Recommendations for Improving Water Quality Assessment and Total Maximum Daily Load Programs in Washington State

Prepared for the
Interagency Project Team[1]
July 29, 2014

[1]The Interagency Project Team is composed of representatives from Clark County, King County, Kitsap County, Pierce County, Snohomish County, Thurston County and the Washington State Department of Transportation.

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List of Abbreviations

BI	biotic index
BIBI	Benthic Index of Biological Integrity
BMAP	Best Management Action Plan
BMP	best management practice
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWC	California Water Code
DMA	designated management agency
Ecology	Washington State Department of Ecology
EIMS	Environmental Information Management System
EPA	Environmental Protection Agency
EPT	Ephemeroptera, Plecoptera, Trichoptera
FDEP	Florida Department of Environmental Protection
GAO	U.S. Government Accountability Office
IR	Integrated Report
LA	load allocation
LOE	line of evaluation
MOS	margin of safety
MS4	municipal separate storm sewer system
NPDES	National Pollutant Discharge Elimination System
NPS	nonpoint sources
Ohio EPA	Ohio Environmental Protection Agency
QA	quality assurance
QAPP	Quality Assurance Project Plan
QA/QC	Quality Assurance and Quality Control
RCW	Revised Code of Washington
RIVPACS	River Invertebrate Prediction and Classification System
Team	Interagency Project Team
TMDL	total maximum daily load
TSS	total suspended solids
WAC	Washington Administrative Code
WERF	Water Environment Research Federation
WisCALM	Wisconsin Consolidated Assessment and Listing Methodology
WLA	wasteload allocation
WQA	water quality assessment
WQP	Water Quality Policy
WQS	water quality standards
WSDOT	Washington State Department of Transportation

Executive Summary

The Interagency Project Team (Team) consists of staff from the surface water departments of Clark, King, Kitsap, Pierce, Snohomish and Thurston counties and staff from the Washington State Department of Transportation (WSDOT). The Team was formed to improve implementation of the Clean Water Act (CWA) Section 303(d) and total maximum daily load (TMDL) programs in Washington State.

The Team evaluated the water quality assessment and TMDL programs in Washington State in comparison to five other states in order to identify potential improvements. This report documents the Team's evaluation methods, key findings, and recommendations. It is intended to serve as a starting point for discussions with the Washington State Department of Ecology (Ecology), United States Environmental Protection Agency (EPA) and policymakers regarding improvements in the state's 303(d) and TMDL programs.

During this report's preparation, the U.S. Government Accountability Office (GAO) released a comprehensive review of the nation's TMDL program, including data and findings applicable to Washington State. The report, *Clean Water Act: Changes Needed If Key EPA Program Is to Help Fulfill the Nation's Water Quality Goals,* concluded that serious water quality problems exist, even after tens of thousands of TMDLs have been completed since 2002. GAO found that more lakes and rivers are listed as impaired now than in 2002. The report states, "few TMDLs had helped water bodies attain water quality standards," and that "long-established TMDLs often do not contain features that would help water bodies attain water quality standards." GAO attributes most of these failures to incomplete or poorly conceived 303(d) listing decisions and TMDLs, and lack of implementation of nonpoint source controls. The GAO report contains recommendations to address these issues.

Despite these shortcomings, the Team views the 303(d) and TMDL programs, if effectively implemented, as having potential for realizing significant benefits towards the protection and restoration of water bodies.

After review of the state representative interviews, national reports, and key findings the Team developed the following nine recommendations:

Recommendation 1: Establish a multi-stakeholder Standing Committee to improve coordination and engagement with the regulated community

Recommendation 2: Implement existing regulatory authority related to unpermitted and nonpoint sources

Recommendation 3: Refine water quality standards and water quality assessment methodologies

a) Use *E. coli* as the indicator bacteria.
b) Revise statewide listings to reflect current water quality conditions.
c) Improve transparency and completeness of methodology for water body de-listing.
d) Define a critical condition or period of application for the water quality assessment (WQA) of each water body-parameter combination.
e) Re-evaluate the potential benefits of the binomial probability distribution function in WQAs.

Recommendation 4: Improve and employ consistent processes for collecting, assessing, and utilizing credible data in WQA and TMDL development

a) Standardize and improve transparency of WQA and TMDL development methodologies to be consistent with current and applicable EPA quality related regulations, policy, and guidance.
b) Clearly define and apply appropriate quality assurance/quality control (QA/QC) levels for WQAs and TMDL development.

Recommendation 5: Refine water quality assessment categories to improve clarity and aid in defining priority water bodies

Recommendation 6: Update the current biological assessment and listing methodology

a) Employ a public process to help define the methodology and quality assurance/quality control (QA/QC) protocols utilized for biologic monitoring efforts.
b) Require stressor identification before listing determinations are made for biological data.

Recommendation 7: Define TMDL prioritization methodology, timelines, and process for public involvement

Recommendation 8: Define TMDL development methodology

a) Require a project definition report or project plan at the beginning of the TMDL development effort.
b) Confirm designated use and applicability of WQS early in the TMDL development process.
c) Develop specific guidelines for determination of the margin of safety (MOS).
d) Assign load allocations (LAs) by specific known nonpoint sources, in conjunction with Recommendation 2.
e) Reject the use of non-pollutants as surrogates.

Recommendation 9: Develop consistent TMDL implementation expectations

a) Develop standardized best management practice (BMP) performance measures (programmatic and structural) to use in defining wasteload allocations and implementation efforts.
b) Develop TMDLs that allow flexibility via adaptive management.
c) Implement TMDLs in a manner that ensures proportional distribution of WLAs or LAs to all major contributing sources, in conjunction with Recommendation 2.
d) Finalize framework for water quality trading and offsets.

Section 1

Introduction

This report recommends improvements to Washington State's Clean Water Act (CWA) programs. It was prepared by the Interagency Project Team (Team), made up of staff from the surface water departments of Clark, King, Kitsap, Pierce, Snohomish and Thurston counties and staff from the Washington State Department of Transportation (WSDOT). The Team retained Brown and Caldwell to evaluate current WQA and TMDL procedures and help identify potential improvements.

1.1 Background

The 1972 federal Clean Water Act requires that all states restore their waters to be "fishable and swimmable." The core requirements of the CWA include:

- water quality assessments (WQAs) to determine the status of the water bodies in each state (CWA Section 305(b)) and identify water bodies that do not meet applicable state water quality standards (WQS) (CWA Section 303(d))
- total maximum daily loads (TMDLs) to bring polluted water bodies back into compliance with WQS (CWA Section 314)
- National Pollutant Discharge Elimination System (NPDES) permits that regulate point-source discharges to waters of the United States in order to meet applicable WQS and TMDL requirements

In the state of Washington, the Environmental Protection Agency (EPA) has delegated authority to the Washington State Department of Ecology (Ecology) to perform WQAs, develop TMDLs, and issue NPDES permits. EPA remains the approval authority for the water quality assessment and TMDLs.

These CWA programs pose substantial administrative, technical, financial, and legal challenges for local and state agencies. Water quality monitoring and TMDL development requires substantial time and effort from Ecology, the regulated community (e.g., NPDES permittees), and stakeholders. TMDL implementation can entail huge costs, major land use restrictions, and increased risk of third-party legal challenges for those that must meet these requirements through their stormwater NPDES permits.

1.2 Project Objectives and Approach

The objectives of this project include: (1) learn alternative approaches for CWA programs from other states; (2) utilize the research to develop recommendations for improving Washington State's WQA, listing/de-listing, and TMDL procedures; and (3) work with EPA and Ecology to refine and implement the recommended improvements. The Team seeks the following overall goals for Washington State's CWA program:

- accurate identification of impaired/polluted water bodies
- efficient TMDLs that lead to tangible improvements in receiving water quality and maximize the benefits of investments in water quality management
- stakeholder assurance that credible decisions translate into wise investment of public resources
- more "fishable and swimmable" water bodies in Washington State

All states are subject to the same CWA requirements as Washington State. Therefore, the Team adopted a "compare and contrast" approach, wherein Washington State's WQA and TMDL procedures were compared with those of other states. The evaluation focused on listing and de-listing procedures, and TMDL prioritization, development, and implementation methods. This approach focuses on the development and implementation of CWA programs by state regulators and did not solicit perspectives regarding these programs from the regulated community.

Based on the information obtained from the interviews and review of related documents, the Team developed draft recommendations for improvements to Washington State's WQA and TMDL programs. The Team seeks to work in collaboration with EPA, Ecology, and other effected parties to refine and implement these recommendations.

1.3 Organization of This Report

Section 2 contains a brief summary of the methods. Section 3 summarizes the key findings for each of the selected states. Section 4 contains recommendations for improvements in Washington State's WQA and TMDL procedures based on the lessons learned by other states. Section 6 contains a list of reference documents. Appendices A and B contain the interview questions and transcripts, respectively. Appendix C contains a summary of the lessons learned in the form of a matrix.

Section 2

Methods

This project used a "compare and contrast" approach to identify programmatic methods and lessons learned by Washington State and other states regarding WQA and TMDL procedures. This involved the steps listed below:

1. Identify states to include in the study and appropriate contact people for each state
2. Develop interview questions
3. Review relevant WQA and TMDL guidelines and documents
4. Interview WQA and TMDL staff from each state (including Washington State)
5. Send an interview transcript to each interviewee to review and edit for accuracy and completeness
6. Prepare a summary matrix and develop recommendations

The following sections summarize these steps.

2.1 Identification of States and Contacts

Team members preliminarily identified five states that they believed had strong WQA and/or TMDL program components: California, Connecticut, Florida, Ohio, and Wisconsin. The Team identified prospective contacts from each state's regulating agency based on previous interactions with the respective state agencies and Internet research.

The Team e-mailed each prospective contact person. The e-mails summarized the overall project goals and specific areas of interest as well as soliciting their participation in telephone interviews. The Team refined the contact list based on feedback from the initial e-mail. For example, several respondents identified additional agency personnel whom they felt should be interviewed for specific topics.

The Team received little feedback from staff at the state of Connecticut. The Team identified South Carolina as having a relatively strong program and therefore decided to replace Connecticut with South Carolina.

2.2 Development of Interview Questions

As part of the initial scoping effort for this project, the Team identified the following four key evaluation areas:

- Listing and de-listing procedures: methods and criteria for conducting WQAs and updating/ developing the 303(d) list so it: (1) reflects the current quality of the waters and accuracy of designated and beneficial uses; and (2) includes a process for de-listing when WQS are achieved
- TMDL development prioritization: criteria for determining which impaired water bodies will result in a new TMDL
- TMDL development methods: criteria for determining the level of effort to undertake for TMDL studies; methods and explicit procedures for developing TMDLs; and criteria for TMDL data quality, quantity, and analytical requirements

- TMDL implementation methods: determination of how wasteload allocations (WLAs) translate into obligations in NPDES municipal stormwater permits and how load allocations (LAs) are regulated among nonpoint sources

The Team developed interview questions for each of the four areas listed above, as well as general questions related to overall program organization and implementation. Appendix A contains the interview questions.

2.3 Literature Review and Research

Prior to each state interview, Brown and Caldwell conducted research to help define the questions used during the limited time set aside for the interviews. Information reviewed during this research phase included:

- most recent 305b/303(d) Integrated Report (IR)
- state administrative code, ordinances, and statutes applicable to defining WQS and beneficial uses, TMDL prioritization, and point and nonpoint source allocations
- program policy documentation (specific for California, Washington State, and Wisconsin)
- most recent responses to public comments on policy documentation (specific to Washington State)
- most recently issued Phase I and Phase II NPDES municipal separate storm sewer system (MS4) permits
- internal documentation, meeting notes, and fact sheets as provided by contacts

Brown and Caldwell also reviewed State web sites to better understand the departments'/states' organizational structure and ensure that the participating contacts would be suited to the questions asked. Section 6 lists the reference documents reviewed.

National research and literature review included publications by the Water Environment Research Federation (WERF). Two of the most relevant publications were the recently published reports, "*A Long-Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program*" (EPA, December 2013) and "*Clean Water Act: Changes Needed If Key EPA Program Is to Help Fulfill the Nation's Water Quality Goals"* (GAO, December 2013).

2.4 State Interviews and Documentation

Brown and Caldwell conducted phone interviews with identified state contacts from November 2012 to February 2013. The initial interviews with contacts from California, Florida, Ohio, and South Carolina identified additional agency staff to interview in order to address all of the interview questions. Brown and Caldwell scheduled and conducted interviews with these additional contacts. In addition, Brown and Caldwell conducted follow-up interviews to address questions not fully answered during the first interview.

