

Chapter 6

Water Quality Standards

Level 1 Volunteer Water Quality Monitoring Training Notebook

National Water Quality Standards

Program Basics

The Water Quality Standards (WQS) program under the Clean Water Act (CWA) requires states to implement their own rules in order to protect water quality at the state level; however, the states must adopt statutes and rules that are at least as strict as federal law. State standards must serve the purposes of the CWA sections 101(a)(2) and 303(c), which means that where attainable, the state must provide water quality for protection and propagation of fish, shellfish, and wildlife; and for recreation in and on the water while taking into consideration public water supplies, navigation, agriculture and other beneficial uses. This statement sets the basis for water quality protection throughout the nation.

The WQS program is divided into the following basic categories:

- Defining goals for a water body by setting its designated uses (example: swimming, fishing, drinking water, aquatic life protection, etc.)
 - Existing uses are those attained on or after November 28, 1975, whether or not they are designated or listed in state Water Quality Standards
- Criteria for measuring attainment of those uses (example: arsenic, dissolved oxygen, lead, mercury, temperature, etc.)
- Antidegradation policies to protect from further degradation of water quality and;
- General policies needed to protect water quality within the state.

These basic categories provide protection to streams based on their designated uses (Example: swimming in the Meramec River). Water quality criteria are then used to determine if water quality is attaining the designated use (Example: <206 *E. coli* bacteria per 100 mL of water expressed as a recreational season geometric mean). Pollutant levels that would exceed the criteria are prohibited (Example: a recreation season geometric mean of 425 *E. coli* bacteria per 100 mL of water). For some designated uses, such as aquatic life protection, multiple water quality criteria may be used to evaluate the designated use attainment. Water quality criteria that are not being met result in the stream being placed on the impaired waters list, also known as the 303(d) list, based on Section 303(d) of the CWA. For more information on Water Quality Standards reference:

- Water Quality Standards Regulations and Federally Promulgated Standards <http://water.epa.gov/scitech/swguidance/standards/wqsregs.cfm>
- Water Quality Standards Handbook (easy to understand explanations) <http://water.epa.gov/scitech/swguidance/standards/handbook/index.cfm>.
- Webcasts (including public participation at the federal and local levels) http://www.epa.gov/watershedacademy#CP_JUMP_460174
- National Recommended Water Quality Criteria <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

State Water Quality Standards

The best approach for understanding Missouri's WQS is to study the rule and ask plenty of questions. Reading rule language may not be on your bucket list of reading material, but it will help you determine if advocacy is something you want to pursue. The basics of the rule will be discussed here, but citizens are encouraged to do research to improve their understanding and involvement. Since streams are the focus of the VWQM program, emphasis in this chapter is on streams alone. However, lakes and wetlands are also protected by standards. The Missouri Clean Water Law and WQS can be accessed at <http://dnr.mo.gov/env/wpp/lawsregs.htm>.

Authority and Responsibilities

As previously stated, the duty to implement WQS is left to the state. In Missouri, the WQS program is administered by the Missouri Department of Natural Resources (MoDNR), Water Protection Program (WPP). Due to state water quality standards being more in depth than the national program, inquiries about state WQS should be brought to MoDNR.

Water quality is protected through several processes, including setting goals, permitting to protect those goals, monitoring and assessing goals to ensure attainment, etc. The following water quality based schematic shows how all the different portions of managing water quality are integrated.



Assigning Protection to a Stream, Classifications and Designated Uses– Step 1

Missouri streams are categorized for protection by their designated use, plus their hydrologic classification (perennial (P), perennial backwaters (P1), intermittent (C), and unclassified) and size classification (Headwater, Creek, Small River, Big River, and Great River). Designated and Beneficial Uses can be explored in depth by visiting: http://dnr.mo.gov/env/wpp/wqstandards/wq_uses.htm. Any changes to a stream's designated use or classification must follow guidelines set forth by the department. Some streams are segmented because of changes in classifications or designated uses. Since a specific stream may be divided into several segments, they are tracked by a Water Body Identification Number (WBID) in the Missouri Clean Water Information System (MoCWIS). Depending on

the designated uses and classification, the stream segments may be listed in several different tables or data sets (see below). Unclassified streams do not have designated uses and are not listed in the tables or MoCWIS.

