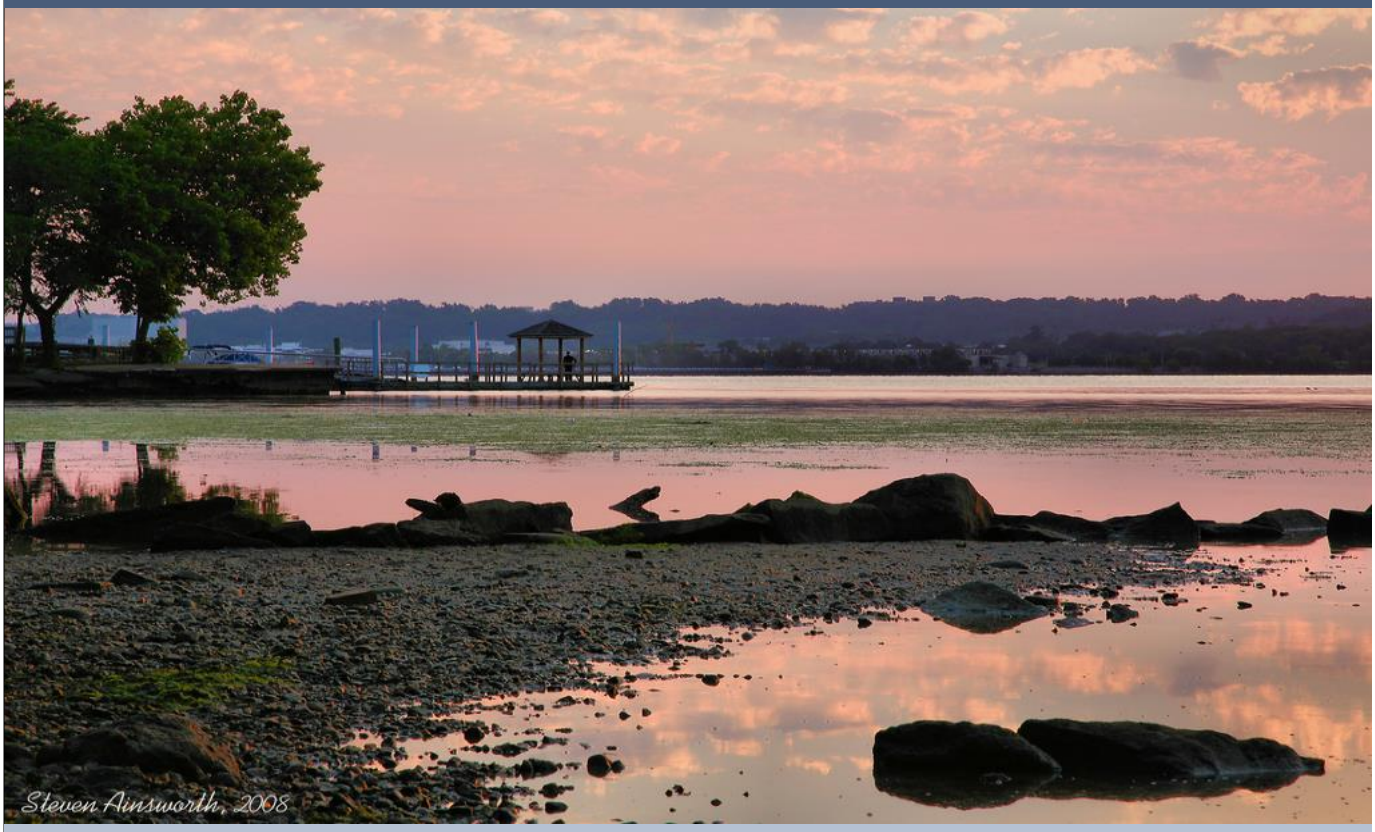
OPPORTUNITIES TO PROTECT DRINKING WATER SOURCES AND ADVANCE WATERSHED GOALS THROUGH THE CLEAN WATER ACT



A Toolkit for State, Interstate, Tribal and Federal Water Program Managers

November 2014

Acronyms

ACWA	Association of Clean Water Administrators
ASDWA	Association of State Drinking Water Administrators
AWQC	Ambient Water Quality Criteria
BMP	Best Management Practice
CFR	Code of Federal Regulations
CAFO	Concentrated Animal Feeding Operation
CSO	Combined Sewer Overflow
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DWSRF	Drinking Water State Revolving Fund
EPA	U.S. Environmental Protection Agency
GI	Green Infrastructure
GWPC	Ground Water Protection Council
HA	Health Advisory
HWI	Healthy Watersheds Initiative
IRIS	Integrated Risk Information System
IU	Industrial User
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
NRWQC	Nationally Recommended Water Quality Criteria
ONRW	Outstanding National Resource Water
ORSANCO	Ohio River Valley Water Sanitation Commission
OW	U.S. Environmental Protection Agency Office of Water
POTW	Publicly-Owned Treatment Works
PWS	Public Water System
SDWA	Safe Drinking Water Act
SDWIS	Safe Drinking Water Information System
SSO	Sanitary Sewer Overflow
SWPP	Source Water Protection Plan
TDS	Total Dissolved Solids
TMDL	Total Maximum Daily Load
UIC	Underground Injection Control
USDA	U.S. Department of Agriculture
USDW	Underground Source of Drinking Water
WBP	Watershed-Based Plan
WLA	Wasteload Allocation
WQBEL	Water Quality-Based Effluent Limit
WQS	Water Quality Standards

Table of Contents

Preface

We live in times of both declining public agency resources and increasing complexity of environmental and public health problems, like the increasing occurrence, intensity, and duration of harmful algal blooms and precursors to disinfection by-products in drinking water. These and other problems are compounded by population growth, climate extremes, and excess water in some places as well as insufficient water in others.

Complex times demand creative and thoughtful approaches to challenges. It is critical that we find innovative solutions that leverage expertise, resources, efficiencies, and authorities to achieve our Nation's water quality and source water protection goals.

As part of a State-U.S. Environmental Protection Agency (EPA) collaboration initiative, a workgroup was formed to identify opportunities to coordinate among clean water and drinking water programs. This workgroup recognizes that many difficult issues cross program boundaries, and thus a coordinated approach has the potential to make greater headway nationally. In developing the product that follows, the workgroup also drew on the experiences of states and EPA practitioners managing these programs.

This Toolkit is a result of state and EPA collaboration. It could not have been developed without the time, effort and dedication of those who contributed to it and particularly the expertise of the state and EPA regional participants who are implementing the practices in this report. Specifically, the following entities have collaborated in the development of this Toolkit:

- EPA Office of Water (OW) and Regional Offices
- Association of Clean Water Administrators (ACWA) and select state members
- Association of State Drinking Water Administrators (ASDWA) and select state members
- Ground Water Protection Council (GWPC) and select state members

This initiative and Toolkit invite a more holistic and coordinated planning and funding approach between the clean water and drinking water programs, and with other public and private partners at the federal, state, and local levels, including water and wastewater utilities. The opportunities outlined in this Toolkit do not reflect all possible environmental authorities that may work together to protect drinking water; it is beyond the scope of this document to acknowledge all threats to, and challenges involved in, protecting drinking water. Instead, the suggestions below describe the fundamental steps toward protective actions that may catalyze broader collaboration among a diversity of programs and entities.

It is important to note that this Toolkit does not impose legally binding requirements on EPA, states, tribes, or the regulated community, nor does it confer legal rights or impose legal obligations on any member of the public. This Toolkit does not constitute a regulation, nor does it change or substitute for any Clean Water Act or Safe Drinking Water Act[1] provision or EPA regulations. Rather, this Toolkit is designed to support discussion, institutional change, and advance water quality goals and the protection of drinking water sources of public water systems (PWSs)[2], also known as source water protection.[3]

Executive Summary

The goal of this State-EPA collaboration initiative is to show how state and federal Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) program staff and managers can more routinely and more intentionally coordinate CWA and SDWA activities to achieve improvements in the quality of our waters. This Toolkit:

- identifies opportunities to reduce pollution in drinking water sources by using CWA tools;
- provides examples of on-the-ground implementation, and is intended to help readers understand *how* they can work across program lines and agency boundaries;
- demonstrates how program managers can align their efforts to protect source water through a *combination* of actions and institutional relationships that facilitate cross-program coordination at the national, regional, state, and watershed scales to achieve common objectives; and
- shows how state clean water programs can leverage the high value consumers place on public health protection and safe drinking water to increase public support for addressing surface and ground water quality challenges more effectively.

EPA, other federal[4] and state[5] agencies, local governments and private organizations[6] can support such collaborative actions by providing technical, programmatic, financial and logistical assistance.

Following the Executive Summary, this document consists of an Introduction that describes the basics of the SDWA and CWA and how they interact, including a "Quick Start to Coordination" section that offers some actions that states and EPA regions can take more readily, likely with existing staff and resources. Following the Introduction, each section of the Toolkit pertains to how specific CWA provisions and tools can be used to protect drinking water resources. The five sections focus on, respectively, Water Quality Standards (WQS); Monitoring, Assessment, and Impaired Waters Listings; Total Maximum Daily Loads (TMDLs); the National Pollutant Discharge Elimination System (NPDES); and Nonpoint Source and Clean Water Act 319 programs. Sections describe a range of potential state activities that could enhance public health protection under each of these provisions, as outlined in a format that includes:

- ➲ Background information on the provision or tool of the CWA;
- ➲ The desired outcomes of possible activities using that CWA provision;
- ➲ A list of key actions that could move CWA implementation toward achieving the desired outcome;
- ➲ A short list of additional references and resources.

Finally, the appendices provide additional resources. These include examples of states already implementing many of the opportunities described in this document, as well as challenges faced and strategies for overcoming such challenges.

Each state's water quality challenges, approaches to addressing these challenges, and program organization and implementation are unique. The measures outlined in this document can be used together, and in collaboration with partners outside of the state and federal water programs, to achieve both operational efficiencies and water quality improvements. Clean water and drinking water program staff, state infrastructure financing staff, enforcement staff, water and wastewater utilities, technical assistance providers, and other partners could work together to look holistically at the pollutant sources and controls in a particular watershed and aquifer recharge zone. This coordination could include an assessment of drinking water, wastewater, stormwater, and nonpoint source concerns and needs to help partners develop creative and appropriate source water protection solutions.

The list below highlights specific opportunities and outcomes of such coordination.

Highlights of Desired Outcomes & Collaboration Opportunities

Recognizing that CWA and SDWA programs are implemented by the states, this list identifies voluntary state actions that could be accompanied by EPA support where such support would facilitate implementation or improve efficiency. These, and additional, outcomes and opportunities can be found in Sections One through Five.

water quality standards

➲ **Desired Outcome: Appropriate designated uses are established to protect public water supplies.**

➲ Opportunities

For states and tribes

- Identify waters with existing drinking water intakes. If intake waters are not designated for a public drinking water supply use, consider doing so to facilitate human health protection; and
- For other waters, consider future drinking water supply needs when designating uses.

water quality standards

➲ **Desired Outcome: Numeric or narrative criteria are adopted to protect public water supply designated uses.** A means of interpreting narrative criteria should also be adopted.

➲ Opportunities

For EPA program offices

- Continue revising Nationally Recommended Water Quality Criteria (NRWQC) tables, where appropriate; share information on recent updates to NRWQC for the protection of human health when released in late 2014 and encourage state/tribal adoption of updated criteria values for public drinking water supply uses.
- Where appropriate, continue working to develop NRWQC or Health Advisories (HAs) for pollutants that are regulated as drinking water contaminants under the SDWA for which there are no standards under the CWA.

For states and tribes

- If an EPA-recommended water quality criterion protective of a water supply use exists for a pollutant of concern, states may adopt such a criterion.
- Where such a numeric water quality criterion does not exist in state WQS (and no EPA criterion exists), states may adopt a Maximum Contaminant Level Goal (MCLG), a human HA value, a human health benchmark for one or more pesticides, or other scientifically supported values.
- States may also interpret a narrative water quality criterion using any of the above values or derive a target value using health effects resources.

For EPA program offices, states, and tribes

- Share information and identify approaches where states/tribes have developed numeric criteria values for public water supply protection where no NRWQC are available (e.g., by using the Integrated Risk Information System (IRIS), HAs, pesticide benchmarks, MCLGs, etc.).
- Explore development of a model narrative criterion and interpretation that individual states can customize to their circumstances.

monitoring, assessment, and impaired waters listing

➲ Desired Outcome: Source waters used for public water supplies are assessed for attainment of drinking water uses, and with stakeholder involvement.

➲ Opportunities

For states, tribes, and stakeholders

- State assessment methodology could describe a process for making assessment decisions about drinking water use support.
- SDWA programs can provide CWA counterparts with drinking water intake locations and source water area delineations via GIS to facilitate assessment and, if warranted, listing of waters for non-attainment of the public water supply use.
- Drinking water utilities could provide source water monitoring data to State Monitoring, Assessment and Listing Programs for making CWA section 305(b) assessment and section 303(d) listing decisions, as part of the CWA provision to evaluate "all existing and readily available information" in listing decisions (40 CFR section 130.7(b)(5)).
- States, tribes and EPA can develop formal communication/coordination channels among the programs at the state and federal levels to achieve an effective, efficient way to accomplish this (note: could implement as part of the EPA/State 303(d)/TMDL Vision effort).[7]

total maximum daily loads

➲ Desired Outcome: TMDL priority setting and development are informed by drinking water information.

➲ Opportunities

For EPA, states, tribes, and stakeholders

- Inform the priority setting and development of TMDLs through data sharing (e.g., SDWA programs and/or utilities could provide turbidity levels, number of days system was impacted and treatment costs to maintain compliance) and providing early input on developing TMDLs regarding source water concerns.
- CWA programs can help prioritize TMDL development based on source water protection needs. Many states prioritize TMDL development for drinking water reservoirs. By working with the drinking water program to provide sufficient and timely information, state CWA staff may rank drinking water sources as high priorities for taking action to develop or implement TMDLs.
- State drinking water programs can share source water information (in GIS format if available), including intake locations, source water monitoring data or data regarding PWS closures, etc. to aid in accurate TMDL development. This information can help characterize the water body impairment(s), identify sources of those impairments, and help identify mitigation measures.

point source controls

➲ Desired Outcome: NPDES permits reflect contaminants of concern to drinking water systems.

➲ Opportunities

For state drinking water and NPDES programs in collaboration

- Locate permitted outfalls (using GIS mapping if possible) in relation to surface water intakes for PWSs.
- Inventory and describe available data about problems experienced by PWSs in the state attributed to upstream pollutant sources.
- Develop an approach to cross-walking a PWS's "pollutants of concern" with contaminants in an upstream NPDES permittee's discharge.
- Write effluent limitations and conditions to prevent harmful concentrations of contaminants of concern from reaching the intakes of PWSs.

point source controls

➲ Desired Outcome: NPDES permittees, producers, and operators adequately notify downstream and affected drinking water systems of spills, CAFO discharges, and intentions to apply biosolids/manure or pesticides/herbicides.

➲ Opportunities

For state drinking water and NPDES programs in collaboration

- Where evidence indicates the presence of a pollutant of concern for a downstream drinking water source, permits could include additional monitoring to collect the data necessary to quantify and model the fate and transport of the pollutant of concern in the receiving water.
- State clean water and drinking water programs could work with their Emergency Planning and Community Right to Know programs to develop an emergency response plan regarding spills to surface and ground waters that have the potential to impact drinking water intakes downstream.

For permit writers

- Upon renewal, NPDES permits with outfalls (or biosolid/manure or pesticide/herbicide application sites) of concern to PWSs could include language requiring the permittee to provide notification (or in the absence of a permit, asking producers and operators to provide 48 hours' notification) to potentially affected PWS operators.

point source controls

➲ **Desired Outcome: Green infrastructure (GI) planning, stormwater, and underground injection control (UIC) permits include consideration of drinking water sources.**

➲ Opportunities

For states and local entities, and developers

- Consider including smart growth techniques as a means to preemptively protect both water quality and source water by avoiding some of the worst effects of unplanned growth.
- When considering ground water infiltration techniques to reduce surface water runoff and pollution, aim to strike the right balance between protecting surface waters and increasing ground water recharge, while minimizing risk to ground water quality.
- Practice rainwater harvesting, if local law/requirements allow, which can reduce demand for treated drinking water while reducing stormwater runoff.

nonpoint source and section 319 programs

➲ **Desired Outcome: Source waters (including ground water) are protected from nonpoint source pollution** using Nonpoint Source Management Plans, Watershed Plans, and leveraging CWA section 319 funding.

➲ Opportunities

For EPA, states, tribes, and stakeholders

- State drinking water programs could engage in updates to the state Nonpoint Source Management Program Plan to ensure priorities for source water protection are reflected in the plan (for example, ground water protection activities are eligible for funding under section 319 if identified in the state Nonpoint Source Program/Management Plan as a priority). Updates of state Nonpoint Source Management Program Plans are conducted every 5 years.
- Consider state Nonpoint Source Management Plans when updating source water assessments and implementing source water protection programs.
- Consider using source water protection areas as a priority for selecting CWA Section 319 watershed projects.
- The Drinking Water State Revolving Fund (SRF) set-asides under section 1452(g)(2) for state source water protection program management and section 1452(k)(1) may be used in a variety of ways for nonpoint source issues on shared projects that affect both nonpoint sources and source water protection. State drinking water and nonpoint source staff could work with SRF fund staff to identify opportunities to address nonpoint source pollution.
- The Clean Water SRF loans can be used to fund nonpoint source projects through the section 319 statutory mechanism. States may fund any projects eligible for section 319 funding, including source water and ground water projects, using this approach.

Introduction

Safe Drinking Water Act and Clean Water Act Fundamentals

Under the Safe Drinking Water Act, EPA sets legal limits on the levels of certain contaminants in drinking water provided by PWSs.[8] These limits (e.g., Maximum Contaminant Levels (MCLs)) reflect both the level that protects human health (i.e., MCLGs) and the level that water systems can achieve using the best available technology. Besides prescribing these legal limits, EPA rules set water-testing schedules and methods that water systems must follow. The rules also list acceptable techniques for treating contaminated water. SDWA gives individual states the opportunity to set and enforce their own drinking water standards if the standards are at least as strong as EPA's national standards. Most states and territories directly oversee the water systems within their borders.[9]

Most of federal safety standards under SDWA apply after treatment of finished water. If drinking water does not meet a standard, the PWS must treat the water to make it safe for human consumption. Reliably providing safe drinking water to the public requires a multiple barrier approach. National drinking water standards and treatment at the PWS to meet those standards are part of this approach, but protecting water quality at the source is also an important component of protecting human health.

Preventing or reducing contamination of a water supply source can lower or avoid treatment costs and improve the reliability of drinking water treatment. This is because protecting source water[10] quality can both reduce harmful disinfection by-products that are produced during treatment of drinking water sources and help plants avoid costly measures like installing advanced treatment technology, connecting with another water supply that provides more treatment, or identifying and developing a new water supply. As noted above, efforts to reduce contamination of drinking water sources can also benefit other water quality goals, such as protecting aquatic life, recreation and fish consumption. The converse of this is also true: that is, focusing on Ambient Water Quality Criteria (AWQC) that are protective of aquatic life can lead to protection of a public water supply use, since AWQC for aquatic life protection are usually more stringent than AWQC for human health protection as well as drinking water standards.

However, as the cross-program matrix in Appendix A indicates, there remain a significant number of pollutants for which the NRWQC under the CWA and HAs under SDWA are less stringent than drinking water standards. We should also be mindful of how we undertake such efforts because reducing one form of pollution could, in some cases, unintentionally cause or exacerbate another (e.g., infiltrating polluted surface water to protect a stream's water quality could contaminate a ground water source of drinking water).

The Source Water Assessment Program requirements in the SDWA yielded source water assessments for PWSs in every state, which included the delineation of watershed or wellhead contribution areas, identification of potential sources of contamination, and susceptibility ratings that can be used to prioritize and implement protection activities. While these assessments are an important source of information and can be used to develop protection plans, for the most part, the SDWA does not confer any *authority* to protect surface water, which is often the source of drinking water. Protection under the SDWA occurs primarily through voluntary coordination efforts at the local or watershed scale and other federal and state regulatory programs, especially the CWA.

The primary objective of the Clean Water Act is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[11] Therefore, unlike SDWA safety standards, CWA standards apply in ambient surface waters. In meeting the objective of the CWA, each state must (1) designate the use or uses of its surface waters, (2) adopt ambient water quality criteria (numeric or narrative) to protect these designated uses, and (3) protect high-quality waters through anti-degradation provisions.

The attainment of state designated uses serves as the foundation for protecting water quality. Examples of designated uses include recreational uses, protection and propagation of fish, shellfish and wildlife, drinking water supply, agricultural, industrial, and navigation. Although the goal of the CWA is often referred to as ensuring all waters are

"fishable and swimmable," the CWA also provides for protection of surface water sources of drinking water. For example, when a state adopts or revises its WQS, the CWA states that "such standards shall be established taking into consideration their use and value *for public water supplies*, propagation of fish and wildlife, recreational purposes, and agricultural, industrial, and other purposes …"[12] (emphasis added).

To help states establish WQS, as required by the CWA, the EPA publishes NRWQC for specific pollutants under section 304(a) of the CWA. However, for many pollutants regulated by the SDWA as drinking water contaminants, *there currently are no NRWQC* under the CWA, thus posing particular challenges in assessing and adequately addressing those pollutants in surface waters that serve as a source of drinking water. The CWA, in efforts to further protect the designated uses, requires the states to assess their surface waters' quality to ensure that the WQS are met; identify waters that are "impaired", or fail to meet WQS; issue permitted effluent limits that control point sources of pollution; and establish watershed management methods that better "control" nonpoint source pollution.[13] This is described in more detail later in this document.

Ground water is an important resource for many human uses and its contamination by land use or by surface water management practices can reduce society's options for fresh water resources. The SDWA assigns responsibility to protect ground water to states by regulating the underground injection of fluids to prevent the contamination of underground sources of drinking water (USDWs) and protecting drinking water wellhead areas from contamination by unsafe practices.[14] The CWA also addresses ground water protection[15], mainly by authorizing states to use CWA funds to monitor ground water quality, consider ground water in watershed management planning, consider impacts of reduced surface water flow such as salt water intrusion into fresh water aquifers, and control the disposal of pollutants on land or in subsurface excavations to protect ground water quality.[16]

Coordinating CWA and SDWA Implementation

To enhance cross program collaboration, consider that the various principal CWA tools can often be applied in ways that are relevant to drinking water. Questions for consideration can include the following:

- Are public water supplies explicitly designated as such in a state's WQS?
- Are there NRWQC or AWQC for drinking water contaminants of concern and are they sufficiently protective?
- Do water quality assessments, impairment listings, watershed plans, and discharge permit procedures adequately address drinking water contaminants of concern?

This document provides a path for EPA's Office of Water (OW), EPA Regional CWA and SDWA program staff, and state regulators to better collaborate, leverage and coordinate their support for a more comprehensive cross-program approach. The following list of opportunities for inter-program coordination can improve many of the important components of source water quality, public health protection, and watershed goals. Individual states will make decisions on which of these or other items are most helpful to address their own water quality and source water concerns based on specific circumstances and considerations.

A Lens through Which to View This Toolkit: The Watershed Approach

Users of this Toolkit should consider how to improve coordination between programs *at the watershed scale*. A watershed approach is a coordinated framework for environmental management that focuses public and private sector efforts to address the highest priority problems within hydrologically-defined geographic areas, taking into consideration both ground and surface water flow. See Appendix D to read more.

Quick Start to Coordination

As mentioned above, state water quality programs vary in their challenges, priorities, and organization. However, there are some key steps that drinking water and clean water quality managers can undertake relatively quickly to begin the process of identifying areas that would most benefit from a coordinated implementation approach to water quality improvement.

State SDWA Administrators can:

- Identify a state-wide priority list of drinking water contaminants of concern to public health, along with (where they exist): a) their state-specific MCLGs and MCLs, and b) any precursors, if known, to contaminants of concern (e.g., organic chemicals that can form disinfection by-products in a water treatment facility).
- Identify locations of these priority contaminant detections, including a) the communities and populations impacted, b) their PWS intake locations, and c) potential sources of the contamination for the priority contaminants (e.g., information that may be available in up-to-date state source water assessments or other CWA databases or tools).
- Communicate with CWA counterparts within the state regarding the health risks associated with drinking water contaminants and the limitations of treatment plants to fully remove contaminants from source water.

