

Category 4b Demonstration for Atrazine Impaired Waters in the Little Arkansas River Subbasin, Kansas

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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 waterbody/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 2008 reporting cycle, the Kansas Department of Health and Environment (KDHE) assigned 11 nonpoint source atrazine impaired stream segments in the Little Arkansas River subbasin to Category 4b. The foundation of KDHE's Category 4b demonstration is the Little Arkansas Watershed Restoration and Protection Strategy (WRAPS) and supplemental information. The WRAPS process grew out of the Section 319 program to foster watershed management for water quality. The process encompasses four stages: development of a stakeholder leadership team; assessment of watershed conditions; planning to identify goals, priorities and applicable programs for the watershed; and implementation of activities to improve water quality.

The Little Arkansas WRAPS, completed in 2004, outlines restoration and protection goals and actions for the surface and groundwater of the Little Arkansas River subbasin. The WRAPS was developed by a stakeholder leadership team consisting of agency advisors (including Kansas State University [KSU] Research and Extension, Natural Resource Conservation Service [NRCS], local County Conservation Districts, and KDHE) and local agricultural producers and atrazine applicators that ultimately implement the voluntary BMP practices. The leadership team is currently focusing implementation of the WRAPS strategies on atrazine impairments in selected sub-watersheds within the Little Arkansas drainage. The elevated atrazine levels are associated with agricultural nonpoint sources: there are no point source dischargers of atrazine in the subbasin. Key components of implementing the WRAPS for atrazine include (1) an outreach/education program for the agricultural community (i.e., producers) on atrazine application rates, timing, alternatives, and label instructions; (2) an atrazine BMP program that includes BMP demonstration sites and on-farm visits by KSU extension staff to promote voluntary atrazine BMPs; and (3) incentive payments to producers that sign up and employ the voluntary BMPs. Based on the schedule for implementing the proposed controls, KDHE expects

the atrazine water quality target will be achieved by 2016. Therefore, KDHE has deferred TMDL development on these waters until that time in order to assess the success of this 4b demonstration approach.

This paper presents KDHE's demonstration for assigning these waters to Category 4b according to EPA's Category 4b guidance, lessons learned in developing the restoration strategy, and potential challenges for maintaining these waters in Category 4b for future 303(d) reporting cycles.

KEYWORDS

TMDL, alternative, Category 4b, impairment, atrazine, nonpoint source, BMP, WRAPS

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).

As an example of the appropriate use of Category 4b on nonpoint source pollution issues, this paper describes a Category 4b demonstration in Kansas 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 Kansas Department of Health and Environment (KDHE) Category 4b demonstration for 11 nonpoint source atrazine impaired stream segments in the Little Arkansas River subbasin located in the south central part of Kansas. 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 atrazine impaired waters in the Little Arkansas River watershed is provided below. Additional details are available in Kansas' complete Category 4b rationale and USEPA's decision document for Kansas' 2008 303(d) list.

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

KDHE uses a watershed approach for both water quality sampling and assessment determinations. Three stream chemistry monitoring stations associated with KDHE's sampling network, SC533, SC534, and SC535, were identified as impaired by atrazine. The atrazine impairment at each of the sampling stations implicates the impairment to the three watersheds upstream of these monitoring stations. The three atrazine impaired watersheds assigned to Category 4b and associated segments (11 total), are shown in Table 1.

Table 1 – Atrazine Impaired Waters Assigned to Category 4b

Category 4b Watershed	Segment		
	Main	Tributary 1	Tributary 2
Turkey Creek (upstream of sampling station 533)	Turkey Creek (11) Turkey Creek (12)	Dry Turkey Creek (13) Runner Turkey Creek (25)	Bull Creek (24)
Emma Creek (upstream of sampling station 534)	Emma Creek (6)	Middle Emma Creek (7) West Emma Creek (8)	None
Sand Creek (upstream of sampling station 535)	Sand Creek (4)	Mud Creek (16) Beaver Creek (26)	None

The three Category 4b watersheds are located in the Little Arkansas River subbasin (HUC 11030012). This subbasin is located in south central Kansas and includes the counties of Ellsworth, Rice, McPherson, Reno, Harvey, Marion, and Sedgwick. The location of the Category 4b watersheds in relation to these counties and the city of Wichita, KS, is shown in Figure 1. Figure 2 identifies the HUC 12s that comprise the Category 4b watersheds.