Following each interview, Brown and Caldwell e-mailed a draft of the completed interview transcript to the interviewees. The interviewees reviewed the draft transcripts and provided edits and additions to ensure accuracy and completeness. Appendix B contains the transcript from each state.

2.5 Prepare Summary Matrix and Develop Recommendations

Brown and Caldwell compiled the information obtained from interviews into a matrix in order to facilitate comparison between states. Appendix C contains the results matrix, which is organized by evaluation area and topic.

Brown and Caldwell, in consultation with the Interagency Team, then developed draft recommendations based on findings. Section 4 contains the recommendations and supporting documentation.

2.6 Coordination with Ecology

In early 2014, the Interagency Team provided a copy of the draft report to Ecology for review and comment. Appendix D contains Ecology's comments on the draft recommendations. In July 2014, representatives from the Interagency Team and Ecology met to discuss the recommendations and Ecology's comments. Appendix D also contains a brief, high level summary of that discussion and plans for future coordination on these recommendations.

Section 3

Key Findings by State

The WQA, TMDL prioritization and development, and TMDL implementation programs varied among the six states evaluated. Programs were limited by lack of funding, reduced work force, limited ability to track TMDL implementation progress, and limited enforcement of nonpoint sources of pollutants. Program effectiveness was enhanced by features such as codification of program elements, well-established legal authority, and robust state monitoring efforts and programs.

The following section outlines the key program elements for each of the interviewed states.

3.1 California

The State Water Board (sets statewide policies) and nine regional water boards are the CWA-delegated authorities which exercise rulemaking and regulatory activities. Regional water boards evaluate water quality conditions and circulate draft IRs for public comment (related to their individual basin 303(d) list). The IR gets submitted to the State Water Board for approval and submitted to EPA.

The Porter-Cologne Act (1970) allows water boards to regulate and enforce on surface and groundwater and establish requirements for nearly all sources of waste discharge including nonpoint sources. The California Water Code (CWC) further authorizes the state and regional water boards. Policy documentation defines WQA and TMDL development.

Program elements of interest include:

- The State's Nonpoint Source Program Plan (1999) provides regulation of point and nonpoint sources of pollutants including requirements for implementation activities.
- Given the magnitude of water quality data statewide, the call for data usually occurs 2 years prior to the reporting period. IR submittal occurs every 4 years.
- Each region evaluates data for purposes of the WQA. Each region maintains a Basin Plan that identifies all waters and designated beneficial uses and criteria (water quality objectives). During the evaluation, each region queries lines of evaluation (LOE) from the State's CalWQA database. Listing/de-listing recommendations are based on summarizing all relevant LOE for a water segment-pollutant combination and determining the number of exceedances. A standardized fact sheet gets prepared for each water/pollutant combination that presents the LOE.
- Policy 2004-0063 defines the listing and de-listing policy and includes listing and de-listing factors and quantitative evaluation criteria.
- Policy 2005-0050 defines the TMDL development policy and includes a detailed process to define the project, collect the data, and establish a project plan and budget. Review of existing WQS (outside of the triennial review process) may be conducted in order to determine whether standards are achievable. The process includes a determination of the need to update WQS.

3.2 Florida

The Florida Department of Environmental Protection (FDEP) is the CWA-delegated authority. The Florida Administrative Code and Florida Statutes codify CWA legislation including WQA and TMDL

development processes. Florida Statute 403.067 also provides authority for regulating point and nonpoint sources of pollution.

Program elements of interest include:

- The State believes that activities need to be authorized in code in order to be enforceable.
- Florida uses expanded (from EPA's classifications) classification categories to identify water quality impairment and 303(d) listed water bodies. Detailed subcategories aid in the prioritization of future TMDL development.
- Florida accepts third-party monitoring data continually. Florida uses a "verified period" of 7.5 years to base listing/de-listing decisions.
- Florida utilizes a rotating-basin approach for data collection, WQA, TMDL development, and TMDL implementation.
- Florida does not base listing decisions on biologic data. Rather, they use biologic data to determine whether the water body gets placed on a planning or study list. Category 5 [303(d) listing] requires identification of a causative pollutant.
- Florida prioritizes Category 5 water bodies for TMDL development based on severity and designated use. Prioritization involves definition of priority as high, medium, and low. High-priority TMDLs are to be initiated in the next 5 years, whereas low-priority TMDLs will be initiated within the next 10 years.
- Florida does not deem hydromodification and flow as water quality issues.
- During the TMDL development process, a Best Management Action Plan (BMAP) is developed, which outlines a combination of pollutant load reduction activities (programmatic and structural) specifically identified to address LAs/WLAs. They use pollutant load estimates for various land uses and activities (via a State-developed BMP toolbox) to develop a BMAP. NPDES MS4 permits reference the BMAP.

3.3 Ohio

The Ohio Environmental Protection Agency (Ohio EPA) Division of Surface Water is the CWA-delegated authority. Ohio Administrative Code outlines the WQS and TMDL development processes. State policy documentation defines WQA methods.

Program elements of interest include:

- Ohio utilizes *E. coli* as the indicator bacteria for all designated uses.
- Ohio has a robust, State-implemented monitoring program with a limited number of contributing, qualified third-party data sources. Monitoring is implemented on a rotating-basin approach.
- State-implemented monitoring activities include a significant amount of biologic monitoring. Ohio uses biologic monitoring to define water quality impairment and list water bodies for select designated uses. They use three indices to define impairment. A causative pollutant must be identified prior to TMDL development.
- Ohio uses expanded (from EPA's classifications) classification categories to identify water quality impairment and 303(d) listed water bodies. Detailed subcategories aid in the prioritization of future TMDL development.
- TMDL prioritization follows a detailed point-based ranking approach.
- The IR identifies a 12-step TMDL development process that includes a watershed assessment to correct listing errors at the beginning of the process.

3.4 South Carolina

The South Carolina Department of Health and Environmental Control is the CWA delegated-authority. The South Carolina Code of Regulations codifies WQS and the authority to issue TMDLs. No codification or formal policy exists for conducting WQA or TMDL development, although the South Carolina IR describes the methodology.

Program elements of interest include:

- South Carolina identifies water body designations (for purposes of WQA and TMDL development) by stations and sites as opposed to reaches. The department made the decision not to define the extent of impairment.
- The State is moving to use *E. coli* as the indicator bacteria for all freshwater designated uses.
- South Carolina accepts third-party monitoring data continually, but for use in the WQA, data must reflect current (i.e., within the last 5 years) water quality conditions. South Carolina bases new listing decisions only on the last 5 years of data.
- For aquatic life beneficial uses, the State may use biological data to define water quality impairment and list/de-list water bodies. The State uses two biological indices to define impairment, the Ephemeroptera, Plecoptera, and Trichoptera (EPT) index and North Carolina Biotic Index (BI).
- South Carolina does not use any categorization in its IR, including EPA suggested categories 1–5. Their rationale reflects the fact that EPA only has the authority to approve a 303(d) list, and therefore, only information about current water quality status gets reported in the IR.
- South Carolina bases TMDL prioritization on factors including severity of pollution, designated use, data availability, and technical capabilities. The 303(d) list includes targeted TMDL development dates for each assessment unit.
- Recently, South Carolina attempted to define impervious area as a surrogate for biologic criteria exceedance (indirectly based on flow). Due to legal challenges, TMDLs never went out for public comment.
- Limited implementation language is included in TMDLs because EPA doesn't review and approve this language. TMDL implementation plans are referenced as a requirement in recent, reissued permits.

3.5 Washington

The Department of Ecology is the CWA-delegated authority. Ecology's responsibilities include the WQA, TMDL, and NPDES programs (except for federal and tribal areas, where EPA is responsible for NPDES). The WQA is intended to meet the requirements of Sections 303(d) and 305(b) of the CWA. Ecology places water bodies that do not meet their applicable WQS in Category 5 of the WQA List as a "Polluted Water." Category 5 is equivalent to the CWA Section 303(d) list.

Federal laws, State WQS, and internal policies guide Ecology's WQA. Revised Code of Washington (RCW) Chapter 90.48 provides authority for Ecology to implement the CWA and develop TMDLs. State code (Washington Administrative Code [WAC] Chapter 173-201) documents the beneficial-use designations for water bodies (marine and freshwater) and specifies the WQS (numeric and narrative) that apply to each beneficial use.

Program elements of interest include:

- Ecology's Water Quality Policy (WQP) 1-11 prescribes procedures related to conducting WQAs and developing TMDLs.

- State WQS include designated uses designed to protect key aquatic species (e.g., salmonids, char, redband trout) and life stages (e.g., spawning, rearing, migration).
- Washington States use fecal coliform as the indicator bacteria for freshwater.
- Ecology performs a WQA every 2 years. The WQA alternates between freshwater and marine water bodies.
- The State monitoring program focuses primarily on characterizing water quality status and trends rather than collecting data to support listing or de-listing. The State also performs targeted monitoring to support TMDL development.
- In 2008, the State began listing water bodies for biological impairment based on benthic monitoring data.
- The State is developing TMDLs that use surrogate parameters (e.g., total suspended solids [TSS] for mercury, developed acreage for total phosphorus/dissolved oxygen).
- Washington State incorporates TMDLs in MS4 permits as implementation actions presumed to make progress toward compliance with WLAs.

3.6 Wisconsin

The Wisconsin Department of Natural Resources is the CWA-delegated authority. The Wisconsin Administrative Code, Natural Resources chapters codifies WQS. The Wisconsin Consolidated Assessment and Listing Methodology (WisCALM) policy document defines the WQA methodology. The State is currently refining its policy for TMDL development and implementation, although the Wisconsin IR contains a description of the methodology.

Program elements of interest include:

- The State employs a citizen-based monitoring certification program in order to qualify third-party data use in WQA and TMDL development.
- Wisconsin Department of Natural Resources employs a coordinated monitoring program with its Drinking and Groundwater, Fisheries, and Watershed bureaus. The coordinated monitoring program uses three tiers. Tier 1 is baseline monitoring (including biological monitoring), tier 2 is targeted monitoring for TMDL development, and tier 3 is follow-up monitoring to assess effectiveness of TMDL implementation.
- Wisconsin uses biological monitoring to conduct a general condition assessment and determine the need for follow-up evaluations. Wisconsin allows the use of biologic data to list water bodies if minimum data (sampling) requirements are met.
- Wisconsin uses expanded (from EPA's classifications) classification categories to identify water quality impairment and 303(d) listed water bodies. Detailed subcategories aid in the prioritization of future TMDL development.
- The WisCALM policy document outlines the TMDL prioritization and ranking process.
- Wisconsin has developed an MS4 Urban Stormwater Technical Team to develop guidance for determining MS4 compliance with TMDL allocations.

Section 4

Recommendations

The Team developed nine recommendations for improvements to Washington State's WQA and TMDL programs based on the evaluation effort described in Section 3 and *EPA's CWA Section 303(d) Long-Term Vision and Goal Statement* (December 2013). Un-prioritized issues/concerns and recommendations with supporting documentation are provided in this section.

Table 4-1 summarizes the recommendations and their relationships to the goals outlined by EPA.

Table 4-1. Recommendations Summary

Recommendation	Summary	Associated 303(d) Vision and Goal Statement
1	Establish a multi-stakeholder Standing Committee to improve coordination and engagement between Ecology and the regulated community	Prioritization Engagement Integration
2	Implement existing regulatory authority related to unpermitted and nonpoint sources	Integration
3	Refine water quality standards and water quality assessment methodologies	Assessment
4	Improve and employ consistent processes for collecting, assessing, and utilizing credible data in WQA and TMDL development	Assessment
5	Refine water quality assessment categories to improve clarity and aid in defining priority water bodies	Prioritization Alternatives
6	Update the current biological assessment and listing methodology	Assessment Alternatives
7	Define TMDL prioritization methodology, timelines, and process for public involvement	Prioritization Engagement
8	Define TMDL development methodology	Protection Alternatives
9	Develop consistent TMDL implementation expectations	Protection Alternatives Integration

Recommendation 1: Establish a multi-stakeholder Standing Committee to improve coordination and engagement with the regulated community

Issue/Concern: Review of other state programs indicates that more effective program implementation appears to be achieved by states with clear outreach and engagement efforts with stakeholders. The Team seeks to improve WQA and TMDL program transparency and communication (specifically technical in nature) between Ecology and the regulated community.