State CWA Administrators can:

- Identify pollutants affecting state waters for which there are no AWQC or for which the criteria only address aquatic life impacts and that could benefit from a coordinated approach that addresses source water protection. For example, harmful algal blooms present both aquatic life and human impacts by a) consuming oxygen, which adversely impacts aquatic life; and b) generating algal toxins, which increase risk to human health through possible drinking water and recreational exposure. Turbidity is another example where there are SDWA standards to protect finished drinking water, but the CWA NRWQC only address aquatic life.

CWA/SDWA Administrators can:

- When each program is identifying priority pollutants for which to develop risk assessments (and so, possibly, standards or criteria), consider opportunities where regulatory approaches could be developed in both programs to ensure broader implementation. For example, EPA's Office of Water is reviewing new disinfection by-products for MCL consideration, and could consider using that information to develop new NRWQC for turbidity/organics which would prevent formation of harmful levels of disinfection by-products.
- Undertake an assessment of states' WQS to determine how they could be applied to implement a coordinated approach for each priority contaminant of concern using impairment listings, TMDLs, and NPDES permits. Resources for further information include:
    - Appendix A provides a matrix of NRWQC and HAs compared to national MCLs. A state could use this format to compare their state-specific AWQC and state-specific MCLs to identify priority contaminants with currently protective state AWQC.
    - Circumstances requiring complex analyses and planning (e.g., where WQS cannot be readily used or a narrative WQS needs to be interpreted) are addressed throughout the topic-specific sections following this Executive Summary.

- Where nonpoint source pollution presents the predominant water quality challenge and a public health risk through drinking water exposure (e.g., from nutrient-fed algal blooms that can release cyanotoxins), conduct a review of applicable nonpoint source authorities. Consider working through a state's CWA and agricultural program non-regulatory provisions, such as updating the state's watershed management plan, to develop a strategy for that pollution source and leveraging voluntary land conservation programs with Federal, state, and local partners.
- Coordinate GIS projects to identify overlaps in priorities and water quality problems that could warrant implementation of a unified approach to improving water quality and protecting source water, meet regularly to assess progress and adapt the approach.

Endnotes

[1] **See: <**http://water.epa.gov/lawsregs/rulesregs/sdwa/currentregulations.cfm>.

[2] "Public water system" or "PWS" (sometimes erroneously called a public water supply) is "a system for the provision to the public of water for human consumption through pipes or other constructed conveyances, if such system has at least fifteen service connections or regularly serves at least twenty-five individuals." **See:** §1401, SDWA.

[3] "Source water" (*a.k.a.*, "sources of drinking water", "drinking water sources") is "untreated water from streams, rivers, lakes or underground aquifers that is used to provide public drinking water, as well to supply private wells used for human consumption." **See:** SDWA, §1453(a)(2)(A) and: <http://water.epa.gov/infrastructure/drinkingwater/sourcewater/protection/basicinformation.cfm>.

[4] e.g., US Department of Interior, US Geological Survey, US Department of Agriculture, Natural Resources Conservation Service, US Forest Service, and Agricultural Research Service.

[5] e.g. State Departments of Environment, State Health Departments, State Geologists, University Agricultural Extensions.

[6] e.g., Source Water Collaborative (SWC) and its members, National Endowment for Sustainable Forestry, U.S. Water Alliance.

[7] **See:** <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm>.

[8] Under § 303(c), CWA, *public water supply* means source water. But the SDWA regulatory definitions [40 CFR § 141.2] speak of "public water systems" (PWSs) which are typically the infrastructure beginning at the intake drawing from the source water i.e., the public water supply under § 303(c), CWA.

[9] **See: <**http://water.epa.gov/lawsregs/rulesregs/sdwa/currentregulations.cfm>.

[10] "Source water" includes surface water and ground water.

[11] §101(a), CWA

[12] §303(c)(2)(A), CWA

[13] §§303(c), 303(d), 305(b), 319, 402, 101(a)(7), CWA

[14] §§1421, 1428, SDWA

[15] e.g., §§106(e)(1), 319(b)(2)(a), 319(h)(5)(D), CWA

[16] §§106, 208, 319, CWA

SECTION I

Protecting Water Quality and Sources of Drinking Water

Water Quality Standards

Protecting source water with

- **Designated uses for sources of drinking water**
- **Numeric and narrative water quality criteria**
- **Anti-degradation tools**

Monitoring, Assessment, & Impairment Listing

Protecting source water with

- Assessment methodologies tailored to drinking water
- Data shared by drinking water stakeholders

Total Maximum Daily Loads

Protecting source water by

- Prioritizing TMDLs for impaired source waters
- Developing TMDLs in view of drinking water contaminants
- Supporting nonpoint source controls
- Identifying opportunities to protect waters that are not yet impaired

Point Sources

Protecting source water with

- NPDES effluent limits and other permit conditions
- Downstream notification
- Green infrastructure planning and stormwater management

Nonpoint Sources

Protecting source water by

- Setting priorities in Watershed Plans
- Leveraging technical and financial resources across programs

Using Water Quality Standards

Introduction

Water Quality Standards are the foundation of the water quality-based pollution control approach described in CWA section 303. In using section 303 to protect a public water supply, states and tribes typically:

1. **Designated Uses:** Designate the waterbody for public water supply (or similar) use (40 CFR section 131.10(a));
2. **AWQC:** Adopt water quality criteria to protect that designated use (40 CFR section 131.11);
    - Criteria may be numeric (e.g., based on EPA's NRWQC, or state-derived values approved by EPA); and/or
    - Criteria may be narrative (e.g., "no toxics in toxic amounts").
3. **Reasonable Potential:** Determine if there is a "reasonable potential" for any NPDES permitted discharge to "cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality" (40 CFR section 122.44(d));
4. **WQ Assessments:** Assess the status of waters for attainment of the WQS; and
5. **Impairments:** List waters as needing restoration through point and nonpoint source controls if the designated use and/or water quality criteria are not met.

This section discusses some opportunities for utilizing WQS to protect drinking water. In addition, the "Water Quality Standards" section of Appendix C highlights specific challenges faced by states in using WQS to protect drinking water and describes how states can overcome these challenges.

Existing Information Sources

EPA has published NRWQC under the CWA for approximately two hundred pollutants[1] including 120 to protect human health,[2] and HAs for just over 190 chemical pollutants,[3] including 43 that are regulated as drinking water contaminants under SDWA.[4] EPA has also promulgated MCLs under the SDWA for about seventy drinking water contaminants.[5]

Appendix A contains a matrix comparing published NRWQC[6] and HAs[7] to federally promulgated MCLs. For a little more than a third of the drinking water contaminants, there is no NRWQC or HA that is as protective or more protective than the MCL.[8] States could consider NRWQC, HAs, and EPA's MCLs in this matrix to assess whether there are contaminants of concern for drinking water use that do not have protective state water quality criteria and, if so, whether it is appropriate to develop or update state water quality criteria to help address the issue. Note that the list of regulated drinking water contaminants is subject to changes and additions through the SDWA's Six Year Review[9] and Contaminant Candidate List (CCL)[10] processes followed by rule development. The NRWQC and HAs are also subject to change as new peer reviewed health effects information becomes available. However, SDWA standards have an even higher bar to meet to update or add numeric standards, which can be an issue for addressing pollutants of concern on a regional scale that may affect drinking water. Therefore, some states have developed their own CWA AWQC for pollutants without EPA-published NRWQC or up-to-date MCLs when monitoring and toxicity information are available.

Some states may have few numeric criteria within their state WQS specific to a drinking water supply use and may, instead, rely on a narrative criterion (e.g., "no toxics in toxic amounts") applied on a site-specific basis. There are many unique chemicals (for example, pesticides) used in different areas of the country. States may seek to determine which specific chemicals need to be assessed for drinking water impacts in order to implement such criteria.

Background

What are Water Quality Standards?

WQS define the water quality goals of a water body by designating the use or uses of the water and setting criteria necessary to protect the uses. When establishing WQS, states and tribes must specify appropriate water uses to be achieved and protected, and must take into consideration the use and value of water for public water supplies; protection and propagation of fish, shellfish, and wildlife; recreation in and on the water; and agricultural, industrial, and other purposes, including navigation.[11]

WQS are defined in regulation at 40 CFR section 131.3(i) as "provisions of State or Federal law which consist of a designated use or uses for the waters of the United States and water quality criteria for such waters based upon such uses. WQS are established to protect the public health or welfare, enhance the quality of water and serve the purposes of the Act." The sections below describe designated uses and criteria in more detail.

Designated Uses

Designated uses are a state's or tribe's concise statements of its management objectives and expectations for each of the individual surface waters under its jurisdiction. Designated uses are defined in regulation at 40 CFR section 131.3(f) as "uses specified in water quality standards for each water body or segment whether or not they are being attained." Specific designated uses for each state's or tribe's waters are defined within that state's or tribe's WQS regulations and can include (but are not limited to) the protection and propagation of aquatic life, recreation, and public water supply. In designating uses, states/tribes can work with stakeholders to identify a collective goal for their waters that they intend to strive for as they manage water quality. States and tribes could evaluate the attainability of these goals and expectations to ensure they have designated the appropriate uses.

Designated uses are important because once states and tribes establish the appropriate use or uses for their waterbodies, they can set the appropriate water quality criteria necessary to protect the use. Water quality criteria serve as the regulatory basis for management actions such as NPDES permit limits, enforcement actions, attainment decisions, and TMDLs.

Water Quality Criteria

Under CWA section 304(a), EPA establishes NRWQC for the protection of human health that can be adopted by states and tribes into WQS and used to establish limits on contaminant concentrations in state waters. Criteria are calculated for both the consumption of "water plus organisms" and "organisms only." These criteria provide contaminant concentrations that are protective of human health, but unlike federal MCLs, water quality criteria do not consider treatment technology, costs, and other feasibility factors. These criteria account for bioaccumulation of pollutants in fish, fish consumption rates, and direct drinking water intake. EPA's NRWQC for the protection of human health were not developed to serve as "at-the-tap" drinking water standards, and they have no regulatory significance under the SDWA. EPA's NRWQC are recommended values with no inherent regulatory impact until adopted into state and tribal standards. Note that NRWQC and state AWQC are often more stringent than federal MCLs, particularly for bioaccumulative compounds, because exposure to pollutants through fish consumption is included in human health AWQC. Most waterbodies have multiple designated uses therefore most waterbodies designated for public water supply use are also designated for aquatic life/fish consumption (hence the "water+organisms" criteria). While this is almost universally true, the converse is not: there are numerous waterbodies designated for aquatic life but not as public water supply waters (hence the "organism only" criteria).

Anti-Degradation

A state or tribe's anti-degradation program provides a framework for protection of existing uses (that is, those uses actually attained in a water body on or after November 28, 1975, whether or not they are included in a state's WQS)[12], which must be maintained and protected for all waters of the U.S. (called "Tier 1" protection). A state's or tribe's program also provides a mechanism for the state to make decisions on whether to allow a lowering of high quality water (called "Tier 2 review").

A Tier 2 review is triggered in accordance with the state's or tribe's anti-degradation implementation methods. For example, it is typically triggered when a facility proposes a new or expanded discharge into a water that the state considers high quality, and which requires a permit under the CWA (e.g., NPDES permit, 404 permit). A state may identify a water in its WQS as a high quality water on a water body-by-water body basis or on a parameter-by-parameter basis. For example, a state may identify a high quality water upon determining, during the permit development process, that the water has quality that is better than one or more of the state's water quality criteria; that is, it has additional assimilative capacity remaining for one or more of the parameters that would be discharged.

A state's or tribe's program also provides protection for the existing water quality (other than for rare exception) in any waters that the state has identified as 'outstanding national resource waters' (ONRWs) in its WQS (called "Tier 3" protection). A state or tribe also has discretion to design and apply levels of protection in between Tier 2 and Tier 3, if they find it useful to employ protection less restrictive than Tier 3 but more restrictive than Tier 2 (i.e., "Tier 2.5").

Who sets Water Quality Standards?

States and tribes have discretion when managing their WQS and designating uses, as long as they meet the requirements of the CWA and the WQS regulation. States and tribes adopt WQS (through a public participation process), and EPA reviews and either approves or disapproves any new or revised state or tribal water quality standard for CWA purposes. EPA is also required to promulgate federal standards where the Agency finds that new or revised state or tribal standards are not consistent with applicable requirements of the CWA, or in situations where the Administrator determines that federal standards are necessary to meet the requirements of the CWA.

The WQS regulation prohibits the removal of a designated use that would also remove an existing use[13] (unless a use requiring more stringent criteria is added, as the most sensitive use must be protected). Existing uses are defined as "those uses actually attained in the water body on or after November 28, 1975, whether or not they are included in the water quality standards." Existing uses are known to be "attained" when both the use and the water quality necessary to support the use have been achieved. A state or tribe could determine existing uses on a site-specific basis.

How can Water Quality Standards be used to protect drinking water?

How can designated uses be used to protect drinking water supplies?

States and tribes have flexibility in determining 1) whether or not to designate water bodies for a public water supply use and 2) how to articulate such a use in their WQS. States may choose to designate water bodies for a public water supply use on a state-wide basis, or on a waterbody-by-waterbody basis, depending on their particular management goals and objectives.

A public water supply use typically includes waters that are a source for drinking water supplies and often includes waters for food processing. These waters are also usually used for recreation and fishing. Where a water body contains multiple designated uses, the most sensitive use must be protected (i.e., the use requiring the most stringent criteria). Typically, waters designated for drinking water supply require treatment prior to distribution in PWSs. The SDWA's

National Primary Drinking Water Regulations (section 1412) require that PWSs meet national standards for over 90 chemical, microbial and radiological contaminants. The SDWA generally regulates finished water quality, not source water quality.

When considering whether to designate a water body for use as a public water supply, states/tribes may wish to consider current water supply needs, future needs and the water supply needs of downstream communities.

States and tribes also have the flexibility to remove a designated public water supply use (provided the water body does not currently serve, or has not served since November 28, 1975, as a drinking water source) should they determine that such a use is no longer a management goal for a particular water body or bodies. When removing a public water supply use, states and tribes are to provide a rationale for the use removal that considers the use and value of the water body. States and tribes may wish to consider using the factors specified in 40 CFR section 131.10(g) as a guide in their decision making process. Changes in a designated use are reviewed and approved by EPA as a change to WQS.

How can water quality criteria protect a public water supply use?

When establishing numeric water quality criteria for designated uses, including for use as a public water supply, States have several options per 40 CFR 131.11(b)(1)):

1. Adopting EPA's NRWQC if such criteria are available;
2. Adopting modified NRWQC to reflect site-specific conditions; or
3. Adopting other numeric criteria based on a scientifically defensible method (e.g., HA values for unregulated contaminants or MCLGs greater than zero).

In addition to establishing numeric water quality criteria, states and tribes also have the option of adopting narrative criteria for non-toxic pollutants (40 CFR 131(b)(2)).

When establishing water quality criteria for toxic pollutants, the WQS regulation at 40 CFR section 131.11(a)(2) requires that states and tribes "adopt criteria for such toxic pollutants applicable to the water body sufficient to protect the designated use." The regulation further specifies that, "where a State adopts narrative criteria for toxic pollutants to protect designated uses, the State must provide information identifying the method by which the State intends to regulate point source discharges of toxic pollutants on water quality limited segments based on such narrative criteria."

Where there are no numeric water quality criteria appropriate for a drinking water supply use in a state's WQS, a state can interpret their narrative standard in a variety of ways, including, but not limited to, considering HA values and MCLGs for noncarcinogens (see Appendix E for available sources of health-based endpoints for toxics). Since detection, treatment feasibility and cost, as opposed to health risk alone, are used to develop MCLs, the decision to use those values to interpret a narrative criterion would be made on a case-by-case basis. Permit writers and WQS program staff may wish to collaborate to determine the most appropriate approach for interpreting the narrative standard for use in the point source permitting process.

Desired Outcomes and Opportunities

➲ Desired Outcome

Appropriate designated uses are established to protect public water supplies

States and tribes have discretion when it comes to designating water bodies for a public water supply or similar use. Some states and tribes may apply a "blanket designation" of public water supply use to all waters in their state/tribal lands, while others may designate a public water supply use on a waterbody-by-waterbody basis. Increased communication between SDWA and CWA counterparts at the state/tribal level as part of the WQS triennial review process to revise state WQS, may result in use designations that can enhance protection.

➲ Opportunities

For States and Tribes

State WQS and other CWA programs and SDWA programs can work together to:

- Identify waters with existing drinking water intakes. If those waters are not designated for a public drinking water supply use, consider doing so to facilitate human health protection strategies that could also support water quality protection, and vice versa.
- Consider downstream waters with drinking water intakes and whether upstream waters should be designated as drinking water sources in order to ensure for the attainment of the use at the downstream intake, per 40 CFR section 131.10(b).
- Consider future drinking water needs (e.g., population growth), so that water bodies can be designated and protected for future use.
- If removing a public water supply use, consider whether or not the use is an existing use, per 40 CFR section 131.10(g) and (h)(1).

➲ Desired Outcome

Numeric or narrative water quality criteria are adopted to protect public water supply designated uses

Adopting numeric water quality criteria into state WQS, or adopting narrative water quality criteria with numeric translators, can provide focused endpoints for permit limits, attainment decisions, and TMDLs or target values for point source and nonpoint source watershed goals absent a TMDL. However, while most states have waterbodies designated for use as a public water supply, many do not adopt or implement numeric or narrative criteria specifically for drinking water source protection. Such numeric criteria may not be adopted because a federal NRWQC or a state-derived numeric criterion is not available for a particular contaminant, or these values may no longer reflect the most up-to-date science. As a result, these waters may not be assessed for attainment, listed if impaired, or be afforded protection from point source discharges.

Since the current list of federal NRWQC does not address all regulated drinking water contaminants, there is a continuing need for new sources of water quality values for states to consider, especially for contaminants of concern in a particular area.

When adopting water quality criteria to protect a public water supply, states/tribes could prioritize such criteria adoption by first determining which pollutants pose a threat to the sources of drinking water within their state or tribe, or within watersheds which drain to one or more public water supplies (using state source water assessments, data from water utilities, or other sources).

➲ Opportunities

In general

If federal NRWQC or state-derived numeric criteria exist for the specific pollutants of concern, EPA encourages states/tribes to adopt such criteria. If such criteria are not available, states/tribes can consider:

- A narrative criterion with a numeric translator for a pollutant of particular concern in the source water. An example of a narrative criterion could be something like, "No toxic or other deleterious substances in amounts that will impair waters for their best usages." Resources for translating a narrative criterion into a numeric target can be found in Appendix B.
- A MCLG in lieu of a NRWQC or state-derived numeric criterion. MCLGs are health-based numbers that are analogous to water quality criteria.
- Other values, such as HAs or human health benchmarks for pesticides or other chemicals that do not have MCLs. HAs often have both lifetime and shorter term exposure values, and provide information in the event of an accidental release or spill. Human health benchmarks for pesticides reflect the most recent cancer and noncancer endpoints for pesticides that do not have an existing MCL or HA value. The endpoints are converted into a HA format for ease of use. These values are intended to support the interpretation of monitoring data for public health risk. Acute and lifetime exposure values are provided.

For EPA program offices

- Continue revising NRWQC tables, where appropriate. Share information on recent updates to NRWQC for the protection of human health when released in late 2014 and encourage state/tribal adoption of updated criteria values for public drinking water supply uses.
- Where appropriate, continue working to develop NRWQC or HAs for pollutants that are regulated as drinking water contaminants under the SDWA for which there are no standards under the CWA.
- Work to develop NRWQC for chemicals (e.g., total phosphorus, bromide) that can be converted to disinfection by-products in downstream drinking water treatment facilities. This would likely include a national effort to relate source water data (e.g., total phosphorus, chlorophyll, bromides, dissolved organic carbon/total organic carbon, temperature) to finished water data (regulated and unregulated disinfection by-products, type of disinfectant and dosage).

For states and tribes

- If an EPA-recommended water quality criterion protective of a water supply use exists for a pollutant of concern, states may adopt such a criterion.
- Where such a numeric water quality criterion does not exist in state WQS (and no EPA criterion exists), states may adopt a MCLG, a human HA value, a human health benchmark for one or more pesticides, or other scientifically supported values.
- States may also interpret a narrative water quality criterion using any of the above values or derive a target value using health effects resources.

For EPA program offices, states and tribes

- Share information and identify approaches where states/tribes have developed numeric criteria values for public water supply protection where no NRWQC are available (e.g., by using IRIS values, HAs, pesticide benchmarks, MCLGs, etc.);
- Share examples of narrative criteria (and associated translators) that states and tribes have adopted to protect public water supply and private drinking water uses, including protection from nutrient pollution and explore the need for a model narrative criterion that protects drinking water sources and that states can customize for their own use; and
    - Explore the potential for developing a numeric "drinking water use" criteria component as a complement to a criterion value that is based primarily on aquatic life protection and/or provide guidance to states/tribes on how to develop such a number. Such numbers have been developed through as HAs, which are similar to MCLGs in that they represent values below which there are no observable effects.[14] A 'drinking water use' criterion value may be an acceptable alternative for those contaminants for which there are no NRWQC or inadequately protective NRWQC, HAs, or other numeric values. Special consideration should be given to interstate waters under this option.
    - Consider how existing water quality criteria for recreation, fish, and aquatic life may also serve to protect drinking water sources.

➲ Desired Outcome

State Water Quality Standards protect downstream public water supplies

The WQS regulation at 40 CFR section 131.10(b) requires that "in designating uses of a water body and the appropriate criteria for those uses, the State shall take into consideration the water quality standards of downstream waters and shall ensure that its water quality standards provide for the attainment and maintenance of the water quality standards of downstream waters."

➲ Opportunities

For EPA program offices

- Educate/inform states and tribes on the regulatory requirements related to protection of downstream waters in WQS;
- Highlight the efforts of the EPA-state workgroup on downstream protection in WQS, including the templates for narrative criteria[15] addressing downstream protection and EPA's "frequently asked

questions" document on the protection of downstream waters in WQS[16], as well as the forthcoming decision tree tool on protection of downstream waters in WQS; and

- Share the summary of state downstream protection provisions and keep updated.

For state Clean Water and Safe Drinking Water directors

Promote WQS program managers, NPDES permit writers and SDWA programs working together to identify waters with drinking water intakes and source waters of special interest, and consider downstream waters' water quality standards when adopting designated uses and criteria for waters upstream of those waters.

➲ Desired Outcome

Use anti-degradation tools to protect high quality drinking water sources

A state's or tribe's anti-degradation program provides a framework for protection of existing uses (that is, those uses actually attained in a water body on or after November 28, 1975, whether or not they are included in a state's WQS),[17] which must be maintained and protected for all waters of the U.S. (called "Tier 1" protection). A state's or tribe's program also provides a mechanism for the state to make decisions on whether to allow a lowering of high quality water (called "Tier 2 review"). A state's or tribe's program also provides protection for the existing water quality in any waters that the state has identified as ONRWs in its WQS (called "Tier 3" protection).

➲ Opportunities

For EPA program offices, states, tribes, and interested stakeholders

Identify ways CWA programs can protect high quality drinking water sources.

- Consider how state anti-degradation policies and implementation methods protect high quality drinking water sources and identify gaps. For example, a state's anti-degradation policy could provide special consideration for identifying a water body as high quality if it is designated as a public water supply.
- Identify whether waters have 'drinking water source' as an *existing use* that is not a designated use – if so, consider designating those waters as public water supplies to make it clear for a permit writer to protect an *existing use* when deriving permit limits.[18]
- Where a state uses the "water body-by-water body" approach to identify high quality waters, consider identifying drinking water sources as high quality waters for Tier 2 protection where those source waters have quality better than required by one or more state water quality criteria.
- Consider identifying high quality drinking water sources as waters for possible Tier 3 (ONRW) protection or "Tier 2.5."

Additional Resources

- EPA's Water Quality Standards Handbook: Second Edition. http://water.epa.gov/scitech/swguidance/standards/handbook/
- EPA's National Recommended Water Quality Criteria. http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm

Endnotes

[1] **See:** <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm>

[2] **See:** <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#hhtable> and <http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm>

[3] **See: <**http://water.epa.gov/action/advisories/drinking/upload/dwstandards2011.pdf>

[4] **See:** <http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm#hhtable" and "http://water.epa.gov/scitech/swguidance/standards/criteria/health/recreation/index.cfm>

[5] **See: <**http://water.epa.gov/drink/contaminants/index.cfm#List**>** ; another 9 contaminants are regulated using treatment techniques that do not list MCLs.

[6] **See: <**http://water.epa.gov/scitech/swguidance/standards/criteria/current/index.cfm**>**

[7] **See: <**http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf**>**

[8] In some cases there is no §304(a) criterion or HA and in other cases the value is numerically greater than the MCL.

