Category 4b Demonstration for Point Source Impaired Waters and the Permit in Lieu of a Total Maximum Daily Load Process for the State of Missouri

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ABSTRACT

Section 303(d) of the Clean Water Act (CWA) and the US Environmental Protection Agency's (USEPA's) supporting regulations in 40 CFR Part 130.7 require states to develop lists of waterbodies impaired by a pollutant and needing a Total Maximum Daily Load (TMDL) (i.e., the Section 303(d) list) and to prepare a TMDL for each water body/pollutant combination. USEPA's regulations also recognize that other pollution control requirements may obviate the need for a TMDL. These alternatives to TMDLs are commonly referred to as Category 4b waters as described in USEPA's Integrated Reporting Guidance for Sections 303(d), 305(b), and 314 of the CWA.

For the 2006 reporting cycle, Missouri Department of Natural Resources (MDNR) assigned 16 impaired waters to Category 4b, where a single point source was identified as the sole source of the impairment. Hence, the foundation of MDNR's Category 4b demonstration for these waters is the discharge limits identified in the associated NPDES permits. MDNR refers to these Category 4b waters as permit in lieu of TMDL waters, or PILs for short. Pollutants covered under these PILs include ammonia, biochemical oxygen demand, non-volatile suspended solids and volatile suspended solids (or total suspended solids or non-filterable residue). MDNR has developed a comprehensive and efficient process for identifying PILs and developing the appropriate Category 4b documentation. PILs are initially identified when: (1) all segments have negligible nonpoint source loading for the pollutant of concern so the facility is the sole source of the pollutant, (2) a defensible Wasteload Allocation (WLA) can be calculated to meet in-stream water quality standards (WQS), and (3) an enforceable permit has been finalized that includes a date certain schedule of compliance to achieve water quality based effluent limits (WQBELs). In order to ensure date certain compliance with the WQS, the final Missouri State Operating Permit includes: (1) WQBELs or other requirements necessary to meet WQS in the impaired segment, (2) a schedule of compliance to meet WQBELs or other requirements (typically three years from issuance), and (3) an in-stream monitoring requirement to demonstrate WQS are being met. MDNR's Category 4b documentation for PILs includes the Final Missouri State Operating Permit, Missouri DNR Fact Sheet or Statement of Basis, Missouri Water Quality Review Sheet, stream survey and water chemistry data, and copies of model output and/or spreadsheets that demonstrate WLA will result in meeting WQS. MDNR tracks the progress of permit requirement implementation to ensure critical milestones and dates are met. PILs are being completed both during and between listing cycles allowing for progress on meeting consent decree requirements.

This paper presents MDNR's process for assigning PILs to Category 4b according to USEPA's Category 4b guidance, lessons learned in developing the process, and potential challenges for maintaining these waters in Category 4b for future 303(d) reporting cycles. This paper also describes several successful examples of PILs in Missouri.

KEYWORDS

TMDL, alternative, Category 4b, impairment, point source, dissolved oxygen, suspended solids

INTRODUCTION

Section 303(d) of the Clean Water Act (CWA) and the U.S. Environmental Protection Agency's (USEPA) 1992 supporting regulations (see 40 CFR 130.7) require states, territories, and authorized tribes (herein referred to as states) to develop lists of waters impaired or threatened by pollutants (i.e., Section 303(d) list) and to develop Total Maximum Daily Loads (TMDLs) for these waters. Since the 1990s, States and USEPA have produced more than 39,000 TMDLs. And, based on the current status of States' Section 303(d) lists, more than 70,000 TMDLs remain to be completed (USEPA, 2009).

USEPA's supporting regulations also recognize that alternative pollution control requirements may obviate the need for a TMDL. Specifically, impaired waters are not required to be included on a State's Section 303(d) list if technology-based effluent limitations required by the CWA, more stringent effluent limitations required by state, local, or federal authority, or "[o]ther pollution control requirements (e.g., best management practices) required by local, [s]tate or [f]ederal authority" are stringent enough to implement applicable water quality standards (see 40 CFR 130.7(b)(1)). These alternatives to TMDLs are commonly referred to as "Category 4b" waters, as described in USEPA's Integrated Reporting Guidance (IRG) for Sections 303(d), 305(b), and 314 of the CWA (USEPA, 2005 and 2006).

Beginning with the 2002 reporting cycle, USEPA's IRG recommends that States use the following five reporting "categories" to report on the water quality status of all waters in their State:

- Category 1: All designated uses (DU) are supported, no use is threatened;
- Category 2: Available data and/or information indicate that some, but not all of the DUs are supported;
- Category 3: There is insufficient available data and/or information to make a DU support determination;
- Category 4: Available data and/or information indicate that at least one DU is not being supported or is threatened, but a TMDL is not needed;
- Category 5: Available data and/or information indicate that at least one DU is not being supported or is threatened, and a TMDL is needed.