Recommendation: Establish a multi-stakeholder Standing Committee to guide the development, revisions, and implementation of the WQA and TMDL programs. The first task of the Standing Committee would be to guide implementation of this report's recommendations. Establishing this committee adheres to *EPA's CWA 303(d) Vision and Goal Statement* (2013) by helping Ecology improve transparency, increase technical understanding, and gain public support of the program.

Supporting Documentation

Interviews revealed that other states implement a robust and clearly documented public comment process for the WQA and TMDL programs, including holding public hearings (California) and contacting basin-specific interested parties (Florida). Additionally, California, Florida, South Carolina and Wisconsin report that consideration of new data emerging during the comment period can result in reconsideration or review of a proposed listing. California also reports that they improved stakeholder confidence at relatively low cost by: 1) increasing focus on transparency in decision-making and the use of third-party data; 2) submitting data for technical peer review; and 3) developing regulatory guidelines for WQA and TMDL programs.

Recommendation 2: Implement existing regulatory authority related to unpermitted and nonpoint sources

Issue/Concern: Nonpoint sources that are not permitted or regulated can significantly contribute to water quality problems. The U.S. Government Accountability Office (GAO) reports, "…progress toward the Clean Water Act's goals of restoring and maintaining "the chemical, physical, and biological integrity of the nation's waters"—including designated uses of fishing, swimming, and drinking—has stalled, largely because nonpoint source pollution has not been controlled… Without changes to the program's voluntary approach to implement projects in waters impaired by nonpoint source pollution, the act's goals are likely to remain unfulfilled" (GAO, 2013).

To date, Washington State has focused on voluntary approaches for addressing nonpoint sources.

Recommendation: Utilize existing legal authority (WAC 173-201-510 and RCW 90.48.080)[1] to control unpermitted and nonpoint sources and ensure that LAs and WLAs are equitable. In addition, Washington State should increase state funding for nonpoint source control, and develop mechanisms to track/account for actions taken by nonpoint sources (e.g., stream shading, fencing cattle from streams, etc.). These actions should improve accountability, tracking, and enforcement of nonpoint source controls and help ensure that all sources are fairly addressed.

Supporting Documentation

As outlined in *EPA's CWA 303(d) Vision and Goal Statement* (2013), effective integration of responsible parties and sources increases the likelihood of successful TMDL implementation, especially for TMDLs that include nonpoint source pollution.

California and Florida staff cited their ability to regulate nonpoint sources as key to the success of their water quality programs.

The recent GAO report cites recognition by EPA and delegated states that:

- "State coordinators reported that they did not know …whether [NPS] load allocations had been met for 48 percent of nonpoint source TMDLs. Moreover, these coordinators did not know whether pollutant levels had changed in 35 percent of nonpoint source TMDLs."
- "When state TMDL coordinators were knowledgeable about TMDLs addressing point sources, they reported that for 83 percent of long-established TMDLs, wasteload allocations…had been met. When state TMDL coordinators were knowledgeable about TMDLs addressing nonpoint sources, however, they reported that 20 percent of load allocations had been met. According to state officials, this discrepancy exists primarily because actions called for in TMDLs for nonpoint source pollution either have not been implemented or have been implemented to a limited extent."
- "In Washington, dairies must have a nutrient management plan to prevent nutrients from entering nearby water bodies. Pennsylvania and Washington officials told us that the

[1]WAC Chapter 173-201-510 Nonpoint Sources and Storm Water Pollution Standards requires that activities that generate nonpoint source pollution, (3)(a) "shall be conducted so as to comply with the water quality standards," and (3)(c) "Activities which contribute nonpoint source pollution shall be conducted utilizing BMPs to prevent violation of water quality criteria." RCW 90.48.080 prohibits discharge of polluting matter in Washington state waters.

mechanisms are generally limited in scope, and state and local officials reported that success or failure to implement TMDLs addressing significant nonpoint source pollution depends largely on voluntary initiatives" (GAO, 2013).

States and local jurisdictions with regulatory tools to address nonpoint sources better position themselves to address water quality problems (WERF, *Navigating the TMDL Process, Evaluation and Improvements*, 2003).

Local jurisdictions in Washington State rely on enforceable codes to regulate traditionally nonpoint sources of pollution, including solid waste, onsite sewage, and non-stormwater discharges. Solid waste regulations can include manure management and illegal dumping or disposal of solid and liquid wastes. Onsite sewage regulations often include a prohibition of discharge of sewage from onsite sewage systems, recreational vehicles, and side sewer connections. Finally, cities and counties regulated as Phase I or Phase II NPDES MS4 communities must have and implement an illicit discharge and connection code that includes escalating enforcement measures. Such efforts by local jurisdictions help support the need for enforcement of nonpoint sources at the state level.

Recommendation 3: Refine water quality standards and water quality assessment methodologies

Issue/Concern: Policies and practices used to conduct WQA and establish the 303(d) list should include standard principles of science, statistics, and logic, such that decisions are scientifically credible and legally defensible (EPA, 2005). Data rules and decision-making processes are expected to produce fewer false positive and negative listings, ensure efficient use of public resources, allow stakeholders to understand and replicate assessments, and provide high levels of protection for designated and beneficial uses.

The Team's review of Washington's WQS, WQA results [303(d) list], and policies used to support WQA and TMDL development suggest that improvements could be made to current methodologies. The Team seeks to improve transparency, adherence to applicable federal and state laws or policies, use of scientifically credible data, and adequate study design to infer true conditions.

Recommendations: Work with stakeholders to implement the following measures:

a) **Use *E. coli* as the indicator bacteria**. Revise the state WQS (WAC 173-201) to use *E. coli* as the indicator bacteria instead of fecal coliform.

b) **Revise statewide listings to reflect current water quality conditions**. In conjunction with Recommendation 5 (below), review and refresh all statewide listings from previous cycles. Remove outdated listings and produce a 303(d) list reflective of current water quality conditions, which will help ensure that TMDL resources are targeted where they are needed.

c) **Improve transparency and completeness of methodology for water body de-listing.** Reduce reliance on informal discussions between Ecology staff for de-listing decisions. Improve documentation related to a quantitative de-listing methodology or policy. To facilitate stakeholder replication of assessments between listing cycles, develop de-listing methods that focus on use of standardized and transparent data analysis procedures to infer true conditions. Implement data evaluation procedures intended to verify and validate results.

d) **Define a critical condition or period of application for the WQA of each water body-parameter combination**. Base the definition on season, climate zone, or other factors as appropriate and make that information available to the public. Revise the WQS if needed to maintain consistency with the WQA definitions.

e) **Re-evaluate the potential benefits of the binomial probability distribution function in WQAs**. Re-evaluate the binomial method for potential application to WQAs and document its findings and conclusions. Prepare a companion document describing potential Type I and Type II errors associated with the binomial distribution method. Such a companion document should include:

- a description of discrepancies and problems that occurred during the 2002/2004 assessment effort when using the binomial probability distribution method
- a description of why/how the binomial probability distribution method can be too restrictive
- a description of why binomial probability distribution functions (for select parameters such as bacteria) can be non-valid
- an assessment of the risk of false positive and negative listings using the binomial probability distribution functions when collecting the minimum number of samples, as required by WAC 173-201A

- a description of how use of a binomial probability distribution function can prevent impaired waters from fluctuating on and off the impaired waters list, thereby resulting in an indication of a persistent problem when none may exist

Supporting Documentation

a) **Use E. coli as the indicator bacteria.** The use of fecal coliform bacteria as an indicator of pathogens in fresh waters has been questioned on technical grounds by members of the public, regulated community and the USEPA. Some indicators, such as *E. coli* can be both directly pathogenic as well as being general indicators of the probable presence of other pathogens (Chordash and Insalata, 1978). *E. coli* functions as a better indicator of human health risk. The use of *E. coli* as the indicator bacteria is consistent with results of Ecology's (2002), evaluation of the State's bacteriological standards. Ohio uses *E. coli* exclusively and South Carolina is moving toward the use of *E. coli*.

c) **Improve transparency and completeness of methodology for water body de-listing**. Most de-listings in Washington State have been based on the acquisition of additional data or identification of an assessment error; few de-listings have occurred as a result of effective and consistently evaluated TMDL implementation. California (2004) established policy 2004-0063 to define the listing and de-listing policy. The policy contains explicit methodology and transparent statistical methods to support de-listing decisions.

d) **Define a critical period for the WQA of each water body-parameter combination.** To date, critical periods for most listed water bodies remain undefined. Current policy does not provide guidelines on how to determine the critical period for WQA purposes. Defining critical periods would help reduce uncertainly associated with assessment decisions (WERF, 2003). It would also help focus future data collection activities.

e) **Re-evaluate the potential benefits of the binomial probability distribution function in WQAs.** The states of California and Florida currently use the binomial probability distribution method for assessment of the aquatic life criteria.

Recommendation 4: Improve and employ consistent processes for collecting, assessing, and utilizing credible data in WQA and TMDL development

Issue/Concern: EPA (2005) guidance for the assessment, listing, and reporting requirements pursuant to Sections 303(d), 305(b), and 314 of the CWA ,indicates that states' assessment methodologies should: (1) explain how they identify, consider, or evaluate all existing and readily available data; (2) articulate the basics of quality assurance and quality control criteria used to evaluate data submitted; and (3) explain the analytical approaches, including statistical analyses, used to infer true conditions. The assessment methodology should include principles of science, statistics, and logic such that listing decisions are credible and defensible.

Ecology's *Quality Management Plan* states: "It is the intent of the policy (Policy 22-01, *Establishing Quality Assurance*) that (1) the quality of all environmental data be documented, (2) the data satisfy the requirements for their intended use, and (3) the data are legally defensible" (Ecology, 2010a). However, minimum QA/QC requirements for data used in WQAs and TMDLs remain undocumented in policy, State statutes, or code.

Decisions based on insufficient information may lead to misdirected or unwarranted actions resulting in wasted resources and loss of credibility and public support for water quality management efforts. The Team believes that credible data provides the crucial foundation for effective WQA and TMDL programs.

Recommendations:

a) **Standardize and improve transparency of WQA and TMDL development methodologies to be consistent with current and applicable EPA quality related regulations, policy, and guidance** (Code of Federal Regulations (CFR) Title 40 Part 31; 40 CFR 35; 40 CFR 136; and EPA 2000, 2001, 2002a, 2002b, 2002c, 2005, 2006a, 2006b, 2006c, 2009, and 2013). This helps to ensure that third-party and Ecology-conducted monitoring efforts provide defensible and scientifically credible data of known quality, sufficient quantity, and appropriate for the intended use.

b) **Clearly define and apply appropriate quality assurance/quality control (QA/QC) levels for WQAs and TMDL development.** Establish minimum QA/QC requirements for the WQA and TMDL programs that include data quality objectives and resulting assessment criteria, with accompanying use qualifiers. This establishes data comparability and representativeness. To maximize water quality benefits, the WQA and TMDL procedures must reduce uncertainty, establish appropriate water quality objectives, and focus improvement efforts on key causes of water quality impairment for each water body.

Supporting Documentation

The 1998 Settlement Agreement required Ecology to complete the development of 1,566 TMDLs by June 30, 2013. As a result, Ecology has been focused on developing TMDLs rather than standardizing and improving transparency of WQA and TMDL methods consistent with current EPA regulations, policy and guidance. This is evidenced by an Ecology focus sheet which describes resource limitations in their TMDL program stating that: "Ecology lacks the resources needed to meet federal production goals…our overall strategy should be to attain clean water as quickly and as inexpensively as possible" (Ecology, 2006).

California, Florida and Ohio limit third-party data sources to government agencies, utility districts and universities while requiring strict QA/QC requirements.

Recommendation 5: Refine water quality assessment categories to improve clarity and aid in defining priority water bodies

Issue/Concern: Some states use additional categories (outside of the five-part categorization format recommended by EPA) to describe the water quality status of water bodies. Use of multiple categories can provide increased benefit with regard to reflecting: (1) additional detail related to the current listing status; (2) data age, quality, and availability; and (3) prioritization of water bodies for TMDL development or additional monitoring. In conjunction with *EPA's CWA 303(d) Vision and Goal Statement* (2013), EPA is focused on identifying, evaluating, and promoting other tools or alternatives that may be more immediately beneficial to achieving applicable WQS. Categorization (and use of the additional categories) may offer an alternative to achieve this goal.