[9] **See: <**http://water.epa.gov/lawsregs/rulesregs/regulatingcontaminants/sixyearreview/>

[10] **See:** <http://water.epa.gov/scitech/drinkingwater/dws/ccl/>

[11] §303(c)(2), CWA

[12] EPA considers the phrase "existing uses are those uses actually attained" to mean the use and water quality necessary to support the use that have been achieved in the waterbody on or after November 28, 1975.

[13] **See:** <http://water.epa.gov/scitech/swguidance/standards/upload/Smithee-existing-uses-2008-09-23.pdf>.

[14] The term for which is "no observable effect level" or "NOEL."

[15] **See: <**http://water.epa.gov/scitech/swguidance/standards/narrative.cfm>.

[16] Frequently Asked Questions on the Protection of Downstream Waters in WQS. <http://water.epa.gov/scitech/swguidance/standards/library/upload/downstream-faqs.pdf >.

[17] EPA considers the phrase "existing uses are those uses actually attained" to mean the use and water quality necessary to support the use that have been achieved in the waterbody on or after November 28, 1975.

[18] **See:** <http://water.epa.gov/polwaste/nps/watershed/concept.cfm>.

SECTION II

Protecting Water Quality and Sources of Drinking Water

Water Quality Standards

Protecting source water with

- Designated uses for sources of drinking water
- Numeric and narrative water quality criteria
- Anti-degradation tools

Monitoring, Assessment, & Impairment Listing

Protecting source water with

- **Assessment methodologies tailored to drinking water**
- **Data shared by drinking water stakeholders**

Total Maximum Daily Loads

Protecting source water by

- Prioritizing TMDLs for impaired source waters
- Developing TMDLs in view of drinking water contaminants
- Supporting nonpoint source controls
- Identifying opportunities to protect waters that are not yet impaired

Point Sources

Protecting source water with

- NPDES effluent limits and other permit conditions
- Downstream notification
- Green infrastructure planning and stormwater management

Nonpoint Sources

Protecting source water by

- Setting priorities in Watershed Plans
- Leveraging technical and financial resources across programs

Using Monitoring, Assessment, and Impaired Waters Listings

Introduction

States implement section 305(b) of the CWA to assess state waters every two years to determine the condition of the waters. Part of this assessment is determining whether waterbody conditions are attaining WQS. Programs implementing section 303(d) of the CWA identify waters that are not meeting state WQS (i.e., are impaired) or are at risk of failing to meet state WQS (i.e., are threatened), and those in need of TMDLs to inform and guide restoration efforts. States create a "303(d) list" of impaired waters comprised of waters that do not meet state WQS. States will release a public notice of the 303(d) list and corresponding assessment methodologies for 30 to 90 days prior to final submittal to EPA for approval.

States and tribes have discretion when it comes to prioritizing waters for monitoring of water quality and for TMDL development and assessment. Increased consultation between drinking water programs and CWA monitoring, 303 (d) listing, and TMDL programs can result in greater involvement of drinking water programs in the assessment and listing process and improved efficiencies. Coordinated activities can expand awareness of, and accounting for, source water protection concerns; improve source water quality leading to reduced treatment costs and harmful disinfection by-products; and increase availability of water quality information.

This section is designed to facilitate state or regional efforts to apply the CWA's 305(b) and 303(d) assessment and listing processes to improve the protection of drinking water sources. This section provides ideas for practices and considerations, and successes that draw upon the experiences of states and others who have undertaken successful protection efforts.

Background

What is the 305(b) report and how does it relate to the 303(d) list?

Section 305(b) of the CWA requires states to report biennially on the health of their waters, including those waters that are not listed as impaired. Information from this report, known as the 305(b) report or "biennial water quality report to Congress," has historically been used in the development of the 303(d) list of waters, waters that have not attained water quality standards. Most states compile the data and findings from the 305(b) report to produce the 303(d) list. EPA recommends that states combine the 303(d) list with the 305(b) report to create an "Integrated Report," due April 1 of even-numbered years.[1] States are encouraged to use a five-category system for classifying all water bodies (or segments) within its boundaries regarding the waters' status in meeting state WQS. Category 5 designates waters to be placed on the section 303(d) list.[2]

What is the 303(d) Program?

The CWA section 303(d) Program encompasses activities primarily focused on the assessment and identification of waters that are not meeting state WQS, as well as the development of TMDLs to inform restoration of those waters. In the past two decades, the program has undergone a transformation from a relatively unknown set of tools to a key and essential management strategy that enhances water quality knowledge and improvement efforts. The section 303(d) Program is a key part of the CWA's strategy for water quality attainment: translating the WQS and goals of the states into analyses, pollution reduction targets, and thoughtful plans to achieve cleaner water.

What is the 303(d) listing process?

Section 303(d)(1) requires states to identify waters within their borders for which technology-based effluent limitations or other required pollution controls are not sufficient to implement any WQS applicable to such waters. This list is often called the "303(d) list" or "Impaired Waters List" and includes waters that are impaired (do not meet WQS even after pollution controls have been put in place) and threatened (usually interpreted to become impaired within two years). CWA regulations direct states to evaluate "all existing and readily available water quality related data and information" when developing their 303(d) lists (40 C.F.R. section 130.7(b) (5)). States are then required to "establish a priority ranking for such waters, taking into account the severity of the pollution and the uses to be made of such waters."[3] Based on the 303(d) list of impaired water bodies, states develop TMDLs designed to facilitate bringing those listed waters into attainment. After a TMDL has been developed, wasteload allocations (WLAs) must be implemented through discharge permits under NPDES. EPA mandates that the 303(d) list of impaired waters be developed under an assessment every two years and submitted to EPA for approval.

EPA policy allows states to remove water bodies from the list after they have developed a TMDL or after other changes to correct water quality problems have been made. Occasionally, a water body can be taken off the list as a result of a change in WQS or removal of designated uses; however, designated uses cannot be deemed unattainable or removed until a thorough analysis clearly shows that they cannot be attained.[4]

Desired Outcomes and Opportunities

➲ Desired Outcome

Source waters used for public water supplies are assessed for attainment of drinking water uses, and with stakeholder involvement

➲ Opportunities

For states in collaboration with utilities

The *Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* identifies "Integration" of the CWA section 303(d) program with other relevant programs as a key component to more effectively achieve the water quality goals of each state.[5] As the plan is carried out, it may provide further opportunities to address source waters effectively through section 305(b) assessment/reporting and section 303(d) listing. State CWA programs can work collaboratively with SDWA programs in the following ways:

Assessment and Listing Methodologies

- State assessment methodology could describe a process for making assessment decisions about drinking water use support. For example:
    - States may have narrative criteria that specify general conditions to protect the beneficial use of waters for public and private drinking water supplies. Benchmarks or guidance values based

on drinking water contaminants or water conditions, such as turbidity, could be developed for applying the narrative criteria in the assessment process.

- States may want to consider expanding or sharpening their definition of drinking water use, particularly in terms of the distance upstream from intakes to ensure an actionable definition is usable for the section 303(d) listing process.

- States may also have WQS that include an expectation that "adequate treatment" will be provided by water supply operators.[6] Drinking water programs may need to work with CWA programs to help establish benchmarks for "adequate treatment" of surface water to be used as a public water supply (e.g., no more treatment than that which is necessary to address naturally occurring pollutant concentrations).

    - In assessing waterbody condition, drinking water and 303(d) listing programs may find it useful to look at different water quality concerns that have the same pollutant precursor. Drinking water impacts can show up as downstream effects (e.g., harmful algal toxins and disinfection by-products) related to upstream contaminants (e.g., excess nutrients). These problems are multi-faceted as multiple drinking water issues can be caused by the same contaminant.

- Prioritize monitoring in waters that are public water supply source waters to provide data for assessment of those waters; including ground water sources under the influence of surface water. SDWA programs can provide CWA counterparts with source water intake and wellhead locations via GIS. 303(d) listing programs may also benefit by using delineation maps of public water supply source water areas developed by state SDWA Source Water Assessment/Protection Programs.

- Explore opportunities to consider upstream waters' impacts to downstream drinking water sources as part of states' Consolidated Assessment and Listing Methodologies.

- Consider waters used for drinking water as a factor when prioritizing waters for TMDL development. This may identify actions to reduce contaminant levels in source waters, either to implement a TMDL, or other criteria in the absence of a TMDL.

Monitoring Data Collection and Sharing

The CWA regulation at 40 CFR section 130.7(b)(5) directs states to "assemble and evaluate all existing and readily available water quality-related data" and to actively solicit such data. Data-sharing can help avoid duplication of efforts, fill gaps in water quality data collected by both programs, identify regional water quality problems, and guide future sampling plans. Drinking water programs and utilities can become active and engaged partners in 303(d) listing and other clean water programs by collecting and submitting high quality data for assessment of water quality, and assisting with pollutant source identification. For example:

- SDWA programs can provide CWA counterparts with drinking water intake locations and source water area delineations via GIS to facilitate assessment and, if warranted, listing of waters for non-attainment of the public water supply use.
- Utilities may have monitoring data from untreated surface water for both unregulated (e.g., Unregulated Contaminant Monitoring Rule) as well as SDWA-regulated pollutants for which water quality criteria exist or could exist in the future. These data can help address gaps in water quality data collected by CWA programs on waters designated as public water supplies, identify and characterize threats to and impairments in source waters, and avoid duplication of efforts.
- Data may also be available from wastewater permit programs, CWA section 319 projects, TMDL reports, universities, watershed groups, regional planning agencies, scenic river coordinators, and county soil and water conservation districts.

- States, tribes and EPA can develop formal communication/coordination channels among the programs at the state and federal levels to achieve an effective, efficient way to accomplish this (note: could implement as part of the EPA/State 303(d)/TMDL Vision effort).
- Note that data used to determine impairment are subject to state specified data quality requirements.

Additional Resources

Funding Opportunities

Available federal funds from collaborations such as USDA Farm Bill Special Projects (Mississippi River Basin Initiative, Gulf of Mexico Initiative, National Water Quality Initiative) and EPA Section 106 and Section 319 grants.

Useful Documents

- Western Governors' Association Policy Resolution 2014 – 03: Water Resource Management in the West
- Western Governors' Association Policy Resolution 2014 – 04: Water Quality in the West
- EPA Integrated Reporting Guidance at: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/guidance.cfm

Endnotes

[1] **See: <**http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/overview.cfm**>**

[2] **See: <**http://water.epa.gov/learn/training/standardsacademy/page7.cfm.> This is the list of waters that require a TMDL.

[3] CWA § 303(d)(1)(A), 33 U.S.C. § 1313(d)(1)(A)

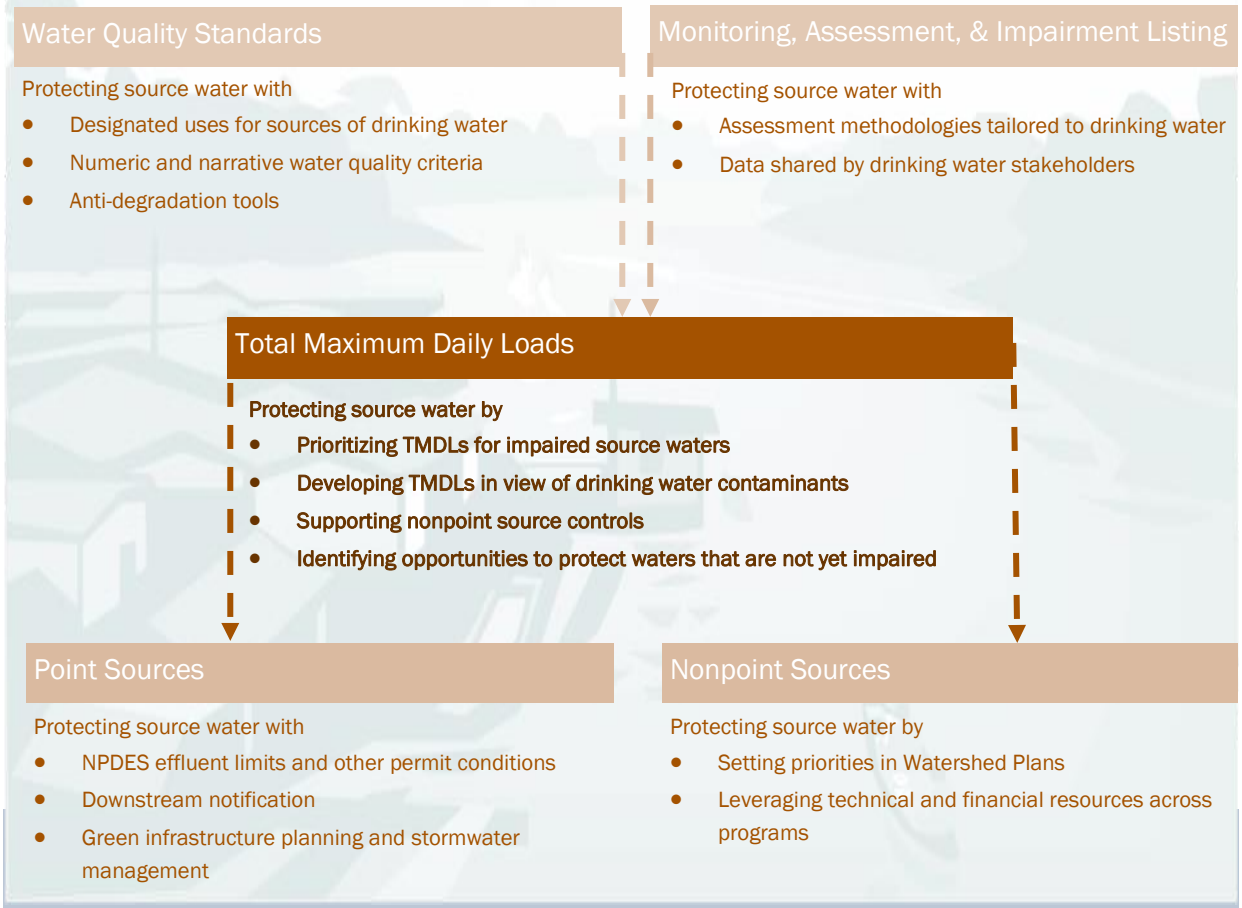
[4] **See: <**http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/overview.cfm**>**

[5] **See: <**http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm**>.**

[6] §1412(b)(3)(C), SDWA

SECTION III

Protecting Water Quality and Sources of Drinking Water



Using Total Maximum Daily Loads

Introduction

This section is designed to advance coordination between those responsible for protecting and providing drinking water and those responsible for the Clean Water Act's TMDL programs. The goal is to involve TMDL programs in helping to protect source waters, as well as for source water protection programs to be involved in TMDL development and implementation. This section provides suggestions derived from TMDL and source water protection programs on how to accomplish successful protection and restoration efforts.

Background

What are TMDLs?

A TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet WQS, and an allocation of that load among the various sources of that pollutant. As such, each TMDL is waterbody- and pollutant-specific. TMDLs are required to identify one or more specific pollutant(s) of concern, which may or may not be referenced as the cause of impairment in the state's 303(d) list.

The CWA section 303(d) and implementing regulations require that TMDLs be developed for waters that fail to meet state WQS. The section 303(d) List or Impaired Waters List contains the waters a state has identified as not meeting one or more WQSs and that need a TMDL (for further information on WQS and 303(d) lists, please see this Toolkit's sections on those topics). The TMDL process is important for improving water quality and potentially protecting source waters because it identifies pollutant allocations to specific sources within the watershed that, when implemented, will meet WQS.

TMDLs must clearly identify the links between the waterbody use impairment, the causes of impairment, and the pollutant load reductions needed to meet the applicable WQS.

In a TMDL, pollutant sources are characterized as either point sources that receive a WLA, or nonpoint sources that receive a load allocation (LA). Point sources include all sources subject to regulation under the NPDES program, (i.e., wastewater treatment facilities, industrial dischargers, some stormwater discharges, and concentrated animal feeding operations (CAFOs)). NPDES permit effluent limits based on TMDLs, known as water quality-based limits, must be issued for point sources. Nonpoint sources include all remaining anthropogenic and natural background sources of the pollutant. TMDLs must also account for seasonal variations in water quality, and include a margin of safety (MOS) to account for uncertainty in predicting how well pollutant reductions will result in meeting WQS.

Note that states may use a TMDL-like process to focus on contaminants of concern. Such processes may have even more opportunities for improving drinking water/source water.

Who develops, approves, and implements TMDLs?

TMDLs are normally developed by a state CWA agency and submitted to EPA for approval but can also originate from a third party. The CWA requires public involvement in developing TMDLs, however, the level of cross-program or citizen involvement in the TMDL process varies by state. Typically, the state will circulate draft TMDLs and issue a formal public notice and allow 30 to 60 days for public comment prior to submitting the TMDL to EPA. In some

cases, hearings are held as well. When EPA approves a TMDL, stakeholders participate in determining how the TMDL could be implemented to reach allowable loading levels.

A *third-party TMDL* is a TMDL in which an organization or group other than the lead water quality agency takes responsibility for developing the TMDL document and supporting analysis. A third party can be a watershed group, municipal wastewater or stormwater discharger organization, industrial discharger entity, other unit of government (such as a county, city, municipality, or land management agency), or nonpoint source organization (such as a farm bureau, irrigation and drainage district, or landowner). For example, the **Milwaukee Metropolitan Sewerage District** is developing TMDLs as a third party on behalf of the **Wisconsin Department of Natural Resources** for the Menomonee River, Kinnickinnic River, and Milwaukee River Watersheds, and for the Milwaukee Harbor Estuary. The pollutants of interest there are fecal coliform bacteria, phosphorous, and sediment. See http://www.mmsd.com/Report.aspx.

There can be multiple advantages to third parties developing a TMDL. Third parties are often very familiar with local watershed issues and can provide valuable insights to the TMDL process. The involvement and economic support of third parties can leverage state funds, as well as the resources and expertise of other agencies and nongovernmental organizations. Third-party involvement in TMDL decisions may improve the level of stakeholder support for the TMDL, increase the likelihood of effective implementation of pollutant controls, and increase the degree of public understanding of TMDLs and water quality protection issues. State agencies, rather than third parties, ultimately adopt TMDLs and submit them to EPA for approval. Thus, states would need to adopt the elements of a TMDL developed by the third party.[1]

After a TMDL has been approved, state and local water quality management plans are updated and control measures implemented. TMDLs, however, are not self-implementing. EPA does not and cannot enforce implementation of a TMDL except in the case of setting more stringent permit limits for point sources. States may have their own authority to enforce nonpoint source reductions. Thus, nonpoint source controls may be established by implementing Best Management Practices (BMPs) through either voluntary or mandatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and demonstration projects.

Although states are not required under section 303(d) to develop TMDL implementation plans, many states include implementation plans with the TMDL or develop them as a separate document. When developed, TMDL implementation plans may provide additional information on how point and nonpoint sources contribute to the impairment and how those sources are being controlled, or could be controlled in the future. When allowing for nonpoint source controls, state implementation plans provide:

1. A reasonable assurance that the controls will be implemented and maintained, or
2. An effective monitoring program to demonstrate that nonpoint source reductions are taking place.

How can TMDLs be used to protect drinking water?

Source water program involvement both early and throughout the TMDL process can allow final TMDLs and implementation plans to aid source water protection and avoid missed opportunities to protect drinking water.

The approach normally used to develop a TMDL for a particular waterbody or watershed generally consists of six activities:

1. Identification of the pollutant of concern as defined in the section 303(d) list and a numeric water quality target. (Note that the pollutant of concern is not always identified at the time of listing. A listing may be for an “unknown” pollutant.)
2. Selection of study area’s “extent,” as in how far from the compliance point the TMDL analysis will extend for the pollutant of concern -- the headwaters, upstream confluence, etc..

3. Calculation of the waterbody assimilative capacity (i.e., loading capacity).
4. Estimation of the pollutant loading from all sources to the waterbody.
5. Analysis (and water quality modeling) of current pollutant load and determination of needed reductions to meet the receiving water's assimilative capacity.
6. Allocation (including a margin of safety) of the allowable pollutant load among the different pollutant sources in a manner that WQS are achieved.

In each of these above steps, there are opportunities to address drinking water concerns. For example, state water quality agencies might be able to utilize source water assessment information in developing TMDLs and implementation plans.

Although TMDLs by definition are intended to restore the quality of impaired waters rather than protect existing high quality waters, implementation of some TMDLs may help provide source water protection as a "co-benefit." Addressing TMDL pollutants not directly of drinking water concern can often lead to indirect source water protection. For example, hundreds of TMDLs for aquatic life protection have been developed for reservoirs and in many cases, protecting aquatic life has the additional benefit of protecting drinking water.

Since a TMDL is basically a pollutant budget for a water body or segment of a water body, and sets loading caps for pollutants, TMDLs do not in themselves result in the attainment of those caps.[2] Implementation of the TMDL is a source water protection opportunity. For example, source water assessment information can be useful in framing TMDL implementation goals that will address pollutant sources.

One tool for prioritizing source water is the **Recovery Potential Screening (RPS) tool** at www.epa.gov/recoverypotential that evaluates the potential restorability of water bodies based on site-specific environmental, social, and economic factors. There are many uses for RPS, including stakeholder information. Some users apply screening results to identify the prospects for successful restoration and target these watersheds as a priority. Others use the screening method to increase awareness of the relative difficulty of restoration in their watersheds, and apply these insights to planning and implementing a best course of action. Among decision-makers and communities alike, the relevance to human health or safety is a powerful criteria for determining the importance of an activity. Associating water quality projects with public health and drinking water can generate significant public support for restoration.

Desired Outcomes and Opportunities

Participation in the TMDL development process by stakeholders like drinking water programs and the public can create a shared understanding of public drinking water systems and the communities they serve. Such stakeholders may have fresh insights into what is happening in a given watershed, and this knowledge can be a valuable perspective to help state water quality agencies develop and implement TMDLs.

Once TMDL development is underway for a pollutant of concern that affects drinking water interests (e.g., pathogens, nutrients), establishing controls on the pollutant source(s) could help protect aquatic life and source water. For example, the control of nutrients for source water purposes may improve the availability of dissolved oxygen (DO) which improves the aquatic habitat.

Source water programs working collaboratively with TMDL programs can:

1. Inform the priority setting and development of TMDLs through data sharing and reviewing draft TMDLs;
2. Support TMDL nonpoint source implementation activities for source waters by providing information from source water assessments for targeting assistance; and
3. Enhance protection of vulnerable source waters based on quantifiable TMDL data.

➲ Desired Outcome

TMDL priority setting and development are informed by drinking water information

➲ Opportunities

For state CWA programs

- Inform the priority setting and development of TMDLs through data sharing (e.g., SDWA programs and/or utilities could provide turbidity levels, number of days system was impacted and treatment costs to maintain compliance) and providing early input on developing TMDLs regarding source water concerns.
- State And Regional CWA program staff could routinely (e.g., annually) check with their SDWA counterparts for an updated list of pollutants of concern to PWSs and the waters where those pollutants have become problematic.
- CWA programs can help prioritize TMDL development based on source water protection needs. Many states prioritize TMDL development for drinking water reservoirs. By working with the drinking water program to provide sufficient and timely information, state CWA staff may rank drinking water sources as high priorities for taking action to develop or implement TMDLs.
- While CWA programs calculate a TMDL for each impaired segment, they might expand the scope of the analysis to include tributary streams. While the listed water body may not be a primary drinking water source, considering its contributions to downstream drinking water sources can facilitate holistic drinking water protection efforts.

For state drinking water programs and utilities

- Share source water information (in GIS format if available), including intake locations, source water monitoring data or data regarding public water system closures, etc. to aid in accurate TMDL development. This information can help characterize the water body impairment(s), identify sources of

those impairments and help identify mitigation measures. For example, state drinking water programs could share data showing the measured turbidity levels and the number of days a PWS intake was closed due to impaired source waters. Alternatively, the TMDL might be a joint opportunity to gather data. Source water assessments or sanitary surveys[3] can provide helpful information for TMDL development.

- Developing data sets in source water assessments would make the information in the assessments more useful to TMDL programs. That may be an incentive for source water programs to strengthen and update source water protection plans and assessments. If these source water assessments were updated and incorporated into section 319 nonpoint source plans, then the funding to implement these plans and their relationship to an approved TMDL could be useful for all programs. However to date, the source water protection plans written have often lacked the clarity and specificity needed to be used for implementation with section 319 funds that requires nine defined elements to be included in watershed based plans.
- Analyze the data for any possible trends over time to inform future section 303(d) listing decisions by the CWA agency. Even if a source water is not currently impaired, an observed trend towards impairment would be an opportunity to interject protection measures. Key to collaboration with the CWA agency is ensuring early submission of any relevant pollutant information to inform the 303(d) listing process, which is the basis for future TMDLs.
- During TMDL development drinking water programs can share information on susceptible areas identified by updated source water assessments or protection plans. Identifying the most susceptible source water areas can guide TMDL WLAs for point sources and LAs for nonpoint source pollution, and the reduction targets for drinking water supplies. Susceptible source water areas are zones where potential contaminant sources or land use activities have the greatest potential to adversely affect the water supply.[4] Also, when participating in the TMDL process, drinking water interests may be able to provide input on the selecting TMDL endpoints (which may need to be different in zones surrounding intakes), identifying potential pollutant sources, and selecting areas to focus pollutant reduction activities during the implementation of the TMDL.
- Provide information/reminders of the contribution of ground water to stream flows as a way to address both ground and surface water.

