Coal Corp. - Short Creek Coal	PC West Virginia Synthetic	Buckhannon River Watershed Association
Alpha Coal and Coastal Coal	Massey Energy Co. - Alex Energy	United States Army Corps of Engineers
Allegheny Energy Supply	Indian Ridge Watershed	United States Geological Survey
West Virginia Wesleyan College	Koppers, Inc.	United States Environmental Protection Agency
Friends of the Cacapon River	National Park Service	West Virginia Department of Environmental Protection
Friends of Deckers Creek	Penn Virginia Operating Company, LLC	West Virginia Division of Natural Resources
Guardians of West Fork Watershed	Plateau Action Network	West Virginia Department of Agriculture
Heizer/Manila Watershed Organization	Tetra Tech, Inc.	Massey Energy Co. - New Land Leasing Co.
Orchard Coal Company - Beckley	ORSANCO	Cacapon Institute

Analytical methodology is normally limited to the procedures contained in the federal regulations of 40CFR136. In limited instances, where 40CFR136 does not include sampling or analytical techniques for a particular pollutant, or where 40CFR136 techniques cannot effectively characterize water quality, results obtained from alternative, scientifically-defensible analytical methodologies have been accepted. Although it is a primary consideration in the evaluation of the acceptability of monitoring results, monitoring and analysis pursuant to 40CFR136 approved methods is not mandated for Section 303(d) or 305(b) processes. 40CFR136 does not always contain approved methods for parameters with water quality criteria. In such instances, monitoring and analysis under other scientifically valid methodologies may be appropriate. For example, “free cyanide” is commonly required in NPDES permits to be analyzed by the method for weak acid dissociable cyanide contained in “Standard Methods;” water

quality data is similarly qualified. In other scenarios, 40CFR136 methods may not provide the analytical sensitivity necessary for assessment, and data from alternative scientifically defensible methodologies may be accepted.

Assessment decisions are made using the most accurate and recent data available to the agency. For the stream quality assessment, DEP generally used water quality data generated between July 2000 and June 2005. The use of data more than five years old is intentionally limited. In the absence of new information, previous assessments are carried forward even if the data becomes older than five years. Additionally, if a water quality criteria change is approved which affects an older assessment the new assessment will only reflect the current criteria.

Waters are not deemed impaired based upon water quality data collected when stream flow conditions are less than 7Q10 flow (the seven consecutive day average low flow that recurs at a 10-year interval) or within regulatory mixing zones. Waters are not deemed impaired based upon “not-detected” analytical results from methodologies that have detection limits not sensitive enough to confirm criteria compliance.

Water Analysis Database – WapBase

DEP has generated the majority of the available water quality data. Currently all targeted, probabilistic, and pre-TMDL development monitoring data is contained in an in-house database (WapBase). WapBase houses most of the water quality, habitat, watershed characteristics, macroinvertebrate data (both raw data and calculated metrics) and supporting information collected by DEP’s Watershed Assessment Section.

External Data Providers

Data submitted from sources outside of the Watershed Assessment Section were considered in the development of this report, including data from other DEP programs. The data providers table is on the previous page.

Once data was submitted, DEP performed the following:

- 💧 Determined data quality and quantity
- 💧 Formatted data for evaluation
- 💧 Determined stream codes and mile points (sample site locations)
- 💧 Used qualified data from external sources to make assessment decisions

Section 5 – Use Assessment Procedures

The primary focus of the Integrated Report is to assess water quality information and determine if the designated uses of state waters are supported. After use assessment, waters are placed into one of five categories as described in the introduction. Section 5 first describes the various protocols used to determine use impairment and place waters on the Section 303(d) List. It then describes the protocols to categorize the remaining waters where uses have not been determined to be impaired. If a water has any impaired use, it is placed in Category 5. Other waters may be placed in Category 1, 2, or 3, depending upon the available water quality data.



Sediment causes problems for aquatic life and overall stream health.
Photo by Mike Ong

Listing Decision for Numeric Water Quality Criteria

The EPA's most recent guidance for assessment and listing encourages decision criteria commensurate with the implementation provisions of a state's water quality standards, such as the concentration value, exposure duration and allowable exceedance frequency as described in the Water Quality Standards section. Previously, EPA has encouraged 303(d) listing decisions relative to numeric water quality criteria to be based primarily upon the frequency of exceedance of the numeric criteria and the "10-percent rule." Usually, if more than 10 percent of the observed values exceeded the concentration value of an applicable numeric criterion, then the water was considered impaired and placed on the 303(d) List.

Typically, if an ample data set exists and exceedances of chronic aquatic life protection and/or human health protection criteria occur more than 10 percent of the time, the water is considered to be impaired. If the rate of exceedance demonstrated is less than or equal to 10 percent, then the water is considered to be meeting the designated use under evaluation. Ample data sets are defined as sets with 20 or more distinct observations. If fewer than 20 samples per station or representative area exist and three

or more values exceed a criterion value, then the water also is considered to be impaired. For this scenario (three observed violations), if additional non-exceeding monitoring results were available that would increase the data set size to 20 observations, a greater than 10 percent exceedance frequency would still exist.

Under West Virginia Water Quality Standards, acute aquatic life protection criteria have associated exposure durations of one hour and may be exceeded once every three years. The normal practice of "grab-sampling" ambient waters is generally consistent with the one-hour exposure duration specified in the standards. Therefore, a direct application of the allowable exceedance frequency provided in the standards is made when assessing impairment relative to acute aquatic life protection criteria. If two or more exceedances of acute criteria are observed in any three-year period, the water is considered to be impaired.

If the data being evaluated is generated as part of a comprehensive network being monitored for a specific purpose, the data may be assigned a higher level of assessment quality, and the “10-percent rule” may be applied with confidence to data sets containing less than 20 observations per station. The primary example of an intensified monitoring program that generates higher assessment quality data is that which is conducted by DEP to support TMDL development. The pre-TMDL monitoring format includes flow measurement and monthly water quality monitoring for one year at multiple locations throughout a watershed. Information is generated over a range of stream flow conditions and in all seasons. Habitat assessment and biological monitoring is performed in conjunction with water quality monitoring. The information generated under this format is among the most comprehensive available for assessing water quality. Upon conclusion of monitoring, it is then necessary for agency personnel to make a definitive judgment relative to impairment. In most instances, application of the “10-percent rule” to the pre-TMDL monitoring data sets result in the classification of waters as impaired if two or more exceedances of a criterion are demonstrated.

Table 4 summarizes the criteria used to make 303(d) impairment decisions relative to numeric water quality criteria.

Some streams have water quality data available at multiple locations. Segmentation of these streams is necessary to determine its impairments by applying the decision criteria to the available water quality data at each monitoring station. If available data at a particular station

Table 4 – Numeric Water Quality Decision Criteria for Listing of Impaired Waters

Water Quality Criteria	Impairment Thresholds	Exceptions
Acute Aquatic Life Protection (Use Category B)	The water is impaired if two exceedances of acute aquatic life protection numeric criteria occur within any three-year period.	If, in the most recent three-year period, no exceedances of criteria are evidenced and at least 12 monitoring results are available, then the water is not considered impaired.
Chronic Aquatic Life Protection (Use Category B) Human Health Protection (Use Categories A and C)	<p>The water is impaired if a greater than 10% frequency of exceedance is demonstrated in an ample dataset (20 or more available observations).</p> <p>The water is impaired if three exceedances of criteria occur with less than 20 available monitoring results.</p> <p>The water is impaired if a greater than 10% frequency of exceedance is demonstrated with less than 20 available observations, if the data being evaluated is of high assessment quality (> two violations)</p>	If, for waters with regularly scheduled monitoring, in the most recent two-year period, no exceedances of criteria are evidenced and at least eight (8) observations are available, then the water is not considered impaired.

indicates impairment, the water is considered impaired both upstream and downstream until a station with available data indicates a nonimpaired condition. In limited circumstances, deviation from that segmentation approach occurred through the application of professional judgment. Most cases of deviation involved an abundance of water quality information at multiple locations in a waterbody, where DEP determined that an integrated

whole waterbody approach resulted in a more representative assessment of existing conditions. Other cases involved targeted or incidental monitoring of a specific streamflow condition at certain locations in a waterbody, and a lack of monitoring of that condition at other locations. DEP determined that water quality results from the monitored site would similarly exist at unmonitored locations, rather than labeling some sections impaired and others “supporting” based upon strict adherence to the segmentation procedure.

DEP does not intend to interpret the impacts of a single pollution event as representative of the current condition of a water if it is known that the problems have been abated. Similarly, the DEP does not intend to interpret the results of clustered monitoring of a single event as being representative of water quality conditions for longer time periods. Data sets are screened for excessive clustering of monitoring, in space or time, to avoid misinterpretation.

The decision of whether to place a waterbody on the 303(d) List must be driven by sound science whether the decision is based on a review of water quality monitoring data or on values obtained from sophisticated water quality modeling efforts. The Clean Water Act recognizes both types of assessment as valid and appropriate. Certain waters are included on the 2006 303(d) List based upon modeling results associated with TMDL development. All such waters are currently in the final stages of TMDL development and modeling of their baseline condition indicates that pollutant reductions from existing sources are needed to ensure compliance with water quality criteria. In the majority of cases, water quality monitoring and predictive modeling reach consistent conclusions regarding the impairment status of waterbodies. In other cases, monitoring data may not be available, may not have been obtained at critical conditions or locations, or may not reflect the conditions that would exist if point sources were discharging at their permit limits.

Evaluation of the results of predictive modeling is mandated by 40CFR130.7(b)(5)(ii) and the prediction of impairment through modeling is validated by applicable federal guidance for 303(d) listing. Where predictive modeling indicates that discharge in accordance with existing permit limits would cause violation of water quality criteria, the designated use of the water quality may be classified as “threatened,” thereby subjecting it to 303(d) listing and TMDL development pursuant to 40CFR130.7(b)(5).

Evaluation of Fecal Coliform Numeric Criteria

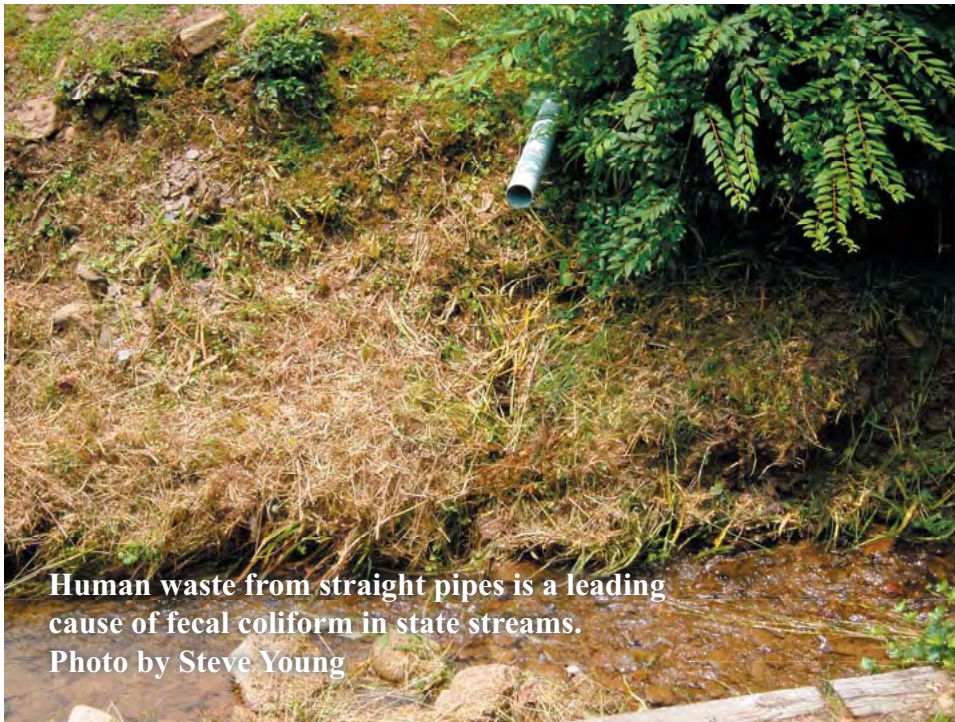
Fecal coliform assessments were based on the previously described decision criteria for numeric water quality criteria. Given the complexity of this particular criteria, most assessments are performed by comparing observations to the “maximum daily” criterion value of 400 counts/100ml. Evaluation of the monthly geometric mean fecal coliform criterion (200 counts/100ml) occurs only where five or more individual sample results are available within a calendar month.

Numeric fecal coliform water quality criteria are applicable to the Water Contact Recreation and Public Water Supply designated uses. Section 8.12 of Appendix E of the West Virginia Water Quality Standards states:

Maximum allowable level of fecal coliform content for Primary Contact Recreation shall not exceed 200/100ml as a monthly geometric mean based on not less than five samples per month; nor to exceed 400/100ml in more than 10 percent of all samples taken during the month.

A practical difficulty exists in accurate assessment of criteria compliance due to the resource commitment that would be necessary to perform monitoring at a sufficient frequency to make determinations using the geometric mean criteria, since the monthly geometric mean criterion is conditioned upon the availability of at least five distinct sample results in a month. The “maximum daily” criterion is not conditioned by a minimum sample set requirement, but practical use of the apparent 10 percent exceedance allowance would involve at least 10 samples per month.

The most frequent and regular fecal coliform water quality monitoring conducted by the Watershed Assessment Section is once per month. That monitoring frequency precludes assessment of the monthly geometric mean criterion and hampers accurate assessment of the maximum daily criterion. Due to limited resources, more frequent fecal coliform monitoring could only be accomplished by significantly reducing the number of West Virginia streams and/or stations where water quality assessments are performed. The DEP does not consider that to be a reasonable alternative.



Human waste from straight pipes is a leading cause of fecal coliform in state streams.

Photo by Steve Young

The DEP uses the following protocols when making assessments relative to fecal coliform numeric criteria:

- 💧 No assessments are based upon the monthly geometric mean criterion (200 counts/100ml) unless an available data set includes monitoring at five per month or greater frequency. When data sets are available, the listing decision criteria for numeric water quality criteria are applied, considering each monthly geometric mean as an available monitoring result.

- 💧 The listing decision criteria are applied to the maximum daily criterion (400 counts/100ml) and available individual monitoring results, but without the monthly prejudice. For example, if twice per month monitoring is conducted for a year and two results in two separate months are greater than 400, the stream would be assessed as fully supporting (2/24 – 8.3 percent rate of exceedance) rather than insufficient data (two months per 12 months exceedance). If five samples per month monitoring is conducted for one year and four daily results greater than 400 are measured in four different months, the stream would be assessed as fully supporting (4/60 – 6.7 percent rate of exceedance) rather than

nonsupporting (four months per 12 months exceedance), provided that the monthly geometric means were below the 200 counts/100 ml criteria.

The decision criteria does not provide for 303(d) listing of waters with severely limited data sets and exceedance (i.e., one sample in a five-year period > 400 counts/100ml). Such waters would be classified as having insufficient data available for use assessment. DEP will target these “fecal one-hit” waters for additional monitoring by incorporating them into the pre-TMDL monitoring plans at the next opportunity for TMDL development in their watershed. Where the intensified pre-TMDL monitoring (monthly sampling for one year) indicates impairment, TMDL development will be immediately initiated, even though the water may not be included in Category 5 of the current Integrated Report.

Evaluation of pH Numeric Water Quality Criteria Data

For the 2006 303(d) List, the DEP evaluated all recent (July 2000 – June 2005) pH water quality data under the previously described listing criteria requirements for numeric water quality criteria. Waters were identified as impaired for pH if the data exceeded listing requirements criteria or if the water was previously listed and insufficient new data were available to reassess the water. The impaired lengths of certain streams were adjusted to recognize ongoing limestone treatment operations that have resulted in the attainment of the pH criterion in the treated segments.

Narrative Water Quality Criteria – Biological Impairment Data

The narrative water quality criterion of 46CSR1 – 3.2.i. prohibits the presence of wastes in state waters that cause or contribute to significant adverse impact to the chemical, physical, hydrologic and biological components of aquatic ecosystems. Streams are listed as biologically impaired based on a survey of their benthic macroinvertebrate community. Benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams of West Virginia. The West Virginia Stream Condition Index (WVSCI) is composed of six metrics that were selected to maximize discrimination between streams with known impairments and reference streams. Streams with WVSCI scores of less than 60.6 are considered biologically impaired and included on the 303(d) List. Benthic macroinvertebrates are collected with a 500 mm mesh rectangular dip net. The kick sample is collected from the 1.0 m² area of substrate. Identifications are completed for a 200-organism subsample. The WVSCI was developed from data using these methods. Streams are listed as being biologically impaired only if the data was comparable (i.e., collected utilizing the same methods used to develop the WVSCI, adequate flow in riffle/run habitat, and within the current index period of April through October).

Streams with low biological scores are listed as having an unknown source/cause of impairment on the 303(d) List and most are listed, by default, for their entire length. It is doubtful that the entire length of every stream is impaired, but without further data, the exact length of impairment is unknown. Each listed stream will be revisited prior to TMDL development. The additional assessments performed in the pre-TMDL monitoring effort will better define the impaired length. The causative stressor(s) of the impairment and the contributing sources of pollution also will be identified during the TMDL development process. If the stressor identification process demonstrates that the biological impairment is not caused by a pollutant, then no TMDL will be developed.

Certain biologically impaired streams have been evaluated but they were not immediately placed on the 303(d) List or in Category 5. The impairment source for these streams has been linked to a pollutant for which a TMDL has already been developed. An example scenario would be a low biological score on a stream that has a TMDL developed for mine drainage. If the pollutant reductions specified by the TMDL are achieved, the biological community would likely restore itself. In these cases, after careful evaluation, the stream was not listed or placed in Category 5 because the full implementation of an existing TMDL is expected to correct the problem. If implementation of the TMDL resolves the pollutant specific impairment but biological scores remain low, then the biological impairment would be listed and the stream would return to Category 5.

Narrative Water Quality Criteria – Fish Consumption Advisories

The narrative water quality criterion of 47CSR2 – 3.2.e prohibits the presence of materials in concentrations that are harmful, hazardous or toxic to man, animal or aquatic life in state waters. Fish consumption advisories are used to inform the public about potential health risks associated with eating fish from West Virginia's streams. The DEP, DNR, and the Bureau for Public Health have collaborated on fish contamination issues since the 1980s; however, an executive order by the governor in 2000 mandated a formal collaborative process to issue fish consumption advisories. Fish

consumption advisories are developed and issued in accordance with an interagency agreement. In the absence of specific body-burden criteria, the presence of contaminants in fish tissue in amounts equivalent to a two meal per month advisory is considered sufficient evidence of impairment.

Risk-based principles are used to determine whether fish consumption advisories are necessary. These advisories are used as a public education tool to help citizens make informed decisions about eating fish caught in state streams. The risk-based approach estimates the probability of adverse health effects and provides a statement on the health risk facing the angler and high-risk groups including women of childbearing age and children. West Virginia's fish consumption advisories include guidelines on the number of meals to eat and information on proper fish preparation to further minimize risk.