Recommendations: Expand existing classification categories for water bodies, which would prevent the development of TMDLs where insufficient data exist or where specific causes of water quality impairment remain uncertain. Suggested classifications include:

- A category for water bodies listed based on dated or poor quality data, which require additional monitoring to reliably determine the current status.
- A category for water bodies where the cause of non-attainment remains unknown and requires more monitoring to determine the cause(s).
- Revise Category 4b or create a new category to include water bodies appropriate to pursue a straight-to-implementation approach to address the water quality impairments. Within permit coverage areas, the straight-to-implementation approach should recognize the gains achieved through compliance with conditions set forth in an NPDES permit.

Additional subcategories may emerge based on results of more detailed monitoring or investigations. Subcategories could reflect water bodies where non-attainment occurs due to natural or background conditions.

Supporting Documentation

Recommendations are in line with *EPA's CWA 303(d) Vision and Goal Statement* (2013) document to include categories for water bodies where alternatives to traditional TMDLs, such as straight-to-implementation approaches, appear appropriate.

Ohio established a category 5h for water bodies in need of additional monitoring information when only dated or poor quality data exists.

Florida established a category 4d for water bodies where the cause of non-attainment remains unknown and more monitoring is needed to determine the cause. Recommendations outlined in *Navigating the TMDL Process, Listing and De-listing* (WERF, 2003), call for defining a category for water bodies where the cause of non-attainment remains unknown.

Wisconsin uses expanded (from EPA's classifications) classification categories to aid in the prioritization of future TMDL development.

Recommendation 6: Update the current biological assessment and listing methodology

Issue/Concern: Since 2008, Ecology has listed water bodies based on results of biologic assessment (i.e., River Invertebrate Prediction and Classification System [RIVPACS] or the Benthic Index of Biological Integrity [BIBI]). Current methods utilize both RIVPACS and BIBI metrics to infer impairment. Differences in methodologies and a lack of justified thresholds introduce ambiguity into the WQA. In addition, current biological sample designs, collection of supplemental data, and statistical methods used to establish impairment thresholds and 303(d) listings are not clearly articulated in policy, State statutes, or code. As a result, the biologic assessment lacks justification for the temporal or spatial sample requirements and locally derived thresholds used to determine impairment, especially where the preference to identify stressors exist. Additionally, numerous (non-pollutant) stressors can affect stream biota; therefore, listing determinations based solely on biologic monitoring may lead to TMDLs that lack scientific support, resulting in ineffective TMDL implementation efforts.

Recommendations: Review current sampling and assessment methods used in Washington State and:

a) **Employ a public process to help define the methodology and QA/QC protocols utilized for biologic monitoring efforts.** Employ either BIBI or RIVPACS, but not both. Ensure that methods: 1) specify an acceptable age of data; 2) justify the number of samples used; 3) address uncertainty due to geographic and/or site-specific variability; 4) distinguish between warm and cold water invertebrates; 5) utilize similar taxa lists and appropriate species counts to derive bioassessment scores; and 6) justify thresholds using data derived from Washington State. Establish protocols to ensure the quality and representativeness of data used in WQAs. Bioassessment criteria used to support the WQA must be based upon transparent, locally derived, and scientifically credible data review and analysis.

b) **Require stressor identification before listing determinations are made for biological data.** Develop sample collection and assessment methods that ensure the collection of consistent and scientifically credible biological stressor information. Assessment methods should identify: 1) how to establish causal links between stressors and biological impairments; 2) the frequency or volume of data necessary; and 3) the analysis used to infer impairment or non-impairment.

Supporting Documentation

All six states interviewed consider biologic monitoring data in their water quality assessments. Each state has a different process for collecting, evaluating, and assessing the data. Some states list water bodies based on biologic data alone, while others use biologic data together with other information.

Numerous stressors (e.g., loss of shade, lack of large woody debris, hydromodification, invasive plants, low flow diversions, etc.) may affect stream biota that are not considered "pollutants" as defined in the CWA. Ecology's *Guidance for Stressor Identification of Biologically Impaired Aquatic Resources in Washington State* (2010) suggests that any listing based on biologic monitoring results should trigger a study to identify the cause(s) or stressor(s) responsible for the observed impairment. The Team supports Ecology's desire to link biological impairment to stressors.

Florida does not base listing decisions on biologic data; they use it to determine whether the water body gets placed on a planning or study list. Category 5 [303(d)] listing requires identification of a causative pollutant.

Ohio and Wisconsin list water bodies based on biologic monitoring results. However, "listing" generally requires exceedances of multiple (i.e., more than two) biologic indicators.

Recommendation 7: Define TMDL prioritization methodology, timelines, and process for public involvement

Issue/Concern: WQA policy and documentation does not clearly describe Washington State's current TMDL prioritization process, but instead is derived ad hoc based on internal staff discussions.

Recommendation: Establish an explicit and transparent TMDL prioritization process, and make it publically available. The process should result in early engagement and involvement with stakeholders in TMDL prioritization. The prioritization should identify any water bodies where straight-to-implementation programs appear appropriate, as well as water bodies where TMDL development requires collection of additional data.

Supporting Documentation

EPA's CWA 303(d) Vision and Goal Statement (EPA, 2013) suggests that the state's IR describe TMDL prioritization plans.

California, Florida, Ohio, South Carolina and Wisconsin have a transparent approach of identifying water bodies slated for future TMDL development efforts (e.g., ranking approach reflecting high/medium/low categories or a point-based approach). Ohio prioritizes water bodies using primary and secondary criteria and weighting factors. Wisconsin's TMDL prioritization and ranking process is described in state policy. California, Florida, and South Carolina publish the results of the WQA along with a TMDL development schedule based on water quality priorities, available data, and state monitoring resources.

Recommendation 8: Define TMDL development methodology

Issue/Concern: Currently, Washington State does not prescribe TMDL development methods in policy, State statutes, or code. TMDL development procedures lack clarity and consistency.

Nonpoint sources (such as agricultural runoff and runoff from forest service logging roads) can be significant contributors of pollutants. Currently, TMDL development includes the identification of point sources, resulting in WLAs divided among the point sources. The remaining available load often gets assigned as a lump-sum LA for nonpoint sources, which makes TMDL implementation effectiveness difficult to assess.

Surrogate parameters are more commonly being defined in the listing/de-listing of water bodies and/or in TMDL development. In Washington State, recent draft TMDLs included non-pollutants as surrogates (e.g., developed area and stormwater flow) that were based on limited water quality monitoring data making it difficult to establish a credible, causal link through scientific analysis to numeric water quality criteria.

Recommendations: Establish explicit TMDL development method(s) by parameter for Washington State. Specific recommendations include:

a) **Require a project definition report or project plan at the beginning of the TMDL development effort**. The project definition report or project plan should summarize: (1) alternatives considered related to development of the TMDL (with input from stakeholders prior to development of the TMDL); and (2) credible modeling approaches and selection principals.

b) **Confirm designated use and applicability of WQS early in the TMDL development process**. Review WQS (specific for aquatic life conditions) to ensure appropriate water quality targets for the water body.

c) **Develop specific guidelines for determination of the margin of safety (MOS).** The guidelines should describe when to use an implicit MOS rather than an explicit MOS. The process for determining an MOS should include a sensitivity analysis based on ranges of key input values for each parameter, rather than an arbitrary selection of the MOS.

d) **Assign LAs by specific known nonpoint sources, in conjunction with Recommendation 2.** Calculation of LAs should occur based on an equitable division among nonpoint sources.

e) **Reject the use of non-pollutants as surrogates.** Use surrogate parameters that have a direct causal relationship with a measured impairment (i.e., total phosphorus as a surrogate for dissolved oxygen).

Supporting Documentation

California, Ohio and Wisconsin have clearly defined methods for TMDL development that reflect project definition, data collection, loadings analysis, and implementation directives.

b) **Confirm designated use and applicability of water quality standards early in the TMDL development process**. TMDL development should not proceed until confirmation of appropriate designated use(s) and associated water quality standards occur (Shabman et al. 2007). A National Research Council report recommends that states conduct a thorough water body assessment before developing a TMDL to accurately and completely identify specific stressors or causes of impairment. The National Research Council also reported that thousands of water bodies had been placed on states' impaired waters lists on the basis of limited data, rather than a thorough assessment. (National Research Council, 2001)

Evidence from a thorough water body assessment before TMDL development establishes whether and to what extent the stressor or stressors prompting a state to list a water body as impaired are indeed causing impairment" (GAO, 2013).

California employs a methodology to ensure it sets appropriate water quality targets for the water body. Ohio typically completes a new watershed assessment as a first step in TMDL development and uses the results to calculate TMDLs and to correct listings/de-listings.

c) **Develop specific guidelines for determination of the margin of safety (MOS).** TMDLs typically define the MOS as either explicit (a specific portion of the TMDL set aside for uncertainty, such as 10 percent of the total load) or implicit (incorporation of conservative assumptions within the application of a TMDL model). The states researched have limited guidance or procedures, but selection of an MOS method can greatly affect the loading results. Reduction of the MOS can potentially lead to a significant reduction in TMDL implementation cost (National Research Council, 2001).

e) **Reject the use of non-pollutants as surrogates.** In Virginia Department of Transportation et. al, vs. the United States Environmental Protection Agency (2013), the Fourth Circuit District court decision held that a non-pollutant, such as flow, cannot be used as surrogates in TMDLs. Due to legal challenges, a surrogate TMDL for biologic criteria based on impervious surface was not completed in South Carolina.

Aside from legal issues, determining the exact causal relationships between non-pollutant surrogates and receiving water quality presents a difficult challenge. "Experts also reported that the TMDLs that do not diagnose and aim to treat the true causes of water body impairment are unlikely to lead to attainment of designated uses (GAO, 2013)."

Recommendation 9: Develop consistent TMDL implementation expectations

Issue/Concern: TMDLs often get developed with little consideration as to the achievability and practicality of their WLAs and LAs, or whether a TMDL is the most appropriate tool for addressing the observed problems (*EPA CWA 303(d) Vision and Goal Statement*, 2013).

Recommendations: TMDL development method(s) must include consistent implementation expectations. Specific recommendations include:

a) **Develop standardized best management practice (BMP) performance measures (programmatic and structural) to use in defining wasteload allocations and implementation efforts.** This would help ensure standardized and transparent TMDL compliance requirements in subsequent NPDES stormwater permits.

b) **Develop TMDLs that allow flexibility via adaptive management.** This approach could be used for complex TMDLs where uncertainty is high or when allocations do not appear attainable with current tools or BMPs. Additional flexibility will allow regulators and identified responsible parties to refine methodology and implementation efforts in conjunction with improving tools, technology, and research.

c) **Implement TMDLs in a manner that ensures proportional distribution of WLAs or LAs to all major contributing sources, in conjunction with Recommendation 2.** This ensures allocations get appropriately distributed among applicable point sources and nonpoint sources.

d) **Finalize framework for water quality trading and offsets.** These market-driven approaches can result in more rapid and cost-effective water quality improvements.

Supporting Documentation

a) **Develop standardized BMP performance measures (programmatic and structural) to use in defining wasteload allocations and implementation efforts.** Use of a BMP toolbox would also help bridge the gap between TMDL development and TMDL implementation (Shabman et al., 2007).
The state of Florida uses standardized BMP performance information for structural and programmatic activities to aid in TMDL development and TMDL implementation efforts. Use of this "BMP toolbox" allows for documentation of prequalified estimates for pollutant reduction.

South Carolina has a BMP implementation matrix to determine bacteria-related TMDL requirements for SCDOT.

California and Wisconsin are in the process of developing guidance for standardizing TMDL requirements in stormwater permits.

b) **Develop TMDLs that allow flexibility via adaptive management.** TMDLs have historically been established with little consideration of the practical ability to attain WLAs and load reductions. For example, the draft TMDL for Lake Whatcom requires retrofitting nearly 90 percent of the existing developed area so that phosphorus loads match forested conditions. Achieving such a large reduction is very unlikely given the watershed conditions (e.g., soils, slopes, infiltration rates, depth to bedrock) and the expected performance of stormwater BMPs.

In Florida, TMDL development efforts are typically phased and employ use of Best Management Action Plans (BMAP). The BMAP process identifies initial pollutant sources

and allocations, but source-specific allocation refinement occurs through coordination with stakeholders (Basin Working Group) post TMDL development.

South Carolina's Charleston TMDL was phased to allow additional study before final reductions were implemented.

c) **Implement TMDLs in a manner that ensures proportional distribution of WLAs or LAs to all major contributing sources, in conjunction with Recommendation 2.** South Carolina may implement a more explicit disaggregation of LAs among nonpoint sources based on EPA's recent support of disaggregation.