- Missouri Use Designation Dataset—A digital geospatial dataset used in conjunction with geographic information systems and maintained by the department. This dataset documents the names and locations of the state’s rivers, streams, lakes and reservoirs which have been assigned designated uses. The initial version of this dataset, as adopted on November 6, 2013, reflects Tables G and H. The dataset uses the geospatial framework provided by the National Hydrography Dataset and is enhanced and supported by hydrological and physical information obtained through the Missouri Resource Assessment Partnership (**MoRAP**) and other scientific sources. The dataset is limited in geographic extent to the state of Missouri.
- Table C – Waters Designated for Cold-Water Fishery
 - Specific listing of streams protected for cold-water aquatic life
- Table D – Outstanding National Resource Waters
 - Specific listing of streams protected by Scenic Rivers congressional law
- Table E – Outstanding State Resource Waters
 - Specific listing of streams protected for outstanding water quality
- Table F – Metropolitan No-Discharge Streams
 - Specific listing of streams within city limits protected from receiving sewer discharges
- Table I – Biocriteria Reference Location
 - Specific listing of streams used for reference of biological criteria development

As an example, look at Meramec River segments in the WQS table noting the differences between WBID, Water Body Name, Class, Uses, and Table:



**Missouri Department of
Natural Resources**
Clean Water Information System

- Online Services
- Contacts
- Definitions

Water Quality Standards Search

County DS:

HUC8:

Standards Table: C - Waters Designated for Cold-Water Fishery
D - Outstanding National Resource Waters
E - Outstanding State Resource Waters

Water Body ID:

Water Body Name:

Class:

Uses:

Metro Area:

Search Results

County DS	HUC8	Water Body ID	Water Body Name	Class	Metro Area	Size	Uses	Table	Legal DS	Legal US
Crawford	07140102	1860.00	Meramec R.	P		10.00	AQL, CDF, CLF, GEN, LWW, SCR, WBC A	H	22,38N,5W	6,37N,5W
Crawford	07140102	1861.00	Trib. to Meramec R.	C		0.80	AQL, GEN, LWW, WBC B	H	Mouth	29,38N,5W
Crawford	07140102	1871.00	Meramec R.	P		38.90	AQL, CLF, GEN, LWW, SCR, WBC A	H	7,37N,5W	19,34N,4W
Crawford	07140102	10032.00	Meramec River			8.00		E	1,40N,2W	25,40N,2W
Crawford	07140102	10033.00	Meramec River			3.00		E	25,39N,3W	2,38N,3W
Crawford	07140102	100238.00	Meramec River			10.00		C	22,38N,5W	Hwy. 8

Please pay special attention to the Legal DS (Downstream) and Legal US (upstream) ends of a segment, which specify the most downstream and upstream ends of the WBID. There are approximately 115,772 miles of classified streams in Missouri and many different streams across the state have the same name or are unnamed, so be sure to note which county the stream is located in to help prevent confusion. A good example is the common stream name of Turkey Creek:

Callaway	10300102	732.00	Turkey Cr.	C	3.30	AQL, GEN, LWW, WBC B	H	Mouth	3,44N,11W
Cape Girardeau	07140105	1829.00	Turkey Cr.	P	2.00	AQL, GEN, LWW, WBC B	H	Mouth	32,33N,14E
Cape Girardeau	07140105	1830.00	Turkey Cr.	C	2.20	AQL, GEN, LWW, WBC B	H	32,33N,14E	36,33N,13E
Carroll	10300101	361.00	Turkey Cr.	P	4.70	AQL, GEN, LWW, WBC B	H	Mouth	14,53N,25W
Carroll	10300101	362.00	Turkey Cr.	C	3.50	AQL, GEN, LWW, WBC B	H	14,53N,25W	34,54N,25W

Note in the table above that Turkey Creek occurs in at least three different counties. If you were looking for Turkey Creek in Carroll County, also note that it is listed twice as WBID 361 and 362. In this case the difference is classification (segment 361 is Class P and segment 362 is Class C). Different rules for protection could apply to the two different segments of the same stream. The public search page for classified streams is located at: http://dnr.mo.gov/mocwis_public/waterQualityStandardsSearch.do.

Criteria for Water Quality - Narrative and Numeric

A *standard* provides a means by which MoDNR can measure attainment of the desired water quality goals. This measurement can be made by comparing stream samples against the criteria established for each designated use. These criteria may be expressed through a narrative or numerically.