The designated uses impaired by elevated atrazine levels in the three Category 4b watersheds are expected aquatic life support and domestic water supply. The applicable numeric atrazine criteria for expected aquatic life support are 3 µg/L (chronic) and 170 µg/L (acute) (K.A.R. 28-16-28e(c)(2)(D)(ii)). The Category 4b watersheds and associated segments are not meeting the chronic criterion. The domestic water supply criterion is also 3 µg/L, which is treated as an annual average, consistent with Safe Drinking Water Act protocols. The three Category 4b watersheds are tributaries to the Little Arkansas River which overlies the Equus Beds, the regional ground water supply for Wichita and other communities.

The Category 4b demonstration identifies the source of elevated atrazine levels as agricultural nonpoint source pollution and indicates that there are no point source dischargers of atrazine in the Category 4b watersheds. The demonstration states that atrazine has been used since the 1960's for selective control of broadleaf and grass weeds in corn and grain sorghum row crops. Because of its high solubility in water, atrazine is susceptible to removal from cropland during overland runoff events. The extent of corn and grain sorghum acres in the Category 4b watersheds is provided in Table 2.

Table 2 – Corn and Grain Sorghum Acres in the Category 4b Watersheds

Category 4b watershed	Drainage Area (acres)	Number of Cropland (Acres)	Est. Number of Grain Sorghum and Corn Acres
Turkey Creek (upstream of sampling station 533)	178,560	95,680	23,920 (13% of drainage area)
Emma Creek (upstream of sampling station 534)	112,000	85,280	19,614 (18% of drainage area)
Sand Creek (upstream of sampling station 535)	66,559	39,110	12,124 (18% of drainage area)

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

Water Quality Target

The atrazine water quality target is the chronic atrazine criterion for expected aquatic life support of 3 µg/L.

Nonpoint source loadings that when implemented will achieve WQS

A 50% reduction in atrazine loading to each of the three KDHE sampling stations (i.e., SC533, SC534, SC535) during the runoff period (April through July) is necessary to achieve the water quality target. The runoff period represents the time when the concentration of atrazine is highest because of recent atrazine applications and increased precipitation events which result in the movement of atrazine into water bodies. Reduction in peak concentrations will also serve to reduce the annual average atrazine concentrations.

Controls that will achieve WQS

Atrazine load reductions will be achieved through atrazine control activities identified through the Little Arkansas Watershed Restoration and Protection Strategies (WRAPS) workgroup. These activities include: (1) an outreach/education program for the agricultural community (i.e., producers) on atrazine application rates, timing, alternatives, and label instructions; and (2) an atrazine BMP program that includes BMP demonstration sites, on-farm visits by KSU extension staff to promote voluntary atrazine BMPs, and incentive payments to producers that sign up for and employ the voluntary BMPs.

The voluntary atrazine BMPs being promoted through the WRAPS process are consistent with current atrazine label restrictions; however, the BMPs go beyond the current label restrictions because they call for applying less atrazine on the ground than the label permits. The voluntary BMPs have published removal efficiencies that range from 25% (e.g., use split applications of atrazine such as 2/3 prior to April 15 and 1/3 at planting) to 100% (e.g., use no atrazine). Where the BMPs with less than 50% reduction efficiencies are implemented, additional BMPs will be used such that the sum of effectiveness will be 50% or greater.

The WRAPS group has conducted water quality monitoring of “targeted” subwatersheds comparing water quality for areas with atrazine BMPs in place and areas where atrazine BMPs were not being implemented. Results from the targeted subwatersheds indicate the effectiveness of atrazine BMPs, which had lower atrazine concentrations (ranging from 18% to 40%) over a two year period than the co-monitored untreated subwatersheds.

Assurances that controls will be implemented

Authorities

Producers and applicators that use atrazine in the Category 4b watersheds must comply with existing label restrictions and Kansas state law. Under Kansas state law, persons that apply

atrazine are required to become certified applicators, which includes training on atrazine label restrictions, and may be subject to fines if pesticides are not used in a manner consistent with the pesticide's label. Because the voluntary BMPs go beyond the current label restrictions, assurances that the voluntary BMPs will be implemented and maintained are based primarily on the extent of (1) existing commitments to implement the needed BMPs, (2) dedicated funding to support full implementation of needed BMPs, and (3) other relevant factors specific to the watersheds under consideration for Category 4b.