Section 5

Limitations

This document was prepared solely for the Interagency Project Team in accordance with professional standards at the time the services were performed and in accordance with the contract between Pierce County and Brown and Caldwell dated September 6, 2012. This document is governed by the specific scope of work authorized by the Interagency Project Team and it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the Interagency Project Team and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

Section 6

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Appendix A: Interview Questions

Interview Questions for State Water Quality Assessment/TMDL Staff

Table A-1. Interview Question Development		
Key evaluation areas		
Key area		Description
1	Listing and de-listing policies	• Definitive criteria for updating the assessment to reflect current quality of waters • Definitive process for de-listing when water quality standards are achieved • How are water bodies de-listed if they are part of a larger TMDL?
2	TMDL development prioritization	Definitive criteria for determining which impaired water body will result in a new TMDL
3	TMDL development methods	Definitive criteria for determining TMDL level-of-effort (i.e., straight to implementation, simple, complex)
4	Translating WLAs into NPDES (municipal) permits	• Definitive criteria for defining WLA based on pollutant of concern (i.e., load, concentration, % reduction, surrogate) • Definitive criteria for selecting actions based on pollutant of concern
Evaluation criteria		
a		Contains issuance and implementation processes authorized by state law
b		Contains explicit detail under administrative procedures
c		Has explicit data quality, quantity, and analytical requirements for the phases of listing, de-listing, TMDL development, WLAs, and implementation action selection
d		Barriers/difficulties associated with implementation of assessment methods that identify explicit data quality, quantity, and analytical methods for all parameters and phases of listing/de-listing
e		Has defined public and stakeholder involvement processes during phases of listing/de-listing and TMDL development/implementation
f		Achieves publication of the 303(d) list updates using the most recent and relevant data (i.e., represents current conditions) within a prescribed time frame
g		Have explicit procedures for determining the level of a TMDL study effort: straight to implementation vs. simple (i.e., 1-year fast-tracked TMDL) vs. complex (multi-year sampling and analysis TMDL)
h		Addresses and has explicit procedures for differentiating allocations between municipal (i.e., WLAs) and non-municipal (i.e., LAs) stormwater sources
i		Has explicit procedures or methods for prescribing/selecting TMDL implementation requirements necessary to achieve WLAs (i.e., does not prescribe numeric WLAs in municipal stormwater permits)
j		Has explicit procedures for establishing cause and effect between the water quality impaired pollutant and the TMDL metric (i.e., flow, impervious cover, biological indicators), if a surrogate is used
k		Has explicit procedures for TMDL revision or withdrawal to reflect changes to adopted water quality standards
l		Has successfully achieved water body clean-up and 303(d) de-listing (i.e., can they cite examples where the TMDL led to de-listing)

Table A-2. General questions		Evaluation criteria
Introductory questions		
1	Please describe your current job position. How does your position involve/affect TMDL issuance within the state?	N/A
2	Do you feel current state regulations provide adequate authority and detail to implement the state water quality program? Why or why not?	b
3	Which elements of your state's TMDL program need to be strengthened?	N/A
4	What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?	d
5	What are the strongest elements of your state's TMDL program?	N/A
General questions regarding TMDL issuance and implementation		
1	What is the current process for defining and updating state water quality standards? Conducting WQAs? Issuing and implementing TMDLs?	a, b
2	Do your state code and policies authorize these processes for defining water quality standards, conducting WQAs, and issuing and implementing TMDLs? If so, where (citation or reference)?	a, b
3	About how many TMDLs are in progress at any given time?	a
4	How many TMDLs have been established (approved by EPA) in the last 5 years?	a
5	How many water bodies have been de-listed due to successful TMDL implementation?	I
6	Do you know of other states that have robust listing/de-listing and TMDL regulations and programs?	N/A
7	If so, whom should we contact for more information about that state's program?	N/A
Concluding questions		
1	Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If so, please provide contact info.	N/A

Table A-3. Listing and De-Listing Policies		
	Questions	Evaluation criteria
Water quality standards		
1	How often are your state's water quality standards reviewed? Revised?	a
2	Do your state's water quality standards contain narrative and numeric criteria? Examples?	a
3	Do your state's water quality standards address frequency and duration criteria in order to define the impairment?	a
3	Is there a specific process or protocol for determining the cause of impairment for narrative criteria?	a
4	Do your state's water quality standards provide flexibility? Examples may include site-specific standards for urban water bodies, seasonal/wet weather standards/tiered standards, etc.	a
5	Do your state's water quality standards include tiered criteria based on level of urbanization?	a
6	Which indicator bacteria does your state use: fecal coliform, E. coli, or enterococci?	a
7	Do your water quality standards reflect eco-regional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?	a
Process for listing/de-listing		
8	Do your state regulations contain explicit procedures for WQA and preparation and submittal of a biannual WQA report, including a list of water quality impaired water bodies? Please provide citation or reference.	a, b
9	If your state regulations don't contain explicit procedures for WQA, what policies or guidelines do you follow? Are they based on EPA's 2006 Integrated Water Quality Monitoring and Assessment Report Guidance?	a
10	Please describe the public process for considering comments to the state's water quality program policy.	e
11	Please describe the public process for considering comments to the state's biannual WQA report.	e
Data for listing/de-listing		
12	Does your state have a water quality monitoring program to assess compliance with water quality standards?	c
13	What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others)?	c
14	About what % of the waters in your state have water quality monitoring data? Do you feel that the available monitoring data are sufficient in quantity and quality to support the WQA?	c
15	Are detailed guidelines related to data submission (number of samples, type, quality control) in place for non-state entities to submit data for use in the assessment?	c
16	Is there a defined data submission time frame/period for when the state collects and receives water quality data for consideration and use?	c
17	How are data considered/handled when submitted outside of a defined time frame/period?	c
18	Do your state regulations provide detailed requirements for data quality, quantity, and analysis for listing and de-listing? Please provide citation or reference.	c
19	Are detailed guidelines in place related to the use and consideration of non-detects in making listing/de-listing decisions?	c
20	Does your WQA program take the age of the data into account? If so, how (e.g., if the only excursions occurred >10 years ago, designate as Category 2 instead of 5)?	f
21	How are newly submitted data used to supplement existing data for purposes of listing and de-listing analysis?	f
22	What have been some common limitations or issues with the collection and compilation of public provided data for use in the WQA report?	d
23	What are some common reasons for rejection of data? Examples?	d

Table A-3. Listing and De-Listing Policies		
	Questions	Evaluation criteria
Methods for listing/de-listing		
24	How are data (qualitative or quantitative) used to support listing/de-listing based on narrative water quality criteria?	d
25	Have you listed any water bodies based on BIBI or other biological attributes (e.g., invasive plants)? If so, please describe the method and criteria used.	d
26	How do you handle situations when different data types/sources result in different assessments of impairment? Do you use a "weight-of-evidence" approach?	d
27	Does your state list 4a (waters that have a TMDL) water bodies by reaches or segments? If so, can individual reaches or segment be de-listed while others remain listed?	c
28	In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicate otherwise?	c
29	Are procedures in place to verify and validate listing and de-listing decisions (i.e., field work, state monitoring)?	f
Publication of listing/de-listing decisions		
30	Can you describe the public process for proposal of new listings and de-listings? How does that process correspond with EPA's review?	e
31	Do you have a defined program for obtaining public and stakeholder input regarding listing and de-listing decisions? If so, please describe.	a
32	Has public or stakeholder feedback alone resulted in reconsideration/review of data associated with listing/de-listing decisions? If so, did the reconsideration result in changes to the listings?	e
33	How often do you update your WQA report and the 303(d) list?	f
Program implementation		
34	How many water bodies in your jurisdiction have been de-listed due to updated data or new information/data?	l
35	How many water bodies in your jurisdiction have been de-listed due to successful TMDL implementation?	l
36	Have any Use Attainability Analyses been completed for waters bodies in your state? If so, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?	k
37	How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.	c

Table A-4. TMDL Development Priorities		
	Questions	Evaluation criteria
1	Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If so, please provide citation or reference.	a
2	If your state regulations don't contain explicit procedures, how do you determine priorities for developing TMDLs?	a
3	What factors influence when and which TMDLs are initiated in any given year?	g
4	Does data availability factor into TMDL development prioritization?	c
5	Does the need to revisit existing TMDLs factor into development prioritization?	g
6	Do you have a defined program for obtaining public and stakeholder input regarding priorities for TMDL development? If so, please describe.	e

Table A-5. TMDL Development Methods		
	Questions	Evaluation criteria
Process for TMDL development		
1	Do your state regulations contain explicit procedures for developing TMDLs? If so, please provide citation or reference.	a
2	How does your state determine the methods you will use to develop a given TMDL (e.g., regulations, policy memo, best professional judgment)? Please provide reference.	g
3	Does your state have explicit procedures to determine the level of effort associated with a TMDL study (i.e., simple, straight to implementation, and complex)? If so, please provide a citation or reference. If not, what characteristics/factors determine this? Examples?	g
4	Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?	g
5	Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?	i
6	Have your TMDL development methods changed to provide more flexibility and consistency with changing water quality standards? Phased TMDLs?	a
7	Has your state issued phased TMDLs? If so, please describe (parameters, rationale, structure).	g
8	Is TMDL development ever phased based on data availability or anticipated implementation issues?	i
9	How are tribal stakeholders involved in the TMDL development/issuance process?	e
10	What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?	g
Data for TMDL development		
11	How are data typically collected or compiled for use in TMDL development?	c
12	Do state regulations, guidance, or protocols contain criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide a citation or reference. If not, how are these requirements determined for a given TMDL?	c
13	Does your state ever use third-party data to develop TMDLs? If so, please provide examples.	g
TMDL development based on narrative criteria		
14	How (if applicable) are narrative standards considered in TMDL development? Have load or WLAs been established based on narrative criteria?	h
15	In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment? If so, please describe.	j
16	In cases where narrative criteria are used, do you have a defined process or protocol to establish or refine TMDL target measures or levels (allocations)?	j
17	Does your state use "surrogates" (e.g., impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?	j
18	If so, which surrogates' parameters have been used?	j
19	If so, how do you establish the linkage between the surrogate and the relevant narrative criterion?	j
TMDL development based on numeric criteria/water quality standards		
20	Does your state use "surrogates" (e.g., impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g., DO, TP, bacteria)?	j
21	If so, which surrogates' parameters have been used?	j
22	If so, how do you establish the linkage between the surrogate and the relevant water quality criterion?	
23	Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.	h
24	Is there a process or protocol in place to revisit TMDLs based on changes to water quality standards?	k

Table A-5. TMDL Development Methods		
	Questions	Evaluation criteria
25	If so, have the affected TMDLs been revised or withdrawn to be consistent with the new WQS?	k
26	In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?	k
Establishing load and wasteload allocations		
27	What is the typical process or method for establishing load and WLAs?	h
28	Do you use the statistical rollback method to establish reduction targets for indicator bacteria?	h
29	How do you differentiate MS4 WLAs from nonpoint LAs?	h
30	How are WLAs generated? Is site-specific discharge data necessary to assign WLAs?	h
31	Which categories of sources are used to establish wasteload and load allocations? Please provide examples.	h
32	How are LAs and WLAs typically represented for bacteria and nutrients?	h
33	How do you determine load and WLAs for impairments with multiple causes (e.g., DO affected by N, P, temperature [shade], sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive species, etc.).	h
34	Are their methods in place to refine or revisit TMDL development and load/WLAs depending on use attainability? If so, please describe.	i
TMDL implementation		
35	Has your state issued TMDLs that use adaptive implementation?	i
36	Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If so, please provide citation or reference.	i
37	How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?	e

Table A-6. Questions Related to Incorporating TMDLs into MS4 Permits		
	Questions	Evaluation criteria
1	Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If so, please provide the citation or reference. If not, what procedures and criteria are used?	a, b
2	Are TMDL requirements incorporated into MS4 permits? If so, how are the requirements expressed in the MS4 permits (e.g., % reduction in pollutant loads or concentrations, implementation of actions such as focused IDDE or riparian tree planting)?	a
3	Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.	i
4	Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?	g
5	Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?	j

Appendix B: Interview Transcripts

Appendix B1: California Interview Responses

Introductory/General Questions

Background Information

In California, the CWA is implemented by the State Water Board (sets statewide policies) and nine Regional Water Boards (exercise rulemaking and regulatory activities by basin). Legislation initiated with Porter Cologne Act (1970), which allows water boards to regulate and enforce on surface and groundwaters and establish requirements for nearly all sources of waste discharge including non point sources.

