

Baseline Water Quality (BWQ) Assessment Procedures

As a result of the Department of Environmental Protection's (DEP) Antidegradation Implementation Procedures, Title 60, Series 5, effective July 2, 2001, various entities will be generating information that will be used by WVDEP to establish BWQ for water segments throughout the state. This guidance is provided to assist generators of BWQ data and the agency staff that become responsible for the review of the data and the establishment of BWQ. It contains various specifications for sample collection and analysis that, when adhered to, should produce the "recent and reliable" data required by the rule. It also provides direction on water segment definition, BWQ sampling locations, and pollutants of concern for regulated entities. Finally, it identifies the procedures that the agency intends to use to interpret the data in its establishment of BWQ.

For any new or expanded operation seeking permit coverage, BWQ must be established for the receiving water segment into which a regulated entity intends to discharge before permitting decisions can be made. If adequate water quality data is not available to establish BWQ, regulated entities will be required to generate and provide it. Regulated entities may elect to generate BWQ data immediately prior to seeking approval of new or expanded activities. Alternatively, they may elect to generate data well in advance of any planned activities, so as to facilitate future approval processes. Environmental groups, trade organizations, the general public, the WVDEP and various other governmental agencies may also elect to generate BWQ data. Multiple regulated entities located on a water segment may combine resources to generate BWQ data and may join with other watershed stakeholders in the effort.

The technical complexity associated with this process precludes establishment of universally applicable procedures. Antidegradation decisions must be based on the 60 CSR 5 and 46 CSR 1 rules as applied to the activity being considered. Deviation from this guidance is acceptable provided that it is technically justified. Given the complexity of the issue, potential generators of BWQ data are expected to notify the agency of their intent to generate data and to obtain agency concurrence on proposed sampling protocols, location, parameters, etc. prior to initiating data collection efforts. The initial consultation with the agency may also be used by regulated entities to evaluate the availability of existing data that may be used as a supplement to, or in lieu of, new BWQ data generation. During data generation projects by regulated entities or third parties, WVDEP may conduct onsite inspections to verify that generators are adhering to established protocols, and may split samples for independent analysis. Generators that proceed without agency notification and concurrence risk rejection of the data and significant delays in the permitting process.

Potential generators of BWQ data are also encouraged to notify other regulated entities and stakeholders in the segment, of their intent to generate BWQ data.

Stakeholder cooperation in the BWQ assessment process may allow sharing of the cost of data generation and avoiding contention in subsequent permitting actions.

Water segment delineation and BWQ sampling location

For proposals by regulated entities that entail a new or expanded discharge, the location of the proposed discharge point will determine the affected water segment. Generally, the BWQ assessment location will be the downstream limit of the identified segment. Certain factors, including, but not limited to, the ability of the data generator to legally and practically access the location may necessitate adjustment of the location.

The agency intends to delineate water segments in sufficient detail to allow distinct BWQ assessments to be performed on our smallest streams that are capable of meeting the sampling and analytical protocols specified herein. Subsequent downstream segment delineations will be bounded by the intersection of tributaries. WVU's Natural Resources Center has provided a GIS coverage of stream segments and associated watersheds that is generally consistent with the agency's segment sizing intent. The coverage will be placed on servers at the Division of Water Resources and the Division of Mining and Reclamation for agency use. DEP will initially use this coverage to identify BWQ assessment locations, and will also use it as a basis for an electronic system to track BWQ assessments and manage any future allocations that are granted through permitting. An excerpt from the initial GIS coverage is provided at the end of this document.

Although the coverage in its current form will allow efficient location of BWQ assessment points for many stream segments, certain revisions and refinements to the coverage are needed. Additional delineation is necessary in certain areas where two or more streams are represented by an individual segment and watershed. Alternative segmentation approaches for the Ohio River and Upper Kanawha River that consider the presence and influence of locks and dams will be developed. For streams upon which lakes and reservoirs are located, the summer pool elevation will be used to establish the downstream boundary of water segments entering the lake. The lake outlet will serve as the downstream boundary of the lake segment. In karst areas where springs and/or sinks are identified, the upper boundary of water segments will generally be established at the point of the emergence of the spring, and the lower boundary will generally be established at the point that surface water sinks. The downstream boundary of water segments exiting the state will be established at the state line.

Finalization of a statewide water segment delineation and BWQ tracking system will take months to complete. After such development, future periodic refinements are envisioned. The present uncertainty associated with segment delineation emphasizes the need for potential BWQ data generators to consult with agency staff prior to initiating data generation activities. Prior to this consultation, regulated entities should investigate all waters potentially impacted by proposed activities to assure comprehensive identification of waters where the monitoring protocol can be accomplished.