Existing commitments to implement controls

Development of the Little Arkansas River WRAPS represents a fundamental first-step commitment to restore the watershed and achieve the atrazine water quality target. The likelihood of the WRAPS being implemented is enhanced because the WRAPS leadership team that developed the strategy included agency advisors (including Kansas State University Research and Extension, Natural Resource Conservation Service, local County Conservation Districts, and KDHE) and local stakeholders (including producers and atrazine applicators that would need to implement the voluntary BMP practices).

Implementing the WRAPS in the Category 4b watersheds involves obtaining and maintaining commitments from multiple key stakeholders, including:

- WRAPS leadership team – leading implementation of the WRAPS plan which includes the information/education and BMP programs and the identification and management of implementation funds,
- Producers – implementing the voluntary atrazine BMP programs, and
- Funding sources – funding the information/education and BMP programs.

The key stakeholders' commitment to implementing the WRAPS in the Category 4b watersheds is exemplified in their implementation actions over the past three years of 2006, 2007, and 2008. These implementation actions, which are highlighted below, have focused on six "targeted" subwatersheds in the Little Arkansas River subbasin, Upper Turkey Creek, Upper West Emma Creek, Black Kettle Creek, Upper Blaze Fork Creek, Lower Sand Creek, and Kisiwa Creek. Three of these "targeted" subwatersheds, Upper Turkey Creek, Upper West Emma Creek, and Lower Sand Creek, are subwatersheds of the corresponding Category 4b watersheds.

WRAPS Group Implementation Actions

- Established a website to communicate information to stakeholders regarding BMP practices, goals of the WRAPS process, and general information on projects being implemented as nonpoint source management measures.
- Coordinated public meetings for producers and other stakeholders and conducted door-to-door surveys of targeted land owners to establish a baseline on BMP use.
- Distributed an educational publication "Atrazine Best Management Practices for the Little Arkansas River Watershed" to producers.
- Conducted over 220 on-farm visits to promote and sign up producers for the voluntary BMP incentive program: 50 visits in 2006, 77 visits in 2007, and 96 visits in 2008.
- Trained over 340 farmers and consultants in 2006 and 2007 regarding atrazine BMPs.

- Established and operated demonstration projects at three farm fields to learn about and promote the effectiveness of the voluntary atrazine BMPs.
- Installed automated surface water monitoring systems to evaluate the effectiveness of BMP implementation.
- Used radio interviews and newspaper articles to educate local communities about atrazine BMPs.
- Provided and managed over \$100,000 in incentive payments to producers to implement voluntary BMPs: ~\$20,000 (2006), ~\$38,000 (2007), and ~ \$49,000 (2008).

Producers Implementation Actions

- Number of producers implementing voluntary BMP practices that received on-farm visits in the “targeted” subwatersheds has generally been high: 80% in 2006, 99% in 2007, and 98% in 2008.
- Number of producers participating in the voluntary BMP incentive program more than doubled over the past three years: 40 producers in 2006, 74 producers in 2007, and 95 producers in 2008.
- Number of voluntary BMP acres has more than tripled over the past three years: 4,792 acres in 2006, 10,545 acres in 2007, and 13,044 acres in 2008 – the later representing about 44% of the total potential BMP acres (i.e., corn and grain sorghum acres) in the six “targeted” subwatersheds.

Over the past three years, up to \$250,000 has been invested in the six “targeted” subwatersheds to implement the information/education and BMP programs. The majority of these funds have been provided through the CWA Section 319 program funds managed through KDHE. Matching funds were provided through the City of Wichita and the State Conservation Commission.

Dedicated Funding

It is anticipated that producers will eventually adopt the voluntary BMPs into their standard operation procedures without the incentive payments. Until that time, funding is needed to fully implement the information/education and BMP programs, namely funds to support the voluntary BMP incentive payments. Approximately \$180,000/year is needed to fully fund and implement the voluntary BMP incentive payments in the Category 4b watersheds plus the Black Kettle Creek watershed.

The primary funding source to fully implement the plan will be USEPA CWA Section 319 grant funds and State Water Plan funds that are dedicated to WRAPS and managed through KDHE. As available, the WRAPS leadership team will use supplemental or matching funds from other agencies, to include funds from the City of Wichita and the United States Department of Agriculture (USDA).