➲ Desired Outcome

Support TMDL nonpoint source control implementation

➲ Opportunities

For state drinking water programs

State source water protection programs can get involved early during the TMDL analysis and development process. Once a TMDL is developed, source water protection programs can facilitate implementation of nonpoint source controls by, for example:

- Raising awareness of the public health impacts of contaminant sources.
- Contributing local knowledge and contacts from existing source water collaborative efforts in a watershed.

For state CWA programs:

Where the TMDL analysis identifies nonpoint sources as a major cause of impairment, states can direct cost-share grant funding, such as section 319 grants, toward implementation of BMPs. These grants can be used to fund state programs for nonpoint source assessment and control as well as individual projects. The funding can be targeted in TMDL areas to improve drinking water within the source areas if intakes and source water protection areas are identified in the 319 workplan. This is part of the new 319 grants guidance: "Nonpoint Source Program and Grants Guidelines for States and Territories" available at http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf (See, also, Section V).

➲ Desired Outcome

Use TMDL process to protect vulnerable source waters that are not yet impaired

➲ Opportunities

For EPA program offices, states, tribes, and interested stakeholders

- Source water programs can look for 'protection' opportunities in the TMDL development process. In developing a TMDL or series of TMDLs, consider setting protection goals for waterbodies included in the analysis that are not currently impaired. TMDLs are typically written for restoring impaired waters; however, states can prepare TMDLs geared towards maintaining a "better than WQS" condition *for a given waterbody-pollutant combination*, and they can be a useful tool for high quality waters.
- A TMDL process may lead to the finding that, while major pollutant reductions are not needed, it is important to have a plan in place that stresses protection and management of current conditions -- particularly in light of growth and development pressures. A TMDL can establish quantifiable goals to maintain caps on current pollutant loads and identify any reductions necessary to maintain a margin of safety and allow for future growth.
- TMDLs also may result in protection, even if protection is not typically their primary goal. A TMDL may be under development for a source water based on impairment of a designated use other than drinking water supply. Such a scenario is an opportunity to get involved and encourage protection from degradation. Any pollutant reduction resulting from implementation of a TMDL in a drinking water supply watershed will help advance protection efforts.

Leveraging the 2013 TMDL Program Vision

Within the Section 303(d) program (Listing and TMDLs), EPA and the states have recently developed together a Visioning Document entitled: *A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program*. EPA will continue to work with states and tribes to strengthen capacities to identify and address impaired waters. Several of the goals of the Vision document – Program Integration, Protection, and Prioritization – are especially relevant to source water protection. Relevant excerpts from the document are included below:

A. *Program Integration: By 2016, EPA and the States identify and coordinate implementation of key point source and nonpoint source control actions that foster effective integration across CWA programs, other statutory programs (e.g., CERCLA, RCRA, SDWA, CAA), and the water quality efforts of other Federal departments and agencies (e.g., Agriculture, Interior, Commerce) to achieve the water quality goals of each state.*

   The intent of this Goal is to integrate the CWA section 303(d) Program with other relevant programs that play a role in influencing water quality, in order to collectively and more effectively achieve the water quality goals of states, tribes, and territories. Because TMDLs are not self-implementing, effective integration of key programs–especially key CWA programs like listing and TMDLs, WQS, monitoring and assessment, CWA 319, CWA 404, and NPDES–is important to realize the pollutant reduction goals identified in TMDLs or alternative approaches. It also is important that integration occur among the different offices in charge of CWA programs within a department or agency as well as between and among local, state, federal and tribal jurisdictions. Interaction between agencies and non-governmental interests also may promote effective implementation. Integration is particularly important for addressing nonpoint source impairments, especially in watersheds crossing multiple jurisdictions and those involving different CWA programs. A consequence of not integrating effectively is less successful implementation, especially for TMDLs or alternative approaches that include nonpoint source pollution that typically lie outside the regulatory reach of the CWA.

   This Integration Goal aims to overcome barriers in coordination by aligning diverse program goals for mutual benefit. To achieve this, cross-program education will be important, in addition to active leadership and engagement among groups managing these key programs. Sharing institutional knowledge and the history of established networks will enable the next generation of state and EPA employees and managers to sustain integrated successes.

B. *Protection: For the 2016 reporting cycle and beyond, in addition to the traditional TMDL development priorities and schedules for waters in need of restoration, States identify protection planning priorities and approaches along with schedules to help prevent impairments in healthy waters, in a manner consistent with each State's systematic prioritization.*

   The intent of the Protection Goal is to encourage a more systematic consideration of management actions to prevent impairments in healthy waters (i.e., unimpaired waters) in order to maintain water quality or protect existing uses or high quality waters. Although protection of healthy waters is envisioned specifically as an objective of the CWA to "restore and maintain the chemical, physical, and biological integrity of the nation's waters," protection efforts have lagged. Protection and restoration are interdependent goals regarding the "integrity of the nation's waters." Protection of healthy headwaters and wetlands, for instance, helps reduce downstream restoration challenges and costs, while restoration reduces risks to adjacent protected, healthy waters. Successful restoration of impaired waters can lay the foundation for committed and continued protection of those same waters.

Although not all states may ultimately choose to use protection approaches, opportunities for protection within the context of state-wide water quality goals can be an important component to achieving water quality objectives. For example, setting CWA 303(d) Program priorities could involve consideration of the restoration potential of impaired waters adjacent or upstream to healthy watersheds. Such coordinated efforts could lead to realizing more effective results than isolated, individual protection or restoration actions. Also, under the protection Goal, healthy waters at risk of becoming impaired could be identified as part of the CWA 303(d) Program prioritization process.

Some states have used their CWA 401 certification or anti-degradation programs to protect healthy waters and habitats. Some Tribes have also promoted the concept of protection in their water programs. Protection provisions are included in the CWA 303(d) regulations, including the opportunity to establish TMDLs for information purposes ("informational TMDLs") or the need to list threatened waters. EPA is also promoting a voluntary Healthy Watershed Initiative (HWI) whereby it will work with state and other partners to identify healthy watersheds and to develop and implement healthy watershed protection plans to maintain the integrity of those waters. Likewise, states could consider leveraging their existing work to identify high quality waters and ONRWs for anti-degradation purposes.

C. *Prioritization: For the 2016 integrated reporting cycle and beyond, States review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate State strategic planning for achieving water quality goals.*

The intent of the Prioritization Goal is for states to express CWA 303(d) Program priorities in the context of the state's broader, overall water quality goals. The CWA 303(d) Program provides an integrating function because it translates state water quality standards into pollution reduction targets for the point source permitting and nonpoint sources management programs as well as other programs outside the CWA.

Linking the CWA 303(d) Program priorities with those of other programs can aid in strategically focusing limited state resources to address priority waters through water quality assessments, TMDL or alternative approaches, water quality protection strategies, implementation actions and follow-up monitoring. Establishing CWA 303(d) Program priorities will lead to more efficient and effective program management, yielding faster progress toward water quality improvement and protection.

Additional Resources

- EPA, 2013: Final "A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program" http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/programvision.cfm
- EPA, 2013: "Nonpoint Source Program and Grants Guidelines for States and Territories" http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf
- http://www.waterrf.org/ExecutiveSummaryLibrary/4007_ExecutiveSummary.pdf
- EPA/Water Environment Federation, Third Party TMDL Development Toolkit http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/ToolkitWebVersion.pdf

Endnotes

[1] WERF, Drinking Water Source Protection through Effective Use of TMDL Processes [Project #4007] Order #: 4007; Fall 2010; Principal Investigators: Karen S. Sklenar & Laura J. Blake "http://www.waterrf.org/ExecutiveSummaryLibrary/4007_ExecutiveSummary.pdf"

[2] Ibid.

[3] "Sanitary survey is on-site review of a public water system's water source, facilities, equipment, operation, and maintenance." **See:** <http://water.epa.gov/learn/training/dwatraining/sanitarysurvey/index.cfm>.

[4] WERF, Drinking Water Source Protection through Effective Use of TMDL Processes [Project #4007] Order #: 4007; Fall 2010; Principal Investigators: Karen S. Sklenar & Laura J. Blake "http://www.waterrf.org/ExecutiveSummaryLibrary/4007_ExecutiveSummary.pdf"

SECTION IV

Protecting Water Quality and Sources of Drinking Water

Water Quality Standards

Protecting source water with

- Designated uses for sources of drinking water
- Numeric and narrative water quality criteria
- Anti-degradation tools

Monitoring, Assessment, & Impairment Listing

Protecting source water with

- Assessment methodologies tailored to drinking water
- Data shared by drinking water stakeholders

Total Maximum Daily Loads

Protecting source water by

- Prioritizing TMDLs for impaired source waters
- Developing TMDLs in view of drinking water contaminants
- Supporting nonpoint source controls
- Identifying opportunities to protect waters that are not yet impaired

Point Sources

Protecting source water with

- **NPDES effluent limits and other permit conditions**
- **Downstream notification**
- **Green infrastructure planning and stormwater management**

Nonpoint Sources

Protecting source water by

- Setting priorities in Watershed Plans
- Leveraging technical and financial resources across programs

Using National Pollutant Discharge Elimination System Programs

Introduction

The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into surface waters.[1] NPDES permits contain several components that can be used to help protect public water supplies:

1. Technology-based effluent limits are based on national minimum performance standards for publicly-owned treatment works (POTWs) and many categories of industrial dischargers.
2. Water quality-based effluent limits (WQBELs) are based on applicable WQS of the receiving water and reflect a positive determination that, without such limit, the discharge will exceed or has the reasonable potential to exceed those standards.
3. Monitoring and reporting requirements can be used to identify pollutants of concern in the discharge and alert permitting authorities when permit violations occur.
4. Standard conditions are uniform in all permits, but several can be relevant to protecting drinking water, such as a 24-hour reporting requirement of events that result in the discharge in excess of certain permit effluent limits, rules for any anticipated noncompliance, and, for POTWs, notification of new pollutants or change in pollutant volume or character.
5. Special conditions may include best management practices, special studies, and pretreatment requirements.

For more information on NPDES technology-based and water quality-based limits, monitoring and reporting requirements, standard conditions, and special conditions, please see the NPDES Permit Writers Manual http://cfpub.epa.gov/npdes/writermanual.cfm.

Background

What are Water Quality-Based Effluent Limits?

State water quality standards consist of designated uses, water quality criteria to protect these uses, an anti-degradation policy to protect existing uses and high quality waters, and general policies addressing implementation issues. NPDES permits establish discharge limits that are necessary to ensure compliance with applicable state water quality standards. When technology-based effluent limits are not sufficient to attain state water quality standards applicable to a receiving water, WQBELs must be established. WQBELs must control all pollutants that the permitting authority determines are or may be discharged at levels that will cause, have the reasonable potential to cause, or contribute to an excursion above a state water quality standard in receiving waters. WQBELs are numeric discharge limits calculated on the basis of allocating, to the discharger, its share of the total allowable cumulative discharge of pollutants that will achieve the water quality standard in-stream concentration. WQBELs include consideration of, among other factors, upstream concentrations, effluent concentration and flow, and the flow of the receiving waters. State water quality standard implementation procedures address these factors and are used by NPDES permitting authorities to develop permit limits. The implementation procedures may also include detailed information for establishing a dilution allowance or

regulatory mixing zone, to allow for mixing of effluents with receiving waters, as authorized under the state's water quality standards.

States establish water quality criteria for aquatic life and human health protection; the latter may consider human health from exposure to pollutants through recreation, drinking water, and/or fish consumption. Where multiple criteria for a pollutant apply to a receiving water, effluent limits (where necessary) must derive from and ensure compliance with all of the applicable criteria. Where a specific numeric criterion does not exist, permitting authorities may calculate a site-specific water quality target concentration based on an interpretation of an applicable narrative water quality criterion and use that numeric target to establish WQBELs. Alternatively, permitting authorities may use indicator parameters to control pollutants of concern.

Who Develops WQBELs?

Permit writers (or water quality modeling specialists) in each state or EPA Region (where a state does not have NPDES authority) use state and federal regulations and relevant data to determine what WQBELs could be included in each NPDES permit.

How Can WQBELs Be Used to Protect Drinking Water?

Where numeric criteria have been established to protect the receiving water as a public water supply, WQBELs derived from these numeric human health criteria would be required for any point source discharge found to have "reasonable potential."

In cases where numeric human health criteria for specific pollutants of concern are not found in state water quality standards, states or EPA may develop effluent limits based on applicable narrative water quality criteria. Information that might be used to interpret the narrative criteria and develop site-specific water quality targets (and WQBELs derived from these targets) to protect drinking water include MCLGs, MCLs and HAs established under SDWA; as well as health advisories using information under other statutes and regulations (e.g., human health benchmarks for pesticides calculated from information developed under FIFRA and risk-based screening levels calculated for use in Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remediation and removal programs). States may also consider the acceptable risk level established for carcinogens under their water quality criteria for human health protection.

What are Pretreatment Local Limits?

Generally, POTWs are designed to treat domestic wastewater only. However, POTWs also receive wastewater from industrial (non-domestic) users (IUs). The general pretreatment regulations establish responsibilities of federal, state, and local government, industry and the public to implement pretreatment standards to control pollutants from the IUs which may pass through or interfere with POTW treatment processes or which may contaminate sewage sludge. Categorical pretreatment standards are national standards developed by EPA for IUs in specific industrial subcategories. "Local limits" are designed to address the needs and concerns of a specific POTW, its sludge, and its receiving waters. The federal regulations at 40 Code of Federal Regulations (CFR) section 403.5(c) and section 122.44(j)(2)(ii) require POTWs to evaluate the need for local limits and, if necessary, implement and enforce specific limits as part of pretreatment program activities.

Who Develops Pretreatment Local Limits?

Municipalities with state or EPA-approved pretreatment programs develop their own local limits.

How Can Pretreatment Local Limits Be Used to Protect Drinking Water?

The Local Limits Development Guidance document[2] discusses the need to address impacts to downstream drinking water facilities, in the context of identifying and protecting the designated uses of the state water quality standards or applicable criteria for the POTW effluent receiving water body. Pollutants of concern to drinking water

intakes could be the subject of particular interest when developing local limits. In the context of resource protection, the guidance discusses the incorporation of ground water protection, water reclamation and reuse projects, and UIC requirements into the determination of effluent-quality based headworks loading assessments (i.e., determinations of what concentrations of certain pollutants can be received at the point at which wastewater enters a wastewater treatment plant without violating local pretreatment program requirements).

Another concern, when considering the potential impacts of industrial users in connection with impacts on sources of drinking water, is the likely large number of IUs who have, over time, ceased discharging to POTWs and found other means of disposal of their wastes (e.g., landfills, unlined pits), which, in turn, may be problematic for ground water at the source of disposal. In addition, pollutants may be reintroduced to POTWs from disposal facilities (e.g., as leachate from landfills) and need to be addressed.

What is Green Infrastructure?

Stormwater runoff is a major cause of water pollution in urban areas. When rain falls in undeveloped areas, the water is absorbed and filtered by soil and plants. When rain falls on roofs, streets, and parking lots, however, the water cannot soak into the ground. In most urban areas, stormwater is drained through engineered collection systems and discharged into nearby waterbodies. The stormwater carries trash, bacteria, heavy metals, and other pollutants from the urban landscape, degrading the quality of the receiving waters. Higher flows can also cause erosion and flooding in urban streams, damaging habitat, property, and infrastructure.

Green Infrastructure (GI) uses vegetation, soils, and natural processes to manage water and create healthier urban environments. At the scale of a city or county, GI refers to the patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the scale of a neighborhood or site, GI refers to stormwater management systems that mimic nature by soaking up and storing water. Note that, for the purposes of this document, Low Impact Development (LID) and GI are interchangeable terms. Both refer to an approach to land development that works with nature to manage stormwater as close to its source as possible.

Who Approves GI projects?

Local governments typically make decisions about whether and how to use GI to manage stormwater. However, some of these applications may fall under the jurisdiction of state and/or federal permitting programs or regulations (e.g., Class V Underground Injection Control Regulations).

How Can GI Be Used to Protect Drinking Water?

By managing runoff at its source, GI reduces the volume of urban runoff that enters storm sewer systems. Lower runoff volumes translate into reduced combined sewer overflows and reduced stormwater discharge volumes. These changes translate, in turn, into lower pollutant loads to receiving waters. GI techniques can also be used to treat stormwater that is not retained on site. By mimicking natural processes of infiltration, GI helps to mitigate excess sedimentation in reservoirs, mobilization of pathogens, flooding, and erosion to surface waters due to high volumes of stormwater runoff.

However, infiltration also increases recharge to ground water aquifers and USDWs. Therefore, while green approaches have a proven track record and offer an attractive and more sustainable infrastructure option, their siting and use needs to consider the potential for contaminating ground water sources of drinking water. A best practice when considering infiltrating stormwater is to strike the right balance between protecting surface waters and increasing ground water recharge, while minimizing the risk to impairing ground water quality.

Some geologic/hydrologic conditions increase susceptibility of ground water to contamination from infiltration because of their decreased ability to filter out contaminants in stormwater (e.g., karst terrain and highly permeable soils). In these areas, practices that introduce stormwater directly into the subsurface and bypass natural methods

of filtration may contribute to the presence of contaminants in USDWs. Such practices may include infiltration basins, infiltration trenches, porous pavements, rain gardens, swales and filter strips, detention ponds, and stormwater dry wells.

Prevalent contaminants is another key factor to consider when developing GI solutions. For example, metals may be captured within the first soil layer. Chloride, however, is a pollutant of concern that is often not retained within the soil and flows into source waters. In cases of highly soluble and mobile contaminants such as chlorides, source reduction is a recommended complement to GI practices.

Adverse consequences of GI can be minimized by considering surrounding geology and landscape, land use, potential contaminants, and nearby wellhead protection areas when siting GI projects. Note that stormwater infiltration to a hole that is deeper than it is wide or via a subsurface fluid distribution system may be subject to SDWA and UIC requirements. EPA guidance on GI solutions includes warnings to consider siting, soils, type of stormwater, and mobilization, when considering development of GI. Some of the newer GI designs may be able to better protect against this leaching of pollutants more effectively, but more research is needed.

Desired Outcomes and Opportunities

➲ Desired Outcome

NPDES permits reflect contaminants of concern to drinking water systems

Significant potential exists for writing NPDES permits that are more protective of drinking water sources. WQBELs in permits must be based on WQS and are developed when there is a finding that the pollutant of concern will cause or has the reasonable potential to cause an excursion above any applicable WQS, including criteria for the protection of drinking water sources in cases where the WQS include public water supply as the designated use. Permit writers often face challenges when developing WQBELs for pollutants of concern to drinking water sources because many states rely on narrative water quality criteria, rather than numeric criteria. These states would need to interpret the narrative criteria on a case-specific basis, a process that can be limited by available data for the specific waterbody and access to tools to interpret narrative criteria. For a more detailed examination of WQS and recommendations for how appropriate criteria can be adopted to protect PWSs, please see Section I of this document.

State Water Directors, NPDES staff, and drinking water staff can work together to increase the level of protection that NPDES permits provide. A starting point for protection of public water supplies is to bring the contaminants of concern to PWSs to the attention of permit writers. Analysis could be based on source water quality data, MCL violations, or information found in the source water assessment for a particular water supply. A useful tool in this process is a matrix of contaminants of concern indicating whether a contaminant is covered by an existing Federal or state MCL, or a state numeric WQS.

An additional layer of protection could be that EPA's selection of state permits for review, as part of its regular oversight duties, be based on proximity to downstream drinking water intakes. Reviews of those permits be conducted in "real time" as the permits are being developed, rather than retrospectively. This would provide enhanced assurance that the permits are protective of the drinking water use. The permit application

requirements could also be enhanced to require more information as to the nearest downstream drinking water systems.

➲ Opportunities

For state water directors and permit writers

- **Matrix of Contaminants:** Develop, for consideration by state CWA and SDWA staff, a state-specific matrix comparing state numeric water quality criteria within state WQS, with state MCLs[3] as well as other contaminants of concern to sources of drinking water that may not yet be regulated. As a starting point for reference, one could use the national-level matrix comparing MCLs and nationally recommended water quality criteria (See Appendix A).
    - Locate permitted outfalls (using GIS mapping if possible) in relation to surface water intakes for PWSs.
    - Inventory and describe available data about problems experienced by PWSs in the state attributed to upstream pollutant sources (e.g., monitoring data, epidemiological data).
    - Georeference all such data. Develop a systematic approach to working through – on a stream reach-by-stream reach basis – available data on pollutants of concern.
    - Develop an approach to cross-walk a PWS's "pollutants of concern" with the contaminants in each upstream NPDES permittee's discharge to identify pollutant loadings that may benefit from further analyses.
- **Water Quality Standards:** States could adopt numeric WQS for contaminants regulated under the SDWA that would help ensure that PWS standards are achieved without the need to provide additional drinking water treatment; or alternatively, numerically interpret, on a site-specific basis, a narrative WQS to provide the necessary ambient target value to support the development of protective WQBELs.
- **Conditions in General Permits:** In instances where the permit writer does not review site specific information for permits (i.e., general permits), states could evaluate how special conditions in general permits can be written to protect drinking water and public health by requiring the identification and assessment of drinking water intakes as part of the permit application process. This can lead to a greater awareness of their proximity to drinking water intakes and flag potential issues for permit writers for public notice requirements and permit review.

For permit writers

- **Permit Limits:** Write effluent limitations and conditions to prevent harmful concentrations of contaminants of concern from reaching the intakes of PWSs.
    - Once WQSs for the protection of public water supplies are in place and there are specific numeric criteria or a narrative criterion that allows the permit writer to consider such impacts, permit writers will be better able to write permits with appropriate ambient targets.
    - Where a state has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion, the permitting authority must establish effluent limits. 40 CFR section 122.44(d)(1)(vi) provides specific approaches that must be used to develop the effluent limitations when this situation occurs.

- When setting permit limits, permitting authorities could take into account the potential effect of multiple dischargers on a receiving stream. As multiple discharges of different quality comingle in a water body, a synergistic or chemical reaction may result that may be of concern to the PWS.
- Reasonable Potential Analysis Examples: Examples can be developed to assist permit writers with conducting "reasonable potential" analysis (to determine whether a discharge has the reasonable potential to cause or contribute to an excursion above any applicable ambient water quality standard) where excursions of a narrative criterion might occur at a downstream drinking water intake point.

- **Monitoring Requirements:** Where evidence indicates the presence of a pollutant of concern for a downstream drinking water source, permits could include additional monitoring to collect the data necessary to quantify and model the fate and transport of the pollutant of concern in the receiving water (e.g., significant dischargers of phosphorus upstream of a drinking water source could be required to measure downstream phosphorus and chlorophyll).

For state drinking water staff and NPDES staff in collaboration

- **State Contaminants List:** The state drinking water program could develop a checklist that includes a comprehensive list of contaminants of concern under SDWA – both statewide and for particular geographic settings. Then, the state can develop numeric water quality criteria or interpret a narrative WQS for those pollutants of concern from which a permit writer can derive a permit limit.
- **List of Drinking Water Intakes:** Each state could establish and maintain a shared and geo-referenced database between drinking water and NPDES staff detailing locations of drinking water intakes and wells and specific contaminants of concern at those intakes or wells, as well as suspected sources of those contaminants e.g., from updated state source water assessments. (Note that some sources of contaminants may be best addressed by nonpoint source control programs or ground water protection programs outside the scope of NPDES).
- **Prioritizing Inspections and Enforcement in Highly Susceptible Drinking Water Areas:** Drinking water protection staff could assist permitting programs to prioritize resources for inspections and enforcement in areas that have the greatest potential to impact drinking water supplies.
- **Narrative Criteria Protocol:** If the state does not have a protocol for translating a narrative criterion, the drinking water program, the WQS program, and the permitting program could collaborate in developing a protocol to protect the sources for PWSs. If there is no numeric or narrative standard, there is no defensible basis for the permit writer to conduct reasonable potential analyses and develop a permit limit.