Sampling and Analytical Protocol

It is important to note that the BWQ pollutant concentration derived from the data generated will be assumed to be the concentration present at the minimum seven consecutive day drought flow with a 10 year return frequency (7Q10). For most permitting scenarios, antidegradation decisions will be based on the low-flow BWQ concentration in conjunction with the 7Q10 flow of the receiving stream, the projected effluent quality and the projected effluent flow. Future permitting guidance will describe in more detail the procedures to be utilized in the assessment of degradation.

The elements of an acceptable BWQ monitoring plan include the following provisions:

At least 12 samples should be collected over a minimum six month period. Two samples should be obtained every month, at least seven days apart, for the entire sampling period. Generators may sample more frequently than specified, but are expected to provide the results of all monitoring. The generator should note any monitoring that does not conform to the specifications of this guidance. Only qualified monitoring results will be used in the establishment of BWQ.

Sampling should be limited to when there has been less than 0.3 inches of rain in the three days prior to sampling or less than 0.1 inches of rain in the 24 hours prior to sampling. The generator of BWQ data should install and maintain a rain gauge within a three mile radius of the BWQ sampling location to ensure that all samples taken are representative of the described conditions.

All samples should be taken when there is a measurable surface flow in the stream segment at the BWQ sampling location.

If environmental conditions prevent achieving the minimum collection requirements, the sampling period should be extended until at least 12 samples are obtained. In the event that environmental conditions allow the collection of only one qualified sample in a particular month, the data associated with that sample should not be rejected.

In general, for stream segments classified as third order or lower, an individual grab sample collected at the approximate center of flow is appropriate. For higher order streams, a sampling plan should be developed and submitted to the agency prior to the initiation of BWQ data generation. The plan should be designed to ensure that representative sampling is performed and may include width and/or depth integrated compositing techniques, as appropriate. When identifying stream order for this specific purpose, the Strahler¹ system should be utilized and the uppermost blue line traces on the USGS 1:24,000 topographic maps (solid or dashed) in a watershed should be considered to be first order streams. An example of the Strahler ordering system is provided at the end of this document.

¹ Strahler, A.N., 1957. Quantitative Analysis of Watershed Geomorphology. *Trans, Amer. Geophysical Union*, volume 38, pp. 913-920.

Samples, containers, preservation, holding time and analysis shall be conducted in accordance with Guidelines Establishing Test Procedures and Analysis of Pollutants in 40 CFR Part 136 and performed by a laboratory certified by West Virginia's Quality Assurance Program. The use of other validated analytical methodologies may be authorized where such use can be technically justified.

Stream flow shall be measured each time BWQ sampling is performed. Acceptable methods for flow measurement include:

- ❖ U.S. Environmental Protection Agency (EPA) manual: "MCD-77 NPDES Compliance Flow Measurement Manual"
- ❖ U.S. Geologic Survey (USGS) manual: "Techniques of Water Resources Investigations of the United States Geologic Survey" Chapter A8, Book 3, "Discharge Measurements at Gauging Stations".

Parameters of Concern

Regulated entities that propose a new or expanded activity may be required to generate BWQ data for any parameters of concern associated with the proposed activity. Parameters of concern would be those pollutants reasonably expected to be present in the discharge that have a West Virginia numeric water quality criteria established. In addition to the parameters of concern, regulated entities may also be requested to provide water quality data for parameters necessary to determine the value of water quality criteria (e.g. pH, temperature, hardness.) If a dissolved metal is a parameter of concern, a regulated entity may also be requested to provide information necessary to translate the total metal present in the discharge to an instream dissolved concentration. Again, the importance of consultation between BWQ data generators and agency staff prior to BWQ data generation cannot be over-stressed.

Interpretation of data and the Establishment of BWQ

Generators of BWQ data are expected to provide documentation of their adherence to established protocols and certification that the submitted information is true, accurate and complete. Qualified data will be reviewed upon its availability and the agency will determine BWQ for individual water segments on a parameter-by-parameter basis. Final BWQ determinations will be publicized upon their establishment.

In general, the agency will perform an arithmetic average of all qualified data to determine BWQ for a particular parameter. For datasets that contain only "not detected" analytical results, BWQ may be considered to be zero, provided that the pollutant is anthropogenic in origin, there is no upstream human activity, atmospheric deposition is unlikely, and appropriately sensitive analytical methodologies were employed. Otherwise, the "not detected" analytical results will be treated as follows:

If the method detection level (MDL) is equal to or less than the applicable water quality criterion, one-half of the detection level should be assigned.