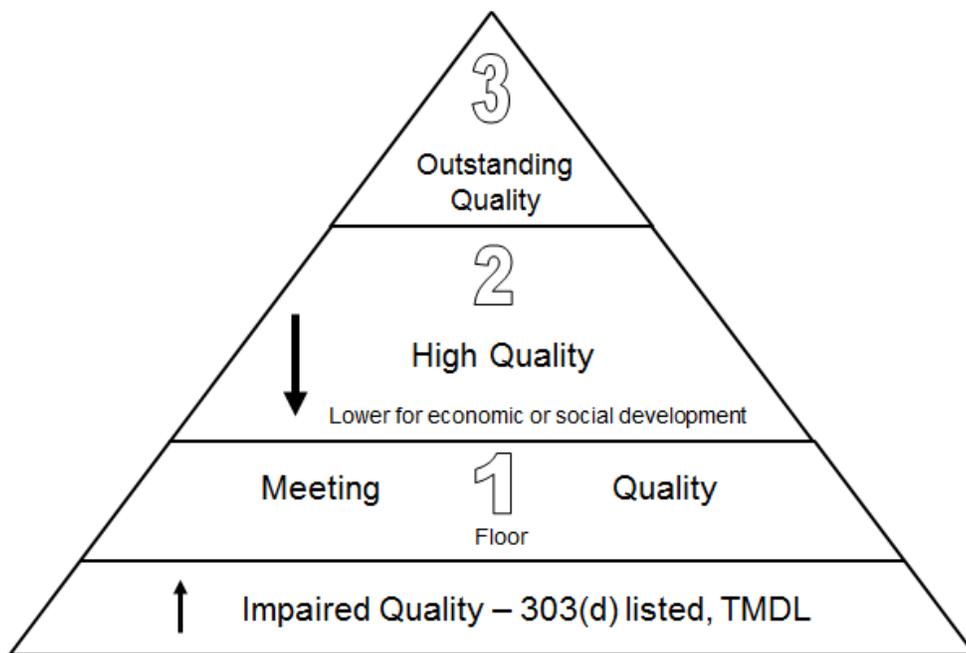
Narrative criteria are expressed with words, rather than as a numeric value. Narrative criteria are descriptions or “free from” statements (“Waters shall be free from...”). Missouri’s narrative criteria are defined in rule at 10 CSR 20-7.031(4) General Criteria. *General Criteria are applicable to all waters of the state and are the only criteria in rule to protect unclassified waters.* General criteria are the most basic protection applied to waters in the State. For instance, a fish kill may be an exceedance of the general criterion to prevent acute toxicity (death) to aquatic life, and is probably also an exceedance of one or more numeric criteria for protection of aquatic life.

Numeric criteria set specific quantifiable limits on how much of a measured parameter (a pollutant) are allowed to be in the water. Sometimes the parameter being measured is obviously a pollutant that should not be in the water in any quantity (e.g., oil or pesticides). However, it may be an element that exists naturally in stream water, often playing an important role in maintaining a healthy balance in the water’s chemistry. If for any reason the element becomes too plentiful or too scarce, it will disrupt the chemical/physical balance of the stream environment. For example, a certain amount of dissolved oxygen is a critical component of good quality water. If the level of dissolved oxygen in the stream drops below the minimum required amount, aquatic life (such as fish, crayfish and many aquatic insects) will die. Therefore, there are numeric criteria for the minimum concentration of dissolved oxygen. *Numeric criteria are applicable only to classified water bodies.* The criteria are defined in length within the rule language; with the numeric criteria and corresponding designated use listed in Tables A – B, of 10 CSR 20-7.031.