As the above categories show, waters assigned to Category 4 and 5 are impaired or threatened; however, waters assigned to Category 5 represent waters on a State's Section 303(d) list. Similar

to Category 5, waters in Category 4 are also impaired or threatened; however, other conditions exist that no longer require them to be included on a State's Section 303(d) list. These conditions, which are referred to as subcategories of Category 4 in USEPA's IRG are described below:

- Category 4a: TMDL has been completed;
- Category 4b: TMDL is not needed because other pollution control requirements are expected to result in the attainment of applicable WQSs in a reasonable period of time;
- Category 4c: The non-attainment of any applicable WQS for the waterbody is the result of pollution and is not caused by a pollutant. Examples of circumstances where an impaired segment may be placed in Category 4c include waterbodies impaired solely due to lack of adequate flow or to stream channelization.

According to USEPA's IR guidance, EPA will evaluate on a case-by-case basis a State's decisions to exclude certain segment/pollutant combinations from Category 5 (the Section 303(d) list) based on the Category 4b alternative. The IRG indicates that States should provide in their Section 303(d) list submission a rationale that supports their conclusion that there are "other pollution control requirements" stringent enough to achieve applicable water quality standards within a reasonable period of time.

Although USEPA's Category 4b guidance was initiated over eight years ago for the 2002 reporting cycle, Category 4b is not a widely used alternative to developing TMDLs for impaired and threatened waters. A 2006 survey (based primarily on States' USEPA-approved 2006 303(d) lists) showed that 267 impaired waters had been successfully assigned to Category 4b in 15 States (Monschein and Mann, 2007). A more recent survey (based primarily on States' USEPA-approved 2008 303(d) list) showed that more than 400 impaired waters have been successfully assigned to Category 4b (Monschein and Reems, 2009). Despite this increase in use of Category 4b, TMDLs (over 39,000 nationally) continue to be the primary means to address impaired and threatened waters in States' Section 303(d) programs.

Several options to advance the appropriate use of Category 4b have been suggested. In a March 2008 letter to USEPA's Assistant Administrator for Water, the Association of State and Interstate Water Pollution Control Administrators (ASIWPCA) highlighted State-developed options for reducing the workload burden for States associated with their biennial development and submission of Section 303(d) lists/Integrated Reports (IR). Among ASIWPCA's options was a suggestion to identify Category 4b demonstrations that have been successfully vetted through the Section 303(d) list development and review process, including those that involve more than National Pollutant Discharge Elimination System (NPDES) permits. Sharing of model Category 4b demonstrations was also identified as a means to advance the appropriate use of Category 4b in Monschein and Mann (2007).

In response to these suggestions for advancing the appropriate use of Category 4b, this paper describes a Category 4b demonstration in Missouri that has been successfully vetted through the Section 303(d) list/IR development and review process according to USEPA's Category 4b guidance for the 2008 reporting cycle. Specifically, this paper summarizes the Missouri

Department of Natural Resources' Category 4b demonstration for 16 point source impaired waters located in the State of Missouri. This paper also presents the methods used to evaluate the appropriateness of assigning these impaired waters to Category 4b, as well as lessons learned in developing the Category 4b demonstration and potential challenges for maintaining these waters in Category 4b for future Section 303(d) list/IR reporting cycles.

METHODS

The State and USEPA evaluated the appropriateness of assigning these impaired waters to Category 4b based on USEPA's IRG for the 2008 reporting cycle (USEPA, 2006). USEPA's IRG indicates that States should provide in their Section 303(d) list submission a rationale that supports their conclusion that there are "other pollution control requirements" stringent enough to achieve applicable water quality standards within a reasonable period of time. Specifically, USEPA requests that States address the following six elements in their Category 4b demonstrations:

1. Identification of segment and statement of problem causing the impairment
2. Description of the pollution controls and how they will achieve WQS, including a description of the "requirements" under which the controls will be implemented
3. An estimate or projection of the time when WQS will be met
4. Schedule for implementing pollution controls
5. Monitoring plan to track effectiveness of pollution controls
6. Commitment to revise pollution controls, as necessary

RESULTS

A summary of the Category 4b rationale for the 16 point source impaired waters in the State of Missouri is provided below. Additional details are available in Missouri's complete Category 4b rationales for these waters and USEPA's decision document for Missouri's 303(d) list.