KDHE’s total CWA Section 319 grant allocation for WRAPS statewide is typically \$1.2 million/year matched with \$800,000 in State Water Plan funds. The City of Wichita, KS provides supplemental funding since reduced atrazine levels benefit water supply sources

associated with the city's operations, particularly the City of Wichita's Equus Beds Aquifer Storage and Recovery project along the Little Arkansas River.

KDHE is committed to continue funding the Little Arkansas River WRAPS in the Category 4b watersheds through these funding sources. There are 44 active WRAPS projects in the State of Kansas, of which the Little Arkansas WRAPS is considered among the top ten in priority for implementation. Furthermore, the Little Arkansas River subbasin has been selected by Kansas to evaluate success in improving water quality in order to meet EPA's SP-12 performance measure.

Other relevant factors

Kansas State University (KSU) was selected by the Little Arkansas WRAPS group to lead the WRAPS planning effort which encompasses research, water quality monitoring, and extension programs for the WRAPS implementation activities. Hence, there is continuity in the lead entity/organization developing and implementing the WRAPS. KSU provides a significant amount of technical expertise to the restoration process. KSU began research in the late 1980s to identify BMPs that would help control atrazine runoff into drinking water supplies and has published recommended atrazine BMPs and information on their effectiveness. KSU staffs participating in the WRAPS are trained agronomists and watershed specialists which facilitates development and implementation of a sound restoration strategy.

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

The atrazine water quality targets of concentrations consistently below 3 µg/L are expected to be achieved in the Category 4b watersheds by 2016. This estimate is based on the overall 10-year BMP implementation schedule as part of the WRAPS process.

4. Schedule for implementing pollution controls

There is a baseline estimate of 60,300 existing acres of corn and grain sorghum eligible for voluntary atrazine BMPs in the Category 4b watersheds. The goal is to make significant BMP implementation progress each listing cycle such that the atrazine water quality target is achieved by 2016. Thus, the current implementation strategy calls for voluntary atrazine BMPs, with an average removal efficiency of 50%, on all of the 60,300 acres by 2016. Until producers incorporate the voluntary atrazine BMPs into their standard operating procedures without incentive payments, funding will need to be available to support the outreach/education and BMP programs until the water quality target is achieved.

Implementation of the voluntary atrazine BMPs has increased over the past three years in the Category 4b watersheds as shown in Table 3. The extent of implementation in 2008 is estimated to range from 10% in the Turkey Creek watershed to 27% in the Sand Creek watershed.

KDHE anticipates significant progress will be achieved in improving the atrazine impairment within the Category 4b watersheds by the 2010 Section 303(d) listing cycle. Annual implementation goals, which are set by the WRAPS leadership team, have not yet been established for 2009 and 2010.

Table 3 – Extent of Atrazine BMP Implementation in Category 4b Watersheds

Category 4b watershed	Est. of Grain Sorghum & Corn Acres	2006 BMP Acres	2007 BMP Acres	2008 BMP Acres
Turkey Creek (upstream of sampling station 533)	23,920	1,818 (8%)	1,184 (5%)	2,386 (10%)
Emma Creek (upstream of sampling station 534)	19,614	1,688 (9%)	1,901 (10%)	2,632 (13%)
Sand Creek (upstream of sampling station 535)	12,124	0	3,140 (25%)	3,209 (27%)

5. Monitoring plan to track effectiveness of pollution controls

KDHE will coordinate with the WRAPS group to provide a progress report on atrazine reduction efforts in the Category 4b watersheds by April 1st for each 303(d) reporting cycle. The report will include implementation progress for each Category 4b watershed as indicated below:

- Total acres with voluntary atrazine BMPs each year,
- Of the total acres each year, the percentage of acres of each type of BMPs used, e.g., early application, pre-plant incorporation, and the associated atrazine removal efficiency estimate for each type of BMP, and
- Total number of producers that receive on-farm visits and sign up to implement the voluntary BMPs each year compared to the total number of producers that only receive an on-farm visit.