There are currently waterbody-specific fish consumption advisories on 13 state streams and two lakes for a variety of fish species and contaminants. Additionally, there is a general statewide advisory that recommends limiting the consumption of certain sport-caught fish from all West Virginia waters in relation to low-level mercury and/or polychlorinated biphenyl (PCB) contamination. The statewide advisory provides species-specific recommendations ranging from one meal per week to one meal per month.

The listing of waters based on fish consumption advisories is strongly supported by EPA. For PCBs, waters are considered impaired if at least one monitoring result for tissue from a commonly consumed species exceeds the two meal per month advisory trigger. In regard to mercury, West Virginia water quality standards contain a numeric body-burden criterion for methylmercury in fish tissue. The criterion for protection of public water supply and water contact recreation designated uses is 0.5 µg/g. In the Ohio River, the applicable ORSANCO body-burden criterion is 0.3 µg/g. Fish tissue mercury impairment decisions are based upon a direct comparison of available observations to the body-burden criteria.

Categorization of Nonimpaired Waters

The following paragraphs describe protocols used to determine use support and to place waters in either Category 1, 2, or 3.

Use support

Stream segments that support **all** of the designated uses are placed in Category 1. This section describes the guidelines used by the DEP to demonstrate use-support for each of the designated uses.

Not all parameters with applicable numeric criteria must be monitored to determine use support. A supporting assessment is made if certain mandatory parameters have been monitored and those results demonstrate compliance with criteria. If monitoring results are available for "non-mandatory" parameters, they also must indicate compliance with the criteria for those parameters if a fully supporting assessment is made. For limited data sets (less than 20 samples per station), no criteria exceedances can be evident. If 20 samples per station or more are available, then compliance would be determined by application of the listing criteria (i.e., less than 10 percent exceedance rate for chronic aquatic life and human health criteria, less than two violations of acute criteria in a three-year period, no violations in the most recent two- or three-year period, as applicable).

Category B (aquatic life) designated uses

For this use to be supported, biomonitoring must have been performed and results must show a WVSCI score > 68.0. Also, there must not be any exceedance of any other aquatic life protection water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more).

The WVSCI methodology can be applied only to wadeable streams. Most nonwadeable streams are part of the Ambient Water Quality Monitoring Network and are sampled quarterly for a variety of pollutant parameters. If no exceedance of listing criteria (for aquatic life criteria) is demonstrated and no other information demonstrates adverse impact to aquatic ecosystems, then the aquatic life use is considered supported.

Category A (public water supply) and C (contact recreation) designated uses

For these uses to be supported, at least one fecal coliform monitoring result less than 400 counts/100ml must be available. Also, there must not be any exceedance of any other human health protection water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more) for the uses to be supported.

Category D (agriculture and wildlife) and E (water supply industrial, water transport, cooling and power) designated uses

For these uses to be supported, pH and dissolved oxygen must have been monitored and results must indicate compliance with criteria. Also, there must not be any exceedance of any other Category D and E water quality criteria (less than 20 samples per station) or any exceedance of listing criteria (20 samples per station or more).

Insufficient data and not assessed

Stream segments without sufficient data to determine use support or impairment may be placed in either Category 2 or 3. Category 2 houses waters with some uses determined to be supported, but lacking sufficient information to assess other uses. Waters are placed in Category 3 if insufficient or no information exists to determine if any of the uses are being met.

The use is not assessed when there is some water quality data available, but not enough to conclude that the use is fully supporting or not supporting. The following situations produce an insufficient data designation:

- 💧 Instream monitoring results demonstrated criteria exceedances, but at a frequency insufficient to deem the use impaired (see Table 4)
- 💧 Water quality data is available for some parameters but is not available for mandatory parameters
- 💧 Biological assessment returned a gray result (WVSCI score between 60.6 and 68.0)

A use is not assessed if a stream has not been sampled within the last 15 years for any parameter that has an applicable water quality criteria for the use being evaluated.

Section 6 – Assessment Results

This section contains the results from all the data that has been assessed for West Virginia waterbodies. Table 5 shows a summary of the classification of West Virginia waters under the five “Integrated Report” categories (see page 5). The results reveal that 30% of West Virginia’s stream miles are in either Category 1 or 2 (fully supporting all or some assessed uses). Category 3, streams with no data available, makes up 39% of stream miles, the largest percentage of the five categories. However, that number is somewhat deceiving. The streams with no data are typically small unnamed tributaries, which usually contribute to the larger waterbodies which have been assessed. All major waterways in the state, such as the Kanawha, Monongahela and Little Kanawha rivers, have data and have been assessed and placed into one of the other four categories. Fewer than one-third of West Virginia’s streams are impaired and fall into either Category 4 or 5.

Since the lists of Category 1, Category 2 and Category 3 waters are quite large, they have not been published with this report but can be viewed on the DEP’s Web site, www.wvdep.org (type in Category in the “search DEP”). Hard copies of Category 1, 2 and/or 3 lists can be obtained by contacting agency personnel at (304) 926-0495 (TTY/TDD (304) 926-0489). Category 4 and 5 waterbodies are included as supplements, located in back of this document.

Category 5 includes 1,131 impaired stream segments, covering approximately 6,595 stream miles, as identified on West Virginia’s 2006 Section 303(d) List. This number has increased from 6,315 miles of impaired streams identified on the 2004 list. The rise is largely due to an increase in the DEP’s monitoring of known or suspected impaired waters. This monitoring was performed in support of TMDL development. EPA approval of in-process TMDLs in the Coal, North Branch Potomac and Lower Kanawha watersheds is anticipated in September 2006 and will result in the transfer of approximately 185 impaired streams in Supplement B-1 from Category 5 to Category 4.

Table 6 contains a detailed breakdown of use support specific to the use categories for West Virginia waters as set forth in the Water Quality Standards (47CSR2).

Table 5 – 2006 Category Summary Report for West Virginia

LAKES					
Type	CATEGORY	# of lakes	% lakes	acres	% acres
Lake	1	28	23	1257	6
Lake	2	40	33	3860	19
Lake	3	33	28	32	0
Lake	4a	8	7	177	1
Lake	5	11	9	15036	74
	TOTAL	120	100	20363	100
STREAMS					
Type	CATEGORY	# of stream segments	% stream segments	miles of streams	% miles
Stream	1	719	7	2237	7
Stream	2	1771	16	6813	23
Stream	3	6613	61	11658	39
Stream	4a	655	6	2758	9
Stream	4b	2	0	2	0
Stream	4c	39	0	44	0
Stream	5	1131	10	6595	22
	TOTAL	10930	100	30107	100

Table 6 – West Virginia Individual Use Support Summary

LAKES																		
Designated Use	Number of Lakes	Size (acres)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Acres	%	#	%	Acres	%	#	%	Acres	%	#	%	Acres	%
A - Public Water	120	20363	28	23	1257	6	42	35	6530	32	34	28	102	1	16	13	12473	61
B1 - Warm Water Fishery	101	15024	27	27	1267	8	27	27	6101	41	39	39	7478	50	8	8	177	1
B2 - Troutwater	19	5339	12	63	1014	19	5	26	125	2	2	11	4200	79	0	0	0	0
C - Contact Recreation	120	20363	66	55	4068	20	2	2	1049	5	40	33	201	1	12	10	15044	74
D - Agriculture and Wildlife	120	20363	66	55	4068	20	5	4	4439	22	48	40	11847	58	1	1	8	<1
E -Industrial	120	20363	66	55	4068	20	5	4	4439	22	48	40	11847	58	1	1	8	<1
Total	120	20363																
STREAMS																		
Designated Use	Number of Stream Segments	Size (miles)	Fully Supporting				Insufficient Data				Not Assessed				Not Supporting			
			#	%	Miles	%	#	%	Miles	%	#	%	Miles	%	#	%	Miles	%
A - Public Water	10930	30109	1329	12	4594	15	1727	16	7423	25	6615	61	11660	39	1259	12	6431	21
B1 - Warm Water Fishery	10346	26538	1023	10	3126	12	1354	13	5555	21	6529	63	11447	43	1440	14	6410	24
B2 - Troutwater	584	3571	213	36	1105	31	156	27	1358	38	94	16	238	7	121	21	870	24
C - Contact Recreation	10930	30109	1718	16	6176	21	1648	15	7020	23	6636	61	11697	39	928	8	5215	17
D - Agriculture and Wildlife	10930	30109	3427	31	15143	50	379	3	1454	5	6657	61	11767	39	467	4	1745	6
E -Industrial	10930	30109	3427	31	15143	50	379	3	1454	5	6657	61	11767	39	467	4	1745	6
Total	10930	30109																

The most common impairments of West Virginia waters are:

- 💧 Exceedance of numeric water quality criteria for pollutants associated with mine drainage (low pH, and high concentration of iron aluminum and/or manganese)
- 💧 Bacterial contamination evidenced by exceedance of numeric water quality criteria for fecal coliform
- 💧 Low pH associated with acid rain, and
- 💧 Biological impairment, as determined through application of the West Virginia Stream Condition Index

The above impairments are prevalent on the 2006 West Virginia Section 303(d) list. The list and the summary results of Tables 4 and 5 provide an overview of the impairment status of West Virginia waters. An alternative mechanism for assessing general status and the relative impacts of various causes and sources is provided by DEP's Probabilistic Monitoring Program. The program and assessment results are described in the Section 7 – Probabilistic Monitoring Program and Data Summary.



Orange water typically indicates the stream violates iron standards.
Photo by Rob Row in Mingo County

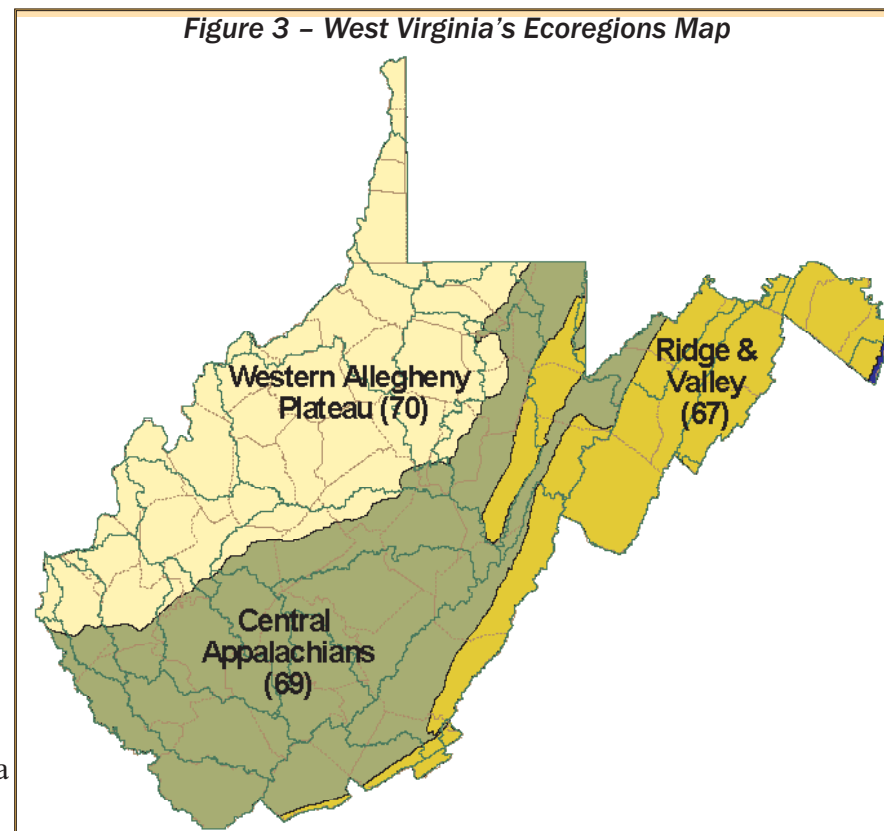
Section 7 – Probabilistic Monitoring Program and Data Summary

The goal of any probabilistic program is to provide statistically unbiased estimates of stream conditions throughout a particular region (i.e., watershed, ecoregion or state) without actually sampling every single stream mile in that region. This approach can be used to describe various aspects of stream conditions including: the proportion of stream miles with biological impairment, proportion of stream miles with specific water quality criteria violations, and characterize the relative importance of stressors such as sedimentation or acid precipitation. The current probabilistic design is stratified to ensure adequate coverage across all watersheds and allows the state to characterize overall water quality conditions at the watershed (USGS 8-digit HUC) level in addition to providing statewide estimates of condition.

In 2006, West Virginia will be completing its second five-year cycle using a sample design that provides data from 750 sites from wadeable streams statewide. The target population for this effort was small to medium sized (1-4th order) wadeable streams. Ninety-eight percent of West Virginia's stream miles are of this size class and ~ 70% of these are wadeable. This level of effort allows for good estimations of conditions across the state with a high degree of confidence. The sites are spread across 25 watersheds and watershed groupings (some small watersheds are combined with adjacent ones) and allow estimates of conditions at this scale, but with lesser confidence. Six sites are sampled in each of the 25 watersheds each year, resulting in 30 samples per watershed at the end of the five-year design.

While this design does allow for watershed level characterizations following the completion of the cycle, describing these estimates for the more broad classification of Level 3 Ecoregions reduces the uncertainties around the different estimates of condition. Results for the first three years (2002-2004) of the current effort have been summarized for this report and are described in terms of ecoregions.

With these improvements in DEP's probabilistic sample design, problems develop in trying to compare one data set with the other. The first five-year cycle included more of the larger order streams, which was a result of both the fact that the original target universe included up to fifth order streams and the fact that several watersheds were sampled in drought years that forced assessments into the larger streams because they were the only ones with flows adequate to sample. These differences in approach are most evident when looking at stream characteristics that would be expected to have an upstream/downstream gradient. For example, sedimentation problems often are not evident in headwater streams because the slope of these streams is such that sand and silt do not settle out until it reaches the slower, flatter sections. By sampling a higher percentage of headwater streams, it might be expected to see a lower percentage of stream miles with sediment impacts.

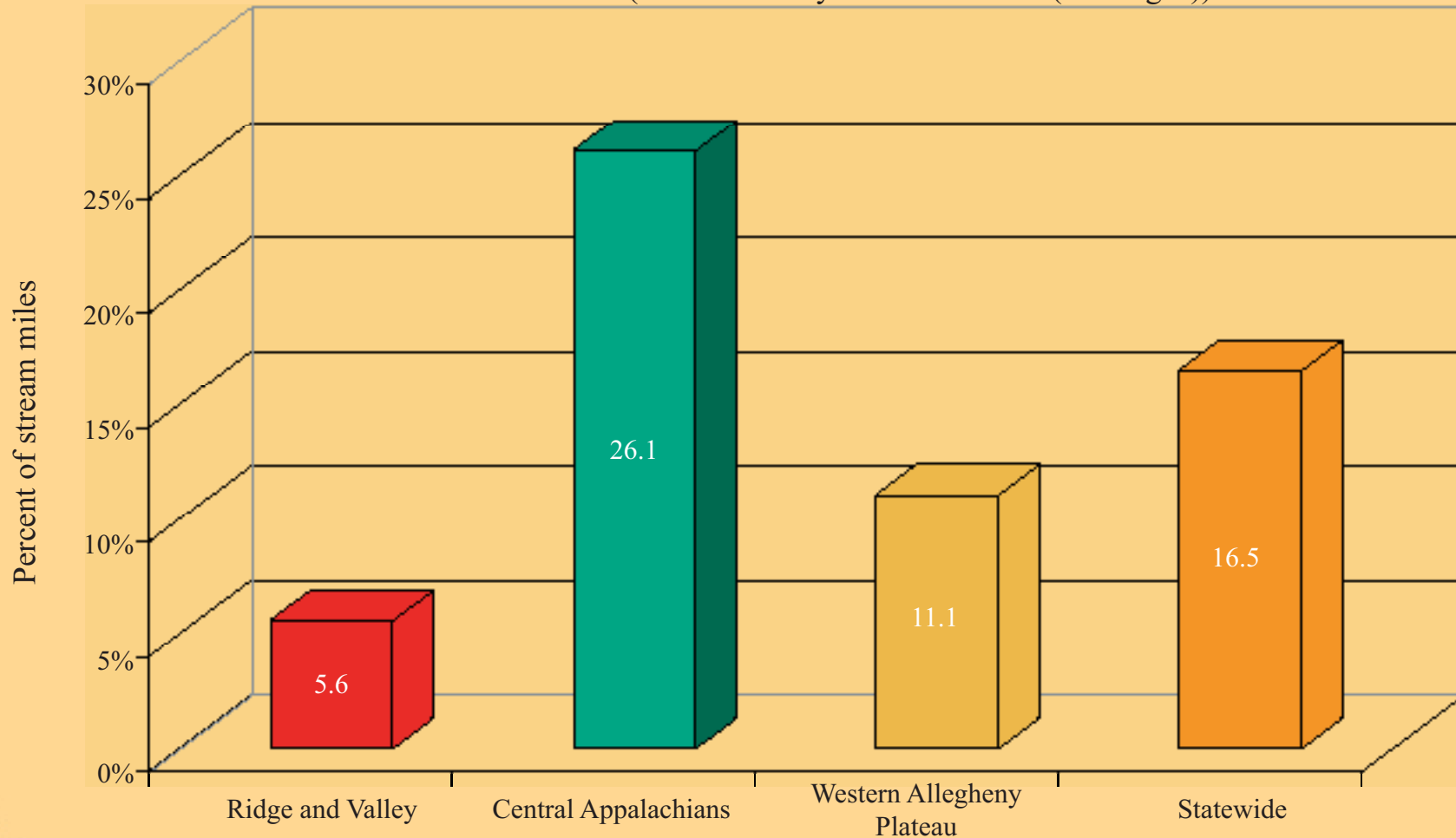


Mine Drainage

Streams impacted by mine drainage may be impaired by low pH and/or elevated concentrations of metals, including iron, aluminum, and manganese. Other dissolved ions such as sulfate may also be present in concentrations above ambient levels. A sulfate concentration greater than 50 mg/L was used to identify probabilistic sites influenced by mine drainage. Following this guideline, approximately 16.5% of the stream miles statewide are influenced by mine drainage (Figure 4). Observed on an ecoregional basis, mine drainage influences a greater proportion of stream miles in the coal rich Central Appalachians (Ecoregion 69) than in the Ridge and Valley (Ecoregion 67) or Western Allegheny Plateau (Ecoregion 70). About 26.1% of the stream miles in the Central Appalachians are influenced by mine drainage. In contrast, about 5.6% and 11.1% of stream miles are influenced by mine drainage in the Ridge and Valley and Western Allegheny Plateau, respectively.