Antidegradation Policy

Antidegradation policy is a very important part of the WQS program. The policy provides base line protection (or “floor”) for water quality in the State. This is done by requiring that existing water quality that attains the existing uses must be maintained and protected. For example, streams with exceptional

water quality MUST be maintained at all times in order to protect all existing uses. Remember that existing uses do NOT have to be designated or defined in rule. They only have to be attained on or after November 28, 1975, as stated in the federal regulation. Another way a “floor” for water quality is protected is by prohibiting the lowering of existing water quality except to accommodate important economic and social development. Requirements to meet this exception are extremely stringent and must be proven by a permittee. The diagram below summarizes how antidegradation works in Missouri. More in-depth antidegradation information, including the rule referenced policy document and webcasts, are located at http://dnr.mo.gov/env/wpp/wqstandards/wq_antideg_pol.htm



The 305 (b) Report and 303(d) List – Steps 2 and 3

The state of Missouri is required to develop a report as a requirement of Sections 305(b) and 303(d) of the CWA. The report is used to summarize water quality issues as well as to determine the progress Missouri has made in meeting the CWA goals. The report categorizes assessments made to waters of the State as good, threatened, or impaired based on attainment of designated uses.

The 303(d) list is part of the report and lists all impaired waters in the state for which impairment has NOT been addressed. Impaired waters are those that do not meet all applicable water quality standards and will not meet standards even if all wastewater discharges receive conventional treatment. A stream placed on the 303(d) list requires a scientific study of the impairment to determine how to fix the water quality issues. Assessment methodologies used to develop the list are described in rule at 10 CSR 20-7.050. There is a public comment period during the development of the 303(d) list and the assessment methodology. More information can be found at: <http://dnr.mo.gov/env/wpp/waterquality/index.html>.

Use Attainability Analysis (UAA) – Step 4

Sometimes the designated uses for a stream are not possible to attain, no matter the efforts put forth to protect, restore, or maintain water quality goals. In these instances, a use attainability analysis (UAA) is conducted to adjust water quality goals via designation of different uses or even removal of designated uses. For example, a very small stream that only has water or flow during rain events has a

designated use for swimming (whole-body contact recreation). In this case it may be proven through the UAA process that the stream is not capable of supporting the designated use. Each designated use has its own UAA process to be followed. Parties requesting the change or removal of a designated use are responsible for performing the UAA.

Alternatively, a UAA may be done to prove that a recreational use does exist, resulting in the designation of that use for a waterbody. More information on the Missouri UAA process, public comments on specific waters, and completed UAAs can be found at: <http://dnr.mo.gov/env/wpp/wqstandards/uaa/index.html>.

Total Maximum Daily Load (TMDL) – Step 5

A Total Maximum Daily Load (TMDL) refers to the maximum amount of a given pollutant a waterbody can absorb before its quality is affected. Every stream on the 303(d) list will have a TMDL written. A TMDL document identifies the impaired stream, specifies the pollutant(s), calculates how much load (i.e., how much pollution) the water body can handle, and provides a plan to remediate the pollution problem. The plan includes allocations of the acceptable load for all sources of the pollutant, both point and nonpoint sources.

The Department uses various factors for prioritizing water bodies on the 303(d) List and scheduling TMDL development. Some factors considered in scheduling TMDL development include:

- Risks to human health and the environment
- Data availability
- Public concern/support
- Modeling needs
- Water quality standards revisions
- Permit renewals
- Department initiatives (permit synchronization)

TMDLs go through a 45-day Public Notice period for public review and comment. For more information about TMDLs visit <http://www.dnr.mo.gov/env/wpp/tmdl/index.html>.

Permitting Wastewater Discharges – Steps 6 to 8

Discharging pollutants to a water of the State is a privilege, not a right. Individuals, municipalities, or industries can only discharge pollutants to waters of the State if they apply for and receive a permit. The permit, which may include several outfalls, puts specific limits on the quantities of pollutants that can be discharged into state waters. These limits ensure the pollutant concentration will not cause the impairment of any designated uses. When a permit is being issued or renewed, there is a 30-day public comment period before issuance of the permit. As long as the limits specified in the permit satisfies the conditions governing the protected stream and the permit remains in good standing, MoDNR MUST issue the permit. In order to keep their permit in good standing, the permittee must continue to meet the specific pollutant limits stated in their permit (stay in compliance). Water samples are routinely collected from outfalls and tested to determine if discharges are in compliance. If permit limits are not met, the discharge is out of compliance. In these situations MoDNR Enforcement and Compliance staff work with the permittee to return to compliance with the permit limits. Severe and long-term cases are reported to the Missouri Attorney General's Office for enforcement action. More information on permits can be found at <http://dnr.mo.gov/env/wpp/permits/index.html>. For enforcement actions taken by the State visit <http://dnr.mo.gov/env/wpp/enf/> .