Each Region has an adopted Basin Plan (water quality control plan) that includes beneficial uses for each water body, program of actions identified to improve water quality, and any adopted TMDLs.

Regional water boards evaluate water quality conditions and circulate draft Integrated Reports for public comment (related to their individual basin 303d list). The IR is submitted to the State Water Board for approval and submitted to EPA.

TMDLs are developed wither by the RWCB or EPA. If developed by the RWCB, they are designed as Basin Plan amendments and include implementation provisions. EPA TMDLs don't include implementation provisions (EPA is limited in enforcement authority on non point sources).

G1 **Please describe your current job position. How does your position involve/affect TMDL issuance within the state?**

Tom Mumley - Asst Executive Officer - manage all WQ programs in region; NPDES program responsibility, oversee planning and TMDL standard, WQ assessment

G2 **Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program? Why or why not?**

Yes, through the Porter Cologne Water Quality Control Act, long standing legal authority to regulate non point/agricultural discharges and requires program of implementation (that could include TMDLs).

Strong stormwater permitting program and designated responsibilities for regional boards.

G2-a **Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments (developing the Integrated Report), and issuing and implementing TMDLs? Can you provide citations or references?**

All topics addressed under California Porter Cologne Water Quality Control Act.

CWC Section 13001 identified SWCB and RWCB as principal state agencies responsible for coordination and control of water quality. Authorizes SWCB to adopt statewide water quality control plans (Basin Plans), which includes beneficial use, water quality objectives (WQO), and implementation programs. Section 13191.3 of the California Water Code (CWC) (approved by Senate Bill 469 in 2002) requires SWCB to prepare guidelines for use by RWCB related to implementation.

Water Quality Control Policy for developing state 303d list– State Water Resources Control Board Resolution No 2004-0063. Excludes changing beneficial use, assessing compliance, and translation of narrative objectives

Water Quality Control Policy for Addressing Impaired Waters– Resolution 2005-0050, TMDL development and implementation.

G2-b What is the current process for defining and updating state water quality standards? Conducting water quality assessments? Issuing and implementing TMDLs?

Each region has a Basin Plan that identifies all waters and designated beneficial uses and criteria (water quality objectives). Region establishes standards, conducts assessments, and issues TMDLs. State board has authority to implement oceans standards, bays/estuaries/inland waters (toxics) supersede.

Defining water quality standards/assessment thresholds – see SWCB Compilation of Water Quality Goals document (April 2011). Updates to standards limited by Resolution 68-16 (California's Antideg Policy).

Each RWCB query lines of evaluation (LOE) from the State's CalWQA database. Listing/delisting recommendations based on summarizing all relevant LOE for a water segment-pollutant combo and based on Listing Policy, determines number of exceedances. A standardized fact sheet is prepared for each water/pollutant combination that presents the LOE. Fact sheets are prepared for all data and information solicited.

TMDLs are developed primarily by the RWCB, but EPA can and has developed TMDLs to meet Consent Degree commitments. During TMDL development, staff will take a limited review of standards to ensure standards are amenable to implementation.

G3 Which elements of your state's TMDL program need to be strengthened?

TMDL implementation plans and funding, guidance and consistency related to the incorporation of TMDL requirements into MS4 permits.

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

Scientific challenges with limited data.

G4 What are the strongest elements of your state's TMDL program?

Ability to implement program - State Board established public advisory group (12 regulated and 12 environmental groups) that resulted in a high level attention in TMDL program in the late 1990s. Consensus was that resources needed, and legislation ensured funding and dedicated staff.

Program transparency - there is an increased focus on transparency in decision making and the use of 3rd party, technical peer review to ensure robust data development and regulatory guidelines. Provides stakeholders additional piece of mind for relatively low cost.

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

No

Water Quality Standards and Listing/Delisting

Water Quality Standards

WQ1 Can you describe/provide background regarding your states water quality standards and how the standards are implemented. First, how are waterbodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

Water Quality Criteria are called "water quality objectives" in CA. Authority to establish water quality objectives is with the RWCB. Beneficial use designations established in Basin Plans.

Listing/delisting activities as conducted by the regions are not evaluated at a consistent scale. When established policy 2004 – spatial scale not defined/attended to, and varies by region with the exception that samples collected within 200 meters shall be considered the same station unless justified in the fact sheet.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/vary by beneficial use designation?

The State has a standard list of beneficial uses that the Regional Boards to designate uses specific to each water body or category of water bodies in a region and include municipal/ domestic supply, agriculture supply, groundwater recharge, freshwater habitat, etc. (25 listed in Water Quality Goals 2011).

Federal water quality criteria legally differ from California's water quality objectives. Objectives provide reasonable protection of beneficial uses whereas criteria must protect the most sensitive use. Both are used to assess listing/delisting.

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban waterbodies, seasonal/wet weather standards/tiered standards based on level of urbanization, etc.?

Multiple categories of beneficial uses allow for flexibility. There are seasonal standards depending on pollutant and beneficial use, but no tiered standards.

Proposing changes to beneficial uses is not regularly implemented. Exercise to go through site specific exercise is scarier than needs to be and there are some procedural challenges. There are examples (Copper in S San Francisco Bay) which were very expensive to implement.

WQ1-c Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?

Yes, narrative/semi qualitative water quality objectives and can be used to support nuisance listings based on odor, color, algae growth, foam, and taste based on a reference condition. Also visual assessment (fish/bird kills) used as secondary line of evidence.

California evaluates water bodies for the following listing factors:

1. Numeric water quality objectives and criteria for toxics (numeric objectives including MCL where applicable) – using a binomial distribution, the null hypotheses is rejected.
2. Numeric water quality objectives for conventional pollutants – guidelines are specified related to depressed DO and determining causative pollutant
3. Numeric water quality objectives for bacteria where recreational standards apply
4. Health Advisories

5. Bioaccumulation in aquatic life tissue
6. Water/Sediment Toxicity
7. Nuisance (per qualitative assessment) – nutrient related would need to determine limiting pollutant. Placed if nuisance condition compared to reference condition.
8. Adverse biologic response
9. Degradation of biological populations and communities
10. Trends
11. Situation specific weight of evidence.

The Water Quality Control Policy (2004) identifies the minimum number of measured exceedances (based on sample size), using a binomial test, in order to list/delist based on quantitative (numeric criteria for toxics and conventional pollutants.

In cases of narrative objectives, evaluation guidelines (numeric values scientifically-based and peer reviewed to protect applicable beneficial use) that have been established by SWCB to represent standards attainment or beneficial use protection. Evaluation guidelines are not water quality objectives. RWCB shall assess the appropriateness of the guideline in the hydrographic unit.

WQ1-d Do your water quality standards reflect eco-regional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?

Water quality standards and beneficial uses are developed at the region scale. As each RWCB develops a fact sheet for each waterbody/pollutant combination proposed for listing/delisting, the fact sheet includes applicable water quality objectives, beneficial uses, etc.

WQ2 Which indicator bacteria do your state use – fecal coliform, e-coli or enterococci?

Mostly have used fecal coliform, but e-coli or enterococci are also used.

WQ3 How often are your states water quality standards reviewed? Revised?

Triennial review conducted statewide/regions. Very few standards added/modified.

During TMDL development, review of standards to determine whether implementation of standards can be achieved (outside of triennial review). In lieu of developing a TMDL and associated implementation plan, may refer back to Water Quality Standards staff. Examples where standards need modification include:

1. Natural conditions alone are incompatible with standards
2. Standards too broad or vague
3. Incompatible Uses Exist – (wildlife waste generates pathogen levels that don't support recreational beneficial use)

Process and Data for Listing/Delisting

WQ4 What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?

Water Quality Control Policy for developing state 303d list– State Water Resources Control Board Resolution No 2004-0063. Additional internal guidelines (workgroups) and templates referenced. State Board did assessment in 2004/06 and developed fact sheet templates.

Fact sheets are submitted by regions to the state outlining LOE for a water body.

WQ5 What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?

All readily available data contributed by the state, EPA, NPDES permittees, etc. At a minimum, data includes the most recent 303d list and 305b report, drinking water source assessments, MS4 data, fish/shellfish advisories, data from SWAMP and regional water quality monitoring groups. Emphasis placed on new information generated after last listing cycle. Data (LOEs) stored in CalWQA database.

WQ5-a Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/delisting decisions?

SWAMP (Surface Water Ambient Monitoring Program comprises about 50-75% of the data used). All monitoring required by permits needs to be SWAMP quality. Has standardized SOPs and QAPP. Interactive data base electronically to see what the status is. Regional data centers are used to collect and store the information. Information on regional data centers can be obtained from Jon Marshack at the State Water Board at jmarshack@waterboards.ca.gov or phone (916) 341-5514.

Policy – All data must be considered. Only high quality directly used directly in assessment. Data from major monitoring programs considered of adequate quality: USGS, SWAMP (Surface Water Ambient Monitoring Program 50-75%), SC Coastal Water research Project, USEPA, Regional Monitoring Pgm of SF Estuary Institute, BPTCP.

WQ5-b If 3rd party data is used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/delisting decisions? Can 3rd party data be used for TMDL development as well?

40 CFR 31.45 (as referenced in 60.053). Numeric data submitted by 3rd party has to have QAPP available and site specific/project specific sampling data and analysis plan. RWCB make finding on fact sheets as to the available and adequacy of data.

If doesn't have QAPP, data can't directly be used for listing/delisting but can be used to support a weight of evidence listing.

For narrative and qualitative submittals, must describe conditions, provide linkage between the measured endpoint and water quality standard of interest, be scientifically defensible, and be verified by SWCB/RWCB.

RWCB have discretion to determine how data to be used including segmentation and spatial/temporal scale. Segmentation is defined in Basin Plans. To be considered temporally independent, samples collected during the averaging period should be combined and considered one event. If an averaging period is not stated, then samples collected less than 7 days apart should be averaged.

- Defined data submission timeframe/period?

There is no predetermined schedule or time frame. It is set during each listing cycle, and the submittal date is usually at least 18 months prior to the 303(d) list/305(b) report submittal date.

- Common issues/problems?

Managing expectations with 3rd party groups who are not aware of the timeframe with which to incorporate data into the assessment.

WQ5-c What are the age limitations/restrictions on data used for listing/delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate waterbody as a Category 2 instead of 5)?

There is not an age limitation specified in policy, but is used in current practice. Because of the long public process, it generally takes so long from submittal date to publication list so there is not a strongly enforced data timeframe. Listing decision often results in eleventh hour changes because not all data allowed to be used. Multiple public comment periods result in new data.

WQ5-d How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?

New data are used to supplement or replace old data, but the process is ad hoc and case by case.

WQ5-e Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?

Determined (varies) on a specific pollutant – water body basis using professional judgment and weight of evidence.

Methods for Listing/Delisting

WQ-6 How is the water quality data compiled in order to make listing/delisting decisions?

Decisions based on compliance with listing factors and using a binomial distribution (for 1-3):

1. Numeric Water Quality Criteria for toxics
2. Numeric Water Quality Criteria for conventional pollutants
3. Numeric Criteria for Bacteria where recreational use applies
4. Health Advisories
5. Bioaccumulation in fish tissue
6. Nuisance
7. Adverse biologic response
8. Degradation of Biologic Populations
9. Trends
10. Situation-specific weight of evidence

Minimum number of exceedances for varying sample size listed in policy

Each RWCB submits fact sheet for each water/pollutant combination proposed for listing/delisting to SWCB.

WQ6-a Is narrative criteria used to make listing/delisting decisions?

Water Quality Policy – 2004-0063

Yes, narrative/semi qualitative criteria used to support nuisance listings based on odor, color, algae growth, foam, and taste based on a reference condition. Reference conditions are defined on a case by case basis. Visual assessment (fish/bird kills) used as secondary line of evidence.

For the 2010 IR, invasive species are considered as a pollutant and would be considered for inclusion on the 303d list. California currently has historical and new invasive species listings; new listings were developed per USEPA request.

WQ6-b In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?

Water Quality Policy (2004-063) – narrative water quality objectives evaluated using evaluation guidelines (used to convert narrative standards to quantitative evaluation). Pre-developed evaluation guidelines represent standards attainment or beneficial use protection. Evaluation guidelines include:

- Sediment Quality guidelines for Marine, Estuarine, and Freshwater Sediments.
- Evaluation Guidelines for the Protection from the Consumption of Fish and Shellfish
- Evaluation Guidelines for Protection of Aquatic Life from the Bioaccumulation of Toxic Substances.