For pretreatment program staff and/or POTWs

- **Consideration of Downstream Drinking Water:** Managers of local pretreatment programs (at POTWs) could take into account any impacts downstream of the POTW discharge when considering developing local limits. In addition, POTWs need to include other potential pollutant pathways such as land filled sludge generating leachate that is reaching receiving streams or ground waters, thereby affecting source water.
- **Pretreatment Intake Analyses:** POTWs should review full analyses of industrial and commercial waste that they accept, including trucked-in waste, when determining potential pollutants of concern for local limits development.

- **Watershed Planning:** As mentioned in the previous section, a systematic and intentional review of pollutants of concern to downstream drinking water intakes could be conducted. WQS and the associated beneficial uses, including downstream uses, could be clearly identified when determining pollutants of concern during the development of POTW local limits. These could be part of watershed planning.

➲ Desired Outcome

NPDES permittees, producers and operators adequately notify downstream and affected drinking water systems of spills, CAFO discharges, and intentions to apply biosolids/manure or pesticides/herbicides.

Drinking water treatment facilities are not always given timely or complete notice of spills or other instances of non-compliance by upstream industrial or municipal dischargers, CAFOs, biosolid/manure spreading applications, and operators who apply pesticides/herbicides. This lack of information can make the process of providing safe drinking water more difficult and expensive for these facilities. When notified early on, PWSs can take preventative actions such as requesting that customers reduce demand, adding activated carbon, shutting down their intake, etc.. Farms, ranches, and CAFOs that have discharges and/or conduct biosolid/manure spreading applications in some (or many) cases may not be required to have a permit or are self-permitting, but can also directly impact drinking water systems, particularly after a rain event. NPDES permits are routinely required to contain some notification conditions, but these typically stipulate only that EPA and/or the permitting authority, and not necessarily the PWS, be notified of spills and intentions to apply pesticides/herbicides. In many cases, a permitting authority may later determine that a divergence from NPDES permit limits could be considered an instance of non-compliance, long after the effects have reached downstream sources. It is recommended that permit writers consider including, where appropriate, permit conditions with limitations or notification procedures that more effectively and in a more timely manner protect drinking water sources and inform PWSs e.g., permit writers could include the contaminant Time of Travel from the discharge point to the downstream drinking water intake(s) in the permit. At a minimum, better coordination and communication between the upstream dischargers (including agricultural producers and pesticide/herbicide application operators) and downstream users will result in safer and more reliable drinking water.

➲ Opportunities

For state drinking water staff and NPDES staff in collaboration

- **List of Critical Permits:** State clean water and drinking water regulatory authorities could coordinate regularly (e.g., at least on an annual basis) to develop and update a list of NPDES permits which are up for renewal linked to the closest downstream drinking water intake or to intakes that are located within a particular distance (e.g., 10 river miles, 3,000 feet on a lake) or dilution factor[4] from the discharge point.). The state's Source Water Assessment Reports may be a useful resource for this exercise, as they typically include geographically referenced PWS intakes and NPDES-permitted outfalls.
- **Emergency Planning:** If they are not already, the state clean water and drinking water programs could work with their Emergency Planning and Community Right-to-Know programs to develop an emergency response plan regarding spills to surface waters that have the potential to impact drinking water plants downstream. Examples of such agreements can be found in Appendices B and C.

For permit writers

- **Notification Requirements in Permits:** Upon renewal, NPDES permits with outfalls (or biosolid/manure or pesticide/herbicide application sites) of concern to PWSs (as discussed in the previous bullet) could include language requiring the permittee to provide notification (or in the absence of a permit, asking producers and operators to provide 48 hours' notification) to potentially affected PWS operators.
    - The details of a notification plan are likely best left to negotiations and discussions between the dischargers or operators of CAFOs and application sites, and the PWS operators. Such discussions allow affected parties the opportunity to reach a mutual agreement that considers their unique circumstances. That being said, a permit writer may want to include, as a permit condition, a qualitative description of the *objectives* of such notification (e.g., that it be timely; that it be given to those likely to be impacted, taking into consideration dilution and time of travel; that it be developed in consultation with the downstream user(s)).
    - PWS operations that are located within the pre-determined distance or time of travel (e.g., 48 hours) from an NPDES permitted outfall may be listed in the NPDES permit to avoid confusion as to which entities require notification.
    - Producers that operate farms, ranches, and CAFOs (that may or may not be required to have a permit or may be self-permitting), can be asked to provide advance notification (e.g., 48 hours) to the public water supply, of their intent to discharge or conduct biosolid/manure spreading applications.

➲ Desired Outcome

GI planning, stormwater, and UIC permits include considerations of drinking water sources.

➲ Opportunities

For states and local entities, and developers

- Review local codes and ordinances for compatibility with GI: local codes and ordinances, such as minimum parking requirements or landscaping codes, can sometimes pose barriers to the implementation of GI.
    - Consider including smart growth techniques as a means to preemptively protect both water quality and source water by avoiding some of the worst effects of unplanned growth.
    - Consider use of enhanced or constructed wetlands, and conservation land and buffers, as pretreatment or post treatment for drinking water utilities or POTWs, respectively.
    - When considering ground water infiltration techniques to reduce surface water runoff and pollution, aim to strike the right balance between protecting surface waters and increasing ground water recharge, while minimizing risk to ground water quality.
    - GI practices could prioritize roofs to ground water over street/parking lot to ground water.
    - Consider the siting and construction cautions mentioned under the discussion "For Developers" below, when evaluating applications for GI facilities.

For drinking water, stormwater, and UIC program staff in collaboration

- Drinking water staff can work directly with CWA stormwater programs on MS4 permits and UIC program staff on prioritizing and implementation of UIC inspections and permit conditions.

For state UIC program permit writers

- Notify PWSs of UIC injection activities within a source water protection area.
- Consider potential drinking water health impacts from contaminants in the wastewater discharge.

For developers

- Use Appropriate GI Practices: Site GI projects properly to avoid unintended consequences. Note that ground water infiltration may be subject to the UIC Program under SDWA if the method of infiltration entails a hole in the ground that is deeper than it is wide,[5] or involves subsurface distribution systems or the subsurface emplacement of fluids through a well.
- Practice rainwater harvesting, where appropriate, which can reduce demand for treated drinking water while reducing stormwater runoff. While infiltration-based GI practices can augment ground water supplies, care should be taken in siting these practices. To avoid contamination of ground water, practitioners should be aware of the presence of contaminants in soils or runoff, as well as the proximity of proposed practices to wells and wellhead protection areas. Practitioners should use this information to select projects that minimize the risk to ground water resources. The state's Source Water Assessment Reports are helpful tools in determining the location of drinking water wells and wellhead protection areas, as well as karst topography and areas with shallow depth to ground water.[6]

Additional Resources

Water Quality-Based Effluent Limits: Regulations and Guidance

- **40 CFR section 122.44 Establishing limitations, standards, and other permit conditions** - "…. each NPDES permit shall include conditions meeting the following requirements when applicable.

  (d) Water quality standards and State requirements: any requirements in addition to or more stringent than promulgated effluent limitations guidelines or standards under sections 301, 304, 306, 307, 318 and 405 of CWA necessary to:

  (section 1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality.

  (section 6) Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:

  (A) Establish effluent limits using a calculated numeric water quality criterion for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and

will fully protect the designated use. Such a criterion may be derived using a proposed state criterion, or an explicit State policy or regulation interpreting its narrative water quality criterion, supplemented with other relevant information which may include: EPA's Water Quality Standards Handbook, October 1983, risk assessment data, exposure data, information about the pollutant from the Food and Drug Administration, and current EPA criteria documents; or

(B) Establish effluent limits on a case-by-case basis, using EPA's Nationally Recommended Water Quality Standards supplemented where necessary by other relevant information; or

(C) Establish effluent limitations on an indicator parameter for the pollutant of concern, provided:

(1) The permit identifies which pollutants are intended to be controlled by the use of the effluent limitation;

(2) The fact sheet required by 40 CFR section 124.56 sets forth the basis for the limit, including a finding that compliance with the effluent limit on the indicator parameter will result in controls on the pollutant of concern which are sufficient to attain and maintain applicable water quality standards;

(3) The permit requires all effluent and ambient monitoring necessary to show that during the term of the permit the limit on the indicator parameter continues to attain and maintain applicable water quality standards; and

(4) The permit contains a reopener clause allowing the permitting authority to modify or revoke and reissue the permit if the limits on the indicator parameter no longer attain and maintain applicable water quality standards."

- NPDES Permit Writers' Manual (September 2010) – Chapter 6 discusses development of WQBELs, primarily based on numeric WQS or Whole Effluent Toxicity (WET) requirements to implement narrative standards where applicable.
- U.S. Environmental Protection Agency. 1991. Technical Support Document for Water Quality-Based Toxics Control (TSD). Technical guidance for assessing and regulating the discharge of toxic substances to the waters of the US. Provides guidance to permitting authorities on effluent characterization and WLA development.
- 2012 Edition of Drinking Water Standards and Health Advisories - <http://water.epa.gov/action/advisories/drinking/upload/dwstandards2012.pdf>.
- Human Health Benchmarks for Pesticides - EPA has developed human health benchmarks for approximately 350 pesticides to enable our partners to better determine whether the detection of a pesticide in drinking water or source waters for drinking water may indicate a potential health risk. This table includes benchmarks for acute (one-day) and chronic (lifetime) exposures for the most sensitive populations from exposure to pesticides that may be found in surface or ground water sources of drinking water. <http://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home>.
- "Regional Screening Levels for Chemical Contaminants at Superfund Sites" <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/>.This website was developed with DOE's **Oak Ridge National Laboratory (ORNL)** under an Interagency Agreement as an update of the EPA Region 3 RSL Table, Region 6 HHMSSL Table and the Region 9 PRG Table. Here you will find tables of risk-based screening levels, calculated using the latest toxicity values, default exposure assumptions and physical and chemical properties, and a calculator where default parameters can be changed to reflect site-specific risks. Values are reported for cancer and non-cancer risk screening in specific tables for various exposure routes, including tap water.

Local Limits in the Pretreatment Program: Regulations and Guidance

- 40 CFR section 403.5(c) *When specific limits must be developed by POTW.*

  (section 1) "Each POTW developing a POTW Pretreatment Program pursuant to section 403.8 shall develop and enforce specific limits to implement the prohibitions listed in paragraphs (a)(1) and (b) of this section. Each POTW with an approved pretreatment program shall continue to develop these limits as necessary and effectively enforce such limits.

  (section 2) All other POTWs shall, in cases where pollutants contributed by User(s) result in Interference or Pass-Through, and such violation is likely to recur, develop and enforce specific effluent limits for Industrial User(s), and all other users, as appropriate, which, together with appropriate changes in the POWT Treatment Plant's facilities or operation, are necessary to ensure renewed and continue compliance with the POTW's NPDES permit or sludge use or disposal practices."

- Local Limits Development Guidance

  This manual provides guidance to municipalities on the development and implementation of local controls for discharges of industrial or commercial wastes to sewage treatment facilities. This manual provides technical assistance and guidance on: Determining pollutants of concern; Collecting and analyzing data; Calculating maximum allowable loadings; Designating and implementing local limits to protect wastewater treatment and collection systems; and Performing annual reviews and periodic re-evaluations. See discussions in chapter 3.2.2 for identifying Pollutants of Concern based on Water Quality Standards or Criteria, and chapter 5.2.2 for Calculation of Allowable Headworks Loadings for both Water Quality Standards or Criteria and Resource Protection.

- EPA Supplemental Manual on the Development And Implementation of Local Discharge Limitations Under the Pretreatment Program: Residential and Commercial Toxic Pollutant Loadings and POTW Removal

  This manual provides information related to residential and commercial sources of toxic pollutants and estimated removal efficiencies of municipal treatment processes.

Noncompliance Notification: Regulations

- 40 CFR section 122.41 (l)(2) *Anticipated noncompliance*

  "The permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

- 40 CFR section 122.41 (l)(6) *Twenty-four hour reporting*

  (i) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

- 40 CFR section 122.41 (l)(7) *Other noncompliance*

  The permittee shall report all instances of noncompliance not reported under paragraphs (l) (4), (5), and (6) of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in paragraph (l)(6) of this section.

- 40 CFR section 122.41 (m)(3) *Notice*- (i) *Anticipated bypass*

  If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.

- 40 CFR section 122.41 (m)(3) *Notice*- (ii) *Unanticipated bypass*

  The permittee shall submit notice of an unanticipated bypass as required in paragraph (l)(6) of this section (24-hour notice)."

- State-specific Rules may also apply:

  For example, Ohio Administrative Code (OAC) 3745-33-08(F) – Notification to public water supply operators: Permits for facilities designated by the director as major discharges, in the following locations, shall require the permittee to notify the public water supply operator as soon as practicable after a discharge begins that results from a spill, separate sewer overflow, bypass, upset, or combined sewer overflow that reaches waters of the state: (a) Discharges within three thousand feet of a public water supply intake located in a lake; or (b) Discharges within ten stream miles upstream of a public water supply intake located in a reservoir or any other surface water of the state.

Green Infrastructure: EPA Fact Sheets and Memos

- Source Water Protection Practices Bulletin: Managing Stormwater Runoff to Prevent Contamination of Drinking Water

  A resource for professionals and citizens involved in planning and decision-making in the areas of stormwater management and source water protection.

- Memorandum: Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans

  In October 2011, EPA's Office of Water (OW) and Office of Enforcement and Compliance Assurance (OECA) issued a joint memo encouraging EPA Regions to assist their state and local partners in pursuing an integrated planning approach to CWA waste and stormwater obligations. The memo identifies GI as one example of a comprehensive solution that can improve water quality while supporting other quality of life attributes that enhance the vitality of communities.

- Memorandum: Protecting Water Quality with Green Infrastructure in Water Permitting and Enforcement Programs

  In April 2011, EPA OW and OECA jointly issued a memo supporting the use of GI. The memo reaffirms the commitment of both offices to work with interested communities on incorporating GI into stormwater permits and into remedies for non-compliance with the CWA.

- Memorandum: Clarification on Which Stormwater Infiltration Practices/Technologies have the Potential to be Regulated as "Class V" Wells by the Underground Injection Control (UIC) Program

  In June 2008, EPA issued a memo reaffirming its support of the use of infiltration practices for managing stormwater, and providing an overview of UIC program requirements for stormwater infiltration practices

that are classified as Class V wells. The memo is supported by a guide describing the major types of stormwater infiltration practices and explaining which practices are generally considered class V wells.

- Memorandum: Use of Green Infrastructure in NPDES Permits and Enforcement

  In August, 2007, EPA issued a memo encouraging the incorporation of GI into NPDES stormwater permits and CSO long-term control plans. Additionally, the memo states that GI can and will be used in future EPA enforcement activities.

- Memorandum: Using Green Infrastructure to Protect Water Quality in Stormwater, CSO, Nonpoint Source and other Water Programs

  In March, 2007 Benjamin Grumbles, EPA's Assistant Administrator for Water, issued this memo to promote GI as a viable stormwater management solution.

- Incorporating Green Infrastructure Concepts into TMDLs

  EPA fact sheet summarizes how GI/LID practices can be incorporated into TMDLs, and examines how these concepts have been applied in two recent TMDLs.

- Factsheet: General Accountability Considerations for Green Infrastructure

  Accountability considerations are important in all actions involving permits or enforcement orders, regardless of the approaches used to achieve compliance with established standards. This factsheet discusses six accountability mechanisms that may be applied to permits or enforcement actions that include GI.

- Factsheet: GPR Crosswalk Table <http://water.epa.gov/grants_funding/cwsrf/Green-Project-Reserve.cfm>.

  If they are looking for just a fact sheet, there is a GPR Crosswalk fact sheet under the guidance tab that lists eligible green expenses at http://water.epa.gov/grants_funding/cwsrf/upload/GPR-Crosswalk-Table.pdf. What is helpful about this fact sheet is that it says what is considered green under each type of project, i.e. what is considered green in a 319 project. Note that the CWSRF is a state run program so the reader contact their state office about how they are implementing the GPR requirement.

Endnotes

[1] Point source means any discernible, confined and discrete conveyance, such as a pipe, ditch, channel, tunnel, conduit, discrete fissure, or container. It also includes vessels or other floating craft from which pollutants are or may be discharged. By law, the term "point source" also includes concentrated animal feeding operations, which are places where animals are confined and fed. By law, agricultural stormwater discharges and return flows from irrigated agriculture are not "point sources". <http://cfpub.epa.gov/npdes/faqs.cfm?program_id=45#109>.

[2] Local Limits Development Guidance available at <http://www.epa.gov/npdes/pubs/final_local_limits_guidance.pdf>.

[3] That is, MCLs which are at least as protective as the federal MCLs and which, in some states, may exist for additional contaminants beyond the Federal minimums.

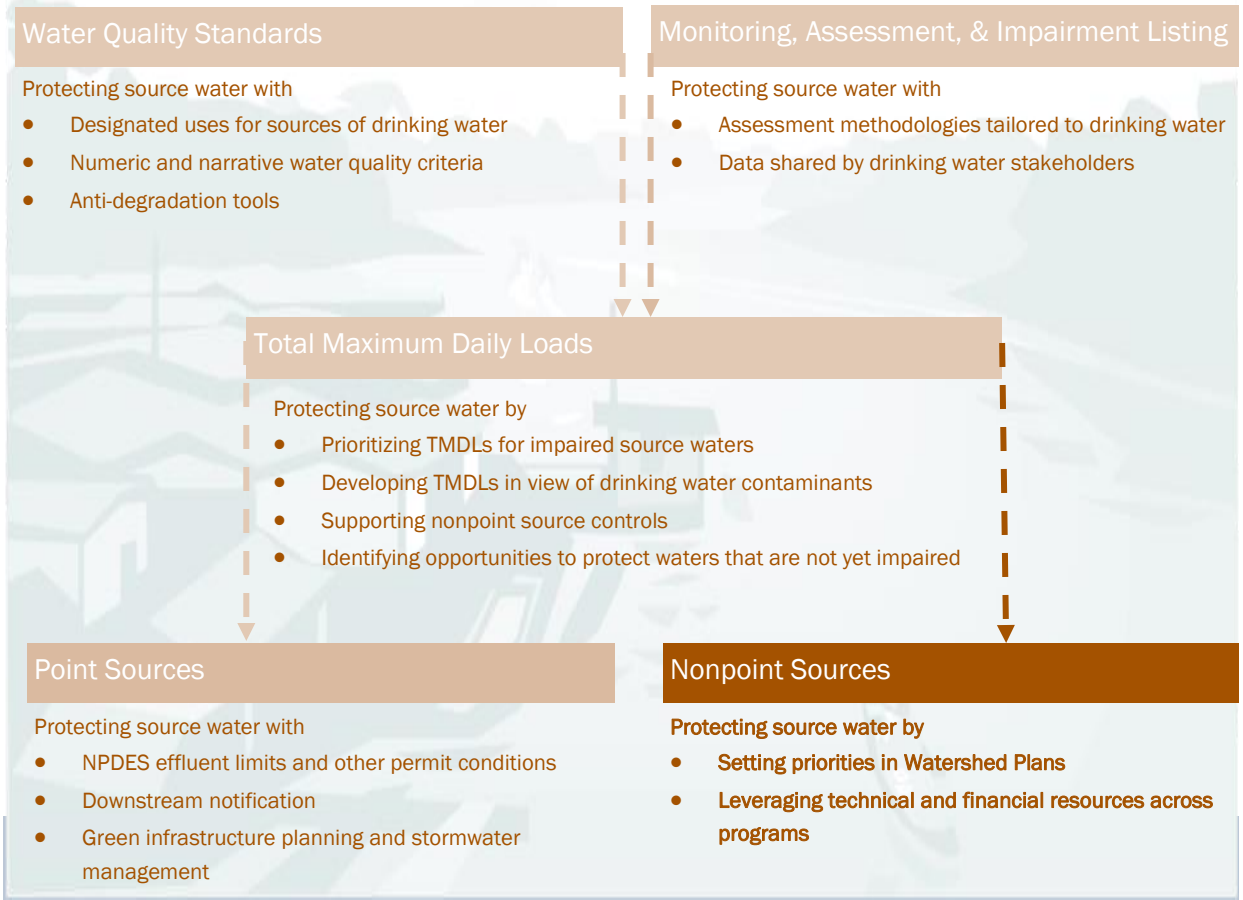
[4] **See:** <http://nhd.usgs.gov/" and "http://nhd.usgs.gov/applications.html">.

[5] **See:** §1421, SDWA and <http://water.epa.gov/type/groundwater/uic/regulations.cfm>.

[6] **See:** <http://water.epa.gov/type/groundwater/uic/class5/types_stormwater.cfm>.

SECTION V

Protecting Water Quality and Sources of Drinking Water



Using Nonpoint Source Control and Section 319 Programs

Introduction

This section is designed to help improve coordination between those responsible for protecting and providing drinking water and those responsible for the nonpoint source program under CWA section 319. Nonpoint source pollution, unlike pollution from industrial and sewage treatment plants, comes from many diffuse sources. Nonpoint Source Management Programs in each state support and promote collaborative efforts of state, federal, and local agencies as well as private organizations to achieve nonpoint source goals. Nonpoint source programs include the management or regulation of forestry, agriculture, grazing, transportation, recreation, hydro-modification, marinas, urban development, land use planning, fish and wildlife habitat, riparian and wetlands protection/restoration, public education, and other activities that affect the quality of the state's waters. Each state's nonpoint source program must meet the requirements of section 319(h) of the federal CWA and the EPA section 319 Program Guidance (April 2013).

The goal in this section of the Toolkit is to involve state nonpoint source programs in helping to protect source waters, as well as for source water protection programs to be involved in watershed planning and nonpoint source activities to restore and protect water quality threatened by nonpoint source pollution. This Toolkit provides ideas on practices and considerations based on the experiences of states in integrating nonpoint source tools and source water protection. For more information on collaboration with stakeholders that may be involved in local watershed efforts to control nonpoint source pollution and protect source water, please refer to the Source Water Collaborative Toolkit http://www.sourcewatercollaborative.org/swp-usda/.

Background

What is Nonpoint Source Pollution?

Nonpoint source pollution is caused by water moving over and through the ground. As the runoff moves, it picks up and carries away natural and human-made pollutants, finally depositing them into lakes, rivers, wetlands, coastal waters, and even our underground sources of drinking water. These pollutants include:

- Excess fertilizers, herbicides, and insecticides from agricultural lands, managed forest lands and residential areas;
- Oil, grease, and toxic chemicals from urban runoff and energy production;
- Sediment from improperly managed construction sites, crop and forest lands, and eroding stream banks;
- Salt from irrigation practices, and road runoff, and acid drainage from abandoned mines;
- Bacteria and nutrients from livestock, pet wastes, and faulty septic systems.
- Atmospheric deposition and hydro-modification.

What is the Section 319 nonpoint source program?

The 1987 amendments to the CWA added section101(a)(7) and established the section 319 nonpoint source program. Section 101(a)(7) states, "It is the national policy that programs for the control of nonpoint sources of pollution be developed and implemented in an expeditious manner so as to enable the goals of this Act to be met through the control of both point and nonpoint sources of pollution."

Under section 319, states, territories, and tribes receive grant money (for which they provide matching funds) to implement state Nonpoint Source Management Programs. Activities funded under the section 319 program include non-regulatory and regulatory programs for enforcement, technical assistance, financial assistance, education, training, technology transfer, and demonstration projects to achieve water quality goals. Federal funding provided under section 319(h) is modest relative to the challenges of nonpoint source pollution nationwide, but it is an important tool for states to use to leverage other funding sources through state nonpoint source management programs. Find more on CWA section 319 at http://water.epa.gov/polwaste/nps/cwact.cfm.

What are state Nonpoint Source Management Programs?

Individual state programs develop state Nonpoint Source Management Program plans which in turn are approved by EPA. The state Nonpoint Source Management Program plan outlines the state's approach to addressing water quality impacts from nonpoint sources of pollution. The plan provides a framework for controlling nonpoint source pollution; please see section 319 Program Guidance: *Key Components of an Effective State Nonpoint Source Management Program* (April 2013)[1] for more information.

What are Watershed-based Plans?

Since the late 1980s, organizations and agencies have moved towards managing water quality by using a watershed approach, which includes stakeholder involvement and management actions supported by sound science and appropriate technology. The watershed planning process works to quantify specific water quality problems and identify actions to achieve water quality goals. National experience indicates that state watershed based plans (WBPs) containing nine elements[2] identified in EPA's Handbook for Developing Watershed Plans to Restore and Protect our Waters[3] provide an effective, integrated approach to addressing the diverse needs of each watershed. WBPs provide a watershed-specific roadmap to guide cost-effective, well-informed restoration and protection efforts. EPA continues to emphasize WBPs as the primary planning framework for section 319 watershed projects. Under the section 319 grants guidelines, states must use at least 50 percent of the annual appropriation of section 319 funds to implement watershed projects guided by WBPs.