1. Identification of segment and statement of problem causing the impairment

Water quality limited (i.e. impaired) water body segments and associated pollutants are identified on Missouri's 303(d) list of impaired waters. Each water body listing includes a narrative description of the spatial extent and length of the impaired segment. In addition, the nature and source(s) of the impairment are documented using field, laboratory, and geographic data. Impaired waters that are identified to have negligible nonpoint source loading for the pollutant of concern are candidates for Missouri's PIL process. The 16 water bodies and associated pollutants assigned to Category 4b based on the PIL process are shown in Table 1.

2. Description of pollution controls and how they will achieve water quality standards

When the permitted facility is confirmed as the sole source of the pollutant, wasteload allocations or other pollution controls are developed to ensure in-stream water quality standards (WQS) are achieved. Wasteload allocations (WLAs) are concentrations of the pollutant of

Table 1 – Description of Impaired Waters Assigned to Category 4b Based on PIL Process

Water Body	Cause of Impairment	Permit Type	Compliance Schedule
Bynum Creek	Nonvolatile suspended solids (NVSS)	Issued new site specific permit to replace general permit	90 days
Dog Creek	NVSS	As above	120 days
Dry Auglaize Creek	Biological oxygen demand (BOD), Non-Filterable Residue (NFR)	Renewed	3 yrs
East Brush Creek	BOD, Volatile Suspended Solids (VSS)	Modified	3 yrs
Elkhorn Creek	BOD, NVSS	Renewed	2 yrs
Gabriel Creek	BOD, TSS	Renewed Renewed	3 yrs – SW Lagoon 5 yrs – NW Lagoon
Horseshoe Creek	BOD, Ammonia	New - now discharges to different stream	1.5 yrs
Little Beaver Creek	VSS	Modified	19 mos
Little Lindley Creek	BOD, VSS	Renewed	3 yrs
Red Oak Creek	VSS	Renewed	3 yrs
Red Oak Creek Tributary (1)	VSS	Renewed	3 yrs
Red Oak Creek Tributary (2)	VSS	Renewed	3 yrs
Rocky Branch	BOD	Modified	Effective on issuance
Stockton Branch	VSS	Renewed	3 yrs
Straight Fork	VSS	Renewed	3 yrs
Walnut Creek	BOD, VSS	Renewed	Effective on issuance

concern that are modeled to achieve the in-stream water quality criteria target during critical stream conditions. Water quality based effluent limitations (WQBELs) are then calculated from the WLAs using methods and procedures outlined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001). New or revised WQBELs developed for PILs are commonly more stringent than effluent limits currently required by the facility operating permit. In these instances, an upgrade of the facility may be necessary to meet the new or revised limits. Where it is impracticable to calculate WBQELs, other pollutant control measures (e.g., best management practices and facility process expansion) can be required by the permit to achieve compliance with the WQS. In all cases, effluent and in-stream water quality monitoring are required to characterize the effluent and water body prior to, during, and following facility upgrades or improvements. An enforceable, date certain schedule of compliance is included in all PILs to ensure WQBELs, pollution controls, and permit conditions are implemented and achieved in a timely manner.

3. Estimate or projection of the time when WQS will be met

Missouri state regulation at 10 CSR 20-7.031(10) requires compliance with new or revised operating permit effluent limitations within three years from the date of permit issuance. The

schedule of compliance found in the state operating permit provides reasonable assurance that the new terms and conditions of the permit will be achieved in accordance with this rule. Interim milestones for achieving the new or revised effluent limitations are often included in the schedule of compliance to ensure steady progress. Operating permit terms or conditions that are not new or revised effluent limitations (e.g., installation of best management practices) are often drafted into the schedule of compliance to be achieved within the five year term of the issued permit or as soon as practicable. The type of permit and associated compliance schedule for the 16 impaired waters assigned to Category 4b are shown in Table 1.

4. Schedule for implementing pollution controls

The date certain schedule of compliance found in the facility operating permit provides the timeline for implementing new or revised effluent limitations or pollution controls. Most schedules of compliance provide for compliance with effluent limitations within three years from the date of permit issuance. Deviations from the schedule of compliance are considered violations of the terms and conditions of the operating permit and are subject to enforcement action.

5. Monitoring plan to track effectiveness of pollution controls

Compliance with new or revised effluent limitations or pollution controls should have the corresponding effect of returning the impaired water body into compliance with applicable WQS. Effluent and in-stream monitoring requirements included in the facility operating permit provide screening level data that allow the department to evaluate whether WQS are being achieved. Once facility generated screening data indicate compliance with applicable WQS, department staff schedule and conduct an assessment of the impaired water to determine whether the water body has returned to compliance with the WQS. If quality assured data indicate compliance with applicable WQS, the water body is moved from Category 4b to the appropriate attainment category on Missouri's Integrated Report. If quality assured data do not indicate compliance with applicable WQS, additional pollution control or compliance measures are explored and implemented.