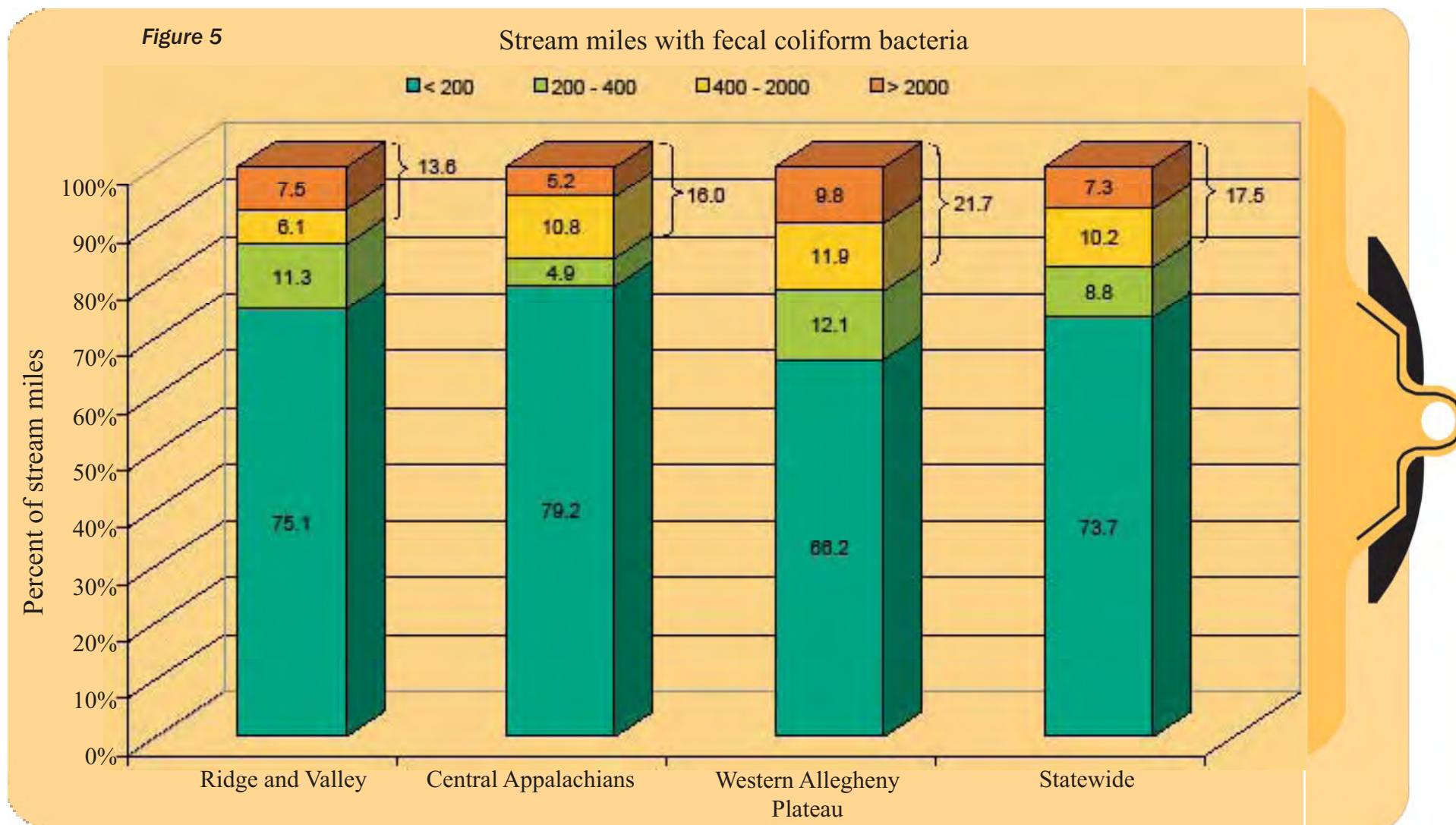
Figure 4

Percent of stream miles influenced by mine drainage
(as indicated by elevated sulfate (> 50mg/L))



Bacterial Contamination

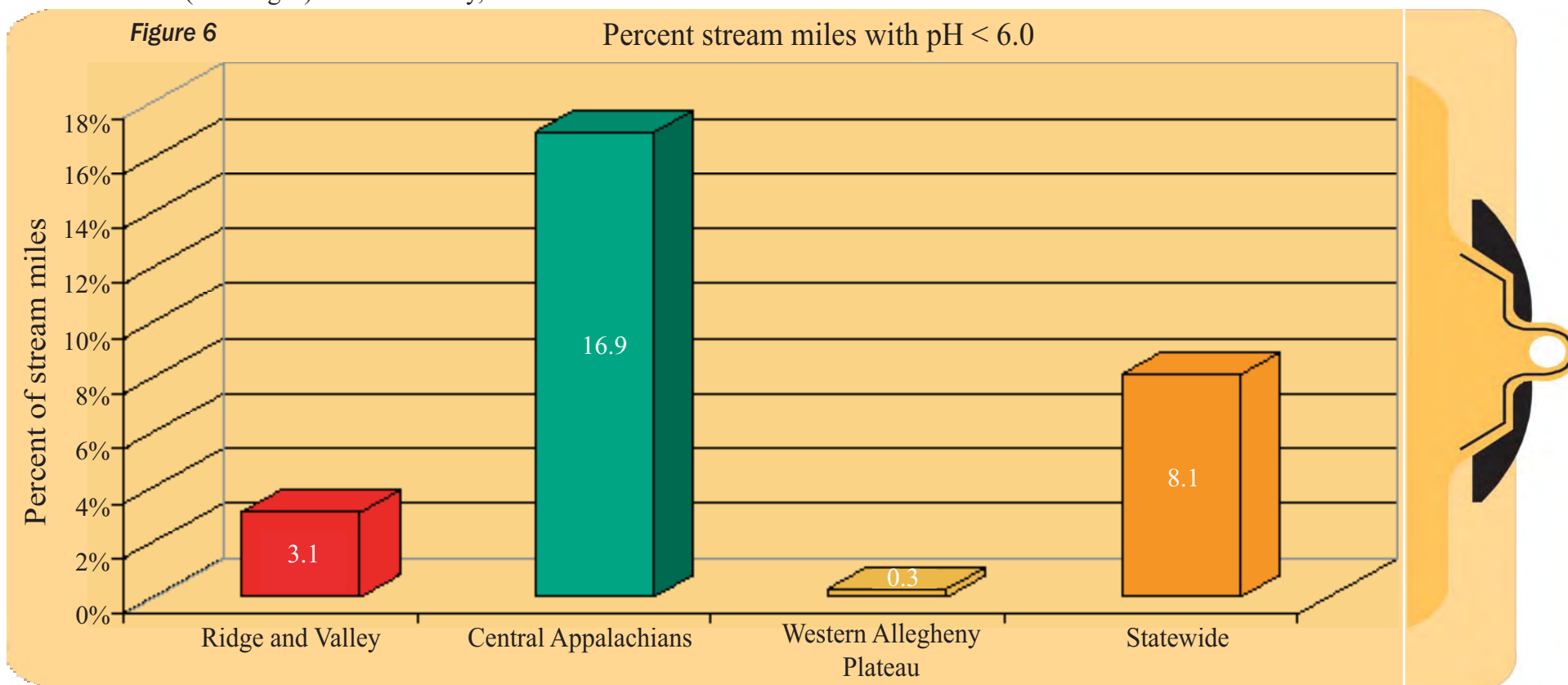
Many West Virginia waters contain elevated levels of fecal coliform bacteria. Contributors to the problem include leaking or overflowing sewage collection systems, illegal homeowner sewage discharges by straight pipes or failing septic systems, and runoff from urban or residential areas and agricultural lands. Based on probabilistic data, about 17.5% of stream miles in the state have fecal coliform bacteria levels that violate the criterion of greater than 400 colonies/100mL (Figure 5). In general, watersheds in the more developed regions of the state had a greater proportion of stream miles violating the criterion. The proportion of stream miles violating the criterion was highest in the Western Allegheny Plateau ecoregion (21.7% of stream miles) and progressively decreased in the Central Appalachians (16.0% of stream miles) and the Ridge and Valley ecoregions (13.6% of stream miles).



Acidity

The aquatic life communities in the headwater sections of many West Virginia waters continue to be impacted by acidic water. The impairment is most prevalent in watersheds with soils of low buffering capacity and most often caused by acid precipitation and less often (but more severely) by acid mine drainage. An evaluation of probabilistic data indicates that approximately 8.1% of the stream miles in the state have pH values below 6.0 (Figure 6). Most of the stream miles identified as impacted by acidic waters are in the Central Appalachians ecoregion, representing 16.9% of the stream miles within this area). Specifically, the Forested Hills and Mountains section of this ecoregion are largely susceptible to acid deposition impacts due to infertile soils and resistant sandstones of the Pottsville group. The Ridge and Valley ecoregion is less susceptible to the impacts of acid deposition with geologic materials such as limestone, shale, and sandstone providing more buffering capacity to neutralize acids. Nonetheless, probabilistic data indicates that approximately 3.1% of the stream miles in this ecoregion are impacted by acidic conditions. There are almost no stream miles with impacts attributed to acidic conditions in the Western Allegheny Plateau ecoregion. Again, this ecoregion has well buffered soils that limit the impacts of acid precipitation.

It is interesting to note that these descriptions, which are based solely on the percentage of stream miles with low pH (< 6), match up very closely with those calculated for the 2004 Integrated Report for Acid Deposition, which were determined by counting sites with low alkalinity (< 10 mg/l) and low sulfates (< 10 mg/L). Unfortunately, those calculations aren't available at this time for the newer data.

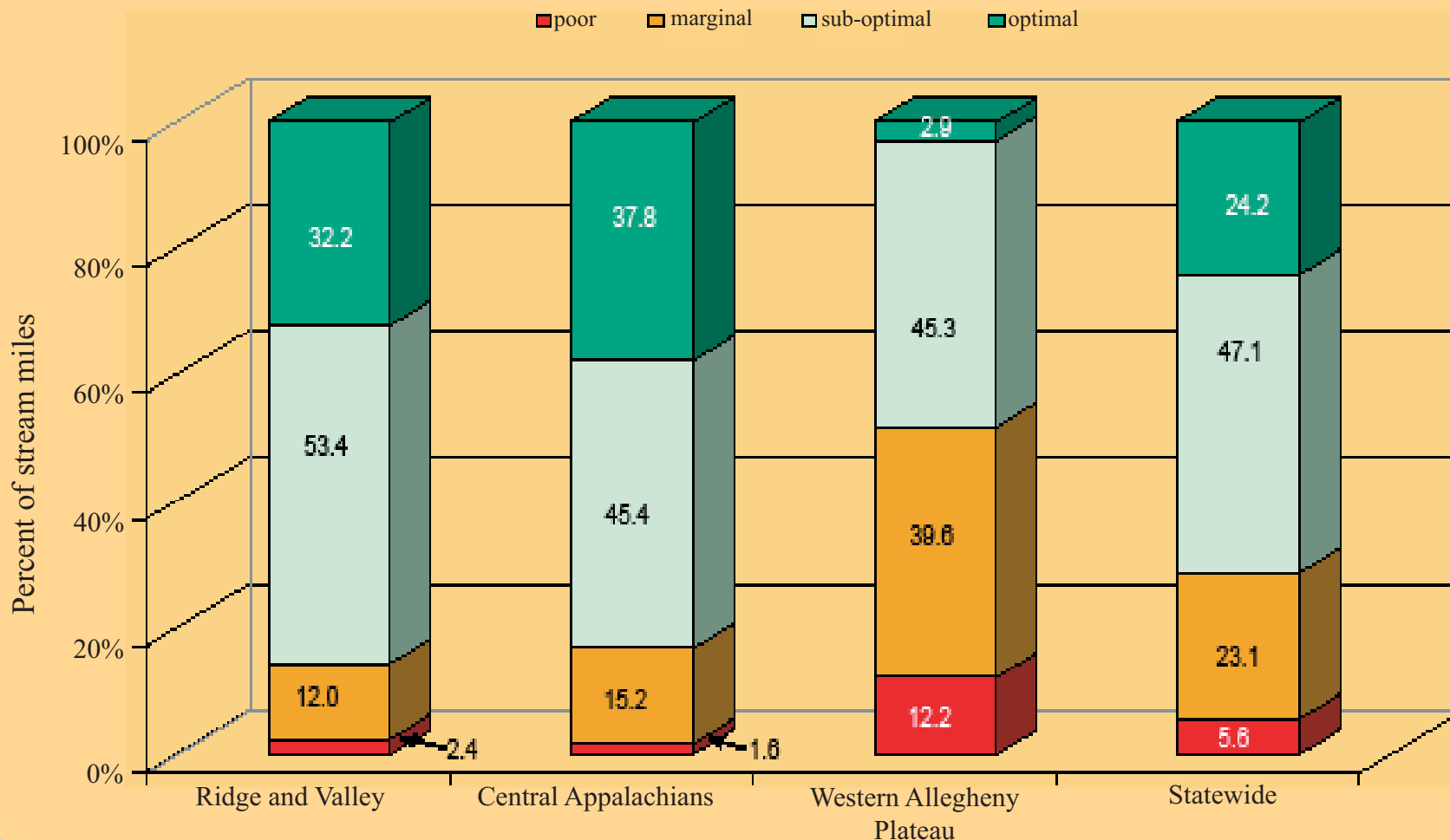


Habitat Quality

During the course of probabilistic sampling, DEP personnel collected data on many features of both riparian and instream habitat known to be important to the biological communities of streams. Habitat parameters in EPA's Rapid Bioassessment protocol were measured. These include measures of the amount of sediments and embeddedness in the stream channel as well as measures of the vegetation along the bank and riparian zone in the stream corridor. Specifically, 10 characteristics are scored (0-20) based on their quality and then combined to assess the overall physical habitat condition of the site. Overall quality is then categorized as optimal, suboptimal, marginal, or poor. Based on probabilistic data, about 24.2% of stream miles have optimal habitat quality (Total RBP score of 160 or greater), 47.1% of stream miles have suboptimal quality (130–159), 23.1% of stream miles have marginal quality (100-129), and 5.6% have poor stream habitat (< 100). This 2006 summary of the RBP habitat cannot be

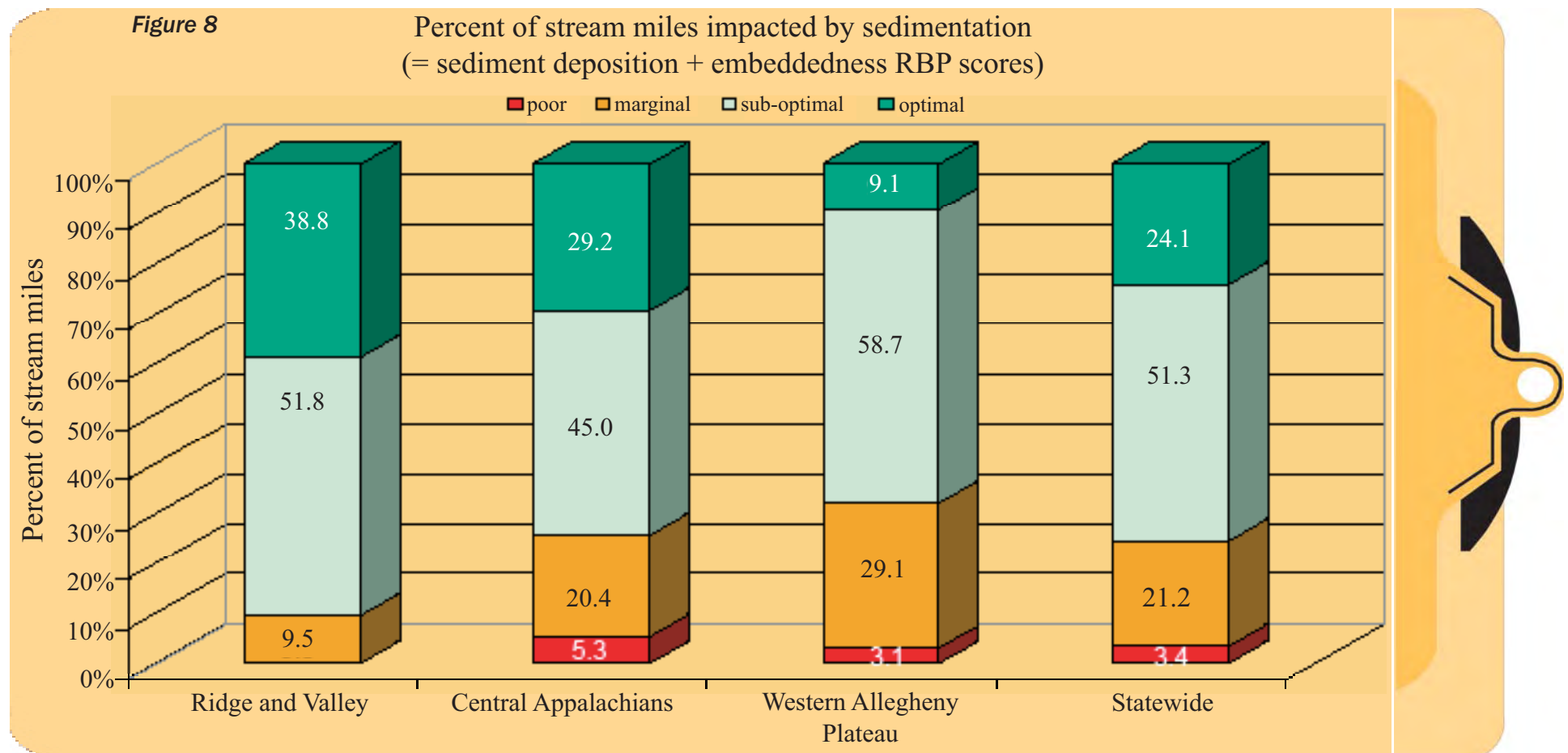
Figure 7

Percent of stream miles by habitat quality



directly compared to that in the 2004 Integrated Report, because of different thresholds. The category thresholds in the 2004 report were such that zero percent of the streams were described as having poor overall habitat. For this report, a site with an average score for each of the individual parameters of ‘marginal’ or less (10 or below) is considered ‘poor.’ In previous reports, in order to be considered poor, a site had to average less than marginal for each of the 10 parameters.

The Ridge and Valley and Central Appalachians ecoregions are similar with respect to overall habitat quality. More than 30% of stream miles in each of these ecoregions are of optimal quality and only about 15% are marginal or poor with respect to overall habitat quality. In comparison, habitat quality scores are lower in the Western Allegheny Plateau. The presence of more widespread development and factors such as higher rates of soil erosion in this ecoregion are potential causes for less than 3% of its stream miles being rated as optimal in overall habitat quality. Additionally, the proportion of stream miles (39.6%) with marginal habitat quality is substantially higher in this ecoregion. It is important to consider that the greatest proportion (more than 75%) of stream miles in the state are in the suboptimal or lower habitat categories. This indicates that most of the state’s stream miles have at least some degree of habitat degradation. (See Figure 7, page 30).