Desired Outcomes and Opportunities

Cross-program coordination can benefit both programs by identifying shared goals and highlighting potential synergies to achieve them. State drinking water and nonpoint source staff may consider policies and partnerships to enhance coordination with each other, as well as with state and local public and private partners involved in source water protection. Some potential outcomes and opportunities may include:

➲ Desired Outcome

Source waters (including ground water) are protected from nonpoint source pollution using Nonpoint Source Management Plans, Watershed Plans, and leveraging CWA section 319 funding.

➲ Opportunities

For state drinking water and CWA programs

State drinking water programs could engage in updates to the state Nonpoint Source Management Program Plan to ensure priorities for source water protection are reflected in the plan (e.g., ground water protection activities are eligible for funding under section 319 if they have been identified in the state nonpoint source program/ management plan as a priority). Updates of state Nonpoint Source Management Program Plans are conducted every 5 years. State source water protection programs and source water collaboratives can aid in the development and implementation of state nonpoint source management program plans. For example:

- CWA 319 Projects: Source water protection areas can be prioritized in selecting section 319 projects.
- Monitoring and Assessment Data: Source water monitoring data, compliance data, assessment maps, and susceptibility ratings from PWSs can be used to inform WBPs (e.g., to prioritize drinking water sources for inclusion in WBPs).
- Hydrogeology: Drinking water program hydrologists and their detailed knowledge of ground water hydrology can be beneficial in nonpoint source plan development by identifying aquifer recharge zones for protection, and where ground water contributes significantly to the base flow of certain stream reaches which may affect surface water quality for better or worse depending on the ground water quality.
- Watershed Metrics: The nonpoint source program prioritization process could include drinking water program and source water protection program metrics. For example, a watershed could be prioritized by the acres or percent of its area that constitutes wellhead protection areas.
- U.S. Department of Agriculture (USDA) Funding: Technical assistance from personnel involved in source water protection planning can benefit nonpoint source WBP development or updating. Federal and state drinking water agencies can provide additional insight to state nonpoint source staff and other participants (e.g., local funding availability from **USDA Natural Resources Conservation Service (NRCS)**[4]).
- Local Intelligence: Source water programs and collaboratives can utilize local knowledge and contacts to provide additional leverage to limited federal and state resources by engaging water systems, either financially or logistically, in watershed planning and management projects.
- State drinking water programs (and PWSs where possible) could share data and other information, including source water assessment maps and susceptibility ratings to help inform state Nonpoint Source Management Program Plans and local WBPs and to identify sources of nonpoint source pollution.

- State drinking water programs, utilities, and source water collaboratives could consider State Nonpoint Source Management plans when updating source water assessments and implementing protection programs.

➲ Desired Outcome

Financial and technical resources are leveraged and used for the multiple benefits of protecting drinking water and achieving nonpoint source pollution control and watershed goals

➲ Opportunities

For state drinking water and CWA programs

- The Drinking Water SRF set-asides under section 1452(g)(2) for state source water protection program management and section 1452(k)(1) may be used in a variety of ways for nonpoint source issues on shared projects that affect both nonpoint source issues and source water protection. State drinking water and nonpoint source staff could work with SRF staff to identify opportunities to address nonpoint source pollution. Source water protection projects can be funded through either the drinking water SRF's so-called 15 percent set-aside for certain source water protection activities e.g., to provide loans for voluntary protection plans and land use changes under 1452(k)(1)(A) and provide grants for wellhead protection under 1452(k)(1)(D) [but no more than 10% of a state's annual allotment may be used for any either of those options], as well as through the Clean Water SRF, which allows a state to fund projects through the section 319 statutory authority. See http://water.epa.gov/grants_funding/dwsrf/index.cfm and your state's web site for more information.
- The Clean Water SRF loans can be used to fund nonpoint source projects through the section 319 statutory mechanism. States may fund any projects eligible for section 319 funding, including source water and ground water projects, using this approach.
- While the section 319 guidelines provide flexibility for states to fund protection activities in unimpaired waters, the program remains focused on restoration efforts for impaired waters. Therefore, it may be helpful for state drinking water program staff to be familiar with the state's section 303(d) list of impaired waters, to identify linkages to source water protection opportunities for inclusion in the next update of the state's watershed management plan.
- States could prioritize waters for providing protection prior to further deterioration and inclusion on the 303(d) list. Source Water Assessment Program susceptibility determinations could be used to help identify which waters qualify for nonpoint source funding. See, also, the HWI.[5]
- State drinking water and nonpoint source staff could work together to coordinate with other public and private partners, such as **USDA NRCS** and **Farm Service Agency**; private foundations; watershed coalitions; and others, to leverage and prioritize technical assistance, funding, and monitoring opportunities based on common goals e.g., to use cost sharing to implement nonpoint source controls.
- State drinking water program staff could also be familiar with TMDL efforts to address nonpoint source pollutants which impair drinking water sources. Drinking water program staff can contribute expertise, data, or other support to develop and implement TMDLs account for the impairment of drinking water sources. See Section III of this Toolkit for more detail on TMDL opportunities.

- State drinking water programs, if involved in local watershed plan development, can encourage water systems to provide financial, logistical, and other support for nonpoint source, source water protection activities (large/very large water systems would be more likely than small to have this capability). PWSs have local knowledge of watersheds and are "eyes on the ground." Their data and information can be useful for identifying nonpoint source program priorities and useful in related programs such as WQS and TMDLs.

➲ Desired Outcome

CWA programs can work collaboratively with SDWA programs

➲ Opportunities

For CWA programs and SDWA programs

Collaborate to work with partners on additional funding opportunities such as **USDA Farm Bill Special Projects** (**Mississippi River Basin Initiative**, **Gulf of Mexico Initiative**, **USDA NRCS National Water Quality Initiative**) and **EPA CWA section 106 and section 319 grants**. To view more information on these grants and initiatives, see "Additional Resources" below.

Additional Resources

- Source Water Collaborative Collaboration Toolkits: Protection Drinking Water Sources through Agricultural Conservation - <http://www.sourcewatercollaborative.org/swp-conservation-partners-toolkit/>.
- Section 319 Grants Guidelines - <http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf>.
- CWA Section 319 program information - <http://water.epa.gov/polwaste/nps/cwact.cfm>.
- Key Components of Nonpoint Source Management Plans - <http://water.epa.gov/polwaste/nps/upload/key_components_2012.pdf>.
- EPA's *Handbook for Developing Watershed Plans to Restore and Protect our Waters* - <water.epa.gov/polwaste/nps/handbook_index.cfm>.
- Fact Sheet – Using DWSRF Set-Aside Funds for Source Water Protection - <http://www.epa.gov/ogwdw/dwsrf/pdfs/source.pdf>.
- TPL report (RE: NC, CWSRF)
- USDA Farm Bill Landscape Initiatives - <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/initiatives/>.
- EPA CWA section 106 grants - <http://water.epa.gov/grants_funding/cwf/pollutioncontrol.cfm**>.**

Endnotes

[1] **See:** <http://water.epa.gov/polwaste/nps/upload/key_components_2012.pdf>.

[2] **See:** <http://water.epa.gov/polwaste/nps/upload/319-guidelines-fy14.pdf>.

[3] **See:** <water.epa.gov/polwaste/nps/handbook_index.cfm>.

[4] **See:** <http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/programs/financial/eqip/>.

[5] **See:** <http://water.epa.gov/polwaste/nps/watershed/concept.cfm>.

Appendix A

List of NRQC-H, NRWQC-FWH, NPDWRs, MCLGs, and Health Advisories by contaminant.

Note: Drinking Water Contaminants in red indicate that no NRWQC exists or criteria (HH and FWH) are less protective than the MCL.

APPENDIX A: NR QC - H ; NRWQC - FWH ; NPDWRs ; MCLGs ; & HEALTH ADVISORIES (in ppb unless otherwise noted)

NOTE: DRINKING WATER CONTAMINANTS IN RED INDICATE THAT NO NRWQC EXISTS OR CRITERIA (HH AND FWH) ARE LESS PROTECTIVE THAN THE M

		CAS #	CONTAMINANT	NRWQC - HH *	WQC - FW	PDWR (MCL)	MCLG	HEALTH ADVISORIES	
								LIFE TIME	10-4 CANCER RISK
LOCs	1	1332214	ASBESTOS ****:	7	---	7	7	---	700-MFL
	2	7440360	ANTIMONY:	5.6	---	6	6	6	---
	3	7440382	ARSENIC:	0.018	150	10	0	---	2
	4	7440393	BARIUM:	1,000	---	2,000	2,000	---	---
	5	7440417	BERYLLIUM:	---	---	4	4	---	---
	6	7440439	CADMIUM:	---	0.25	5	5	5	---
	7	18540299	CHROMIUM(VI):	---	11	100	100	---	---
	8	7440508	COPPER***** :	1,300	******	1,300	1,300	---	---
	9	143-33-9	CYANIDE:	140	5.2	200	200	---	---
	10	7681-49-4	FLUORIDE:	---	---	4,000	4,000	---	---
	11	7439-92-1	LEAD:	---	---	15	0	---	---
	12	7439976	MERCURY:	---	0.77	2	2	2	---
	13	14797-55-8	NITRATE (as N):	10,000	---	10,000	10,000	---	---
	14	14797-65-0	NITRITE (as N):	---	---	1,000	1,000	---	---
	15	7782492	SELENIUM:	170	5	50	50	50	---
	16	7440280	THALLIUM:	0.24	---	2	0.50	---	---
OCs	17	15972-60-8	ALACHLOR:	---	---	2	0	---	40
	18	1912-24-9	ATRAZINE:	---	---	3	3	---	---
	19	71-43-2	BENZENE:	2.2	---	5	0	3	1,000 - 10,000
	20	50-32-8	BENZO[A]PYRENE:	0.0038	---	0.2	0	---	0.5
	21	1563-66-2	CARBOFURAN:	---	---	40	40	---	---
	22	56-23-5	CARBON TETRACHLORIDE:	0.23	---	5	0	30	50
	23	12798-03-6	CHLORDANE:	0.0008	0.0043	2	0	4	10
	24	108-90-7	CHLOROBENZENE:	130	---	100	100	---	---
	25	75-99-0	DALAPON:	---	---	200	200	200	---
	26	19-12-8	DBCP:	---	---	0.2	0	---	3
	27	103-23-1	DI(2-ETHYLHEXYL)ADIPATE:	---	---	400	400	400	3
	28	95-50-1	[ORTHO] 1,2 -DICHLOROBENZENE:	420	---	600	600	600	---
	29	106-46-7	[PARA] 1,4 -DICHLOROBENZENE:	63	---	75	75	75	---
	30	107-06-2	1,2-DICHLOROETHANE:	0.38	---	5	0	---	40
	31	75-35-4	1,1-DICHLOROETHYLENE:	330	---	7	7	400	6
	32	156-59-2	CIS-1,2-DICHLOROETHYLENE:	---	---	70	70	10	---
	33	75-09-2	DICHLOROMETHANE:	4.6	---	5	0	200	500
	34	117-81-12	DI(2-ETHYLHEXYL)PHTHALATE:	---	---	6	0	---	300
	35	78-87-5	1,2-DICHLOROPROPANE:	0.50	---	5	0	---	60
	36	88-85-7	DINOSEB:	---	---	7	7	7	---
	37	85-00-7	DIQUAT:	---	---	20	20	---	---
	38	94-75-7	2,4-D:	100	---	70	70	---	---
	39	145-73-3	ENDOTHALL:	---	---	100	100	50	---
	40	72-20-8	ENDRIN:	0.059	0.036	2	2	2	---
	41	100-41-4	ETHYLBENZENE:	530	---	700	700	700	---
	42	106-93-4	EDB(ETHYLENE DIBROMIDE):	---	---	0	0	---	2
	43	1071-83-6	GLYPHOSATE:	---	---	700	700	---	---
	44	76-44-8	HEPTACLOR:	0.000079	0.0038	0.4	0	---	0.8
	45	1024-57-3	HEPTACLOR EPOXIDE:	0.000039	0.0038	0.2	0	---	0.4
	46	118-74-1	HEXACHLOROBENZENE:	0.000280	---	1	0	---	2
	47	77-47-4	HEXACHLOROCYCLOPENTADIENE:	40	---	50	50	---	---
	48	58-89-9	[LINDANE] GAMMA-BHC:	0.980	---	0.2	0.2	---	---
	49	72-43-5	METHOXYCHLOR:	100	0.03	40	40	40	---
	50	23135-22-0	OXAMYL (VYDATE):	---	---	200	200	---	---
	51	1918-02-1	PICLORAM:	---	---	500	500	---	---
	52	1336-36-3	PCBs:	0.000064	0.014	0.5	0	---	10
	53	87-86-5	PENTACHLOROPHENOL:	0.27	15	1	0	40	9
	54	122-34-9	SIMAZINE:	---	---	4	4	---	---
	55	100-42-5	STYRENE:	---	---	100	100	100	---
	56	8001-35-2	TOXAPHENE:	0.00028	0.0002	3	0	---	3
	57	1746-01-6	2,3,7,8-TCDD (DIOXIN):	5.00E-09	---	3.00E-08	0	---	2.00E-08
	58	93-72-1	2,4,5-TP:	---	---	50	50	50	---
	59	71-55-6	1,1,1-TRICHLOROETHANE:	---	---	200	200	- --	---
	60	79-00-5	1,1,2-TRICHLOROETHANE:	0.59	---	5	3	3	60
	61	120-82-1	1,2,4-TRICHLOROBENZENE:	35	---	70	70	70	---
	62	127-18-4	TETRACHLOROETHYLENE:	0.69	---	5	0	10	---
	63	108-88-3	TOLUENE:	1,300	---	1,000	1,000	---	---
	64	156-60-5	TRANS-1,2-DICHLOROETHYLENE:	140	---	100	100	100	---
	65	79-01-6	TRICHLOROETHYLENE:	2.5	---	5	0	---	300
	66	75-01-4	VINYL CHLORIDE:	0.025	---	2	0	---	2
	67	1330-20-7	XYLENES:	---	---	10,000	10,000	---	---
MICROs	68		GIARDIA:	---	---	99.9%	---	---	---
	69		HPC(of colonies):	---	---	500 / ml	---	---	---
	70		LEGIONELLA:	---	---	---	---	---	---
	71		VIRUSES:	---	---	99.99%	---	---	---
	72		TURBIDITY**:	---	---	5	---	---	---
RADIOs	73		GROSS ALPHA ***:	---	---	15	---	---	---
	74		RADIUM 226 + 228***:	---	---	5	---	---	---
	75		BETA PARTS***:	---	---	4	---	---	---
	76		URANIUM:	---	---	30	0	---	---

* HUMAN HEALTH CRITERIA (WATER + ORGANISM); AQUATIC LIFE CRITERIA (CHRONIC) ** MEASURED AS NEPHLELOLOMETRIC TURBIDITY UNITS (NTUs)

*** MEASURED AS PICOCURIES PER LITER (pCi/L) or for BETAS IN MILLIREMS / YEAR **** MEASURED AS MILLION FIBERS PER LITER (MFL)

***** ORGANOLEPTIC CRITERION FOR COPPER IS 1,000 PPB ****** LINK TO AQUATIC LIFE COPPER CRITERION DESCRIPTION

Appendix B

State-Specific Examples of Protecting Water Quality and Sources of Drinking Water

Water Quality Standards

New York

New York State has designated more than 50% of its lakes (by surface area) as "source of water supply for drinking, culinary, or food processing purposes." Waters under this classification include:

- *Class AA fresh surface waters:* Waters that, if subjected to approved *disinfection* treatment, with additional treatment if necessary to remove *naturally* present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.
- *Class A fresh surface waters:* Waters that, if subjected to approved treatment equal to *coagulation, sedimentation, filtration and disinfection*, with additional treatment if necessary to reduce *naturally* present impurities, meet or will meet New York State Department of Health drinking water standards and are or will be considered safe and satisfactory for drinking water purposes.

New York has adopted ambient WQS for several hundred substances to protect this designated use. Additional protection is provided by (separate) finished drinking water standards. Some of the challenges faced by New York in protecting public water supplies include difficulty and lack of resources in addressing the breadth of contaminants through substance-specific criteria (including contaminants of emerging concern).

NY is also working to develop AWQC for phosphorus that are protective of finished drinking water by targeting regulatory endpoints for disinfection by-products and arsenic under the SDWA, as well as cyanotoxins from harmful algal blooms.[1]

North Carolina

North Carolina has designated more than 50% of its lakes (by surface area) with the use of "source of water supply for drinking, culinary, or food processing purposes." North Carolina has also adopted ambient WQS for substances to protect this designated use. State regulations allow surface water standards for the protection of human health to be derived using formulas identical to those prescribed for derivation of federal MCLs – but additionally protect for the consumption of fish and shellfish. The State also adopts federal MCLs as finished drinking water standards.

The following are a few of North Carolina's Classifications (Designated Uses) of Water Supply (WS) waters. The same numerical and narrative water quality criteria apply to all Water Supply classifications. The standards are calculated to protect human health through consumption of fish and water. Examples of water supply classifications include:

- *Water Supply I (WS-I):* Waters protected for all Class C uses plus waters used as sources of water supply for drinking, culinary, or food processing purposes for those users desiring maximum protection for their water supplies. WS-I waters are those within natural and undeveloped watersheds in public ownership. All WS-I waters are High Quality Waters (HQW) by supplemental classification (See full description of Class C waters below).
- *Water Supply II (WS-II):* Waters used as sources of water supply for drinking, culinary, or food processing purposes where a WS-I classification is not feasible. These waters are also protected for Class C uses. *WS-II waters are generally in predominantly undeveloped watersheds*. All WS-II waters are HQW by supplemental classification.

- *Water Supply III (WS-III):* Waters used as sources of water supply for drinking, culinary, or food processing purposes where a more protective WS-I or II classification is not feasible. These waters are also protected for Class C uses. WS-III waters are generally in *low to moderately developed watersheds*.

Michigan

Michigan WQS are set at levels designed to protect surface waters of Michigan at the point of public water supply intake and in contiguous areas as determined necessary for assured protection. Michigan uses a water body by water body approach to designate public water supply use. Michigan has a current list of community water supplies using surface waters. Michigan's administrative rules include procedures to calculate water quality values to protect drinking water sources from contaminants whose concentrations exceed Human Non-Cancer Values (HNV) and Human Cancer Values (HCV). These values apply to surface waters protected as drinking water sources, and assume a person consumes 2 liters of water per day. **Michigan Department of Environmental Quality (Michigan DEQ)** has a list of almost 300 parameters with their HNV and HCV for drinking water and non-drinking water uses.

Wisconsin

Implementation of Wisconsin's existing surface WQS may present some mutual benefits to both the CWA and SDWA programs. Aside from the surface water quality criteria for toxic substances, the state's existing WQS include criteria for the protection of recreation and fish consumption and aquatic life uses that may also serve to protect existing public water supply source waters. For example, implementation of statewide phosphorus criteria should result in decreased cultural eutrophication, which in turn, should reduce the magnitude and frequency of for cyanobacterial blooms that can produce toxins and cause undesirable taste and odor effects for public water supply waters.

Monitoring, Assessment, and Impaired Waters Listings

Ohio

Ohio's CWA program collaborates closely with its SDWA program to assess surface waters for attainment of the public water supply beneficial use, and the two programs share CWA section 106 funds to accomplish this activity. **Ohio EPA's Division of Drinking and Ground Waters (DDAGW)** completes the public water supply beneficial use assessment for the Agency's Integrated Water Quality Report. Both SDWA PWS compliance monitoring data and raw water quality data collected by the two programs are used to complete the assessment. As part of the assessment process, treatment information is obtained from utilities to determine if treatment beyond conventional processes was needed and if compliance monitoring data can be used as representative of source water conditions. State programs also use data collected from Drinking Water Source Assessment Reports and TMDL Reports to determine future sampling sites.

Ohio sets water quality criteria for the public water supply use with the assumption that only conventional drinking water treatment is needed to meet WQS. In the case of pollutants for which EPA has not published NRWQC, Ohio bases its criteria to protect this use on SDWA MCLs.

To ensure that CWA program officials can readily identify locations of public water system intakes for permitting and assessment purposes, DDAGW shares statewide GIS data layers of surface water intakes and the watershed area that contributes water to each intake (information included in the SDWA program's Drinking Water Source Assessment Reports). In Ohio, the public water supply beneficial use water quality criteria apply only within 500 yards of an active public water system intake. There has been some initial discussion between the CWA and SDWA programs to evaluate whether it would be desirable to expand the public water supply beneficial use zone to be consistent with Ohio's Source Water Assessment and Protection corridor management zone, 10 miles upstream from the intake.

Oregon

Oregon Department of Environmental Quality SDWA staff coordinate regularly with CWA staff to revise standards and new stream listings for "water quality limited" streams in Oregon. The CWA 2010 Integrated Report applied the narrative criterion in state rules (OAR 340-041-0007(11)) that establishes the *statewide goal of protecting the potability of drinking water*. The current applicable narrative standard does not specify measurements or limits for protecting potable drinking water. Oregon DEQ has in the past used the existing numeric criteria as a substitute quantitative target for protecting all beneficial uses along with other information documenting impacts from turbidity on specific fish, shellfish, and drinking water uses in waters throughout the state. For the 2010 §305(b) assessment, Oregon DEQ's nonpoint source specialist obtained records from PWS operators for various drinking water systems in Oregon. Available data included the number of shutdowns occurring in a PWS and source water turbidity levels at the time of the shutdown. Oregon DEQ reviewed the information to determine how many shutdowns were related to turbidity levels that exceeded the system's operating capacity and treatment levels which prevented the PWS from providing drinking water from the surface water source.

Oregon DEQ's drinking water source protection methodology includes evaluating data showing the measured turbidity levels and the number of days any PWS was closed. For their 2010 Integrated Report, this resulted in listing specific source waters as "*Category 5: Water quality limited, 303(d) list, TMDL needed*". Anecdotal reports or un-validated shutdowns reported in the Safe Drinking Water Information System (SDWIS) were not sufficient for Oregon DEQ to determine that the levels exceeded natural conditions, and these systems were assessed as *"Category 3: Insufficient data to determine whether a designated use is supported"*. Five water systems had sufficient data of high quality to determine that PWS shutdowns were occurring over a number of years. DEQ proposed that these five water bodies be on the Water Quality Limited 303(d) list due solely to drinking water beneficial use limitations.

Oregon DEQ's drinking water protection staff and CWA implementation staff also developed a consistent methodology to include the data for drinking water MCLs into the existing water quality criteria under the CWA for purposes of the 303(d) data queries. The first step is a thorough cross-walk of MCLs versus existing WQS. There are 3 MCLs that are more stringent than the water quality criteria. These 3 chemicals were added to the 303(d) query to establish the Integrated Report lists. There were 25 chemicals that have MCLs under SDWA, but no current water quality criteria under the CWA. Under the Oregon methodology, if the MCL is exceeded in source water, the data point goes into Category 3(b) of the Integrated Report (*Insufficient data to determine whether a designated use is supported, but some data indicate nonattainment of a criterion*). If the MCL is exceeded in post-treatment water samples (SDWIS data), and has at least 2 relevant data points, the source water goes into Category 5. For those source waters listed under Category 5, Oregon DEQ will need to consider any progress toward additional treatment for those chemicals before proceeding toward TMDL development. In practice, if a PWS has received funding for a drinking water treatment upgrade, Oregon DEQ will need to consider whether there is a need for further reductions through a TMDL.

For CWA Integrated Reports, Oregon DEQ routinely requests that stakeholders including local, state and federal agencies, a local interest groups and watershed councils submit water quality data to be considered for inclusion in the CWA 303(d) list and 305(b) assessment. In the most recent calls for data, this has included a direct mailing to PWS operators, requesting that they submit water quality data for raw water prior to treatment. The goal is for Oregon DEQ to develop a more thorough data set with which to compile the future reports, including raw data at or above the PWS intakes.

Other Examples

Use of external data in drafting of 303(d) list

- **Ohio EPA Credible Data Program:** http://www.epa.state.oh.us/dsw/credibledata/index.aspx.
- **Washington Ecology:** http://www.ecy.wa.gov/programs/wq/303d/WQpolicy1-11ch1.pdf.

- **South Carolina Department of Health and Environmental Control:** https://www.scdhec.gov/environment/water/tmdl/#2.
- **Colorado's Monitoring Partnerships and Data Sharing Network**: http://www.coloradowaterquality.org/.