Appropriateness and justification for alternative guidelines shall be described in the fact sheet.

WQ7 Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.

SWAMP conducts physical/biological monitoring, but hasn't done direct listing based on that. Used in weight of evidence approach. California has a policy effort in play to consider biologic objectives (work in progress), but no quantitative objectives exist currently.

WQ8 In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?

Yes, as one of the listing criteria, if a declining trend is shown per data collected over the last 3 years minimum and impacts are observed (Policy 2004-0063). This addressed the states antidegredation requirements.

WQ9 Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?

Verification and validation is conducted through public comment periods and during TMDL development, if feel that the standards aren't appropriate, standards may be modified.

Publication of Listing/Delisting Decisions

WQ10 Please describe the public process for considering comments to the state's water quality program policy.

There have historically been no proposed changes or solicitation for changes to the state's water quality program policy. If there was a review period, the State would use our standard policy/water quality plan amendment process. Staff would review and identify potential revisions, solicit input on potential revisions, and then prepare specific recommendations with supporting justification and documentation that would be public noticed for comments and ultimately brought to the State Water Board for action.

WQ11 Can you describe the public process for review of the Integrated Report and associated listing/delisting decisions? How does that process correspond with EPA's review?

At a public hearing, the RWCB shall consider and approve each proposed list change as documented in water body fact sheets. Advance notice and opportunity for public comment provided. Written responses to all comments provided by RWCB. RWCB submits all fact sheets, responses to comments, documentation, etc. to SWCB.

SWCB shall evaluate RWCB decisions and assemble all fact sheets into a consolidated state list. Before adoption of the list, a public workshop is held and opportunity for public comment

provided. Request for review of specific listings only if comments received within 30 days of RWCB's decision.

After the workshop, the SWCB approves the 303d at a Board Meeting. The past process (2004/2006) was implemented entirely by the SWCB.

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/review of data associated with listing/delisting decisions? Did the reconsideration result in changes to the listings?

Yes. New data is often provided in conjunction with comments, and all available data must be used.

WQ13 How often do you update your water quality assessment report and the 303d list?

Conducted about every 4 years (given the RWCB coordination element). Currently the 2010 303d list is effective and the next 303d and IR report is scheduled for 2014.

Program Implementation

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data?

Per the 2010 IR, 195 delistings proposed.

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

In conjunction with TMDL development (per the TMDL Guidance), UAA may be one path considered in the project planning phase of TMDL development. Region 6 recently conducted a UAA and changed the beneficial uses of some mountain lakes. The SF Bay Region recently removed contact recreational use from a wetland.

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

California's listing policy (2004-063) requires all waters that do not meet water quality standards be placed on 303d list. The 303d list includes 1) waters still requiring TMDL and 2) waters where the water quality segment is being addressed. Water segments in "waters being addressed" must meet either one of the following conditions: a) TMDL has been developed and approved by EPA and the approved implementation plan is expected to result in full attainment of the standard or b) an existing regulatory program is expected to result in the attainment of the standard within a reasonable time frame.

Therefore, all Category 4a, 4b, and 5 waters are on the state 303d list. All are submitted to EPA for federal 303d list. Category 4b is not readily used to separate segments out that would not otherwise require a TMDL (but the state is currently considering it).

TMDL Prioritization Questions

TP1 **Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.**

WQ Policy 2004-0063 lists criteria for consideration by RWCB that include:

1. Water body significance
2. Degree that objectives not met/beneficial use not attained
3. Degree of impairment
4. Potential threat to human/environmental health
5. Water quality benefit of activities ongoing
6. Potential for beneficial use protection and recovery
7. Degree public concern
8. Funding availability
9. Availability of data

All water quality limited water bodies assigned a TMDL schedule date. Schedule fluctuates – were required to develop a schedule for TMDL development per EPA in the late 1990s that required all TMDLs to be developed by 2013. Challenges – data resources limit how many TMDLs to be issued based on increased workload.

TP1-a **If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?**

See above.

TP1-b **What factors influence when and which TMDLs are initiated in any given year?**

See above.

- Does data availability factor in?

  Yes.

- Does the need to revisit existing TMDLs factor into development prioritization?

  Yes, this is considered by the Regions prepare TMDL program workplans.

TP2 **Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.**

Priorities/schedule for TMDL development are proposed at the same time as the 303d list updates.

Also, some (but not all) regions consider TMDL priorities during their triennial reviews.

TMDL Development Questions

General Questions

TD1 About how many TMDLs are in progress at any given time?

Based on current 303d, over 400 TMDL projects needed. Regional boards currently engaged in developing over 120 TMDLs. Schedules developed to ensure development of all over next 13 yrs.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

Check with Joanne Cox, our State TMDL Coordinator. 916 341 5552 or Joanne.Cox@waterboards.ca.gov

TD3 Does your state list 4a (waters that have a TMDL) waterbodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may by delisted while others remain listed?

California lists by segments, although the spatial scale and segmentation of waterways into TMDLs is up to the RWCB.

A segment is categorized as 4a so long as at least one 303d listing is being addressed by an EPA-approved TMDL. Therefore, delisting per select parameters is not likely to change the 4a designation.

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

TMDL Guidance – A Process for Addressing Impaired Waters in California (Resolution 2005-0050)

TMDLs either developed by RWCB as Basin Plan amendment (with implementation addressed) and supporting staff report or by USEPA (where no implementation is addressed).

Each TMDL project, which may include one or more pollutant-water body combinations, is scoped and planned via a project planning process described in the Guidance.

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

Basin Plan amendments have allocations, numeric targets, sources, etc. and would follow the process outlined in the TMDL Guidance. There is an independent, scientific peer review; there is a 45-day public comment period and public hearing before sent to SWCB for additional hearings. Total timeframe 12-18 months from initial TMDL language to adoption.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

  When TMDL only effects single party, RWQB can establish limits directly in permit including abatement and discharge orders. Therefore compliance would be tracked based on adherence to a permit. If multiple parties affected, it is a quasi-legislative action.

  In addition to establishing and implementing TMDLs in single permits, there is a growing movement to pursue "straight to implementation" without and hopefully

preclude need for a TMDL. (Easier said then done!) As an example, there is a recent listing in the San Francisco region for trash (EPA passed). Los Angeles already has trash TMDL, which has 0 allocations. The RWCB knows that implementation of a 0 allocation is not possible. Therefore, the SF Region was challenged by EPA to put a date for TMDL development for the trash TMDL and the region has in turn opted to prioritize that parameter-segment last. Thus, the regions use the more flexible nature of TMDL prioritization to delay TMDL issuance and focus on implementation activities.

The regions are currently experimenting with authority and using the waste discharge permits and MS4 permits (the SF Bay Region has one area wide regional permit that includes trash requirements and BMPs) to outline implementation activities prior to TMDL issuance. Per state code – implementation has to be addressed with each Basin Plan amendment if completed by RWCB anyway. The hope is that this activity will allow use of Category 4b listings. Haven't tested how strict EPA is with this method. Other applications include toxics (legacy pollutants) being addressed with direct clean up efforts.

TMDLs (with their regulatory backing) come into play more for non point source management.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

  All TMDLs issued by RWCB are adopted with implementation plans.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

Yes, where they are affected. All TMDL projects provide opportunity for stakeholder participation/involvement. Type and level of involvement varies (see TMDL Guidance). Tribal stakeholders are usually accounted for in the TMDL project plan.

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

TMDLs produced by RWCB include an implementation plan with TMDL (i.e., the mercury and PCB TMDL) – that states that the TMDL will be periodically reviewed or reviewed every 5 year. TMDLs are developed with an open invitation to allow for revisiting per new information provided. Throughout the state, TMDLs are developed based on available information, and in some cases, it was known that limited data was available for these parameters and the WLA and LA are unattainable. This understanding is built into implementation plan.

TMDLs issued under consent decree (Southern CA) are high priority for updating TMDLs (see Los Angeles MS4 permit – has 30 TMDLs). The focus of the TMDL reassessment is due to limited implementation information incorporated into TMDL (known shortcomings with the TMDL). Much coordination with the community occurs, and if additional data provided, they would revisit. Possible contact: LB Nye 213 576-6785 or lb.nye@waterboards.ca.gov (woman).

Data for TMDL Development

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

TMDL Project Plans consider existing data and identify and set course to collect needed new data and include consideration and use of 3rd party data. See TMDL Guidance.

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

The SWAMP has a Quality Assurance Program Plan with protocols, etc. for many but not all monitoring constituents. Ultimately, all TMDL data needs should/will be included. Meanwhile, additional data needs are determined on a TMDL Project specific basis per TMDL Guidance document.

TMDL Development based on Narrative Criteria

TD9 How (if applicable) are narrative standards considered in TMDL development?

Narrative standards are linked to specific evaluation guidance (thus has a quantitative target).

Each TMDL includes a numeric target set to meet narrative or numerical standards.

TD9-a Have load or wasteload allocations been established based on narrative criteria?

Yes, e.g., San Francisco Bay PCBs TMDL and allocations based on human health and wildlife bioaccumulation narrative objectives. Napa River and Sonoma Creek sediment TMDLs are based on narrative sediment and settleable material water quality objectives (see description below).

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

- **If yes, which surrogates parameters have been used?**

  SF Bay Region projects:

  SF Bay PCBs TMDL target is a fish tissue concentration. There actually is a numeric standard for PCBs (170 picogram), but because the driver is human health and fish consumption (narrative criteria), the RWCB used the narrative criteria and determined the concentration (numeric) to allow for fish consumption. In proposing adherence to the narrative criteria instead of the numeric, the RWCB had to demonstrate to EPA satisfaction that the water column value would not be a detriment to WQ – through advisory committees. The RWCB developed a food web model to translate levels of PCB in fish tissue to levels in bed sediment. Mass balance model used to translate the loading in sediment to Total PCB.

  Sediment TMDLs – Primarily based on narrative criteria ("adverse impacts and excessive siltation causing detriment to salmonid habitat") (see the North Coast TMDL). A few sediment TMDLs are translated to a turbidity concentration. The Sonoma Creek and/or Napa River Sediment TMDLs use spawning gravel permeability, streambed scour, and substrate composition- percent fines as indicators/criteria that the problem would be solved (tracking solution). The allocations (LA and WLA) were based on reference condition for specified indicators. A habitat improvement strategy was incorporated with sediment TMDLs. The RWCB took a more holistic approach to TMDL development.

  http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/planningtmdls/basinplan/web/bp_ch7b.shtml#7.2.3

  http://www.waterboards.ca.gov/sanfranciscobay/board_decisions/adopted_orders/2008/R2-2008-0103.pdf

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/napasediment/NapaSedBPA090909.pdf

- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion?

  Approach is presented in supporting staff report and varies by TMDL.

TMDL Development based on Numeric Criteria/Water Quality Standards

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

During TMDL development itself, during the project definition phase, it is determined whether the water body will require additional data collection efforts and/or whether standards related action like a UAA would be needed.

No Phased TMDLS have been issued.

TD10-a Is TMDL development ever phased based on data availability or anticipated implementation issues?

Yes, some TMDLs are developed over multiple years

TD10-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?

No

- If yes, which surrogates parameters have been used?
- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

TD11 Is there a process or protocol in place to revisit TMDLs based on changes to a numeric water quality standards?

No standard process or protocol currently in play or written down anywhere. This may happen at the region level. The effort for changing WQS or creating site specific standards is really placed on the entities that discharge to the waterbody (i.e., POTW).

California has historically had success with politically sensitive subjects because of the joint fact finding approach (open process with peer review/stakeholders involvements) employed. In CA – any new requirements have to go through scientific peer review (standards, TMDLs) – the RWCB/SWCB has a contract with University of California system to do independent peer review (similar to EPA processes).

TD11-a If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?

Not known.

TD11-b In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?

See previous response.

TD12 Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.

Only general guidance, see TMDL Guidance.

Establishing Load and Wasteload Allocations

TD13 Which categories of pollutant sources are used to establish wasteload and load allocations? Please provide examples.

Varies, but generally include consideration of municipal and industrial wastewater, NPDES permitted stormwater (sometimes lumped, sometimes spilt into municipal, industrial, construction, etc., agriculture runoff, atmospheric deposition.

TD14 What is the typical process or method for establishing load and wasteload allocations?

Varies; models, empirical data

TD14-a How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?

WLAs developed by identifying pollution sources and amounts (loads) identified for various times of year. Then effect of loads evaluated. Allocations assigned to all sources.