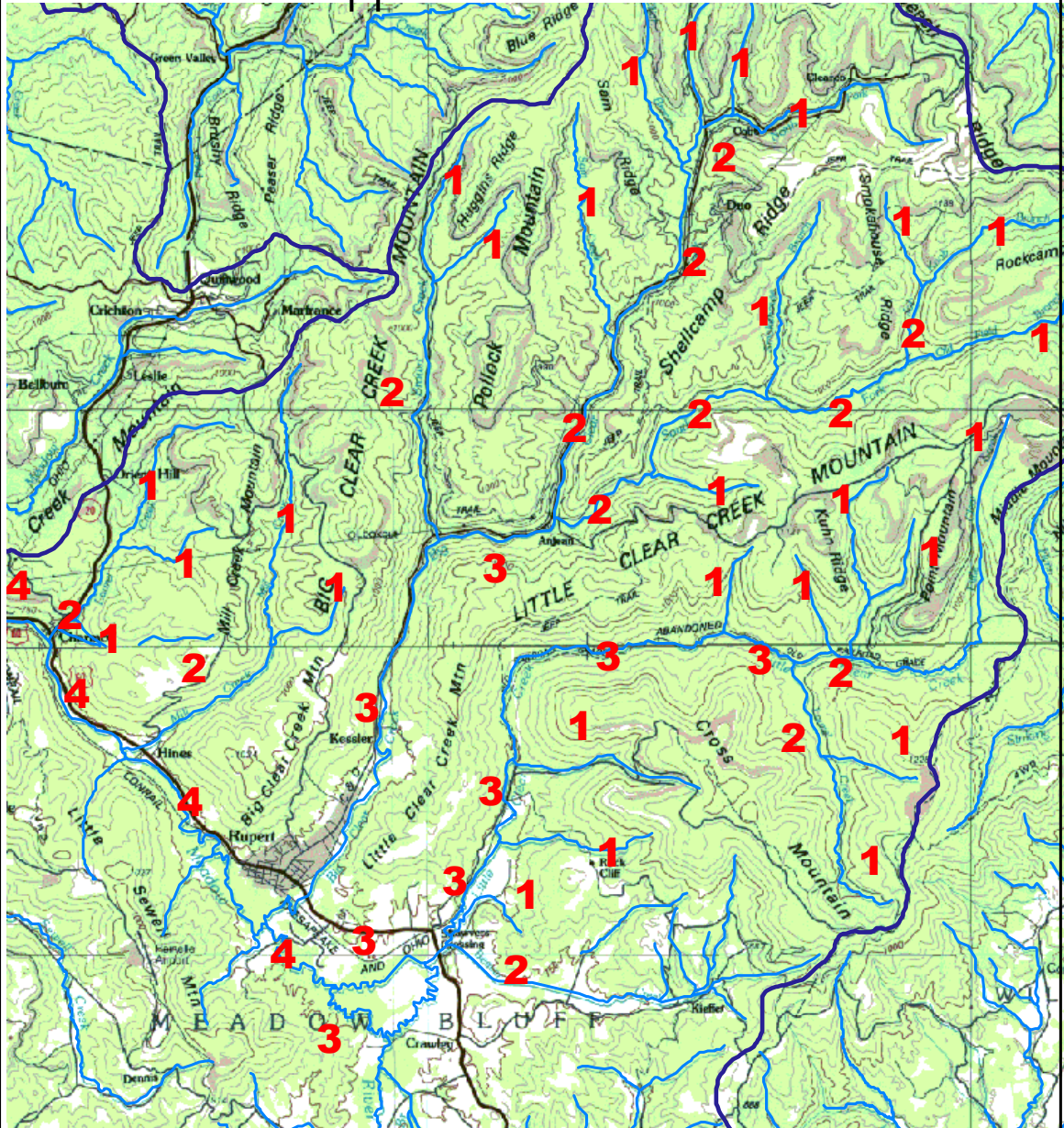
If the MDL is greater than the applicable water quality criterion, one-half of the water quality criterion should be assigned.



Generators should make every effort to use the most sensitive, practical analytical methods available. The use of less sensitive analytical methods may cause rejection of the dataset.

Generally, the agency will use the initial BWQ value established for a particular pollutant parameter in a water segment to judge the impact of all subsequent, proposed new or expanded activities involving that parameter. BWQ reassessments may be appropriate if the data used in the original determination is shown to have been negligently or fraudulently generated, or if the water quality of the segment is believed to be significantly improved over that which existed at the time of the original BWQ determination. Affected stakeholders may petition the Secretary of the WVDEP to authorize BWQ reassessment under those circumstances.

STREAM ORDERING EXAMPLE

Upper Meadow River



- 1 - 4** Stream Order
-  Watershed border
-  DNR coded Reach3 hydrology

SEGMENT DELINEATION EXAMPLE UPPER MEADOW RIVER WATERSHED