Engaging citizen stakeholders and data sharing

- **Washington Department of Ecology** has developed a 303(d) List Query Tool and Interactive Mapping Tool that provides the ability to search listed waters based on multiple criteria.[2] Washington Ecology has also provided GIS map layers with multiple layers of data to provide a visual overview of the state's listed waters.
- **Ohio EPA** engages citizens using interactive Google maps that allow the public to view location-specific water chemistry data, drinking water advisories, and NPDES permit information.[3]

Use of listing to reduce pollutants prior to TMDL development

- In issuing permits, **The Washington Department of Ecology** reduces the amount of pollutants allowed to be released into waters that appear on the 303(d) list, even before a TMDL is completed. See also pp. VI-35 – VI-40 of WA's Permit Writer's Manual[4] and 40 CFR 122.4.

Total Maximum Daily Loads

Missouri

Intensive corn production in the watershed around **Missouri's Vandalia Lake** contributed high levels of the herbicide atrazine to the lake water. In the late 1990s, water quality data showed atrazine levels at approximately 89 parts per billion (ppb), far exceeding the 3 ppb water quality criterion required for finished drinking water. As a result, Missouri added Vandalia Lake to the state's 1998 and 2002 CWA section 303(d) lists of impaired waters.

To address the contamination, federal, state and local watershed stakeholders worked with farmers to implement BMPs to improve the quality of their drinking water source. State and federal incentive programs provided funds through local organizations to support organizing, planning and implementing the project. Atrazine levels dropped, and the **Missouri Department of Natural Resources (MDNR)** removed Vandalia Lake from the state's 2006 303(d) list for atrazine.

This project ultimately brought together new partnerships and a greater awareness of how to jointly resolve water quality problems. Many groups collaborated by sharing data and organizing the Vandalia **Watershed Management Committee**, which included **University of Missouri Outreach and Extension**, the **USDA NRCS** and the **City of Vandalia**. Committee members included municipal employees, elected officials, residents, landowners, operators and **Soil and Water Conservation Districts**. Other collaborators joined, including **MDNR, the Missouri Department of Conservation, the Mark Twain Water Quality Initiative, the Missouri Department of Health** and other agencies. See http://water.epa.gov/polwaste/nps/success319/mo_van.cfm.

Texas

Aquilla Reservoir was built in 1983 for water supply, flood control, and recreation purposes. Corn and sorghum production comprise 40 percent of land use in the watershed. The reservoir is the sole source of water for the **Aquilla Water Supply District**'s treatment plant.

During the late 1990s, monitoring of finished drinking water showed that atrazine concentrations consistently exceeded state and federal drinking water standards mandating a MCL of 3 micrograms per liter (3µg/L). Three consecutive MCL violations led the state to place the reservoir on its 303(d) list of impaired waters in 1998 without a WQS. This led the **Texas Commission on Environmental Quality (TCEQ)** and the **Texas State Soil and**

Water Conservation Board (TSSWCB) to establish a TMDL for atrazine. EPA approved the TMDL in 2002 that required the reservoir to maintain a running annual average atrazine concentration not to exceed the 3µg/L MCL for 2 consecutive years. This would amount to a 25 percent atrazine load reduction.

State, federal, regional, and local agencies collaborated to reduce reservoir pollution, protect against new pollution sources, and monitor progress through water quality testing. Agricultural producers, affected water supply companies, government agencies, and other stakeholders formed the **Texas Watershed Protection Committee,** which identified BMPs for use in the watershed and documented BMP adoption. The committee also worked to increase pesticide dealers' awareness of the problem and gain their assistance and support in solving it. Finally, corn and sorghum producers received technical and financial assistance to implement the BMPs.

Project leaders also targeted urban areas for atrazine reductions. They prepared fact sheets about atrazine and alternative lawn management. Through the **Texas Master Gardener** program, they delivered television public service announcements about proper application and storage of herbicides and pesticides. Finally, they distributed fact sheets and general articles to local newspapers, to feature columnists, and at local meetings.

These efforts led to a 60 percent atrazine load reduction, far exceeding the TMDL. Over 2 consecutive years of monthly reservoir sampling showed atrazine concentrations well below the 3µg/L requirement. The waterbody now meets atrazine concentration standards, and TCEQ has recommended that it be removed from the state 303 (d) list (http://water.epa.gov/polwaste/nps/success319/tx_aquilla.cfm).

Utah

In 1941, the **Bureau of Reclamation** completed construction of the **Deer Creek Reservoir**, located on the Provo River in Wasatch County, Utah. Since that time, Deer Creek Reservoir has become a vital source of drinking water for over one million people, as well as a source of irrigation water and a popular recreation destination. In 2002, the EPA approved a TMDL for the reservoir's coldwater aquatic life use. This use was impaired by low DO levels at the bottom of the reservoir caused by excessive phosphorus loading and high surface water temperatures. Nonpoint source runoff from urban areas and agricultural activities also contributed to the impairment.

The TMDL process provided stakeholders with a framework for compiling, analyzing, and understanding data for parameters affecting DO levels in the Deer Creek Reservoir. As a result, stakeholders were able to participate in the development of a TMDL that established quantifiable goals to maintain current phosphorus loads and identifies phosphorus reductions necessary to maintain a margin of safety and allow for future growth. The TMDL brought together **Wasatch, Salt Lake and Utah Counties, Midway Fish Hatchery, Jordanelle Reservoir Water Quality Technical Advisory Committee**, five regional conservancy districts, and **Utah Department of Environmental Quality**. These groups collaborated to plan nine projects focused on agricultural BMPs, CAFO cleanup, streambank restoration, load reduction from the reservoir's fish hatchery, and a comprehensive nutrient management plans for feedlots casing water quality impairments.

At the time of TMDL development, data analysis of DO levels, temperature, algae levels, water clarity, and fishery health, all showed signs of improvement. Analysts attributed these results to years of water quality improvement projects and programs. Although the TMDL development process did reveal improvements in water quality, it also highlighted the sensitivities of Deer Creek Reservoir. The final TMDL report states that although major improvements are not needed, it is important to have a plan in place that stresses protection and management of current conditions – particularly in light of growth and development pressures in Wasatch County. See: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/deercreek.cfm.

National Pollutant Discharge Elimination System Programs

WQS/Permit Limits and Conditions: Examples of states where NPDES permits reflect contaminants of concern to drinking water systems.

Pennsylvania

Pennsylvania's WQS include the designated use of public water supply for all surface waters statewide. Pennsylvania implements certain parameters of concern for drinking water intakes in accordance with their regulations, which state that "the water quality criteria for Total Dissolved Solids (TDS), nitrite-nitrate nitrogen, phenolics, chloride, sulfate and fluoride established for the protection of potable water supply shall be met at least 99% of the time at the point of all existing or planned surface potable water supply withdrawals…" NPDES permit writers document the nearest downstream drinking water intake and determine if the permitted discharge will meet the state requirement. An analysis may be done on a case-by-case basis where there has been a determination of potential drinking water impacts from other parameters contained in a discharge. In such cases, the permit writer can use the drinking water MCLs as a guide if no specific state numeric water quality criteria exist.

West Virginia

West Virginia has a statewide designation of water supply for all surface waters, except those sources determined to be unsuitable because of insufficient flow or hydrologic modifications. Concentrations of those pollutants for which there are water quality criteria to protect the water supply use must be achieved within ½-mile above a water supply intake, requiring the calculation of WQBELs if necessary to achieve these criteria.

Oregon

Oregon requires suction mining permittees (700M) to identify public and domestic drinking water intakes and ensure that there is no visible turbidity plume at the intake.

New York

New York's Priority Waters Listing is a mechanism to document contaminant issues for use by permit writers. **County Water Quality Coordinating Committees** are a forum for PWS and local health departments to raise these concerns locally and transfer to state.

WQS/Permit Limits and Conditions: Examples of consideration of downstream drinking water in pretreatment.

EPA Region 6/New Mexico

The Farmington, New Mexico NPDES permit[5] contains requirements to reduce salinity in order to meet drinking water requirements in the Colorado River. The basin-wide **Colorado Salinity Control Program (CSP)** was established by EPA in December 1974. The permit limits daily maximum TDS to 400 mg/L net increase over finished drinking water concentrations. The permit requires that the city complete a BMP that will have two parts. The first part of the BMP is for residential customers and requires the city to design a citizen education fact sheet on TDS reduction, to be distributed through its water billing. The goal of the TDS reduction fact sheet will be to inform the public about how they can reduce salinity return to the city by limiting water softener usage and using alternative water softener alternatives, such as dryer sheets as a substitute for liquid fabric softeners. The second part of the BMP will be for the city to conduct a commercial/industrial (CI) user impact analysis on TDS discharges to the city and to reevaluate local limits for TDS. The city would be required to implement changes if the survey indicates that reductions could be passed on to significant CI users through creation of new local limits for TDS as part of its pre-treatment policies.

Florida

Florida Department of Environmental Protection (Florida DEP) provides guidance, including a computer program, to assist POTWs in deriving pretreatment local limits to achieve water quality needs under different effluent disposal options. Effluent disposal options include drinking water standards, as well as water reuse irrigation on different types of soil, direct discharge to both fresh and marine waters, and underground injection to meet primary and secondary ground water standards. The Florida guidance can be accessed at http://www.dep.state.fl.us/water/wastewater/downloads/LLIDS2001v2_Manual.pdf.

Florida

The Florida DEP has AWQS for Class III marine waters for bromodichloromethane, bromoform, chloroform, and dibromochloromethane. The **City of St. Augustine**, FL investigated effective chlorine-free disinfection methods due to growing concerns regarding these trihalomethane compounds (i.e., disinfection by-products). The **St. Augustine wastewater treatment plant** changed its disinfectant treatment from chlorine to peracetic acid (PAA). A benefit of PAA disinfection is the absence of chlorinated disinfection byproduct formation. A study found that two trihalomethane species from the chlorinated effluent were more than double their surface water limits while the concentrations in PAA treated water was below laboratory detection limits. To date, the system has reduced pathogen loads sufficiently; eliminated the presence of chlorinated disinfection byproducts in the facility's discharge; and lowered overall chemical use and costs associated with disinfection. Please see this **Water Environment Foundation** article for more information: http://www.wef.org/publications/page_wet.aspx?id=12884903117&page=feature.

Emergency Planning: Examples of States where NPDES Permittees Notify Downstream Drinking Water Systems of Spills

Ohio

Ohio EPA has an **Emergency Response Program** that has well-established procedures for collecting spill information and disseminating it to all of the necessary stakeholders. The **Emergency Response Program** details are covered on their website: http://www.epa.state.oh.us/derr/ersis/er/er.aspx. Also attached is an example of an investigation report that details how they handled a pollution incident that may impact a public water supply.

Virginia

Virginia Executive Order 41 requires state agencies to be prepared for all disasters and to ensure the continuity of state government operations. In response to the state order, the **Virginia Department of Environmental Quality** developed the **Pollution Response Program (PREP)**, which is equipped to manage incidents such as oil spills, fish kills, and hazardous materials spills. PREP staff often assist local emergency responders, other state agencies, federal agencies, and responsible parties. Incidents can be reported by anyone using an online form or a 24-hour number. The 2010 Virginia Pollutant Discharge Elimination System (VPDES) Permit Manual contains in its "Conditions Applicable to All VPDES Permits" a provision directing permittees to call this 24-hour reporting number for emergencies related to unauthorized discharges, unusual or extraordinary discharges, and incidents of noncompliance.

Emergency Planning: Examples of Notification Requirements in Permits

Ohio

The Ohio Administrative Code states, "Permits for facilities designated by the director as major discharges, in the following locations, shall require the permittee to notify the public water supply operator as soon as practicable

after a discharge begins that results from a spill, separate sewer overflow, bypass, upset, or combined sewer overflow that reaches waters of the state: (a) Discharges within three thousand feet of a public water supply intake located in a lake; or (b) Discharges within ten stream miles upstream of a public water supply intake located in a reservoir or any other surface water of the state."

Additionally, the **Metropolitan Sewer District of Greater Cincinnati (MSD), Sanitation District No. 1 of Northern Kentucky (SD1) and the Ohio River Valley Water Sanitation Commission (ORSANCO)** have developed a website to provide Ohio River water quality information and river conditions in the Greater Cincinnati area (www.recr8ohioriver.org). This website provides an excellent example of overcoming interstate notification barriers.

Massachusetts

The Massachusetts *Sanitary Sewer Overflow (SSO)/Bypass Notification Form* (http://www.mass.gov/dep/water/approvals/ssoform.pdf) states that "all responsible officials whose duties include management of resources which may be affected by the SSO discharge" must be contacted within 24 hours of an overflow. A list of relevant agencies includes "Drinking Water Resource Managers."

Pennsylvania

Philadelphia has an early warning system concerning spills and emergency conditions. They received EPA funding to assist them in developing the warning system. The city has also developed a protocol called "**River Cast**" (www.phillyrivercast.org), which is based on synthesizing information about fecal coliform levels, historical data, flows, and weather conditions in order to support real-time assessments of the condition of the river.

West Virginia

The **City of Elkins, WV** NPDES Permit: section f(2)(h)(9) (*Combined Sewer System Overflows; Public Notification*) contains the following condition: "The permittee shall notify the water treatment facility when CSOs upstream of the City's water intakes become active in order to avoid impact to the City's water intakes. The permittee shall document these notifications in a log."

Examples of States where NPDES Permittees Must Notify Affected Drinking Water Systems of Manure/Biosolid and Herbicide/Pesticide Applications

Michigan

Michigan's aquatic nuisance program issues permits to apply herbicides and pesticides in areas that may impact surface water intakes. Permit conditions may require the permittee to notify the operator of affected water systems 48 hours before applying chemicals. That permit condition remains in effect as permits are re-issued.

Consider Local Environment in Plans and Guidance: Examples of States where GI Plans Include Considerations of Drinking Water Sources

District of Columbia

The District's 2013 Stormwater Management Guidebook and regulations provide guidance on selecting the proper BMPs for sensitive areas, also known as hotspots. Some BMPs (porous pavement and infiltration basins, for example) are simply not permitted, whereas others (bioretention and sand filters) are permitted with certain exceptions, such as the installation of an impermeable liner. When the guidebook and regulations are properly followed, certain BMPs are permitted due to their ability to reduce the flow of pollutants to surface waters while still protecting ground water.

The **Navy Yard** is an example of GI complete recycle solutions used in an area of high soil contamination. Specialized liners and drainage devices were used to ensure that the surrounding soils would not contaminate the stormwater effluent.

Ground Water Discharges: Examples of States where UIC Permits Include Considerations of Drinking Water Sources

Michigan

Discharges of wastewater to ground waters of Michigan require a permit. Permit writers routinely check whether the requested discharge is located within the delineated 10-year time of travel capture zone (wellhead protection area) of a community or non-community public water supply well. If it falls within the delineation, the permit writer notifies the public water supply by copying the draft permit and the final permit. Administrative rules and permit conditions require dischargers to notify the public water supply should a discharge limit be exceeded. Discharge limits are based on drinking water standards, if available. When a contaminant is not regulated, the discharge limit is health based. A desired outcome is a routine check, similar to the ground water discharge permit procedure, on delineated areas by other CWA programs that manage watersheds and issue permits.

Nonpoint Source Control and Section 319 Programs

EPA's section 319 nonpoint source success stories website (http://water.epa.gov/polwaste/nps/success319/) features stories about primarily nonpoint source-impaired waterbodies where restoration efforts have led to documented water quality improvements. The website highlights a number of success stories where 319 programs have benefited source water protection and drinking water supplies including.

Nebraska 319 Request Related to Ground Water Protection

Nebraska's recent discussion with EPA illustrates how section 319 funding may be used for ground water protection and restoration activities. Because **Nebraska Department of Environmental Quality** has included ground water protection as a priority in its Nonpoint Source Management Plan, ground water activities are eligible for section 319 funding. Nebraska approached EPA with a request to consider the local ground water management plans developed within the state as alternatives to the nine- element watershed-based plans (EPA's grants guidelines require watershed project funds to be used for the implementation of nine-element WBPs). EPA responded that Nebraska may fund ground water protection and restoration activities under the "protection" exemption to the WBP requirement. Although the ground water management plans do not need to meet the nine elements of a WBP, the alternative plans must meet the five basic elements listed in EPA's guidelines. The next step is for Nebraska DEQ to work with its partners to develop and revise the ground water management plans for watershed project funding so that they can adequately meet the five elements listed in the section 319 guidelines:

- Identification of the causes or sources of nonpoint source impairment(s), water quality problem(s), or threat (s) to unimpaired, high quality waters;
- Watershed [or ground water/aquifer] project goal(s) and explanation of how the proposed project(s) will achieve or make advancements towards achieving water quality goals;
- Schedule and milestones to guide project implementation;
- Proposed management measures (including a description of operation and maintenance requirements) and explanations of how these measures will effectively address the nonpoint source impairment identified above; and
- Water quality results monitoring component, including description of process and measures (e.g., water quality parameters, stream flow metrics, biological indicators) to gauge project success.

New York

Upper West Branch, Delaware River is a significant source of drinking water for NYC and is impaired for phosphorus. Project partners developed a voluntary, incentive-based program with farmers to implement BMPs, including whole farm plans (WFP) on dairy farms. A decrease in phosphorous loadings will benefit both drinking water supply and ecological uses.

New York's Priority Waters Listing is a mechanism to document contaminant issues for use by permit writers. **County Water Quality Coordinating Committees** are a forum for PWS and local health departments to raise these concerns locally and transfer to state.

North Carolina

Mills River has been the focus of numerous restoration efforts, including: obtaining conservation easements, restoring riparian buffers and stream banks, moving two pesticide chemical mixing stations away from river banks, stabilizing logging roads and cattle fencing. The effort brought together many project partners, which leveraged both EPA's section 319 Watershed Management and section 1452 Source Water Protection grant funds.

North Carolina

One of the *Enabling Source Water Protection Project* recommendations for North Carolina was to work with partners to enhance Clean Water SRF support of drinking water protection, GI, and other environmentally innovative activities. The **North Carolina drinking water protection program** was successful in getting the Clean Water SRF program to provide five extra points in its priority rating system for wastewater loan applications for projects in areas that are covered by an approved source water protection plan. While this is a small number of points in relation to the total of 100 available points, it was enough to elevate source protection projects over competitors with otherwise-similar values. Adding these points to the loan application also encouraged interest from the wastewater community and served as a new educational opportunity for promoting source water protection.

Illinois

Charleston Side Channel Reservoir is a drinking water supply reservoir that was listed as impaired under CWA section 305(d) for several pollutants (phosphorus, sediment, manganese). Project partners installed shoreline stabilization structures and other BMPs, including agricultural conservation tillage and nutrient management planning.

Iowa

In **Lake Icaria**, sediment loading from agricultural practices led to impairment. State and federal agencies worked with landowners to implement BMPs.

Missouri

Cameron Lakes, Mark Twain Lake, and Smithville Lake were listed as impaired because atrazine concentrations exceeded the MCL established for public drinking water supplies. Conservation tillages BMPs were implemented, along with selected atrazine application methods.

Maine

Cobbossee Lake has a long history of nuisance algae blooms that turned its once sparkling clear, trout-filled water murky green. The dedication of the **Cobbossee Watershed District (CWD)** and the local municipalities and water districts that engaged in remedial work and source protection activities made a visible improvement

to the lake. **The CWD** is a unique entity created by state legislation and given land use authority, as well as a mission of monitoring and education. **Cobbossee Lake**, although not noted in the 319 summary as such, is the receiving water for 10 or so recreational and other public water supply lakes in the watershed. Many lakes in the watershed have benefitted received from 319 projects to enhance watershed protection activities and improve lake water quality. While the above success story examples are primarily focused on surface water, section 319 can be used for ground water protection and restoration activities, as long as the activities align with the priorities included in the state Nonpoint Source Management Program plan. The section 319 program guidance, *Key Components of an Effective State Nonpoint Source Management Program* (November 2012), includes elements which encourage overlaying the section 319 program with ground water protection efforts. (Specifically, see elements 3 and 5 of the program guidance).

Endnotes

[1] **See:** <http://www.awwa.org/publications/journal-awwa/abstract/articleid/36464584.aspx>.

[2] **See:** <http://www.ecy.wa.gov/programs/wq/303d/ListDifferences.html>.

[3] **See:** <http://www.epa.state.oh.us/gis.aspx>.

[4] **See:** <https://fortress.wa.gov/ecy/publications/publications/92109.pdf>.

[5] **See:** <http://www.nmenv.state.nm.us/swqb/NPDES/Permits/NM0020583-Farmington.pdf>.

Appendix C

Troubleshooting: Selected Challenges and How They Can Be Overcome

This guide seeks to acknowledge that the desired outcomes enumerated earlier may remain difficult to achieve. Appendix B provides concrete examples of how state programs and interstate organizations are protecting drinking water using CWA-related tools, but these models may not be realistic for all areas due to complicating factors. Some of these challenges are listed below, not to discourage the use of this guide, but to recognize the reality for many working on these issues and to invite the development of creative solutions. Examples of such solutions are noted below.

Selected Challenges and How They Can Be Overcome

Water Quality Standards

- **Drinking water contaminants of concern may not have NRWQC.** Many states seek to establish water quality criteria for drinking water contaminants in the absence of NRWQC. This may involve numerically translating narrative criteria.

    - *Example approach:* The **New York State Department of Environmental Conservation (NYSDEC)** established water quality criteria for drinking water contaminants in the absence of NRWQC. These include contaminant-specific criteria, calculated using dose-response data from scientifically valid studies on oncogenic and non-oncogenic effects of pollutants (e.g., IRIS assessments, National Toxicology Program studies, and CA risk assessments), and derived according to procedures contained in New York's regulations (http://www.dec.ny.gov/regs/4591.html).

      NY also has generic default standards for organic contaminants that are in one of several specific chemical groups such as halogenated alkanes, halogenated ethers, halobenzenes, and more. These "principal organic contaminant" standards are 5 ug/L for each individual contaminant, and mirror drinking water standards (MCLs) promulgated by the New York State Department of Health. Finally, criteria may be correlated with a chemical for which a standard or guidance value has been established. The standard adopted by New York is the most stringent of the values derived using these procedures.

      In addition to these standards, New York also has established "guidance values" for a number of specific contaminants, derived using the same rigorous procedures used for ambient standards. New York uses these guidance values in the absence of standards for specific substances, and evaluates guidance through extensive internal and public review. New York's ambient water quality guidance values have been effectively employed for 30 years; they numerically translate the state's narrative standard for, in effect, ‘no toxics in toxic amounts.’

- **Water supply may need to be protected from precursors to disinfection by-products when the precursor is not itself a significant human health or aquatic life threat.** In recent years, some states have faced the challenge of establishing a standard for bromide in ambient water. Bromide does not, in and of itself, harm most aquatic life or humans. However, bromide can react with chemicals used in the drinking water treatment process to produce harmful by-products. EPA does not currently have a NRWQC to address these “created” contaminants and the state does not have the resources to address the issues.

- *Example approach:* In North Carolina, a specific company was responsible for introducing bromides into one of North Carolina's surface water bodies. After the company was made aware of the issue, it took a progressive stance in assisting the affected treatment plants with finding a solution. However, an added challenge is that bromide was introduced to the company's wastewater effluent by technology to reduce air pollution through the Clean Smokestacks Act. Pending resource availability, the state could derive water quality criteria for bromides that would be protective of downstream public water supply uses.

Monitoring, Assessment, and Impaired Waters Listings

- **A public water supply use may not be distinct from other public health uses in a state's code, making it difficult to assess waters for public water supply uses.** For example, a public health and welfare use may contain a designation (or subcategory) for public drinking water supply. CWA criteria may differ depending on the surface water classification. For example, if the water is classified to include consumption of fish the lipid value of representative fish can vary, impacting the criteria calculation. Bundling a public drinking water supply use with other human uses can be a barrier in making assessment decisions.

    - *Example approach:* In Wisconsin, the public health and welfare use found in the state code at NR 102.04 (7) contains a designation (or subcategory) for public drinking water supply. EPA Region 5 and **Wisconsin Department of Natural Resources (WDNR)** are reviewing the current rule language to determine if revisions are necessary to clarify the existing language regarding public water supply. WDNR will also identify priority and supplemental indicators of water quality that could be added to Wisconsin's baseline monitoring program. Those data could then be used to assess the public health and welfare use of the state's surface waters as part of its biennial water quality reporting.

- **Assessments can also be limited by a lack of monitoring for contaminants of concern.** Many human health criteria for carcinogens and non-carcinogens are not routinely monitored in waters designated for public water supplies.