6. Commitment to revise pollution controls, as necessary

The Permit in Lieu of TMDL process, like the TMDL process, can become iterative if the new or revised effluent limitations or pollution controls do not result in compliance with applicable WQS. In these cases, additional pollution control or compliance measures are explored and implemented through permit modifications or settlement agreements, as appropriate. For some situations, additional reduction of associated pollutants is necessary to achieve compliance with the WQS (e.g. nutrient reduction in addition to reduction of biochemical oxygen demand to achieve dissolved oxygen criteria). In others, additional regulatory actions may be required of the facility or community to achieve compliance (e.g., enforcement action or pre-treatment requirements). In all cases, the department stands ready to assist the facility in complying with the terms and conditions of their state operating permit through compliance assistance, technical expertise and, when available, grant and/or loan funding.

DISCUSSION

Lessons learned in developing the Category 4b demonstration and potential challenges for maintaining these waters in Category 4b for future 303(d) reporting cycles are described below.

Lessons learned in developing the Category 4b demonstration

In developing Missouri's PIL process, MDNR staff recognized the importance of a complete and thorough administrative record to ensure the successful assignment of PILs to Category 4b. Documentation submitted with the PILs must satisfy the requirements of two Clean Water Act programs – Section 303(d) and NPDES.

The NPDES program requires a Fact Sheet or Statement of Basis that demonstrates the new or revised effluent limitations or pollution controls are acceptable pollution control requirements that will result in compliance with the WQS. The Fact Sheet or Statement of Basis includes the Missouri Water Quality Review Sheet which provides data and model output and/or spreadsheets that demonstrate the WLA used to derive effluent limitations are appropriately protective of water quality. Because the final Missouri State Operating Permit is required to undergo a 30-day public notice period, the due process component of the CWA Section 303(d) program is satisfied. To support the Category 4b determination both during and between 303(d) reporting cycles, all available stream survey and water chemistry data are provided as part of the PIL submittal process. These data definitively demonstrate the facility in question is the sole source of the water quality impairment. When reviewed collectively with the NPDES documentation, the state is able to satisfactorily demonstrate the alternative pollution control requirements contained in the PIL will result in achieving WQS in the impaired water. The PIL process has been most effective for ammonia, BOD, NVSS, and VSS (or TSS or NFR) impaired waters.

While the vast majority of PILs lend themselves quite well to the process, there are occasions when additional regulatory approaches are needed. For example, MDNR recently completed Category 4b demonstrations for two limestone quarries covered under Missouri's general permit (GP) for storm water and other specified discharges from limestone quarries. The general conditions of the GP and lack of date certain compliance with the WQS did not make the MO-G49 permit an ideal candidate for a PIL. However, standard conditions in Missouri's GP's allow the department to require permittees to apply for and obtain an individual operating permit when the discharge is a significant contributor of pollution which impairs the beneficial uses of the receiving stream. In the cases mentioned above, the limestone quarries obtained individual operating permits similar to the GP, but with added requirements for pollution controls and monitoring that followed a date certain schedule of compliance. When water quality assessments conducted by MNDR confirm WQS are being achieved, the facilities may apply for and obtain the GP for limestone quarries.

Potential challenges for maintaining these waters in Category 4b for future 303(d) reporting cycles

The most significant challenge for maintaining these waters in Category 4b for future 303(d) reporting cycles is facility adherence to the date certain schedule of compliance. While most

facilities are able to comply with the requirements of the PIL within three years, some can not due to financial or operational reasons. The availability of state revolving funds, the timing of bond issuance, and the amount of capital on hand can affect the readiness of a facility to proceed with or complete an upgrade. Depending on the circumstances, the time required to complete these steps may exceed the three year schedule of compliance found in the state operating permit. In these cases, MDNR proactively engages the facility to determine the best course of action that will allow the facility to stay in compliance with the terms and conditions of the permit. Often, legal remedies such as voluntary settlement agreements provide certainty to MDNR and USEPA the PIL will be fully implemented. In those few cases where a facility refuses to implement the PIL, enforcement action can be taken by the department and/or the Missouri Attorney General to compel the permittee to do so.

CONCLUSIONS

Collectively, development of Missouri's PIL process has facilitated both identification of NPDES permits that may qualify for Category 4b and USEPA's review of the Category 4b demonstrations. Given the success of the PIL process, Missouri Department of Natural Resources intends to utilize the approach for future listing cycles.

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