Although we may gain insight into overall habitat conditions by combining the individual measures, it is useful to examine specific habitat problems. Sedimentation of streams is one of the most important problems facing water resource protection agencies in West Virginia. Important sources of increased sedimentation include agricultural activities, mining, logging, oil/gas, roads, urban and suburban development, and removal of stream bank and riparian vegetation. The effects of sediment deposition on stream biota are well known and include interference with respiration and the smothering of physical habitat. In the course of evaluating probabilistic data, embeddedness and sediment deposition from EPA's RBP habitat evaluation were combined and used as an overall indicator of habitat quality as related to sedimentation. The categories used to rate overall habitat quality, were also used to rate sedimentation: optimal, suboptimal, marginal, or poor. Sedimentation results for the state as a whole indicate that 3.4% of stream miles are in poor condition, 21.2% stream miles are marginal, 51.3% of stream miles are suboptimal, and 24.1% of stream miles are in optimal condition (Figure 8). As with the overall habitat scores, the widespread impacts of sedimentation as a pollutant in West Virginia are apparent in that over 75% of the wadeable streams miles in the state score less than optimal.

Parallel to overall habitat quality, the Ridge and Valley and Central Appalachians ecoregions are similar with respect to sedimentation. In the Ridge and Valley ecoregion, about 34% of stream miles are in good condition and about 12.9% are in poor condition. Results for the Central Appalachians are similar with 36.1% of stream miles in good condition and 13.8% of stream miles in poor condition. It's interesting to note that in these ecoregions there are nearly as many stream miles in optimal condition as in marginal and poor condition combined. The Western Allegheny Plateau continued to show substantial problems with respect to habitat quality, especially in terms of sedimentation. In contrast to the Ridge and Valley and Central Appalachians, only about 9% of stream miles in this ecoregion are in optimal condition and approximately 32.1% of stream miles are in poor condition. If marginal and poor stream miles were combined for this ecoregion, nearly two-thirds (66.3%) of its stream miles would be categorized as having enough sediment to reduce habitat quality. The presence of more widespread development and higher rates of soil erosion in this ecoregion are potential causes of the observed increase in sedimentation and resultant decrease in habitat quality.

West Virginia Stream Condition Index or WVSCI

The WVSCI consists of six benthic community metrics combined into a single multimetric index. The WVSCI was developed using DEP and EPA data collected from riffle habitats in wadeable streams.

WVSCI Scoring Criteria

**> 68.0
Unimpaired**

**≥ 60.6 to 68
“Gray Zone”**

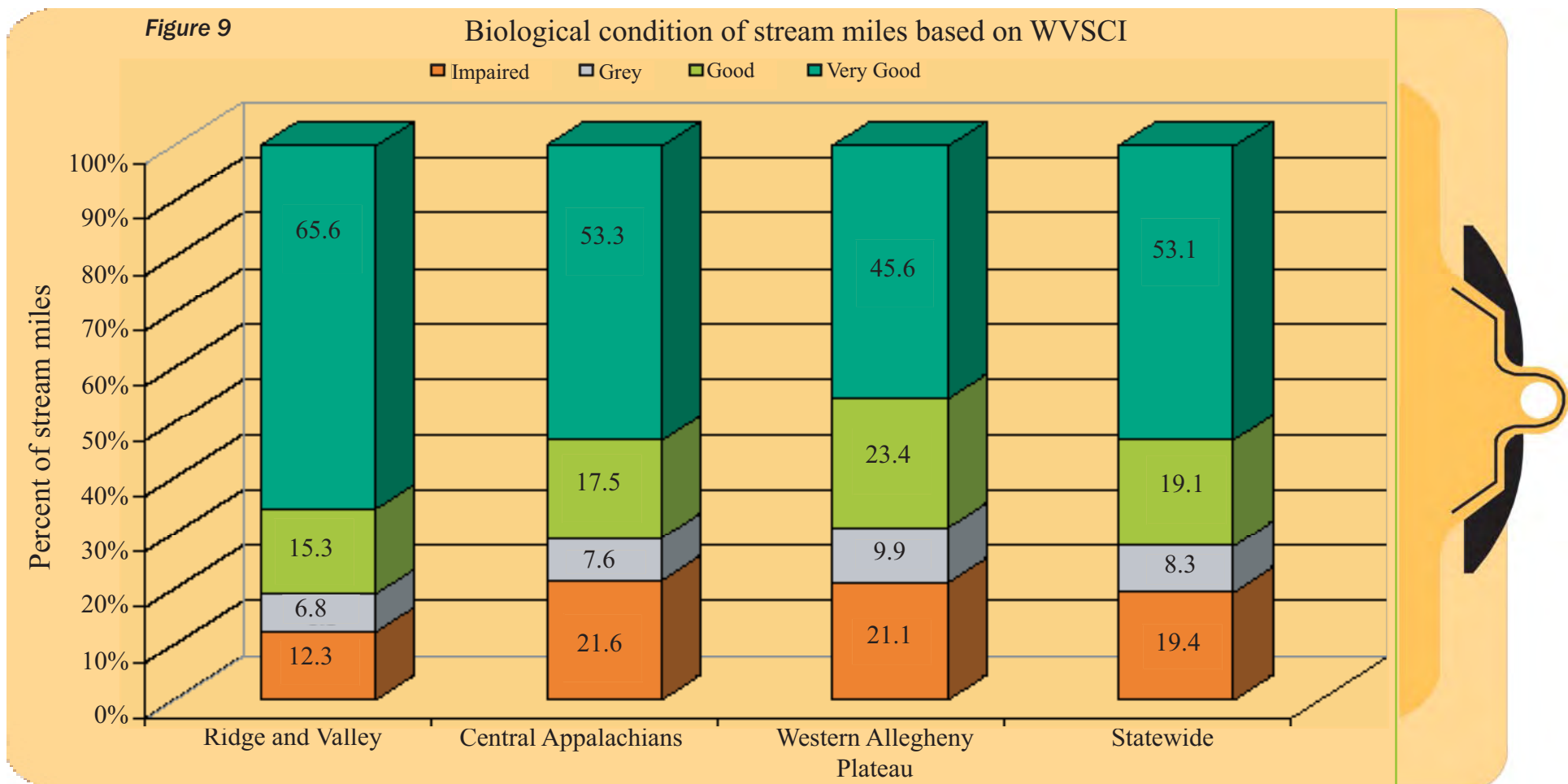
**< 60.6
Impaired**

In general terms, all metric values were converted to a standard 0 (worst) to 100 (best) point scale. The six standardized metric scores were then averaged for each benthic sample site to come up with a final index score ranging from 0.0 to 100.0. Using the distribution of scores from all sites that are considered reference sites, an impairment threshold of 68.0 was established. If a stream site received a WVSCI score greater than 68.0, it was considered to be unimpaired. Initially, a site that received a WVSCI score equal to or less than 68.0 was considered impaired. However, because the final WVSCI score can be affected by a number of factors (collector, micro-habitat variables, subsampling, etc.), agency personnel sampled sites in duplicate to determine the precision of the scoring.

Following an analysis of the duplicate data, agency personnel determined the precision estimate to be 7.4 WVSCI points for a single sample. The value (7.4) was then subtracted from the impaired threshold score of 68.0 and generated what is termed the “gray zone” that ranges from 60.6 to 68.0. If a site had a WVSCI score within the gray zone, a single kick sample was considered insufficient for classifying it as impaired. If a site received a WVSCI score less than 60.6, the agency was highly confident that the site was truly biologically impaired based on that benthic macroinvertebrate sample.

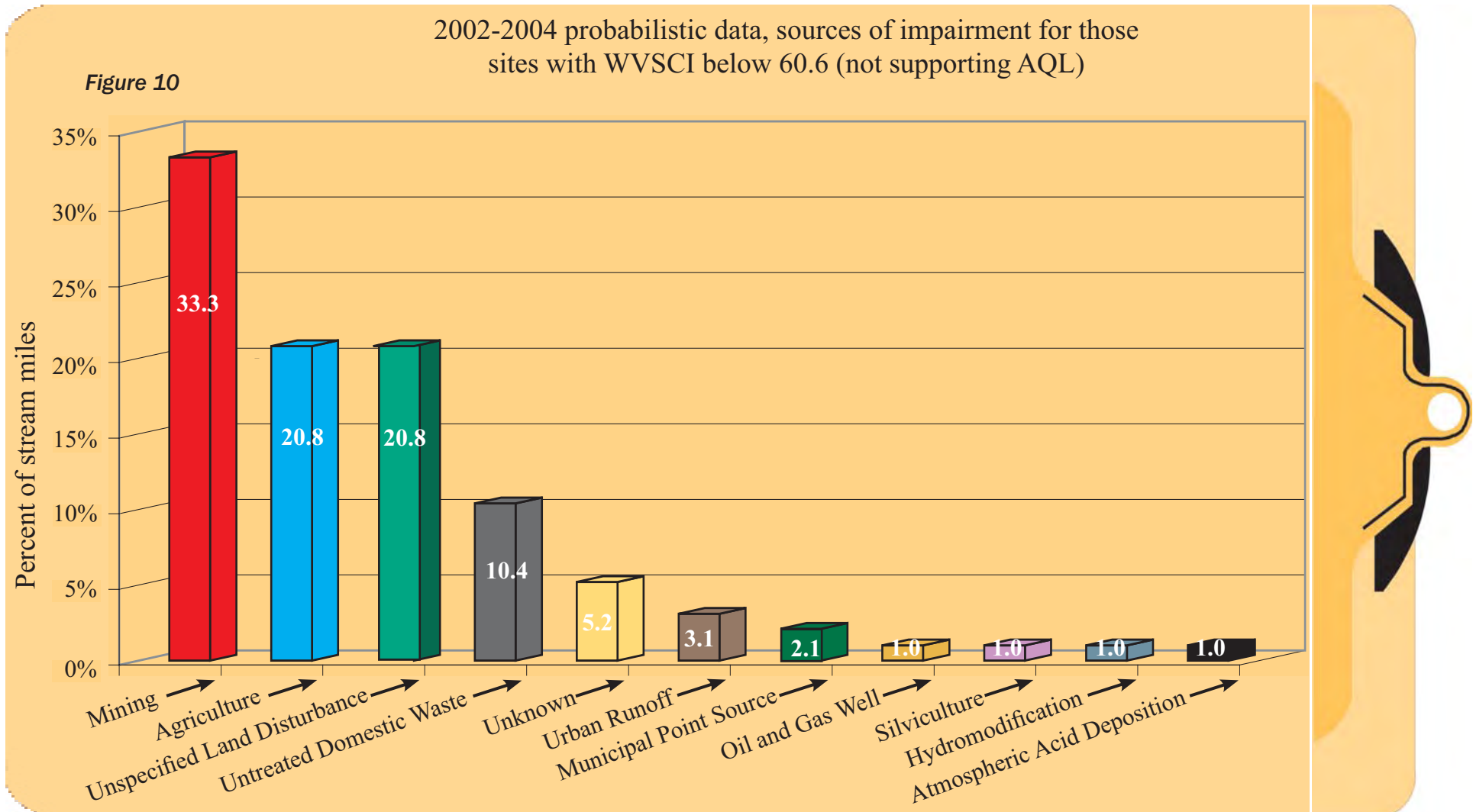
Biological Impairment

The biological communities living in West Virginia streams are exposed to many stressors, including toxic contaminants, sedimentation, nutrient enrichment, and acid precipitation. DEP uses benthic macroinvertebrates to assess the biological condition of streams in the state. These organisms can provide reliable information on water and habitat quality in streams. They are extremely diverse and exhibit a wide range of tolerances to pollutants. They serve as an excellent tool for measuring overall ecological health, especially when summarized into a single index of biological integrity. In West Virginia, the health of benthic macroinvertebrate communities are rated using a multimetric index developed for use in wadeable streams. The WVSCI is composed of six metrics (each measuring a different aspect of the community) that were selected to maximize discrimination between streams with known impairments and reference streams. Based on the WVSCI impairment threshold of 60.6 (0–100 scale), about 19.4 % of wadeable stream miles in the state are impaired, while approximately 72.2 % of stream miles are not impaired (Figure 9 -Random). Both the Western Allegheny Plateau and the Central Appalachians ecoregions had slightly higher percentages of stream miles rated as impaired (21.1% and 21.6% respectively).



Sources of Bio-impairment

The results of the 2002-2004 probabilistic sampling revealed that 96 out of 451 sites received a WVSCI score of 60.6 or less. Benthic macroinvertebrate communities that score within this range are considered impaired, and DEP would describe them as not supporting their aquatic life use designation. Eleven categories of major sources of biological impairment were determined using water chemistry analyses, narrative descriptions by sampling personnel, benthic community characteristics, and several Geographic Information System data layers depicting landuse activities. Each of the 96 sites was assigned a primary source of impairment from one of the 11 categories. For sites with possibly more than one source of impairment, the most obvious source was listed. Of the 96 bio-impaired sites, mining affected more than 33 percent. The next highest source of impairment is agriculture.



Section 8 –Major Basin Summaries

Guyandotte River

The Guyandotte River is divided into upper and lower sections. The confluence of Island Creek and the Guyandotte River defines the boundary between the Upper and Lower Guyandotte watersheds. The impairments of the Upper Guyandotte River mainstem (fecal coliform, total iron and biological impairment) and the Lower Guyandotte River mainstem (fecal coliform, total iron) are addressed by TMDLs developed by EPA Region III in 2004. In that effort, EPA also developed TMDLs for numerous Guyandotte River tributaries predominantly impaired by mine drainage.

Kanawha River and Major Tributaries (New, Bluestone, Greenbrier, Gauley, Elk and Coal rivers)

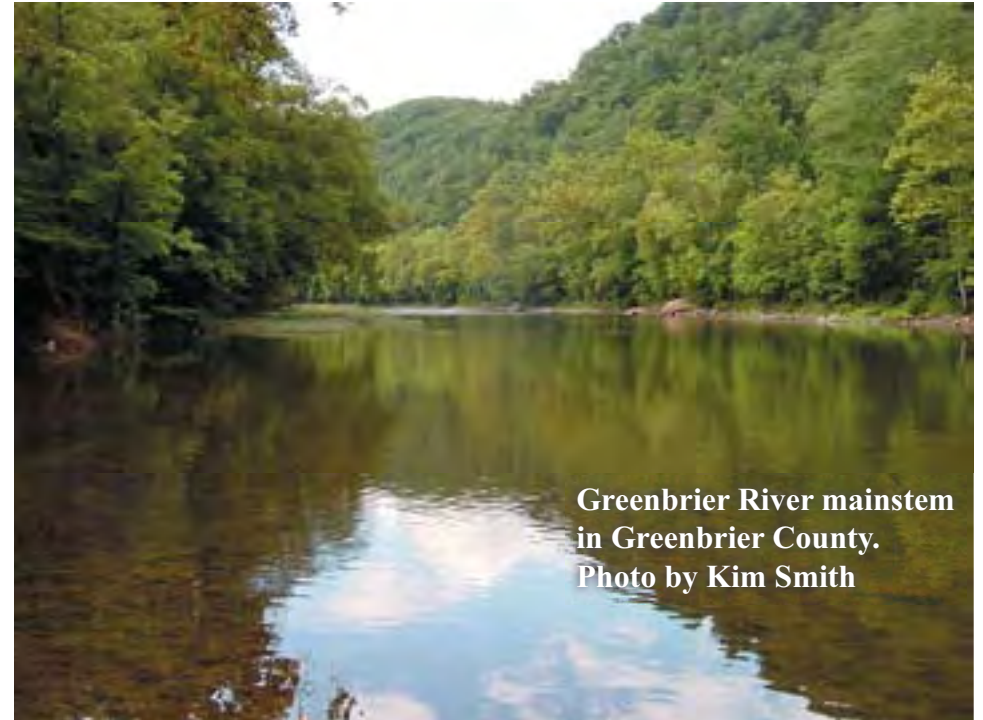
The Kanawha River, like the Guyandotte, is also divided into two sections. The break occurs near the mouth of the Elk River with the upper section extending upstream to the confluence of the New River and Gauley River. The Lower Kanawha River segment begins near the mouth of the Elk River and continues downstream to its confluence with the Ohio River at Point Pleasant.

The entire Kanawha River mainstem, Bluestone River and Bluestone Lake are listed as impaired because of consumption advisories related to elevated fish tissue concentrations of and Polychlorinated Biphenyls (PCBs).

Fecal coliform impairments have been identified in the Lower Kanawha River mainstem and in all of the major tributaries of the Kanawha River. Affected segments include the New River (mouth to Bluestone Dam), the Gauley River (mouth to river mile 37.2), the Elk River (mouth to Sutton Dam), and entire lengths of the Bluestone, Coal and Greenbrier rivers.

Previous EPA TMDL development efforts addressed dioxin impairments of the Lower Kanawha River and tributaries (September 2000) and metals impairments of the Elk River and tributaries (September 2001). Additionally, the Department of Environmental Protection finalized numerous TMDLs for impaired tributaries of the Upper Kanawha River in January 2005.

The DEP is developing fecal coliform TMDLs for the Coal, Greenbrier, New, and Bluestone rivers. The Coal River TMDL will be finalized in 2006 and the Greenbrier, New, and Bluestone rivers TMDLs will be finalized by December 2007. In addition to the TMDLs for the mainstem impairments, TMDLs will be developed for these rivers' tributary waters.



**Greenbrier River mainstem
in Greenbrier County.
Photo by Kim Smith**

Monongahela River and Major Tributaries (Cheat, Tygart Valley, and West Fork rivers)

Between March 2001 and September 2002, EPA developed TMDLs addressing the iron, aluminum, manganese and pH impairments of the Monongahela, Cheat, Tygart Valley and West Fork rivers and numerous tributary waters.

Recent aluminum and manganese water quality criteria revisions create uncertainty relative to the impairment status of affected waters and, as such the validity of many TMDLs. DEP has recently initiated pre-TMDL monitoring in the Cheat River and tributaries to re-evaluate impairment status pursuant to currently effective criteria and modify iron, aluminum, manganese and pH TMDLs, as appropriate. This effort will be finalized in 2009 and may include new TMDLs for geographically proximate impaired streams in the Cheat River Watershed. It is important to note that the pH water quality conditions of the Cheat River mainstem and Cheat Lake have shown drastic improvement in recent times. The West Virginia Division of Natural Resources' limestone drum station on the Blackwater River and its application of limestone fines to headwater streams impacted by acid rain have restored many miles of trout water and recent pH data at the head of Cheat Lake has documented a pH greater than 6.0 continuously for the past two years.

Fecal coliform impairments have been identified in the Monongahela River (entire length), the Tygart Valley River (river mile 65 to headwater), and the West Fork River (mouth to Stonewall Jackson Lake tailwater). The same segment of the West Fork River also is biologically impaired, has a dissolved zinc water quality criteria impairment, and a consumption advisory related to elevated fish tissue concentrations of Polychlorinated Biphenyls (PCBs). Stonewall Jackson Lake, Cheat Lake and Tygart Lake are all listed as impaired for mercury because of consumption advisories related to elevated fish tissue concentrations of mercury.