The progress report will also include results from water quality monitoring at KDHE's monitoring stations at the downstream "pour points" of the Category 4b watersheds (i.e., Stations SC533, SC534, and SC535). These stations are sampled by KDHE on a four year rotation, e.g., 2006, 2010, and 2014. As appropriate, KDHE will also use results from KDHE and U.S. Geological Survey (USGS) permanent/fixed stations on the Little Arkansas River and directed monitoring by KSU on the Little Arkansas River, tributaries, and atrazine BMP demonstration project sites.

Assessing and reporting out on these multiple lines of implementation and water quality response data/information will facilitate the following:

- Assessment of progress and challenges occurring in the Category 4b watersheds,
- Clarification of what corrective actions may be needed, and
- Flexibility for the WRAPS group and KDHE to continue to demonstrate progress toward the goal of achieving the atrazine water quality targets in the 4b watersheds by 2016.

6. Commitment to revise pollution controls, as necessary

KDHE is committed to continuing to offer resources and expertise to the WRAPS leadership team to enhance implementation efforts to ensure the Category 4b watersheds make progress towards meeting the goal of achieving the atrazine water quality target by 2016. KDHE is committed to revise the strategy if progress is not documented, including initiating TMDL development.

If participation lags or there is no tangible decrease in atrazine levels KDHE will initiate the development of a TMDL in 2011. If the watershed strategy is making progress towards meeting water quality goals in 2011-2012, but does not yield attainment of water quality standards by 2012, KDHE will defer the decision to develop TMDLs until 2016.

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

Category 4b assignments can facilitate implementation of nonpoint point source controls

In January of 2002, a watershed stakeholder committee consisting of farmers, urban residents and other citizens within the Little Arkansas watershed was formed with the goal of developing and implementing a Watershed Restoration and Protection Strategy (WRAPS). The Kansas WRAPS process is a planning and management framework intended to engage stakeholders in a process to:

- 1.) Identify watershed restoration and protection needs;
- 2.) Establish management goals;
- 3.) Create a cost effective action plan to achieve goals; and
- 4.) Implement the action plan.

The stakeholders within the Little Arkansas watershed were already engaged with one another and were proactively working to address the atrazine impairments within their watershed that were identified as impaired on the Kansas Section 303(d) list. Kansas develops TMDLs on a basin-by-basin approach and TMDL development was scheduled for the Lower Arkansas Basin in 2006. The Little Arkansas WRAPS group actively engaged KDHE to consider their existing watershed and implementation plans in lieu of developing a TMDL and avoid duplicative implementation or planning.

KDHE proposed the Category 4b alternative since this watershed group had a plan developed, and had begun implementation of the plan. Since implementation efforts were already beginning, KDHE did not see the added value a TMDL would provide for this watershed since the ultimate objective of the TMDL was already being addressed through the WRAPS plan. The stakeholders concurred with KDHE's recommendation to move forward with achieving 4b status for portions of the watershed that were identified as impaired for atrazine. The stakeholders were concerned that a TMDL would chill the group's enthusiasm and proactive efforts and preferred an opportunity to address this issue without a TMDL.

The assignment of Category 4b to the watershed has allowed for the current implementation activities to continue, and has facilitated faster implementation than if a TMDL was developed.

The 4b demonstration helps refine the priority watersheds where implementation efforts should be focused in the future and the expectations of these efforts.

Demonstration of dedicated funding, existing commitments, and other relevant factors important for voluntary and incentive-based controls

According to USEPA's Category 4b guidance, USEPA considers a number of factors in evaluating whether there are sufficient assurances that the restoration strategy that the Category 4b assignment is based on will be implemented, including:

- Authority (local, state, federal) under which the controls are required and will be implemented with respect to sources contributing to the water quality impairment (examples may include: self-executing state or local regulations, permits, and contracts and grant/funding agreements that require implementation of necessary controls);
- Existing commitments made by the sources to implement the controls (including an analysis of the amount of actual implementation that has already occurred);
- Availability of dedicated funding for the implementation of the controls; and
- Other relevant factors as determined by USEPA depending on case-specific circumstances.