    - *Example approach:* In Wisconsin, substances with human health criteria are reviewed to determine which substances are pollutants of concern will be incorporated into the WDNR's water monitoring program. Additional parameters that could serve as indicators of water quality for public water supply source waters could be identified, monitored, and assessed. This, however, would be an additional demand on WDNR's already limited staff and fiscal resources.

- **The following additional challenges present obstacles to the assessment of drinking water sources.**

- PWSs are not monitoring for chloride, sulfate, or TDS because they are not regulated as drinking water contaminants. This may lead to a lack of data on contaminants of concern, especially emerging contaminants. Furthermore, PWSs don't necessarily want to be "credible data collectors" for state CWA decisions because source water monitoring is not required for compliance with the SDWA and is costly.

- Some PWSs selectively pump from a variety of sources. Therefore, we don't always easily know that a water body is impaired based on PWS data.

- It is challenging to address OC, a precursor of total trihalomethanes (TTHMs), because OC can indicate a healthy watershed but may also result in drinking water issues. This is also the case with bromide.

- Incorporating drinking water source data into the Integrated Reporting could be very valuable. However, the availability/accessibility of paper or electronic records from disparate sources; and differences between WQS and drinking water standards and building a methodology around them, can be very challenging.

Total Maximum Daily Loads

- **TMDL implementation can alter pollution levels in ground water.** Ground water protection concerns are not explicit in TMDL programs, which focus on surface waters. However, TMDL implementation can alter pollution levels in ground water, as in the case of nitrate. One challenge is to craft efforts that protect both surface and ground water, as opposed to harming one while protecting the other. There are many ways to do this: for example, TMDL implementation can help reduce surface contaminants through stormwater infiltration.
- **Currently, source water assessments lack quantitative data on specific contaminants, hindering the development of quantitative targets for TMDLs.** Since source water assessments can help state CWA staff better understand the threats to drinking water but are relatively qualitative, instead of quantitative like TMDLs, the assessments can be difficult to apply to inform the development of TMDLs.
- **TMDLs must be implemented to be effective.** TMDLs without implementation do little to protect surface water bodies, and a strong emphasis should be placed on identifying funding sources to assist with implementation efforts e.g., sections 106 and 319 grant programs in addition to DW and CW SRF programs.

National Pollutant Discharge Elimination System Programs

- **NPDES permits don't always reflect contaminants of concern to drinking water systems due to a lack of information and quantitative water quality criteria.** A key challenge in using the matrices like the table in Appendix A is determining which particular contaminants are problematic for a given public water system in a given stream reach. Making such determinations typically requires gathering information from both the public water system (to the extent that analyses of their intakes have been conducted) as well as the state. Medium to large PWSs typically have some ambient water quality data collected from their intakes, while small water systems typically do not. Similarly, in an era of constrained state resources, states may not have up-to-date ambient water quality data for the locations of concern.

  A further complication is that some of the contaminants of concern are "emerging" and may not yet have either a federal or state regulatory status nor definitive information about how significant a concern they may be (e.g., cyanotoxins, perfluorinated compounds, pharmaceuticals and personal care products).

  Finally, state source water assessments may have examined contamination source information, but not necessarily specific pollutants. The records of the state assessments may or may not be stored electronically.

  - *Example approach*: Pennsylvania's WQS include the designated use of public water supply for all surface waters statewide. Pennsylvania implements certain parameters of concern for drinking water intakes in accordance with their regulations. In part, their regulations state that, "the water quality criteria for TDS, nitrite-nitrate nitrogen, phenolics, chloride, sulfate and fluoride established for the protection of potable water supply shall be met at least 99% of the time at the point of all existing or planned surface potable water supply withdrawals…" NPDES permit writers document the nearest downstream drinking water intake and determine if the permitted discharge will meet the state requirement. An analysis may be done on a case-by-case basis where there has been a determination of potential drinking water impacts from other parameters contained in a discharge. In such cases, the permit writer can use the drinking water MCLs as a guide if no specific state numeric water quality criteria exist.

- **Where a state has a designated use for public water supply but does not have appropriate numeric water quality criteria for pollutants of concern, the permit writer does not have numeric criteria upon which to calculate a permit limitation(s).** All states have both numeric and narrative WQS. Those states that rely chiefly on narrative standards, or whose numeric standards may not address the contaminant(s) of concern, would need to interpret their narrative standard on a case-specific basis. States interpreting narrative standards may be limited by available narrative translators and could benefit from identification of data and information (from EPA as well other sources) to support those efforts.

- **There is no "one size fits all" approach to defining how far downstream from a discharge a permit could consider possible impacts.** This is likely to vary from site to site and requires data and information to support these decisions.

  In order to ensure that NPDES permits consider downstream drinking water intakes, a clear understanding of where those intakes are located in relation to NPDES-permitted facilities is necessary. Such compilations of "paired facilities" may not currently exist, in many cases.

  - *Example approach:* Adequate analyses of current and projected downstream considerations require application of modeling techniques to project concentrations likely to occur at the drinking water intake. States might gain access to and experience in using models that would be considered satisfactory for state use.

- **Permits may reach across state boundaries for considering drinking water intakes.** The standards among states may not be consistent. If the downstream state's standard is stricter, the upstream state must ensure it is met.

- **Challenges remain in setting water quality-based effluent limits and connecting NPDES permitting and pretreatment programs.** The principal barrier for setting of local limits is analogous to the set of challenges associated with developing WQBELs for NPDES dischargers to protect downstream sources of drinking water – namely, establishing a firm legal and technical basis for those limits.

  Municipalities may be hesitant to calculate local limits for reasons beyond those associated with the technical challenges of developing NPDES-imposed federal and state pretreatment requirements. These impediments could include reluctance, on the part of the municipality, to impose expensive limits on industries that could detract from the overall economic vitality of the city.

  State and Regional pretreatment programs are often not located within the same office as the NPDES permitting program and are managed separately.

  - *Example approach:* **Florida Department of Environmental Protection** provides guidance, including a computer program, to assist POTWs in deriving pretreatment local limits to achieve water quality needs under different effluent disposal options. Effluent disposal options include drinking water standards, as well as water reuse irrigation on different types of soil, direct discharge to both fresh and marine waters, and underground injection to meet primary and secondary ground water standards. The Florida guidance can be accessed at http://www.dep.state.fl.us/water/wastewater/downloads/LLIDS2001v2_Manual.pdf.

- **NPDES Permittees Don't Always Notify Downstream Drinking Water Systems of Spills.** Interstate notification can be even more challenging, when industrial plants or wastewater treatment plants in one state affect drinking water facilities in a state downstream.

  - *Example approach:* **Ohio EPA** has an Emergency Response Program that has well-established procedures for collecting spill information and disseminating it to all of the necessary stakeholders. The Emergency Response Program details are covered on their website: http://www.epa.state.oh.us/derr/ersis/er/er.aspx. Also attached is an example of an investigation report that details how they handled a pollution incident that may impact a public water supply.

Furthermore, the Ohio Administrative Code states, "Permits for facilities designated by the director as major discharges, in the following locations, shall require the permittee to notify the public water supply operator as soon as practicable after a discharge begins that results from a spill, separate sewer overflow, bypass, upset, or combined sewer overflow that reaches waters of the state: (a) Discharges within three thousand feet of a public water supply intake located in a lake; or (b) Discharges within ten stream miles upstream of a public water supply intake located in a reservoir or any other surface water of the state."

Additionally, the **Metropolitan Sewer District of Greater Cincinnati (MSD)**, **Sanitation District No. 1 of Northern Kentucky (SD1)** and the **Ohio River Valley Water Sanitation Commission (ORSANCO)** have developed a website to provide Ohio River water quality information and river conditions in the Greater Cincinnati area (www.recr8ohioriver.org). This website provides an excellent example of overcoming interstate notification barriers.

- **GI for stormwater management can have unintended consequences in certain situations.** For example, infiltration might contaminate an aquifer or where clay soil would poorly absorb the infiltration or where karst regions would transmit contaminants to underground sources of drinking water.
    - *Example approach:* The District of Columbia's 2013 Stormwater Management Guidebook and regulations provide guidance on selecting the proper BMP(s) for sensitive areas, also known as hotspots. Some BMPs (porous pavement and infiltration basins, for example) are simply not permitted, whereas others (bioretention and sand filter) are permitted with certain exceptions, such as the installation of an impermeable liner. When the guidebook and regulations are properly followed, certain BMPs are permitted due to their ability to reduce the flow of pollutants to surface waters while still protecting ground water.

Nonpoint Source Control and Section 319 Programs

- **Drinking water utilities and communities may be reluctant to implement source water protection programs.** One challenge may be overcoming hesitancy or indecision (including time/expertise/resource constraints) for drinking water utilities or the communities they serve to initiate and incorporate source water protection efforts into their infrastructure or capital improvement planning processes.
    - *Example approach:* More data would help make a better case to drinking water utilities on potential realized benefits associated with source water protection and encourage utilities to incorporate source water protection planning as part of their Capital Improvement Planning Processes. The more that drinking water utility managers and leaders of the communities served by the utilities support source water protection, particularly through CWA programs like 319, the more effectively they can protect public health.
- **Another challenge is the need to explore the possibility of developing 319 projects to establish baseline and ongoing monitoring for pollutants that threaten downstream drinking water utilities.** These ongoing monitoring projects would be informed by the utilities by identifying pollutants of concern and would serve as one possible way to hardwire integration.
- **We need to better integrate drinking water source protection into watershed planning.** It can be challenging to incorporate source water into watershed plans, and examples of where this has been done successfully would be helpful. It also would be helpful to identify the key steps in phases of watershed planning projects that outline how to incorporate source water in each phase.

- **One challenge related to integrating source water protection into clean water programs is that the current focus is on phosphorus, not nitrogen.** While identifying areas with high phosphorous loading, we may also investigate nitrogen levels in those same areas.
- **It should be noted that the section 319 NPS Program strongly encourages section 319 resources to be used on impaired waters** (which may or may not be upstream of drinking water sources) either on the 303d list, or on ones for which TMDLs have been developed. As such, the parameters to be monitored using 319 funding would likely be predefined as pollutants suspected of causing the impairment(s).
- **Water quantity considerations are not always considered in section 319 watershed plans.** We should consider water quantity/water budget issues in developing 319 watershed plans. More generally, we need to better understand ground water and surface water interactions, especially where depletion or contamination of ground water is impairing surface water, and where protection of ground water (quality and quantity) would restore surface water.
- **The NPS challenge is large, yet relative to the national scope of the NPS problem, section 319 funds to states are relatively small.** Therefore, while 319 funds are important resources, it remains critical for states to leverage state and other project funds and continue to strengthen existing partnerships and programmatic relationships as well as to develop new partnerships to achieve water quality goals.
- **There is a need to change the way we've traditionally measured BMP performance.** BMPs put in place by landowners to reduce fertilizer from entering surface waters do not necessarily prevent nitrogen from entering the ground water which may contaminate underground drinking water supplies or travel underground to reach a surface water.

Appendix D

A Lens through which to View This Toolkit: The Watershed Approach

Drinking water data and information can play an important role in state initiatives to prioritize watersheds for water quality improvements, and can also play an important role in implementing individual CWA programs *within the watersheds*. Including drinking water in the watershed approach provides opportunities to involve nontraditional partners and local citizens in the water quality protection effort. In polls at the national and local level, safe drinking water is consistently ranked as one of the top citizen concerns in terms of environmental issues. Successful implementation of the CWA can be enhanced by including drinking water interests, data, and expertise.

While each of the sections in this document pertain to individual CWA provisions and tools, these tools can be coordinated and, in collaboration with partners outside of the state and federal water programs, can achieve both operational efficiencies and water quality improvements as part of a holistic "watershed approach." Many states have initiated some form of a watershed approach designed to coordinate the implementation and timing of various CWA programs.

There are many ways to apply a watershed approach in planning and implementing a state's water quality work. Using watersheds as a way to focus on individual geographic areas provides opportunities to coordinate and leverage water quality improvements. Within the watershed, multiple resources can be focused to solve water quality issues -- cross-program, cross-media (if necessary), and multi-agency (if possible). Individual water quality programs will likely be more inclined to share data and information when the work is coordinated and leveraged.

In this document, a watershed refers to not only traditional surface water drainage areas, but the same concepts can be applied to a *ground water* aquifer and its recharge area. It is important to note that any watershed approach must consider the ground water component that is an integral part of the water cycle in that watershed.

Using a watershed or aquifer-shed approach for strategic planning and management is an effective way to collaborate with relevant partners to determine statewide priorities that are protective of water quality. As part of a larger effort at the state level, this type of approach can involve NPS, 303(d) Integrated Reports, point source permits, stormwater, drinking water, toxics monitoring, spill response, and more. Drinking water data and PWS information can be included in planning and developing the watershed and aquifer-shed approach at the state level, including prioritizing for assessments and monitoring. Further, drinking water source protection staff, resources, and grants become an integral part of the watershed restoration effort.

For example, a watershed approach could be used to plan GI solutions that address water quality and/or drinking water concerns, before funding grey infrastructure projects that can potentially increase utility rates. Gray infrastructure generally refers to more centralized, end-of-pipe practices for stormwater management and wastewater treatment, such as stormwater detention ponds or wastewater treatment plants. GI, in contrast, refers to more distributed practices that restore or mimic natural processes. GI spans many spatial scales, from interconnected networks of natural and undeveloped areas that maintain and support ecosystem services, to stormwater controls embedded in the built environment that enhance infiltration, evapotranspiration, and stormwater harvesting and use.

If a grey infrastructure project or upgrade is determined to be necessary in a rural community, these same partners can work together, along with the **USDA Rural Utilities Service** and technical assistance providers such as the **Rural Community Assistance Partnership** and the **National Rural Water Association,** to help communities address violations and develop infrastructure projects that consider wastewater, stormwater, and drinking water funding and operational needs within a community or watershed.

In addition, source water protection projects, conservation, and practices that are designed to improve water quality can also be coordinated with agricultural and forestry partners such as the **USDA Natural Resource Conservation Service (NRCS)** (visit the online coordination tool at: **www.sourcewatercollaborative.org/swp-usda** for more information), **Farm Service Agency**, and **Forest Service**; private foundations (e.g., the **William Penn Foundation**); nonprofits (e.g., **The Nature Conservancy**), and others, to leverage and prioritize technical assistance, funding, and other opportunities based on common goals. Additional, state-specific examples of application of a watershed approach may be found below.

Implementing Watershed and Aquifer-shed Planning Approaches at the State Level

Colorado

Upper Arkansas River Basin: The **Colorado Drinking Water Program** awarded a source water protection grant to the **Upper Arkansas Council of Governments (UAACOG)** to develop and implement the Upper Arkansas River SWAP and NPS Program Integration Action Plan. The plan is based on the associated Source Water Protection Plans (SWPP) in **Lake, Chaffee, and Fremont Counties** and is aimed at improving water quality, promoting sustainable recreation areas, and preserving and restoring wetland and aquatic ecosystems for fish and wildlife through a holistic watershed planning effort by connecting all of the various water resource planning efforts in the **Upper Arkansas River Basin**. Potential cooperating agencies include multiple federal and state agencies, as well as **County Commissioners**; county planning departments; and conservation districts. The Action Plan is comprised of six measurable outcomes and anticipated next steps include the need to: identify a cooperating agency to advance the SWPP into a watershed protection plan; examine stream segment impairments (303d and TMDL lists) in SWAP areas; and leverage the holistic watershed plan for NPS funding for implementation projects that address metals, E. coli, nutrients, sediment, or other impairments in the area.

Oregon

Water quality restoration is generally addressed by most CWA agencies on using a parameter-by-parameter approach. In Oregon, TMDLs have been developed based on consent decrees and have not always addressed the most pressing environmental issues in the basins for which they were developed. This approach has been driven largely by lawsuits, CWA requirements for listing waterways, and individual parameters identified through limited monitoring within each watershed. As an example, many TMDLs were developed to address temperature only because this data was more abundant when the state determined water quality listings prior to 1990.

By moving into a watershed approach, the **Oregon DEQ** has sought to address water quality issues in a comprehensive manner that integrates the multiple sub-programs in water quality and other cross-media programs. Under this new evolving strategy, Oregon DEQ has developed the groundwork for improved water quality assessments (Integrated Reports) and implementation plans for restoration and protection. The new strategy created basin teams that will use local expertise to prioritize the water quality problems, develop plans to address the water quality problems, implement and assess the effectiveness of the solutions.

The first step in the process is to develop a preliminary list of concerns in the basin and the probable stressors. This will allow the team to focus on the water quality problems that pose the most significant environmental threats in the basin, including impacts to ground water and drinking water. The team evaluates existing data sources, such as:

- Most recent 303(d) list and Integrated Report database
- Any other data sources described in past CWA strategic plans
- 305(b) report
- Source water assessment reports
- Ground water quality reports
- Recent LASAR (Oregon DEQ Laboratory database) data
- Recent SDWIS data from Oregon Health Authority (drinking water regulatory monitoring)
- Other Oregon DEQ toxics data
- Oregon DEQ technical reports (e.g. lab assessments, mixing zone reports)
- Agency Toxics Reduction Strategy list of high priority toxic chemicals

- USGS data
- Oregon Health Authority data on public health advisories (fish consumption, etc.)
- Other agencies' technical reports and data
- Readily available reports from the geographic areas (e.g. Watershed Analyses, ESA reports, etc)
- Data from point sources and permits
- Land use information
- Emission inventories

The basin team requests data from **Oregon Department of Agriculture (ODA)** and **Oregon Department of Forestry (ODF)** about pesticides used in the basin. Oregon ODA staff has information about product use, product registration, etc. that may help Oregon DEQ staff determine whether particular pesticides are likely to be present in the basin. Oregon ODF has data on forestry applications of pesticides after harvest within each basin.

The purpose of the data review is to identify contaminants of concern in the basin, based on their impact on beneficial uses. For the drinking water contaminants of concerns, the Oregon DEQ drinking water staff provides a consistent package of information to each basin team. A series of questions are answered through database queries that provide important information on the PWSs and drinking water within each basin. This information is included in the assessment report for each basin or watershed that Oregon DEQ is working on. The questions are highlighted below, along with the methodology or template for answers:

Are there drinking water intakes on the rivers/streams in the basin?

Identify the number of public drinking water systems within the basin that are supplied in whole or in part by surface water intakes. Create a list of systems and indicate the number of people served (data provided by the Oregon Health Authority). Indicate the number of PWSs relying in whole or in part on ground water and population served.

Has the drinking water program identified water quality problems in the basin and do we know the contributing sources of these problems?

Use SDWA monitoring data (SDWIS) and CWA data to provide the results of each of the following data queries:

- Number of water systems served by surface water that have experienced contamination problems in finished water
- Contaminants of concern found in the raw drinking water if sampled as part of Oregon DEQ's Drinking Water Source Monitoring Project
- Number of systems required under SDWA to conduct *E.coli* monitoring to determine if they are at risk from cryptosporidium or other pathogenic microorganisms entering the drinking water supply; provide summary of results number of systems with elevated turbidity and/or disinfection by-products
- Number of PWSs served by surface water and ground water that have closed or modified a source due to contamination
- A list of the potential sources of contamination identified within drinking water source areas that pose the greatest risk to the source waters
- A link to the executive summaries of the individual PWS Source Water Assessments
- Number of potential sources of ground water contamination discharging to surface water
- Number of systems within a quarter mile of surface waters or within a half mile of surface waters
- Number of systems that have experienced ground water contamination problems and list the contaminants.

Do we need to collect additional data to determine if the source water is being impacted (if so, is there a plan)?

Discuss what the existing data shows—for example, if there are potential ground water impacts to surface water but very little data in surface water upstream of intakes. Point out that the SDWA monitoring is required for finished (post-treatment) water only and that there are no requirements for testing other contaminants that pose potential risks to PWSs, including "emerging

contaminants" such as pharmaceuticals, chemicals associated with personal care products, and many ubiquitous pesticides and semi-volatile and volatile organic chemicals. Indicate if more data is needed in the basin to help assess whether source water is being negatively impacted by potential sources of contamination, such as biosolids applications, high density septic systems, pesticide applications, and forest management practices. List and/or discuss important data gaps including:

- Additional monitoring for toxics in areas upstream from drinking water system intakes
- Location and extent of existing and future biosolids applications sites
- Increased monitoring of pharmaceuticals, personal care products and other emerging contaminants in vicinity of high density septic systems and biosolids application sites
- Data to assess transport of contaminants via ground water inputs to surface water
- Data to better characterize the risk of algal toxins to PWSs
- Data to better characterize the risks to PWSs from elevated turbidity associated with forest management practices and roads
- Data to better characterize correlations between storm events and impacts to PWSs from specific contaminants including fecal coliform and turbidity
- Analysis of land use patterns and disturbances and how they relate to source water turbidity.

After the basin teams collect the data and information for the watershed(s), the next step is developing a set of priorities. There are several approaches which may be considered when ranking the priorities in the basin: comparison of all collected data to water quality criteria; watershed/landscape modeling; relative risk analysis based on identified stressors; or some combination of approaches. The information from one or more of the prioritization processes is used to develop the draft list of priority pollutant/parameters in the basin. The basin team will also consult with staff from land quality and air quality to identify cross media and cross program priorities. These priorities should be integrated into the entire process, through implementation and evaluation. If a TMDL is in place in the basin, the team will incorporate that data and identify implementation actions in the basin that include both TMDL parameters and other priorities.

The next step is to develop the implementation plan to reduce the loading of priority contaminants of concern. Implementation plans include identifying these important elements:

- Beneficial uses
- Impairment(s) to be addressed
- WQS, if applicable
- Drinking water MCLs, if applicable
- Causes of impairment or potential pollutant sources
- Lists of local sources of information, advisory committee members, etc.
- Management measures, including:
- Permits
- TMDLs, with pollutant load reductions
- Pesticide Stewardship Partnership
- Plans from other land managers, including Federal agencies like **Bureau of Land Management** and **USFS**
- Ground water management areas

- NPS reduction strategies
- Oregon ODA-managed lands-- update SB1010 watershed plans
- Oregon ODF-managed forest lands--enforcement if water quality problems related to forestry are identified
- Toxics reduction strategies described in the "Oregon DEQ Agency Toxics Reduction Strategy"
- Source reduction strategies identified in SB 737 Legislative report
- Locations where increased flows are needed to meet WQS and beneficial uses
- Existing strategies developed or implemented to reduce pollutants affecting public drinking water intakes or wells
- Estimate of load reductions expected from management measures
- Description of the critical or sensitive areas, identified by monitoring, GIS, or modeling in which priority measures will be needed to reduce loading
- Identify other stakeholders responsible for implementing management control measures
- Estimate of the amounts of technical and financial assistance needed and their associated costs
- Identify funding sources including CWA 319, Clean Water SRF, Drinking Water SRF, USDA, **Oregon Watershed Enhancement Board** funding, other grant or loan programs
- Information and education component that identifies the outreach that will be used to implement the plan
- Schedule for implementing the management measures outlined in the plan, both for point and nonpoint sources
- Description of the criteria and milestones to measure progress in implementing the management measures
- Set of criteria that can be used to determine whether the load reductions are being achieved over time, and whether the measures are sufficient (example: water quality benchmarks to measure with monitoring).
- Monitoring program to evaluate the effectiveness of the implementation efforts over time
- Management measures will vary according to the parameter of concern. For example, if an NPDES facility is identified as a source of a priority parameter (especially upstream of a drinking water intake), the team may examine the following options:
- Revisit permit limits
- Evaluate pre-treatment requirements
- Identify the facility for funding for improvements

Appendix E

Online Resources for Toxic Endpoints, September 2013

- IRIS (Integrated Risk Information System) – EPA: http://www.epa.gov/IRIS
- Drinking Water Science and Regulatory Support – EPA: http://water.epa.gov/drink/standards/hascience.cfm
- Pesticide Chemical Search – EPA: http://iaspub.epa.gov/apex/pesticides/f?p=CHEMICALSEARCH:1:0::NO:1
- Human Health Benchmarks for Pesticides – EPA: http://iaspub.epa.gov/apex/pesticides/f?p=HHBP:home:10774339089885
- PPRTV (Provisional Peer Reviewed Toxicity Values for Superfund) – EPA: http://hhpprtv.ornl.gov/quickview/pprtv.php
- HEAST (Health Effects Assessment Summary Tables for Superfund) – EPA: http://epa-heast.ornl.gov/heast.php
- ITER (International Toxicity Estimates for Risk): http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?iter
- OEHHA (Office of Environmental Health Hazard Assessment) – California EPA: http://www.oehha.ca.gov/water/phg/allphgs.html
- Minnesota Department of Health: http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html
- New Jersey Department of Environmental Protection: http://www.nj.gov/dep/standards