Little Kanawha River

A small headwater section of the river is impaired relative to pH from RM 162.1 upstream to the headwaters. Additionally, the entire river is now listed for fecal coliform impairment and PCBs.

EPA previously developed iron and aluminum TMDLs for the mainstem and several tributaries. The previously developed aluminum TMDL is obsolete due to recent criteria revisions. Currently, four additional tributaries are under DEP TMDL development for total iron, pH and biological impairment with finalization expected by December 2007.

Ohio River

EPA developed TMDLs for dioxin and PCBs impairments in the Ohio River in 2000 and 2002, respectively. Additional segments of the river are included as dioxin-impaired on the 2006 Section 303(d) List, upstream of the area of applicability of the original TMDL. DEP finalized numerous TMDLs for impaired tributaries in the Upper Ohio North Watershed in January 2005.

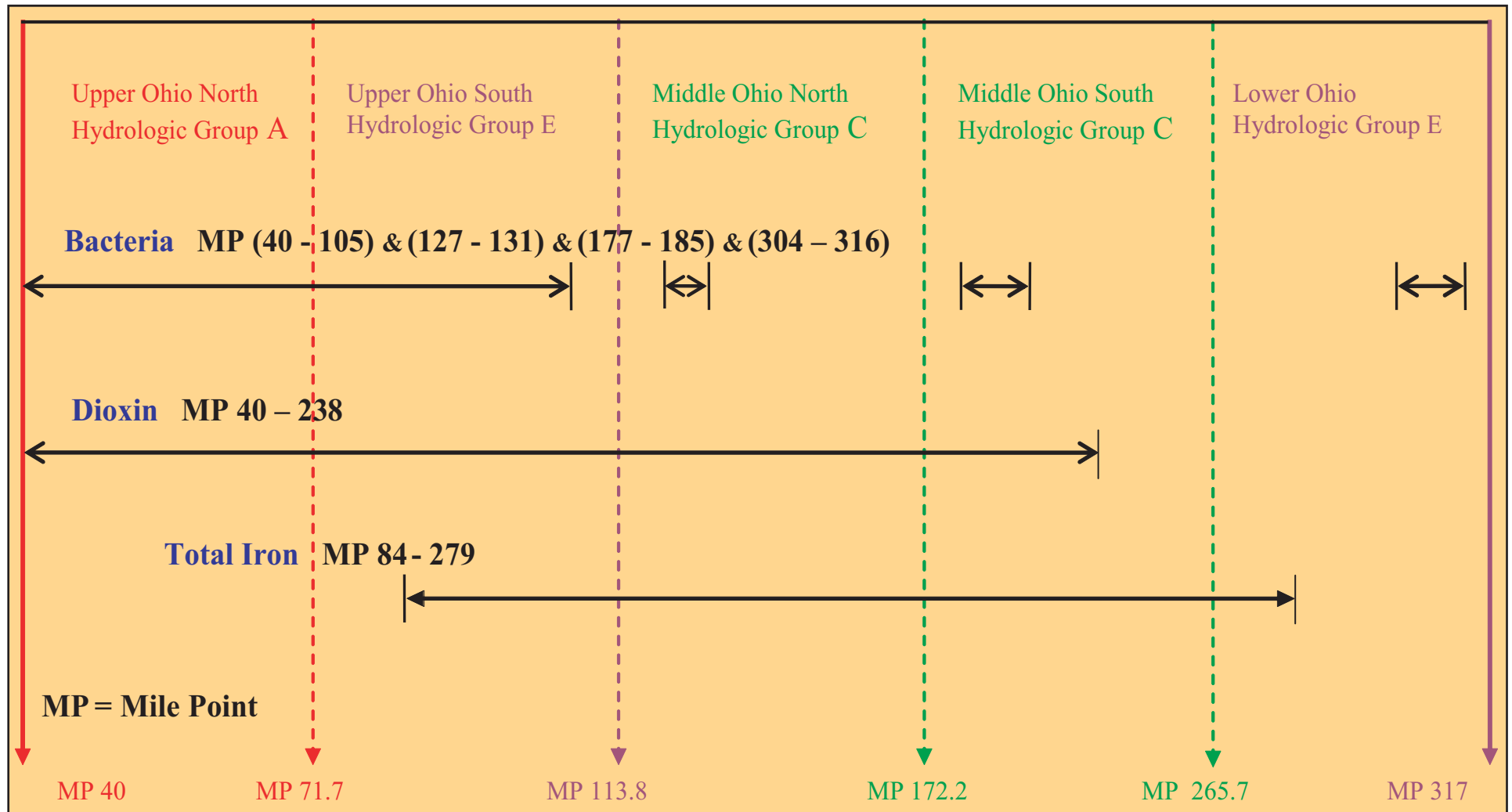
The Ohio River Valley Water Sanitation Commission (ORSANCO) does extensive water quality monitoring of the Ohio River. Every two years ORSANCO publishes its 305(b) report addressing water quality issues on the Ohio River. As in the past, DEP has reviewed ORSANCO's Draft 2006 305(b) report and incorporated the data and assessment results into the West Virginia 303(d) List. When both West Virginia and ORSANCO have an established criterion for a particular pollutant the most stringent standard is applied for assessment purposes, as provided in the ORSANCO Compact.

The bacteria impairment identified for various Ohio River segments reflects assessments based upon a combination of both ORSANCO's E. coli. water quality criteria and West Virginia's fecal coliform criteria.

In addition, certain segments of the river have been identified as iron-impaired based upon the applicable West Virginia warmwater aquatic life criterion of 1.5 mg/l.

The following graphic depicts the impaired segments of the Ohio River bordering West Virginia.

Figure 11 – Impairments of the West Virginia section of the Ohio River



Tug Fork River

In 2002, EPA developed iron and aluminum TMDLs for the Tug Fork River mainstem. Iron, aluminum, manganese and pH TMDLs were developed for its impaired tributaries. As described earlier, subsequent aluminum and manganese water quality criteria revisions create uncertainty relative to the impairment status of affected waters and, as such, the validity of many aluminum and manganese TMDLs.

The Tug Fork River is identified on the 2006 Section 303(d) List for biological impairment from RM 51.6 to its headwaters and is listed for fecal coliform impairment from the mouth to RM 35.7.

Chesapeake Bay and Gulf of Mexico

The Chesapeake Bay and Gulf of Mexico are impaired by nutrients and sediment from multiple upstream states and sources. These large and biologically diverse waterbodies are an important economic resource for their surrounding states and the nation as a whole. The need for their protection and restoration is a high priority for many parties. West Virginia's Potomac, Shenandoah and James rivers are headwaters to the Chesapeake Bay. The remaining watersheds in the state flow to the Gulf of Mexico. West Virginia's involvement in the restoration of these waterbodies will likely require nutrient and sediment reductions from both point and nonpoint sources. In some cases, these reductions may be necessary on streams that may not be locally impaired. Given this, equitable load reduction targets and implementation strategies are of primary importance to West Virginia.



Aerial photo of Chesapeake Bay.
Courtesy of NASA/GSFC

Section 9 – Interstate Water Coordination

Joint PCB Monitoring Effort with Virginia

The DEP has been working with the Virginia Department of Environmental Quality (Va. DEQ) to assess the issue of PCB impairment along the Virginia section of the Bluestone River. As part of a cooperative project, DEP and Va. DEQ placed a number of semi-permeable membrane devices throughout the Bluestone watershed in both Virginia and West Virginia. The purpose of the project is to determine the level of PCB contamination present in the mainstem Bluestone River and tributaries. Several devices were placed in streams that are known or suspected to be historical PCB sources. DEP and Va. DEQ are working with both the United States Geological Survey (USGS) and Region III of EPA on this project. EPA provided funding through its RARE grant program while USGS supplied the semi-permeable membrane devices and is doing the analysis of the devices. The product of this cooperative effort is expected to be a TMDL for the Bluestone River and tributaries with loadings and allocated reductions for sources in both Virginia and West Virginia.

Ohio River Valley Water Sanitation Commission — ORSANCO

As with previous reports, DEP's 2006 Integrated Report includes assessments based on data provided by ORSANCO. Throughout development of ORSANCO's 2006 Biennial Assessment Report, DEP has been involved with ORSANCO's efforts to standardize assessments among the "compact" states. DEP personnel continue to participate in several standing committees, along with representatives from other Compact states, charged with helping direct ORSANCO's water quality and biological monitoring efforts.

West Virginia and the Chesapeake Bay Program

In June 2002, Governor Bob Wise signed the Chesapeake Bay Program Water Quality Initiative Memorandum of Understanding. By signing this memo, West Virginia agrees to develop goals and objectives to reduce nutrient and sediment loads. Reductions of 33 percent for nitrogen, 35 percent for phosphorus, and 6 percent for sediment are needed between 2002 and 2010. These reductions are anticipated to come from a variety of sectors including point sources such as municipal wastewater treatment plants and industry, and nonpoint sources such as agriculture, forestry, urban, suburban, and mixed open land uses. The plan for meeting these reductions is in West Virginia's Potomac Tributary Strategy. Fourteen percent of West Virginia's waters drain into the Potomac River and on to the Chesapeake Bay.

Interstate Commission on Potomac River Basin

The Commission is a non-regulatory agency of basin states (Maryland, Pennsylvania, Virginia and West Virginia), Washington, D.C. and the federal government. The Commission promotes watershed-wide solutions to the pollution and water resources challenges facing the basin and its more than 5.3 million residents. Examples of current commission efforts include Chesapeake Bay Program involvement, stream biological assessments, support of selected stream gages, the Potomac Groundwater Assessment, Potomac Basin Drinking Water Source Protection Partnership coordination and Potomac Watershed Toxic Spill Model support. In addition, the Commission's public outreach program supports and helps coordinate an annual watershed-wide clean up effort and produces and distributes 150,000 copies of the newsletter *Potomac Basin Reporter*. The commissioners are appointed by their respective jurisdictions and provide policy guidance and oversight for a skilled staff of scientists and educators. Currently, the West Virginia representative is serving as the chairman of the Commission.

Ohio River Basin Commission

The Commission, in its current form, was founded in 1981. The purpose of the Commission shall be to: (1) provide a forum for Ohio River Basin states to study, discuss, and develop regional policies and positions on common interstate issues concerning water and related land resources; (2) coordinate to the extent possible water and related land resources planning in the Ohio River Basin; (3) provide representation of regional interest to the federal government; (4) investigate, study and review water related problems of the Basin and; (5) assist in water and related land resources training for Basin representatives. The Commission welcomes membership from all states draining to the Ohio River including Illinois, Indiana, Kentucky, Maryland, New York, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia.



Overlooking the Ohio River
from Oil Ridge in Pleasants County.
Photo by Mike Whitman

Section 10 – Total Maximum Daily Load (TMDL) Development Process

Beginning in 1997, EPA Region III developed West Virginia TMDLs under the settlement of a 1995 lawsuit, Ohio Valley Environmental Coalition, Inc., West Virginia Highlands Conservancy, et. al. v. Browner, et. al. The lawsuit resulted in a consent decree between the plaintiffs and the EPA that specifies TMDL development requirements and compliance dates. While EPA was working on developing TMDLs, DEP concentrated on building its own TMDL program. With the help of the TMDL stakeholder committee, the agency secured funding from the state legislature and created the TMDL section within the Division of Water and Waste Management.

The TMDL section is committed to implementing a TMDL process that reflects the requirements of TMDL regulations, provides for the achievement of water quality standards, and ensures that ample stakeholder participation is achieved in the development and implementation of TMDLs. DEP's 48-month development process enables the agency to carry out an extensive data generation and gathering effort to produce scientifically defensible TMDLs, as well as allow ample time for modeling, report drafting and frequent public participation opportunities.

The DEP's TMDLs are developed according to the Watershed Management Framework cycle. The framework divides the state into 32 major watersheds and operates on a five year, five-step process. The watersheds are divided into five hydrologic groups (groups A - E). Each group of watersheds is assessed once every five years. A map depicting the 32 watersheds and the hydrologic groupings is provided as an attachment to this document. The TMDL process begins in the first year of the cycle with pre-TMDL sampling and public meetings in the affected watersheds. The data is compiled and TMDL development begins in year two of the cycle. In the third year, TMDL development continues and the TMDL is drafted. The TMDL is finalized in the fourth year. In the fifth year of the cycle, TMDL implementation is initiated through the NPDES permitting process and efforts toward limiting nonpoint source pollutant loading.

Throughout the TMDL development process, there are numerous opportunities for public participation and input. The West Virginia TMDL program also must accomplish TMDL development in accordance with the consent decree between EPA and the Ohio Valley Environmental Coalition, et. al., which requires all streams impaired by mine drainage to have TMDLs developed by 2008. Each year, the agency selects waters within the targeted hydrologic group where mine drainage TMDL development is mandated by the consent decree. Other geographically proximate impairments are added to those selections until the agency's annual resources for TMDL development are consumed. In this way, statewide TMDL development by regulatory deadlines is efficiently and systematically accomplished.

The DEP began developing TMDLs for selected waters in Hydrologic Group A in 2001. Additional development efforts were initiated for group B, group C, group D and group E in impaired waters in 2002, 2003, 2004 and 2005, respectively. The DEP received EPA approval of group A TMDLs in early 2005. Hydrologic Group B TMDLs were on schedule but are now delayed due to recent approval of the revision of dissolved aluminum water quality criteria. Work is underway to incorporate the necessary changes resulting from the criteria revision and, upon completion, these revised draft TMDLs will be advertised and offered for public comment. DEP expects finalization this summer. Development is progressing well for TMDLs scheduled for finalization in 2006, 2007 and 2008.

Projected TMDL Completion Year	
Hydrologic Group A	2009, 2014, 2019
Hydrologic Group B	2010, 2015, 2020
Hydrologic Group C	2006, 2011, 2016, 2021
Hydrologic Group D	2007, 2012, 2017
Hydrologic Group E	2008, 2013, 2018

The 303(d) List identifies and prioritizes the waters and impairments for which TMDLs will be developed over the next three years by specifying the year in the “Projected TMDL Year” column. The impaired waters intended for TMDL development in 2006, 2007, and 2008 are known and identified on the list. The remaining legacy mine drainage impairments that, per the consent decree, must have TMDLs developed by 2008 are also specified. For other waters and impairments, where the timing of TMDL development is less certain, the “Projected TMDL Year” is identified as the most future year when opportunity exists per the DEP’s plans to develop TMDLs in concert with the Watershed Management Framework.



DEP's Catherine Rosfjord sampling near
Cheat Lake in Monongalia County
Photo by Rob Row

Section 11 – Water Pollution Control Programs

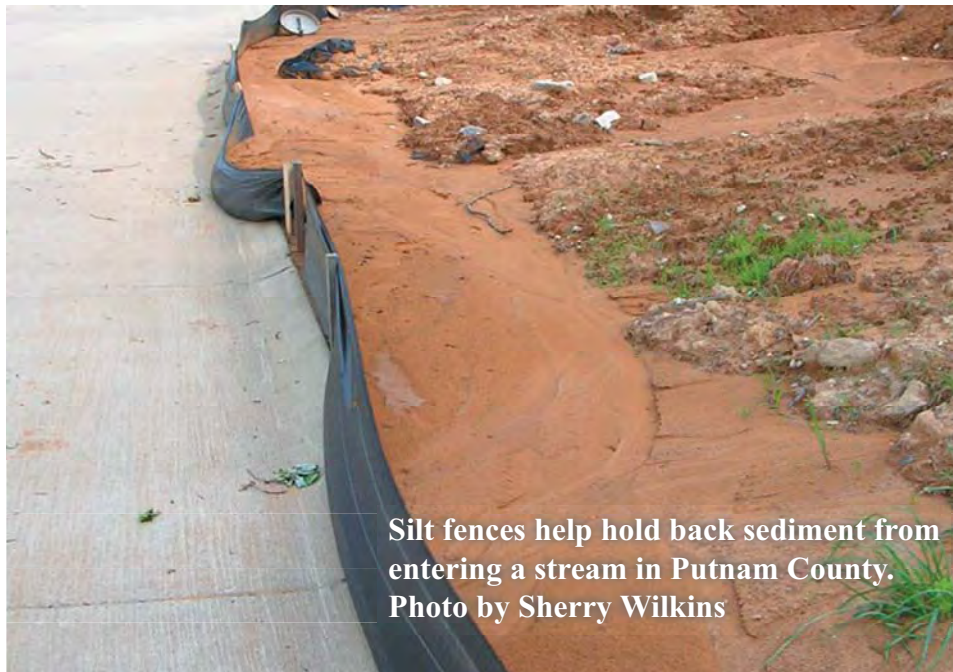
Division of Water and Waste Management

The Division of Water and Waste Management's mission is to preserve and enhance West Virginia's watersheds for the benefit and safety of all. DWWM strives to meet its mission through implementation of programs controlling surface and groundwater pollution caused by industrial and municipal discharges as well as oversight of construction, operation and closure of hazardous and solid waste and underground storage tank sites. In addition, the division works to protect, restore, and enhance the state's watersheds through comprehensive watershed assessments, groundwater monitoring, wetlands preservation, inspection and enforcement of hazardous and solid waste disposal and proper operation of underground storage tanks. The Integrated Report provides greater detail about Point Source, Nonpoint Source and Groundwater programs.

In January 2006, Environmental Enforcement became a branch of the Division of Water and Waste Management. Environmental Enforcement promotes compliance with the Solid Waste Management Act, Water Pollution Control Act, Groundwater Protection Act, Hazardous Waste Management Act, Underground Storage Tank Act, and Dam Safety Act by providing assistance, inspecting regulated sites, and enforcing conditions required by these acts.

Point Source Program or National Pollution Discharge Elimination System (NPDES)

The objectives of the point source control program are to control and reduce water pollution. These objectives are met by ensuring that discharges from facilities meet the applicable Clean Water Act effluent limitations and do not violate water quality standards. The DWWM's primary mechanism for implementing this program is the West Virginia NPDES permit. This program, at the state level, regulates activities and facilities involving the installation, construction, modification, and operation and maintenance of wastewater treatment systems as well as their discharges. Individual and general permits are used to implement the program. The permits include effluent limits and requirements for facility operation and maintenance, discharge monitoring and reporting. Permits for stormwater construction require the implementation of proper best management practices. Permits for home aeration units require the permittees to maintain an operation and maintenance agreement. Due to these requirements and emphasis on issuing major permits, the best available technology approach to point source control has resulted in substantial pollution reduction in all state waters, particularly in the area of conventional pollutants.