USEPA's approval of KDHE's 2008 Section 303(d) list with these impaired waters assigned to Category 4b demonstrates that watershed restoration plans based on voluntary and incentive-based controls can be appropriate for Category 4b. However, because there is no existing authority requiring implementation of the nonpoint source controls, USEPA placed particular emphasis on the extent of existing commitments, dedicated funding, and other relevant factors specific to the watersheds under consideration for Category 4b. USEPA recognized that KDHE was able to provide adequate assurances that the voluntary BMPs will be implemented and maintained based on the following factors:

- Commitments – Relevant stakeholders in the Category 4b watersheds including the WRAPS group, producers, and funding source [including KDHE] have demonstrated a track record of commitments to implement and maintain the controls where the WRAPS plan has been employed. This demonstrates that the WRAPS plan can be a successful strategy to obtain the remaining commitments necessary to achieve the atrazine water quality target for the Category 4b watersheds.
- Funding – The submittal provides a cost estimate for implementing key actions, identifies key funding sources, and demonstrates that the funding sources are adequate to meet the cost estimate. KDHE has demonstrated a commitment to providing state funds to implement the WRAPS plan in the Category 4b watersheds. The WRAPS leadership team has also demonstrated a track record of obtaining/managing implementation funds.
- Other relevant factors – KSU's involvement in the implementation efforts provides continuity and technical expertise to the implementation efforts.

Opportunities exist to more closely coordinate planning elements for Category 4b and comprehensive Section 319 watershed management plans

There were several challenges encountered with obtaining approval from USEPA on designating portions of the watershed as Category 4b. Since a watershed plan was essentially in place,

KDHE underestimated the level of effort required to obtain the Category 4b status. However, to meet USEPA's expectation that sufficient assurances exist to implement the nonpoint source controls, KDHE needed to generate more detailed information for the Category 4b watersheds – including the cost estimate to fully implement the watershed plan in those watersheds and a demonstration that the anticipated funding sources are adequate. However, because there is no way to accurately forecast exact funding awards to the WRAPS group within current budgetary constraints, KDHE felt the effort to develop these projections was somewhat overstated. The primary source of funding is through CWA Section 319 funds allocated through USEPA. KDHE's level of financial commitment to this project is therefore dependant upon USEPA's commitment to adequately allocate Section 319 funds to Kansas. The WRAPS watershed plan is based on the nine elements associated with a Section 319 watershed plan and the 4b demonstration had to fit the six elements identified in USEPA's Category 4b guidance in context with the existing watershed plan.

Based in part on these unexpected challenges, there is a need for collaboration on the federal level to more closely coordinate the respective planning elements of nonpoint source Category 4b demonstrations and comprehensive Section 319 watershed plan (nine elements).

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

Maintaining implementation progress may be a challenge within the 4b demonstration area. There is an expectation that the voluntary controls will be implemented as producers realize the benefit of these actions as the cost-share opportunities subside. It may be difficult to account for which producers are implementing controls on a voluntary basis if they are not engaged with the WRAPS group. In addition, the funding sources for incentive-based controls are not guaranteed by any one agency, despite their level of commitment.

USEPA has requested subsequent biennial update reports on implementation and water quality monitoring to coincide with the two-year 303(d) reporting cycle to evaluate the suitability of maintaining these waters in Category 4b. The update reports may create challenges for KDHE as the necessary information ultimately is dependant upon the WRAPS leadership team. The WRAPS group operates independently and focuses on their approved Section 319 watershed plan and it is unclear at this point if they truly understand the level of expectation EPA and KDHE carries forth with the 4b demonstration since this was recently approved. In addition, KDHE may be challenged with influencing the WRAPS to continue their primary efforts within the select 4b watersheds, since the WRAPS area extends beyond the three 4b sub-watersheds.

The fact that this watershed had an existing and proactive watershed stakeholder group that already had an implementation plan in place prior to the TMDL development phase is atypical. However, as WRAPS projects move forward across the state similar scenarios may be encountered where typical TMDL implementation efforts are actually preceded by the TMDL document. KDHE would suggest considering the 4b demonstration when stakeholders are already in place and implementing their watershed plan with local and state agencies on impairments identified within their watersheds. This process of encouraging stakeholders to address impairments can be promulgated with the coordination between the Section 303(d)

listings and associated state and federal funded programs (i.e. WRAPS) that may aide in addressing specific watershed impairments. It is likely that KDHE will encourage WRAPS groups to develop watershed plans and address listed waters prior to initiating non-point source TMDLs or seeking alternative Category 4b status. Although such impaired waters will remain on the state's 303(d) list, this approach may direct implementation earlier and more effectively than attempting to repeat the Little Arkansas 4b experience.

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