Silt fences help hold back sediment from entering a stream in Putnam County.
Photo by Sherry Wilkins

This approach also has provided states greater latitude in requiring additional reductions in effluent loadings of these pollutants. Best available technology limits are generally adequate to protect water quality

since the majority of major dischargers are located on large rivers, which have the capacity to assimilate wastewater. The best management practices approach for control of storm water discharges associated with construction activities has resulted in a reduction of pollution associated with these sources. On smaller streams, the combination of best available technology and water quality-based permit limits has generally provided the greatest degree of pollutant control, particularly in relation to toxic substances. In addition to enabling DWWM to correct problems, state rules also provide a pretreatment program in conjunction with the NPDES program with procedures for regulating proposed industrial wastewater connections to publicly owned treatment works. This allows DWWM to evaluate proposals and require the installation of pretreatment facilities where necessary, or otherwise approve with required conditions.

Each permitted facility also is required to monitor its discharges and submit regular reports. As a result of reviewing these reports, where noncompliance exists, administrative actions are generally initiated to obtain compliance. These may include warning letters, notices to comply, enforcement orders, or referrals for civil action. Other activities administered by the permitting section of the DWWM include developing wasteload allocations for new or expanding activities, regulating the land application of sewage sludge through the permit process, and regulating industrial solid waste landfills through issuance of permits.

Combined Sewer Overflows (CSO)

There are currently 55 permitted CSO communities in West Virginia that have over 700 outfalls. These communities are located throughout the state and discharge to the major rivers, including the Ohio, Kanawha, Monongahela, and Guyandotte, as well as their tributaries. The DEP is currently reviewing long-term control plans and water quality studies submitted by these communities.

Concerns include CSOs located along rivers used for recreational purposes. Many of West Virginia's larger rivers are used for water contact recreation. It is important to educate the public about CSOs when using these recreational areas. The major concern is the effect of CSOs on water quality. Preliminary results have indicated smaller streams are affected more than the larger rivers. Long term planning for many cities has tried to reduce the number of CSOs or discharges on these smaller streams. West Virginia so far has identified funding needs of over \$900 million to minimize CSO impacts statewide.

Nonpoint Source Control Program

Many of the streams being listed on the state's list of impaired waters are affected by nonpoint sources. The majority of the TMDLs being developed involve nonpoint source water quality impacts. To more effectively respond to TMDL implementation needs, the Nonpoint Source Management Plan was updated in 2000 to incorporate watershed management principles, including integration of TMDL and Watershed Management Framework scheduling. That integration has already proven beneficial in the state's eastern panhandle where TMDLs were completed in the mid-1990s for bacteria associated with agricultural animal wastes. Through the Nonpoint Source Program, partnerships with state and federal agriculture agencies, and the DEP's State Revolving Fund, more than \$18 million has been spent implementing best management practices to address agricultural water quality impacts in the Potomac River and its tributaries. These examples emphasize the need for the existing nonpoint source programs promoting voluntary installation of best management practices to be more focused on identified priority watersheds. Also, enforcement of water quality violations from nonpoint source activities should be used as necessary to encourage compliance. Continuation and expansion of the agency's use of the fund's loans for additional nonpoint source problems, such as failing septic system rehabilitation, also would be beneficial.

The Nonpoint Source Control Program works with other cooperating state agencies to assess nonpoint source impacts, then develops and implements projects designed to reduce pollutant loads from agricultural, silviculture, resource extraction, urban runoff and construction activities. Program initiatives are based upon education, technical assistance, financial incentives, demonstration projects, and enforcement, as necessary. The division's Nonpoint Source Program supports the overall administration and coordination of the nonpoint source activities through these participating state agencies: the Division of Mining and Reclamation, the Division of Land Restoration, the West Virginia Conservation Agency (WVCA), the Office of Oil and Gas, and the Division of Forestry. Each year, specific activities are funded under the Nonpoint Source Program. The following are descriptions of the current program's components.

Nonpoint Source Program Coordinator for Agriculture and Construction

The Nonpoint Source Program of the WVCA has broad responsibilities for coordination of the statewide nonpoint source water quality activities for agriculture and construction. This integrates the water quality components, geographic locations, cooperating agency activities and resources into the total program objectives.

State Revolving Fund for Agriculture

Loan funds are made available at low interest to landowners for installation of best management practices on farms through the DWWM's Revolving Loan Fund. The revolving fund program coordination office is located at the WVCA headquarters. It is responsible for development of the program, which includes implementing and evaluating the state's Revolving Loan Fund for the installation of agriculture best management practices through the local Soil Conservation Districts, WVCA, DEP, Natural Resources Conservation Service, and the Farm Service Agency.

State Nonpoint Source Silviculture Program

Managed through the Division of Forestry, the goal of this program is to maintain and strengthen the cooperative effort and involvement of state and federal agencies, environmental groups, forest industries, woodland owners, and the general public toward preventing and correcting water quality problems associated with the harvesting and processing of forest products. In addition, the program deals with the problems created by forest fires, repeat fires and enforces the use of best management practices under the West Virginia Logging Sediment Control Act.



Animal waste entering streams may contribute to a stream having fecal coliform exceedences.
Photo by Alvan Gale

Watershed Resource Center

The Nonpoint Source Resource Management Training Center is a cooperative partnership project conducted by the WVCA, the West Virginia Department of Education, DEP, and EPA. The main objective of this partnership is to combat nonpoint source pollution in West Virginia and reduce

nonpoint source impacts through public education. The nonpoint source Watershed Resource Center provides information and training on the control of nonpoint source impacts to all individuals and groups that disturb soil. Land users utilizing this facility include urban developers, loggers, farmers, watershed associations, homeowners, earth moving contractors, consulting engineers, resource extraction industry individuals, students, and teachers.

Groundwater Program

Under the Groundwater Protection Act, West Virginia Code Chapter 22, Article 12, Section 6.a.3, DEP is required to provide a biennial report to the Legislature on the status of the state's groundwater and groundwater management program, including detailed reports from each agency that have groundwater regulatory responsibility. The current biennial report to the Legislature covers the period from July 1, 2003, through June 30, 2005. This is the seventh report completed since the passage of the act in 1991. This section provides a brief overview of the report. Copies of the full report "Groundwater Programs and Activities: Biennial Report to the West Virginia 2006 Legislature" may be obtained by contacting the Groundwater Program at the Division of Water and Waste Management, 601 57th St., SE, Charleston, WV 25304. The report also may be reviewed at www.wvdep.org. http://www.wvdep.org/Docs/9776_GW_Biennial_Report_2006.pdf

The DWWM Groundwater Program is responsible for compiling and editing information submitted for the biennial report. The DEP, the West Virginia Department of Agriculture, and the West Virginia Department of Health and Human Resources all have groundwater regulatory responsibility and contributed to the report. These state boards and six standing committees currently share the responsibility of developing and implementing rules, policies, and procedures for the Ground Water Protection Act (1991). The Environmental Quality Board, the Groundwater Coordinating Committee, the Groundwater Protection Act Committee, the Groundwater Monitoring Well Drillers Advisory Board, the Well Head Protection Committee, and the Nonpoint Source Coordinating Committee are the standing committees.

The report provides a concise, yet thorough, overview of those programs that are charged with the responsibility of protecting and ensuring the continued viability of groundwater resources in West Virginia. It is also the intent of the report to express the challenges faced and the goals accomplished as we work together to protect and restore West Virginia's water resources. Many of the programs and offices in the reporting divisions express a need for an accessible central and statewide electronic data system. Currently, all groundwater and other data is collected by individual programs and offices. The DEP Information Technology Office has implemented the Environmental Resource Information System and is currently working on the implementation of the Environmental Quality Information System.

Another desire expressed is the need for a systematic approach to groundwater complaint investigation that would enhance involvement and coordination among agencies with groundwater protection responsibilities.

Programs and agencies also have identified the need for specific hydrogeologic information on the state's groundwater such as regional and local potentiometric surfaces (water levels), groundwater flow studies, and access to statewide dedicated groundwater monitoring data. The installation of a centralized database linked to GIS coverages accessible to the various agencies and the public will go a long way in resolving this problem.

Additional themes include greater outreach to the citizens of West Virginia on issues such as nonpoint source pollution, protecting individual ground and drinking water sources, and the installation of toll-free help lines to enhance statewide consistency and a unified approach to the implementation

of groundwater rules. Many of these problems are addressed by five-year cooperative studies performed jointly between the Division of Water and Waste Management and the United States Geological Survey (USGS).

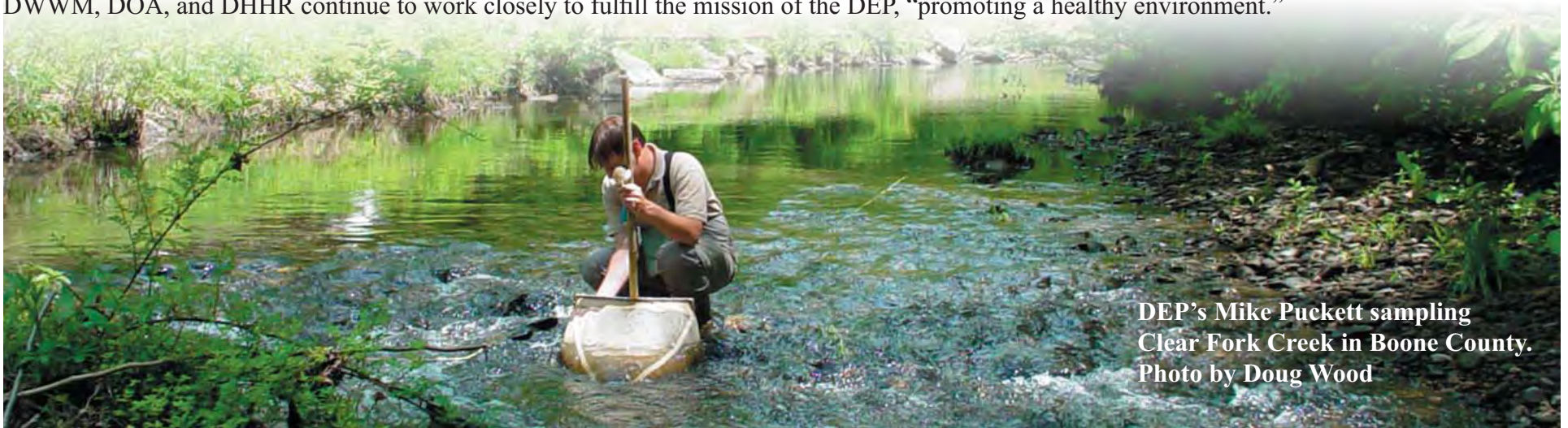
The Ambient Groundwater Quality Monitoring Network was established by the DWWM in cooperation with the USGS in 1992 and is an on-going project. The network provides critical data needed for proper management of West Virginia's groundwater resources. The major objective of this USGS study is to assess the ambient groundwater quality of major systems (geologic units) within West Virginia and to characterize the individual systems. Characterization of the quality of water from the major systems helps to:

- 💧 Determine which water quality constituents are problems within the state
- 💧 Determine which systems have potential water quality problems
- 💧 Assess the severity of water quality problems in respective systems
- 💧 Prioritize these concerns

Only by documenting present ambient groundwater quality of the state's major systems can regulatory agencies assess whether water quality degradation has occurred in certain areas and whether potential degradation is a result of natural processes or those associated with human activity.

Spatial variability in water quality is determined for specific geologic units based on sampling of approximately 30 wells annually. The sampling continues over a period of approximately six years and provides a database of more than 200 wells from which comprehensive water samples are collected. Wells are selected in specific drainage basins in given years, rotating annually to new basins, thus providing sampling of groundwater in all watersheds of the state over the five year period. Then, the cycle of sampling begins again. All associated groundwater quality data for each well sampled and summaries of groundwater quality for each respective watershed are published in the USGS Water Resources Data for West Virginia annual report.

While many challenges remain, much has been done to provide protection and continued viability of West Virginia's groundwater resource. The DWWM, DOA, and DHHR continue to work closely to fulfill the mission of the DEP, "promoting a healthy environment."



DEP's Mike Puckett sampling
Clear Fork Creek in Boone County.
Photo by Doug Wood

Section 12 – Cost Benefits

The improvement in water quality due to the installation of new and upgraded municipal wastewater systems has been significant since 1972 when the Water Pollution Control Act Amendment was passed by Congress. Between 1972 and 2003, 409 wastewater systems received funding provided by DEP's Construction Assistance Program. From 1972 to 1990 the major funding provided was from the EPA Construction Grants Program totaling \$668 million in grant funds to 200 projects. From 1990 to 2005, the major funding provided was from the Clean Water State Revolving Fund low interest loan program, totaling approximately \$478 million in loan funds to 192 projects. During the specific reporting period of July 2003 to June 2005, 24 wastewater projects were funded by the State Revolving Fund program totaling approximately \$120 million in closed loan agreements.

The above funding provided to municipal systems has resulted in a number of them coming into

compliance with administrative orders and consent decrees. Some of the utilities have extended sewer service to areas where customers used malfunctioning septic tank systems or had direct discharges to streams. All of these projects have environmental benefits affecting the quality of surface and groundwater. They correct a number of health hazards, including raw or partially treated sewage being discharged to areas where children play.

Table 7 – State Agency Water Pollution Control Expenditures for Fiscal Year 2005

Department of Environmental Protection		
Office of Administration		9,380,360
Office of Information Technology		2,834,347
Division of Water & Waste Management		111,344,958
Division of Mining and Reclamation		19,760,015
Office of Oil & Gas		2,352,540
Office of Environmental Enforcement		3,626,425
Division of Land Restoration		54,761,374
Environmental Quality Board		102,449
Division of Natural Resources		
Fish Kill Reimbursement		13,683
Acid Impacted Streams		140,000
Stream Restoration		2,300
	Total	204,318,541
Note: Abandoned Mine Lands and Environmental Remediation are now combined.		
Office of Water Resources and Waste Management are now combined.		

To varying degrees, each project improves and affects the quality of surface waters and groundwater. These types of discharges deplete the oxygen level in the receiving stream and raise the bacteria levels well above standards in the water, leaving it aesthetically unpleasing. Tons of pollutants are removed daily at wastewater plants in the state and more stream miles are able to sustain a full array of aquatic life as a result of these improvements. Boaters, swimmers, and fishermen can be assured of a safer and healthier stream to enjoy. A few thousand families have centralized sewage collection and treatment for the first time. Many yards and ditch lines have been relieved of oozing seepage and raw sewage discharges. This not only results in environmental benefit, but also reduces public health risk.

In West Virginia, the majority of water pollution control activities (permitting) are administered through various state agencies. The DWWM oversees the establishment and refinement of water quality standards along with administration and enforcement of water pollution control (NPDES) permits not related to coal mining. In addition, the office administers Section 401 water quality certifications, with comments provided by the DNR's Wildlife Resources Section. The Division of Mining and Reclamation handles coal-related NPDES permits. The DWWM issues NPDES permits associated with solid waste facilities. The state Bureau for Public Health has input on municipal facilities and oversees all activities associated with home septic systems in cooperation with county sanitarians. The Environmental Quality Board acts as an appellate board on some water pollution control activities. The DWWM also contributes to two interstate commissions dealing with water pollution: ORSANCO and the Interstate Commission on the Potomac River Basin. Table 7 provides a breakdown of various state agency expenditures for water pollution control activities during fiscal year 2005.

In addition to the traditional municipal wastewater projects that have always been funded by the DEP, in fiscal year 1998 a new nonpoint source pollution control program was created under the fund called the West Virginia Agriculture Water Quality Loan Program. This program has provided more than \$3.9 million for the installation of agriculture best management practices across the state, with most of the funding going to Grant, Hampshire, Hardy, Pendleton and Mineral counties. These counties were the original five that participated in the 1998 pilot program before the program was implemented statewide. During the specific reporting period of July 2003 to June 2005, \$457,837 was provided for agriculture best management practices statewide.

Improvement in the water quality of state rivers and streams has had numerous benefits, particularly for the larger rivers such as the Ohio, Kanawha, and Monongahela. In these waterbodies, a recovery of the sport fishery has coincided with an increase in other water-based recreational activities such as boating, skiing, and swimming.

Section 13 – Public Participation and Responsiveness Summary

The draft Section 303(d) List was advertised for public comment from March 22, 2006, through May 5, 2006. Notices of the availability of the draft document were placed in newspapers statewide, including requests for public comment (see reply below). The draft document was promoted via e-mail and the Internet. At the conclusion of the public comment period, DEP considered all comments and made adjustments to the list where appropriate. DEP submitted its 2006 Section 303(d) List to EPA Region III for approval.

The DEP is pleased to provide the following responses to the comments received about the state's Draft 2006 Section 303(d) List. The DEP appreciates the efforts commenters have put forth to improve West Virginia's listing and TMDL development processes.

All comments have been compiled and responded to in this responsiveness summary. Comments and comment summaries are bold and italicized. Agency responses appear in plain text.

1. Comments were received expressing concern over the recent revisions to water quality criteria for dissolved aluminum and manganese.

The Draft West Virginia 2006 Section 303(d) List properly bases impairment decisions on currently applicable water quality criteria. The subject criteria have been approved by EPA and are therefore effective for Clean Water Act purposes. The protection of associated designated uses is inherent in EPA's approval. Detailed information regarding the criterion revisions and DEP implementation actions is provided in West Virginia Water Quality Standards section of the document.

2. Comments were received requesting the listing of the entire lengths of South Branch of the Potomac River, Lost River, and the Cacapon River pursuant to the narrative water quality criteria of 47CSR2 § 3.2.e and § 3.2.i. and the documentation of intersex in smallmouth bass.

DEP remains concerned with the findings of reproductive anomalies in the smallmouth bass of the subject waters. Over the past three years, in cooperation with several state and federal agencies, DEP has undertaken an extensive effort to assess the extent and cause, whether natural or anthropogenic, of intersex occurrence in South Branch smallmouth bass. The study includes fish community and water quality sampling of the South Branch and several other streams, three of which were selected as reference streams. Intersex has been documented in all of the studied streams, including the reference streams. Intersex has also been documented in Virginia's reference water, the Cowpasture River.

DEP agrees that impairment assessments based upon narrative criteria are valid, as evidenced by the numerous biological impairments displayed on 2002, 2004 and 2006 Section 303(d) Lists. Those listings are based upon the narrative criterion of 47CSR2 § 3.2.i, with impairments determined through the collection of benthic macroinvertebrates and comparison to the West Virginia Stream Condition Index.

The assessment of impairment pursuant to the referenced narrative criteria is possible in relation to intersex, but DEP lacks any index or methodology to gauge acceptable/unacceptable rates of intersex. The documentation of intersex in reference waters with low anthropogenic influence implies the existence of a non-problematic background condition. While extremely concerned with the apparent high rate of intersex in the subject waters, DEP

Section 303(d) Commentors	
Appalachian Center for the Economy and Environment	West Virginia Rivers Coalition
L. Dadisman	

also lacks documentation of the effects that the observed intersex is having on their smallmouth populations. As such, the agency cannot conclude the significant adverse impacts to biological integrity required for impairment under 47CSR2 § 3.2.i. Although the presence of antibiotics and other substances was suspected and confirmed through monitoring of discharges and receiving waters, the low concentrations that were measured cannot be linked to either fish kills or intersex. Identification of specific causative pollutants is not necessary for the listing of biological impairment pursuant to 47CSR2 § 3.2.i., but is important for listing pursuant to 47CSR2 § 3.2.e, where wastes must be present and contain materials in concentrations which are harmful, hazardous or toxic to man, animal or aquatic life.

The DEP's decision not to list the subject waters in no way affects its commitment to study the situation and address the cause(s) of any impairment that is identified in the future. All available resources will continue to be applied. The agencies involved are currently focusing on studies concerning:

- 💧 The relationship of intersex and fish kills
- 💧 The causative pollutants associated with the fish kills
- 💧 The reproductive ability of male bass with intersex, via assessment of sperm motility, and
- 💧 The presence, magnitude and effect of antibiotics, pesticides, endocrine disrupting compounds and other pollutants

Because this situation mandates flexibility, DEP and partner agencies may initiate other studies in the future as plausible hypotheses are presented. DEP's progress will be documented on its Web site, and in future integrated reports.



DEP's Rob Row sampling Pinch Creek
in Raleigh County.
Photo by Ashley Thomas

Section 14 – U.S. Environmental Protection Agency Approval

The DEP submitted an initial report to the EPA Region III office on August 18, 2006. This submission contained revisions based on EPA 's review of the draft 303(d) document noticed for public comment. In addition, EPA Region III provided e-mail comments on subsequent issues that arose during their review of the August 18 submittal. The DEP made necessary revisions and resubmitted the document to EPA Region III on December 22, 2006. The EPA determined the report, as revised, met the applicable requirements of Section 303(d) of the Clean Water Act. EPA approved West Virginia's 2006 Section 303(d) list on February 28, 2007.

A copy of the EPA approval letter and rationale follows, along with DEP's submission letters from August 18 and December 22, 2006. EPA's Approval Rationale documents the applicable statutory and regulatory requirements and explains how West Virginia's 2006 Integrated Water Quality Monitoring and Assessment Report complies with each requirement.

NOTE: The contents of the letters have not been altered in any way, but have been reformatted to fit this document. Actual signed copies of the letters are available upon request.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029
2/28/07

Ms. Lisa McClung, Director
Division of Water and Waste Management
West Virginia Department of Environmental Protection
601 57th Street SE
Charleston, WV 25304-2345

Dear Ms. McClung:

Thank you for the West Virginia Department of Environmental Protection's (WVDEP) final submission on August 24, 2006, of its identification of waters under Section 303(d) of the Clean Water Act ("2006 Section 303(d) List").

The U.S. Environmental Protection Agency Region III (EPA) has reviewed the submission and supporting documentation and, pursuant to Section 303(d) of the Act, 33 U.S.C. §1313(d), hereby approves West Virginia's 2006 Section 303(d) List of water quality limited segments still requiring a Total Maximum Daily Load (TMDL). The enclosed narrative provides an explanation of the basis for EPA's approval.

Thank you again for this submission. If you or your staff has any questions, please feel free to contact Mr. Larry Merrill at (215) 814-5452 or Ms. Jennifer Sincock at (215) 814-5766 for assistance.

Sincerely,

Signed

Jon M. Capacasa, Director
Water Protection Division

Enclosure

cc: Patrick Campbell, WVDEP DWWM
David Montali, WVDEP DWWM

APPROVAL RATIONALE

Introduction

EPA has conducted a complete review of West Virginia's 2006 Section 303(d) List and supporting documentation and information. Based on this review, EPA has determined that West Virginia's list of water quality limited segments ("WQLSs") still requiring Total Maximum Daily Loads ("TMDLs") meets the requirements of Section 303(d) of the Clean Water Act ("CWA" or "the Act") and EPA's implementing regulations. Therefore, by this order, EPA hereby approves West Virginia's 2006 Section 303(d) list. The statutory and regulatory requirements, and EPA's review of West Virginia's compliance with each requirement, are described in detail below.

Statutory and Regulatory Background

Identification of WQLSs for Inclusion on Section 303(d) List

Section 303(d)(1) of the Act directs the states to identify those waters within their jurisdiction for which effluent limitations required by Section 301(b)(1)(A) and (B) are not stringent enough to implement any applicable water quality standard, and to establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters. The Section 303(d) listing requirement applies to waters impaired by point and/or nonpoint sources, pursuant to EPA's long-standing interpretation of Section 303(d).

EPA regulations provide that states do not need to list waters where the following controls are adequate to implement applicable standards: (1) technology-based effluent limitations required by the Act; (2) more stringent effluent limitations required by state or local authority; and (3) other pollution control requirements required by state, local, or Federal authority. See 40 CFR 130.7(b)(1).

West Virginia developed an Integrated Report which identifies the assessment status of all of West Virginia's waters combining EPA's Section 303(d) and 305(b) requirements. The Integrated Report compartmentalized the waters of West Virginia into five distinct categories. All stream segments or assessment units fall into one of the following categories:

- Category 1 - Fully supporting all designated uses.
- Category 2 - Fully supporting some designated uses, but insufficient or no information exists to assess the other designated uses.
- Category 3 - Insufficient or no information exists to determine if any of the uses are being met.
- Category 4 - Waters that are impaired or threatened but do not need a (TMDL).
 - o Category 4a - waters that already have an approved TMDL but are still not meeting standards.
 - o Category 4b - waters that have other control mechanisms in place which are reasonably expected to return the water to meeting designated uses.
 - o Category 4c - waters that have been determined to be impaired by pollution or other natural factors.
- Category 5 - Waters that have been assessed as impaired and are expected to need a TMDL.

West Virginia's Section 303(d) list of impaired waters is in Category 5 of West Virginia's 2006 Integrated Report. West Virginia also provided

the 2006 Section 303(d) list in the same format as the 2004 Section 303(d) list consisting of the 303(d) list of impaired waters and six supplemental tables that track previously listed waters. The format of the 2006 Section 303(d) list follows the Watershed Management Framework with five hydrologic groups (A-E). Within each hydrologic group, watersheds are arranged alphabetically and impaired waterbodies are listed alphabetically within their appropriate watershed. The information that follows each impaired stream includes the stream code, the affected water quality criteria, the source of the impairment (where known), the impaired size (or, by default, the entire length), the reach description, the projected timing of TMDL development and whether or not the stream was on the 2004 list.

Six supplemental tables were provided to track previously listed waters that are not present on the 2006 Section 303(d) list. “Supplemental Table A - Previously Listed Waters - No TMDL Developed” is a list of previously listed waters which have been reevaluated and determined not to be impaired and, therefore, not in need of a TMDL. Causes for revision of the impairment status include recent water quality data demonstrating improved water quality condition, revision to the water quality criteria associated with the previous listing, or a modification of the listing methodology. Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR 130.7(b)(1) and the state’s listing criteria. In the Integrated Report, these waters have been moved from Category 5 to Category 1, 2, 3, or 4, as appropriate.

“Supplemental Table B - Waters with TMDLs Developed” is a list of previously listed impaired waters for which a TMDL has been developed and approved by EPA. Waters included in this supplement have had a TMDL developed, but water quality improvements are not yet complete and/or documented. Since the Section 303(d) list is a list of water quality limited segments still requiring TMDLs (see 40 C.F.R. 130.7(b)), EPA’s Integrated Water Quality Monitoring and Assessment Report Guidance recommends classification of such waters in a category separate from the 303(d) list. WVDEP developed this supplemental table to track previously listed impaired waters for which TMDLs have been developed. In the Integrated Report, these waters have been listed in Category 4a which includes waters that already have an approved TMDL but are not meeting standards. Supplemental Table B has a sublist called “Supplemental Table B1 – 2005 TMDLs” which is a list of previously listed waters for which a TMDL was developed in 2005, revised due to aluminum and manganese criteria changes, and approved by EPA on September 26, 2006.

“Supplemental Table C - Water Quality Improvements” is a list of previously listed impaired waters with improved water quality due to TMDL implementation or pre-TMDL stream restoration work that resulted in delisting. These waters are included in Category 1 (meeting all uses), provided that impairments for other uses or pollutants are not present.

“Supplemental Table D - Impaired Waters - No TMDL Development Needed” is a list of impaired waters for which either other control mechanisms are in place to control pollutants or the water is impaired by pollution (i.e., flow alterations caused by mining). These are the same waters contained in Category 4b and 4c, respectively.

“Supplemental Table E - Total Aluminum TMDLs Developed” is a list of previously listed impaired waters for which a total aluminum TMDL has been developed and established by EPA. Due to the criteria change from total aluminum to dissolved aluminum, West Virginia placed total aluminum TMDLs onto a separate table from Supplemental Table B. All waters contained on Supplemental Tables B and E are included on Category 4a of the Integrated Report.

“Supplemental Table F – New Listings for 2006” is a list of impaired waters that were not previously included on the 2004 Section 303(d) list.

Consideration of Existing and Readily Available Water Quality-Related Data

In developing Section 303(d) lists, states are required to assemble and evaluate all existing and readily available water quality-related data and information, including, at a minimum, consideration of existing and readily available data and information about the following categories of waters: (1) waters identified as partially meeting or not meeting designated uses, or as threatened, in the state's most recent Section 305(b) report; (2) waters for which dilution calculations or predictive modeling indicate nonattainment of applicable standards; (3) waters for which water quality problems have been reported by governmental agencies, members of the public, or academic institutions; and (4) waters identified as impaired or threatened in any Section 319 nonpoint assessment submitted to EPA. See 40 CFR 130.7(b)(5). In addition to these minimum categories, states are required to consider any other data and information that is existing and readily available. EPA's 1991 Guidance for Water Quality-Based Decisions describes categories of water quality-related data and information that may be existing and readily available. See Guidance for Water Quality-Based Decisions: The TMDL Process, EPA Office of Water, Appendix C (1991) (EPA's 1991 Guidance). While states are required to evaluate all existing and readily available water quality-related data and information, states may decide to rely or not rely on particular data or information in determining whether to list particular waters.

In addition to requiring states to assemble and evaluate all existing and readily available water quality-related data and information, EPA regulations at 40 CFR 130.7(b)(6) require states to include as part of their submissions to EPA, documentation to support decisions to rely or not rely on particular data and information and decisions to list or not list waters. Such documentation needs to include, at a minimum, the following information: (1) a description of the methodology used to develop the list; (2) a description of the data and information used to identify waters; and (3) any other reasonable information requested by the Region. West Virginia's 2006 Integrated Water Quality Monitoring and Assessment Report identified the state's assessment methodology and its use of data.

Priority Ranking

EPA regulations also codify and interpret the requirement in Section 303(d)(1)(A) of the Act that states establish a priority ranking for listed waters. The regulations at 40 CFR 130.7(b)(4) require states to prioritize waters on their Section 303(d) lists for TMDL development, and also to identify those WQLSs targeted for TMDL development in the next two years. In prioritizing and targeting waters, states must, at a minimum, take into account the severity of the pollution and the uses to be made of such waters. See Section 303(d)(1)(A). As long as these factors are taken into account, the Act provides that states establish priorities. States may consider other factors relevant to prioritizing waters for TMDL development, including immediate programmatic needs, vulnerability of particular waters as aquatic habitats, recreational, economic and aesthetic importance of particular waters, degree of public interest and support, and state or national policies and priorities. See 57 Fed. Reg. 33040, 33045 (July 24, 1992) and EPA's 1991 Guidance.

Analysis of West Virginia's Submission

Identification of Waters and Consideration of Existing and Readily Available Water Quality-Related Data and Information

EPA has reviewed West Virginia's submission, and has concluded that West Virginia developed its 2006 Section 303(d) list in compliance

with Section 303(d) of the Act and 40 CFR 130.7. EPA's review is based on its analysis of whether West Virginia reasonably considered existing and readily available water quality-related data and information and reasonably identified waters required to be listed.

A. Description of the methodology used to develop this list, Section 130.7(b)(6)(i)

West Virginia's 2006 Section 303(d) list was developed using all existing and readily available data. In West Virginia, the WVDEP's Division of Water and Waste Management (DWWM) is responsible for the collection and compilation of this information. In preparation for the 303(d) listing process, WVDEP sought water quality information from various state and Federal agencies, colleges and universities, and private individuals, businesses and organizations. News releases and public notices were published in state newspapers and letters were sent to state and Federal agencies known by WVDEP to be generators of water quality data.

West Virginia's 303(d) list is based largely on the data collection and assessment that underlies the 305(b) report of the state's water quality. WVDEP generated the majority of available surface water quality data through the Watershed Assessment Program (WAP) performed within the Watershed Management Framework cycle. Biological data sources included WV Stream Condition Index (WVSCI) scores collected during WVDEP's WAP. Additional data was obtained from state and Federal agencies, local environmental agencies, colleges, and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown on Table 3 of the Integrated Report. West Virginia considered all data and information regarding 130.7(b)(5) categories, which is the minimum required by Federal regulations.

Data evaluation by the agency began in the fall of 2005. In-house personnel possessing varying areas of expertise compared instream data to applicable water quality criteria and determined the impairment status of state waters. The basis for 303(d) listing decisions relates to the West Virginia water quality standards. In general terms, if water quality standards are exceeded, a waterbody is considered impaired, placed on the 303(d) list, and scheduled for TMDL development. More specifically, a waterbody is considered impaired when it does not attain the designated use assigned to it by applicable water quality standards. Use attainment is determined by comparison of the instream values of various water quality parameters to the numeric or narrative criteria contained in the standards. The West Virginia water quality standards are codified at 46 CSR 1 - *Legislative Rule of the Environmental Quality Board - Requirements Governing Water Quality Standards*, and at 60 CSR 5 - *Legislative Rule of the Department of Environmental Protection - Antidegradation Implementation Procedures*. The 46 CSR 1 version used to develop the 2006 Section 303(d) list went into effect January 9, 2006. All water quality standards contained in this version have received the EPA's approval and are currently considered effective for CWA purposes.

In addition, West Virginia provided its rationale for not relying on particular existing and readily available water quality-related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. For the stream quality assessment, West Virginia generally used water quality data generated between July 2000 and June 2005. EPA finds West Virginia's screening protocol and criteria described in its 2006 Section 303(d) listing rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

West Virginia released the Draft 2006 Section 303(d) List for public comment on March 22, 2006 through May 5, 2006. Notices of the availability of the Draft 2006 Section 303(d) List were placed in newspapers statewide and promoted via e-mail and the internet. These notices included information on where to obtain the documents and where to send comments. On May 1, 2006, WVDEP provided EPA with its 303(d) Decision Database which records listing decisions for all waterbodies. After review of the 303(d) Decision Database, EPA provided comments to WVDEP on June 16, 2006, requesting (1) clarification of individual waterbody listings; (2) supporting documentation used to place waters onto Category 4b shown in “Supplemental Table D – Impaired Waters – No TMDL Development Needed”; (3) a list of stream name and/or stream code changes from the 2004 to 2006 lists; (4) copies of comment letters received during the public comment period; and (5) supporting data for Ohio River listings. West Virginia received written comments from three entities including EPA. WVDEP evaluated all comments received and prepared a responsiveness summary detailing WVDEP’s actions regarding these comments. EPA concludes that WVDEP properly considered and responded to relevant public comments.

EPA received WVDEP’s final 2006 Integrated Water Quality Monitoring and Assessment Report package combining the Section 303(d) list and Section 305(b) report on August 24, 2006. This package included: (1) a listing rationale narrative describing: (a) an overview of the process for development of the 2006 Integrated Report; (b) the assessment methodologies for the following kinds of data: numerical water quality criteria data including fecal coliform and pH, biological impairment, and fish consumption advisories; and (c) an explanation of the data evaluated in the preparation of the list; (2) a summary of comments and responses that could affect the listing of waters; (3) the 303(d) list with six supplemental tables tracking previously listed waters; (4) spreadsheets containing information on stream segments in each of the five assessment categories; (5) WVDEP’s 303(d) Decision Database which records final listing decisions; and (6) all comment letters received by WVDEP during the public comment period.

West Virginia received comments questioning listing decisions for particular waterbodies. Where commentors advocated for or against particular impairment listings, West Virginia responded to the comments by providing relevant waterbody-specific analyses used in the listing decision, and where appropriate, making changes to the Section 303(d) list.

In identifying water quality limited segments for inclusion on the Section 303(d) list, states must evaluate attainment with water quality standards established under Section 303(c) of the Act, including numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements, based on consideration of all existing and readily available information, including but not limited to assessment information such as chemistry, toxicity, or ecological assessment. 40 C.F.R. 130.7(b)(3) and (b)(5). Assessment information is particularly important for determining whether a waterbody is achieving its designated use (such as supporting aquatic life) or narrative criteria.

With respect to the various types of assessment information, EPA recommends that the states apply a policy of independent application to determine whether a waterbody is achieving applicable water quality standards. This policy addresses three types of assessment information: chemistry, toxicity testing results, and ecological assessment. Each of these three methods can provide a valid assessment of non-attainment of a designated use and each independently can provide conclusive evidence of nonattainment without confirmation with a second method. EPA, Final Policy on Biological Assessments and Criteria (June 19, 1991); see also 48 Fed. Reg. 51,400, 51,402 (Nov. 8, 1983) (noting that biological monitoring is one method of testing compliance with narrative criteria); cf. 33 U.S.C. 1313(c)(2)(B) (nothing in Section 303 should be construed “to limit or delay the use of effluent limitations or other permit conditions based on or involving biological monitoring or assessment methods

....”). Biological assessments can provide compelling evidence of water quality impairment because they directly measure the aquatic community’s response to pollutants or stressors, and they can help provide an ecologically based assessment of the compliance status of a waterbody. Memorandum from Geoffrey H. Grubbs, Director, Assessment and Watershed Protection Division, EPA, to Water Management Division Directors, Regional TMDL Coordinators, Regions I-X re Guidance for 1994 Section 303(d) Lists (Nov. 26, 1993).

Following EPA’s review of WVDEP’s final 2006 Section 303(d) list, EPA identified some additional concerns for which clarification and/or additional listings were provided by WVDEP in subsequent correspondence. West Virginia provided additional information to address EPA’s comments and certain discrepancies identified by WVDEP. An electronic copy of West Virginia’s revised 2006 Integrated Report combining the Section 303(d) list and Section 305(b) report with associated databases were received by mail on December 22, 2006.

EPA has reviewed West Virginia’s description of the data and information it considered, its methodology for identifying waters, and additional information provided in response to comments raised by EPA. EPA concludes that the state properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR 130.7(b)(5).

B. Description of the data and information used to identify waters, including a description of the data and information used by West Virginia as required by Section 130.7(b)(5).

1. Section 130.7(b)(5)(i), Waters identified by West Virginia in its most recent Section 305(b) report as “partially meeting” or not meeting designated uses or as threatened.”

West Virginia’s 2006 Section 303(d) list was combined with the 305(b) report to form what is now referred to as the Integrated Report. Therefore, the 305(b) report is no longer a stand alone document and the data that would have gone into development of such a “stand alone” report was used in the production of the Integrated Report. In West Virginia, the biennial water quality assessment is conducted by the WVDEP DWWM. The Integrated Report incorporates the data and evaluations obtained from state and Federal agencies, local environmental agencies, colleges, and universities, citizen monitoring groups, and private firms. A complete list of data providers is shown on Table 3 of the Integrated Report. West Virginia relied heavily on ORSANCO’s 2006 305(b) report and use support information when making listing decisions for the Ohio River and the tributaries for which data was available. West Virginia’s Integrated Report compartmentalized the waters of West Virginia into five distinct categories which were described above. Waters are defined as being either supporting of all uses, supporting of all uses for which assessment occurred, lacking data for a determination, impaired but not requiring a TMDL, or impaired and requiring a TMDL.

Waters in Category 5, impaired and requiring a TMDL, are those placed on West Virginia’s 2006 Section 303(d) list. These waters are found as not attaining their designated uses based on monitoring data. The methodology used to determine non-attainment of designated uses is described in West Virginia’s 2006 Integrated Water Quality Monitoring and Assessment Report. West Virginia also provided the Section 303(d) list with five supplemental tables that track previously listed waters.

2. Section 130.7(b)(5)(ii), Waters for which dilution calculations or predictive models indicate nonattainment of applicable water quality standards.

West Virginia relied primarily on water quality monitoring data described above in identifying impaired segments. However, certain waters are included on the 2006 Section 303(d) list based upon modeling results associated with TMDL development. TMDL modeling of the baseline condition for all such waters indicates that pollutant reductions from existing sources are needed to ensure compliance with water quality criteria. In the majority of cases, water quality monitoring and predictive modeling reach consistent conclusions regarding the impairment status of waterbodies. In other cases, monitoring data may not be available, may not have been obtained at critical conditions or locations, or may not reflect the conditions that would exist if point sources were discharging at their permit limits. Where predictive modeling indicated that discharges in accordance with existing permit limits would cause violation of water quality criteria, the designated use of the water quality may be classified as “threatened,” thereby subjecting it to 303(d) listing and TMDL development pursuant to Section 130.7(b)(5).

3. Section 130.7(b)(5)(iii), Waters for which water quality problems have been reported by local, state, or Federal agencies; members of the public; or academic institutions.

West Virginia solicited data from entities outside of the WVDEP. Several waters were placed on West Virginia’s 2006 Section 303(d) list as a result of data collected by agencies other than WVDEP as identified in Table 2 of the Integrated Report.

- Federal agencies (i.e., U.S. Geological Survey, National Park Service, and EPA)
- State agencies (i.e., WV Department of Natural Resources, WV Department of Agriculture, and ORSANCO)
- Members of the public (i.e., Friends of Decker Creek, Friends of Cacapon River)
- Private companies (i.e., Koppers, Inc., Allegheny Energy Supply)
- Academic institutions (i.e., WV Wesleyan College)

West Virginia encouraged comment on its draft lists, and the submission of water quality data, each time the list was public noticed. West Virginia received additional data and information as comments to their Public Notice Draft 2006 Section 303(d) list. In their listing rationale, West Virginia summarized the comments and any changes that were made to the proposed list based on additional data and information.

4. Section 130.7(b)(5)(iv), Waters identified by West Virginia as impaired or threatened in a nonpoint assessment submitted to EPA under section 319 of the CWA or in any updates of the assessment.

West Virginia properly listed waters with nonpoint sources causing or expected to cause impairment, consistent with Section 303(d) and EPA guidance. Section 303(d) lists are to include all WQLSs still needing TMDLs, regardless of whether the source of impairment is a point and/or nonpoint source. EPA’s long-standing interpretation is that Section 303(d) applies to waters impacted by point and/or nonpoint sources. In *Pronsolino v. Marcus*, the District Court for the Northern District of California held that Section 303(d) of the CWA authorizes EPA to identify and establish TMDLs for waters impaired by nonpoint sources. *Pronsolino et al. V. Marcus et al.*, 91 F.Supp.2d 1337, 1347 (N.D.Ca. 2000), *aff’d*, 291 F.3d 1123 (9th Cir. 2002), *petition for cert. filed*, 71 U.S.L.W. 3531 (Feb. 6, 2003) (No. 02-1186). See also EPA’s 1991 Guidance and National Clarifying Guidance for 1998 Section 303(d) Lists, Aug. 27, 1997.

5. Other data and information used to identify waters (besides items 1-4 discussed above).

EPA has reviewed West Virginia's description of the data, information, and methodology used by West Virginia in the development of their 2006 Section 303(d) list. This includes supplemental data and information that was submitted in response to EPA's comments. It is not clear if WVDEP considered other data in addition to the categories of existing and readily available data and information listed in the EPA regulations and set out above. As mentioned previously, several Federal, state, and local agencies, citizen groups, private companies, and academic institutions provided data to WVDEP for preparation of West Virginia's 2004 Section 303(d) list. Table 3 of the Integrated Report lists 30 sources of data utilized during the listing process. After this review, EPA has concluded that West Virginia has properly assembled and evaluated all existing and readily available data and information, including data and information relating to the categories of waters specified in 40 CFR 130.7(b)(5).

C. A rationale for any decision to not use any existing and readily available data and information for any one of the categories of waters as described in Sections 130.7(b)(5) and 130.7(b)(6)(iii).

West Virginia provided its rationale for not relying on particular existing and readily available water quality-related data and information as a basis for listing waters. West Virginia DWWM staff evaluated data from internal and external sources to ensure that collection and analytical methods, quality assurance/quality control and method detection levels were consistent with approved procedures. All qualified data from available sources were used in the decision making process. EPA finds West Virginia's screening protocol and criteria described in its 2006 Integrated Report rationale narrative to be a reasonable rationale in determining the usage of outside data, as waters listed as "impaired" should be based on scientifically valid data.

D. Rationale for delisting of waterbodies from the previous 303(d) list.

West Virginia has indicated, through "Supplemental Table A", those waterbodies that were included in previous 303(d) lists but are now delisted from the 2006 Section 303(d) list. West Virginia has demonstrated, to EPA's satisfaction, its rationale for these delistings. According to the regulations at 40 CFR 130.7(b), a water may be delisted for the following reasons: more recent or accurate data; more sophisticated water quality modeling; flaws in the original analysis that led to the water being listed in the categories in section 130.7(b)(5); or changes in conditions (i.e., new control equipment, elimination of discharges).

WVDEP delisted waterbodies due to new water quality analyses demonstrating compliance with water quality standards, revisions to water quality criteria associated with the previous listing, or a modification of the listing methodology. One of the conditions outlined includes more recent or accurate data showing compliance with applicable water quality standards. For the 2006 Section 303(d) list, West Virginia submitted various sets of data demonstrating that certain waters either recovered to the point that the applicable water quality standards have been attained, or were listed in error and are currently not impaired. For other delistings, reassessments revealed that some waters were still impaired, but that the pollutants or impairment lengths had changed. These delisted water-pollutant combinations were reassessed using methodologies at least as stringent as the methodology that originally placed the water on the list.

For each segment proposed for removal from the 2006 Section 303(d) list, West Virginia provided EPA with sufficient documentation as justification. Such data included benthic macroinvertebrate data, chemical data, compliance data, and other forms of documentation. EPA reviewed

this data and approves the delisting determinations listed in “Supplemental Table A”. Decisions regarding the need for TMDL development were made in accordance with the requirements of 40 CFR 130.7(b)(1) and the state’s listing criteria.

WVDEP has also identified on “Supplemental Table B” those waterbodies where a TMDL has been completed. Consequently, these waterbodies are not included on the 303(d) list.

E. Any other reasonable information requested by the Regional Administrator described in Section 130.7(b)(6)(iv).

During the review of West Virginia’s 2006 Section 303(d) list, EPA Region III staff requested additional information from West Virginia.

- **Justification for differences between EPA recommendations and WVDEP’s final 2006 Section 303(d) list.** In comment letters dated June 16, 2006 and various electronic comments sent from September 2006 to October 2006, EPA requested clarification and amendments to West Virginia’s 2006 Section 303(d) list and WVDEP’s 303(d) decision database. West Virginia evaluated EPA’s comments and provided explanations and specific data for specific streams where the state determined the recent data showed the streams were meeting water quality standards. Where appropriate, the list was revised to resolve the discrepancy. WVDEP provided data and other documentation as necessary to support its listing decisions and database.

- **Justification for delisting segments.** West Virginia delisted a number of segments listed on the 2006 list which were provided on “Supplemental Table A - Previously Listed Waters - No TMDL Developed”. EPA reviewed the monitoring data to support delisting and requested that some segments remain on the list. West Virginia either placed the waters back on the 2006 Section 303(d) list, or provided a reasonable rationale for removing the waters. Where waters were delisted, the delisting was consistent with the CWA and implementing regulations.

- **Clarification of changes to previously listed waters.** EPA requested that West Virginia clarify changes in segment length and stream codes to previously listed waters. This information was provided to EPA to justify changes made from previous listing cycles.

EPA concludes that West Virginia has addressed all additional information EPA Region III requested of the state during the review of the 2006 Section 303(d) list.

F. Identification of the pollutants causing or expected to cause a violation of the applicable water quality standards described in Section 130.7(b)(4).

West Virginia identified the pollutants that were causing or expected to cause a violation of the applicable water quality standards for every listed segment where the identity of the pollutant was known. West Virginia included those pollutants for which a numeric water quality criterion was violated, such as fecal coliform. For violations of a narrative criterion, pollutants were rarely identified. Therefore, many waters were listed for violations of the narrative biological standard without identifying a cause since no cause was determined at the time of listing. West Virginia anticipates that the cause of biological impairments will be determined during TMDL development.

G. Priority Ranking and Targeting

Within the 2006 Section 303(d) list, West Virginia has provided TMDL development dates and a detailed discussion of both the priority ranking and schedule development in its 2006 Section 303(d) list rationale. This discussion includes a description of West Virginia's five-year Watershed Management Framework cycle for its five hydrologic groups (A-E). EPA reviewed West Virginia's priority ranking of listed waters for TMDL development, and concludes that West Virginia properly took into account the severity of pollution and the uses to be made of such waters. Scheduling, however, takes into account additional relevant factors, such as programmatic considerations (i.e., efficient allocation of resources, Watershed Management Framework cycles, and coordination with other programs or states) and technical considerations (i.e., data availability, problem complexity, availability of technical tools). Another factor West Virginia considered in prioritizing its listed waters is the schedule in the consent decree resolving *Ohio Valley Environmental Coalition, Inc., et al. v. Carol Browner, et al.*, No. 2:95-0529 (S.D.W.VA.) entered on July 9, 1997, which establishes dates for EPA to ensure TMDL development for all waters and pollutants listed on West Virginia's 1996 Section 303(d) list.

In addition, EPA reviewed West Virginia's identification of WQLSs targeted for TMDL development in the next three years, and concludes that the targeted waters are appropriate for TMDL development in this timeframe. High priority has been placed on these stream segments. For other impairments where the timing of TMDL development is less certain, multiple year entries were indicated that represent the opportunity for TMDL development per the Watershed Management Framework cycle.

Although West Virginia's projected TMDL development dates do not strictly follow EPA's pace guidance of completion with eight to thirteen years since initial listing, West Virginia's TMDL development plans appear consistent with the guidance in that West Virginia plans to develop TMDLs for approximately 100 impaired waters per year and attempts to simultaneously develop TMDLs for all known impairments. The 2006 Section 303(d) list identifies eleven lakes and 1,131 streams. Given West Virginia's TMDL development rate of approximately 100 waters per year, it is likely that West Virginia will comply with EPA's pace guidance.

H. Coordination with the U.S. Fish and Wildlife Service

During West Virginia's public comment period, EPA sent a copy of West Virginia's Draft 2006 Section 303(d) list in electronic correspondence on October 30, 2006, to the West Virginia Field Office of the U.S. Fish and Wildlife Service (FWS). EPA requested comments from FWS regarding the draft list. No comments from FWS were received.

August 18, 2006

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Mr. Merrill:

Pursuant to requirements contained in the federal Clean Water Act, 40CFR130 and in current federal guidelines, I am hereby transmitting to your office West Virginia's 2006 Integrated Water Quality Monitoring and Assessment Report. The report represents a lengthy review of all existing and readily available water quality information on West Virginia's waters, contains information on our assessment methodologies and includes the West Virginia 2006 Section 303(d) List. The Section 303(d) List component is being officially submitted for your approval.

In support of the submission, the following information is provided on the included CD:

- An electronic copy of the document
- Spreadsheets containing information on stream segments in each of the five assessment categories
- West Virginia's 303(d) decision database with supporting electronic data files
- A spreadsheet identifying and rationalizing the changes, including stream code updates, made to the Section 303(d) List and supplements in the time since the documents were released for public comment.

The Integrated Report contains a Responsiveness Summary addressing public comments received in response to the Draft Section 303(d) List. Hard copies of public comments received are also enclosed.

Consideration was given to the comments provided by EPA Region III. DEP reactions to the more substantive issues are provided below:

Classification of the ammonia impairments of Stony River (WVPNB-17) and Fourmile Creek (WVPNB-17-C) under Category 4B

The subject impairments result from the use of anhydrous ammonia for the treatment of acidity and metals in mining related discharges subject to a WV/NPDES Permit. Controls will be applied through permitting and/or enforcement actions and both waters are anticipated to be compliant with ammonia water quality criteria prior to the development of the 2008 Section 303(d) list.

Classification of the biological and temperature impairments of Stony River (WVPNB-17) under Category 4B

The public notice draft inadvertently omitted Category 4B temperature and biological impairments for the segment of Stony River between Mount Storm Lake and Fourmile Creek. The discharge from Mount Storm Lake is believed responsible for elevated stream temperatures and associated changes in the biological communities in the segment of Stony River below the lake. Currently, Virginia Electric and Power Company (a unit of Dominion Resources, Inc.) operates the Mt. Storm Power Station using Mt. Storm Lake, as a source of cooling water for the coal-fired power generation facility. The current NPDES permit expires in November 2006 and upon reissuance, will require operational modifications as necessary to reduce or eliminate thermal impacts to this segment of Stony River.

Identification of Previously Developed Total Aluminum TMDLs

Supplement E has been added to display streams for which obsolete total aluminum TMDLs have been developed.

Ohio River Mainstem Data

The Ohio River impairment decisions are based primarily on data obtained from the Ohio River Sanitation Commission (ORSANCO). ORSANCO maintains an extensive water quality sampling program for the Ohio River and works in conjunction with other states to standardize its pollutant sampling list. DEP assessments were based upon data included in ORSANCO's 2006 305(b) report.

Impairment Naming Convention for Aluminum Listings

As requested, DEP changed the name of aluminum listings in the List, Supplements and Decision Database from "aluminum" to "aluminum (d)" to clarify that identified impairments are based upon dissolved aluminum water quality criteria.

Table of Data Providers

As requested, the "Data Providers" table has been updated to reflect entities who submitted data for the 2004 Integrated Report, if their data was considered in the preparation of 2006 report.

Additional Changes made by DEP

In addition to the changes specifically noted above, DEP identified several errors in the draft Section 303(d) List, which were corrected to accurately reflect the current status of WV waters. Documentation of DEP-initiated changes is included in the spreadsheet denoting changes made to the Public Notice draft document.

The document represents the best efforts of our staff and I am confident that you will find the report to be both informative and compliant with applicable guidance. The report as submitted to your office is available on our website, although we do not intend to print and distribute the

document until we obtain your approval of the Section 303(d) portion. As such, I look forward to your timely review and stand ready to explain our actions in any detail necessary for your approval. If you or your staff have any questions or would like to discuss any issue in greater detail please contact Dave Montali or me at (304) 926-0499 (exts.1063, 1046).

Sincerely,

signed
Patrick V. Campbell
Assistant Director

Attachments

cc: Lisa McClung, Director, DEP-DWWM
Jennifer Sincock, US EPA
Mark Barath, US EPA
James Laine, DEP-DWWM

December 22, 2006

Larry Merrill
Office of Watersheds
US EPA Region 3 (3WP30)
1650 Arch Street
Philadelphia, PA 19103-2029

Dear Mr. Merrill:

Following our telephone conversation of December 14, 2006 and a review of comments provided by your staff, the WVDEP made various revisions in anticipation of EPA approval of the Section 303(d) components of the 2006 Water Quality Monitoring and Assessment Report. WVDEP also modified portions of the report in response to questions and comments provided relative to the Section 305(b) components. For any unresolved 305(b) issues, WV DEP would anticipate continued dialogue between our agencies. Resultant modifications to our report/process will be included in the 2008 report.

Specific to the 2006 Integrated Report, the WVDEP made the following final revisions:

1. Ohio River mainstem (WVO) - resolved issues with bacterial listings, categories and use supports for the Middle Ohio North and Middle Ohio South segments.
2. Toppers Creek (WVKP-13) - removed dissolved aluminum listing from Supplement A and added segment from Legg Fork to Headwaters to Supplement B1 to be consistent with the Toppers Creek TMDL.
3. Little White Oak Branch (WVKC-10-T-22.5) - removed pH impairment from Supplement B1 and included it on Supplement A after confirming pH no longer warrants listing consistent with the Coal River Watershed TMDL.
4. Added Cacapon Institute to the list of data submitters (Table 3).
5. Corrected the errors in the "Biological Impairment" narrative on Page 33 to be consistent with Figure 9.
6. Corrected the finalization year for the Cheat TMDL to 2009 on page 36.
7. Revised Page 50 to provide a list of entities providing comment on the Draft 2006 Section 303(d) List.

8. Corrected the list reference date in last sentence of the last paragraph (2002 changed to 2004) of the List Key description page.
9. Tables 5 & 6 and the Section 6 narrative have been updated to reflect all revisions.
10. Added narratives describing Supplemental Tables A – F.

Enclosed with this correspondence is a CD containing the revised West Virginia 2006 Integrated Water Quality Monitoring and Assessment Report and an updated version of the 2006 decision database. In addition, the CD contains additional electronic files with revised versions of stream impairment/use attainment determinations and categorical listings. A spreadsheet with an updated version of the 2006 Section 303(d) list and supplemental tables is also included. The spreadsheet contains a tab identifying changes made since the release of the draft document. Further, we anticipate delivering all information necessary to populate EPA's ADB by January 5th, 2007.

WVDEP remains willing to cooperate in any manner necessary to support EPA's approval of the Section 303(d) List. If you or your staff have any questions or would like to discuss any issue in greater detail, please contact Dave Montali or me at (304) 926-0499.

Sincerely,

signed
Patrick V. Campbell
Assistant Director

Attachments

cc: Lisa McClung, Director, DEP-DWWM
Jennifer Sincock, US EPA
Mark Barath, US EPA