The need for site specific discharge data (flow and concentration) varies. Usually just use what information is available. As an example, the PCB TMDL used representative data set (flow and concentration) comprised from <25% of the current POTWs and using low detect analysis. This data was used to create a total WLA, which was in turn split up by contributing flow. This ended up not equitable for one POTW. However, the RWCB opted not to use low detect analysis for compliance, instead they are using existing regulatory standard (which allows the dischargers a little more flexibility).

TD14-b How do you differentiate MS4 wasteload allocations from non-point load allocations?

Varies, but usually through some form of watershed area accounting with some empirical data.

TD14-c How are load and wasteload allocations typically represented for bacteria and nutrients?

Varies; for bacteria in some cases loads, in other as concentrations (densities).

TD14-d How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).

Varies

TD15 Are their methods in place to refine or revisit TMDL development and load/wasteload allocations depending on use attainability? If yes, please describe.

No, but it can happen on a case by case basis.

TD16 Do you use the statistical rollback method to establish reduction targets for indicator bacteria?

Yes, we use a reference beach approach for pathogens to account for natural sources.

TMDL Implementation

TD17 Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.

No explicit procedure other than the TMDL Guidance and our California Environmental Quality Act regulations that require evaluation of the environmental impact of reasonable foreseeable means of compliance.

The TMDL Guidance includes reference to a BMP toolbox, which is used to select implementation activities to achieve pollutant reduction.

TD18 How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?

Yes, the California Water Code requires permits or conditional waiver for all discharges. See our Nonpoint Source Policy.

http://www.waterboards.ca.gov/water_issues/programs/nps/docs/oalfinalcopy052604.pdf

TD19 Has your state issued TMDLs that use adaptive implementation?

Yes, TMDL strategy focuses on public participation and cultivating an understanding of issues. Implementation addressed in TMDL development.

Many and most SF Bay region TMDLs explicitly use adaptive implementation. Implementation requirements may allow phased implementation and also include requirements to conduct studies.

As an example, the recent mercury TMDL was established based on fish tissue concentrations and translated to level in streambed sediment (via a food web model) and instream sediment, which was used to do mass balance and determine allocation scheme. Most mercury in runoff associated with TSS – which is a more explicit parameter to consider with respect to implementation actions. Allocations based on reducing current loads in half – but the RWCB knows that it is not feasible to do this. Use of adaptive implementation can be used to determine what we can get to and revisited in the TMDL (as written into implementation plan). For the mercury TMDL, attainment of the allocation(s) can be met in any one of the following ways 1) demonstrate that mercury in suspended sediment is below sediment target; 2) directly show that can meet load allocation (effluent limit); 3) implement BMPs. Per the state BMP toolbox (per literature), there is limited BMP effectiveness information for mercury so the TMDL built in adaptive implementation– schemes/phases/tiers for compliance and the ability to provide grant money: 1) Do a desktop review; 2) pilot scale implementation (written into permits) for various BMPs; 3) focused implementation; 4) full implementation (over time). If known BMPs are effective, directly require in permit. (i.e., look for fluorescent light bulbs with industrial/commercial inspection).

Tom Mumley wants to develop guidance for incorporating and developing TMDL requirements for stormwater. Built permits with TMDLs in mind. Recognizes the need for training, toolbox consistency, and implementation measures.

Questions Related to Incorporating TMDLs into MS4 Permits

P1 Are TMDL requirements incorporated into MS4 permits?

Yes

P1-a If so, how are requirements expressed in the MS4 permits (e.g. numeric effluent requirements, development of pollutant load reduction benchmarks, implementation of actions such as focused IDDE or riparian tree planting)?

Requirements may be numeric effluent requirements, pollutant load reduction benchmarks, and/or BMP requirements. TMDL compliance assumes an approximate 20 year implementation period. Therefore, permits incorporate during the "pilot scale phase", reporting on efforts to demonstrate adequate progress and inform next permit term requirements – evaluate effectiveness of what has been done.

As an example, in the Los Angeles region, the MS4 permits are established with numeric effluent limits, but also specify that municipalities have flexibility to establish a plan of action and time frame with quantitative plan of action (opens up the possibility for lawsuits and legal actions).

P1-b Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?

No, but it's on a "to do" list. Tom Mumley has drafted a internal TM "TMDL Requirements in Stormwater Permits" that attempts to summarize consistency in process for such activities.

Historically, all MS4 permits had guidelines in the permit that they can not cause detriment to receiving water quality. However, dischargers (permittees) shall demonstrate compliance with receiving water quality as long as follow procedures per permit "safe harbor language". Recently EPA questioned they validity of that statement and the state is trying to figure out an appropriate response.

P1-c Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.

See our San Francisco Bay Regional MS4 permit, the new LA permit, and the draft San Diego Permit. Review fact sheet (basis for requirements)

http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/Municipal/index.shtml

http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/index.shtml

http://www.waterboards.ca.gov/sandiego/water_issues/programs/stormwater/index.shtml

P1-d Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?

Looking at other numeric surrogates but so far not using any of them.

Concluding Questions

Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.

See contacts included in script.

Next Steps:

Tom to forward PowerPoint of MS4 permit comparison in CA (currently in internal draft form).

Appendix B2: Florida Interview Responses

Introductory/ General Questions

G1 Please describe your current job position. How does your position involve/affect TMDL issuance within the state?

Drew Bartlett – Director, Division of Environmental Assessment and Restoration. Oversees development/ implementation of WQ stds, TMDL pgm. This division sets water quality standards, performs water quality assessments, develops TMDLs and basin management plans, provides restoration funding and provides laboratory services.

Julie Espy - Administrator of Watershed Assessment Section, focused on listing/delisting of waterbodies and monitoring.

Jan Mandrup-Poulsen – Administrator of Watershed Evaluation and TMDL Section, focused on TMDL development.

G2 Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program? Why or why not?

Yes, implementation by the state (and not EPA) allows for increased program flexibility. Florida's assessment methodology is adopted as regulation, which provides public with predictable and transparent process. TMDLs are adopted by rule. The restoration plans (BMAP) are adopted by an enforceable secretarial order – not code. Agricultural and non point sources are referenced specifically, which promotes accountability.

1999- Florida legislature felt EPA would use the TMDL Program to achieve water quality standards and designated uses by ratcheting down on NPDES point sources – FDEP knew couldn't achieve WQ stds based on reductions to point sources only, so in 1999 the FDEP worked with the Florida Legislature to pass the Florida Watershed Restoration Act – enabling legislation 403.67 Florida statutes (authorizing for TMDL program and provided the authority to address nonpoint sources) and resulting in a much less adversarial relationship between FDEP and point/ nonpoint sources.

G2-a Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments (developing the Integrated Report), and issuing and implementing TMDLs? Can you provide citations or references?

Code references are associated with the Florida Administrative Code. Overall process authorized by Florida Watershed Restoration Act.

Water Quality Standards (thresholds) – FAC 62-302

Conducting Water quality assessments – Impaired Surface Water Rule (62-303 FAC)

Issuing TMDLs – 403.067 of the Florida Statutes (law) – gives Florida to authority to address point and nonpoint sources of pollution. Statute allows DEP and Dept. of Agriculture via a cooperative arrangement to work with individual nonpoint sources (i.e., farmers). Department of Agriculture serves as liaison; FDEP doesn't enforce against farmers, but has the authority to require that they file a Notice of Intent to implement formally adopted Best Management Practices appropriate for their commodity, which acts as a protective shield.

Implementing TMDLs (BMAPs) – Adopted by Secretarial order to be enforceable– BMAP (available online)

G2-b What is the current process for conducting water quality assessments? Issuing and implementing TMDLs?

Assessments conducted annually on a rotating basin basis. 52 basins/ watersheds grouped into 29 larger basins yielding five basin groups. The groups are organized such that one basin lies within each of the six state-wide districts, allowing for district support each year of the rotating basin cycle. All districts have 5 basins with the exception of the northeast district.

Annually, the statewide database (FL-STORET) is queried for monitoring records. Extracted records are run through a program for QA that outputs a recommended assessment list. Output is reviewed by FDEP staff. New data is applied and three public comment periods conducted. Verified list and list of waters to be delisted are adopted by Secretarial Order. These lists annually amend the 1998 303d list.

One basin group is assessed in each region annually. Phase 1 consists of a preliminary assessment to determine data needs. Phase 2 consists of subsequent monitoring to address those needs and assessment once the data have been collected. It concludes with placement on the states Verified Waters list and/ or list of waters to be delisted which is incorporated in a report that is submitted to EPA to update the stat's 303(d) list. This year: group 1 basin. Next year: group 2, etc. The whole state is assessed every 5 years. Currently, FL is on schedule.

Phases 1 and 2 are completed "on schedule" according to the description in the 2012 IR. However, we do not do TMDLs or BMAPs for all waters. TMDLs are usually done within a year and are on schedule, but BMAPs are almost never completed within one year, but are usually done by the time we come around to assess the basin again. Our BMAP staff work on several BMAPs within several basins at a time. The goal is to complete it as soon as possible, but they generally take about 2 years.

G3 Which elements of your state's TMDL program need to be strengthened?

None currently. Because we have it in rule, we have consistency and transparency to public, regulated communities, environmental groups. They have the ability to challenge our final decisions.

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

Limited activities authorized by code or adopted in order to be enforceable.

Currently, per code, forced to list waters that fail DO standard (5 mg/L) and forced to list causative pollutant (if not done, we place the waterbody in Category 4d, i.e, impaired, but no pollutant identified). Under the terms of a 1999 Consent Decree, TMDLs must be issued per the requirement of the Clean Water Act, and EPA wants to apply TMDLs for those waters that fail the DO standard. The standards are inaccurate for DO (currently working on refined DO standard more reflective). Existing state rules limit flexibility.

G4 What are the strongest elements of your state's TMDL program?

Originally, there were two lists and associated classifications for waterbodies – the planning (need more data) and verified (need TMDL) (Category 5). We added a Study classification for those waters that were in between the two classifications (Category 4d/4e). Waters had impairment, but not ready for a TMDL (see IR Table 7.5).

Recently revised trend analysis for nutrients (independent from the ongoing trends monitoring at the consistent sites) in our assessment methodology to allow more flexibility. This allows analysis of a water bodies potential to meet standard.

FL-STORET takes into account data from all over the state, whatever exists in the state, not just our data. There is an automated process for QA.

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

None.

Water Quality Standards and Listing/ Delisting

Water Quality Standards

WQ1 Can you describe/ provide background regarding your states water quality standards and how the standards are implemented. First, how are waterbodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

Water Quality Standards (thresholds) – Currently use a 1:24000 scale, which results in 6600 waterbody segments (WBID). Impairment, listing status, and delisting is based on these segments and it allows for greater focus in the TMDL and BMAP.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/ vary by beneficial use designation?

Designated uses: Drinking water (Class 1), primary contact and recreation (Class 2), aquatic life use (fishable/ swimmable) (Class 3), agricultural, industrial (no waters fall into this category). Most waters fall into the Class 3 designation. There are no cold water streams or land use based designations. Standards vary according to designated use.

Criteria from all applicable classes (e.g., Class 3) would apply to Class 1 waters (potable water supplies) as well, and waters would have to address all applicable parameters and criteria.

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban waterbodies, seasonal/ wet weather standards/ tiered standards based on level of urbanization, etc?

Provisions in state's water quality standards allow for development of a SSAC (site-specific alternative criteria). Tried to get more refined standards but EPA didn't allow (i.e., per urbanization). Adopted rules allow flexibility. Currently use a Class III limited, but it hasn't been implemented yet and is only applicable for 9 parameters (e.g., DO)

Additionally, listing categories have been expanded from EPA's recommendation to include Category 3a and 3b (to distinguish between segments where no data is available and where data is available but doesn't meet data sufficiency requirements). Also, recently added Category 4d (segment is not attaining but no causative pollutant identified – like in the case of DO) and 4e (segment is not attaining but recently completed or ongoing restoration activities are expected to restore the designated use).

Florida has an ADOC (Alternative DO Criteria) – opportunity defined in code, but a procedure for conducting is not defined in code. Establishing an ADOC is not commonly utilized, typically done with NDPES permits, but can also be done with TMDLs. Requires additional monitoring to establish alt criteria – typically results in a lower, but still protective, criterion (DEP would do this, specific for this waterbody).

WQ1-C Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?

Yes – narrative standards still exist for nutrients and certain waterbodies – in 2011, FDEP completed some rulemaking to establish numeric criteria for nutrients, but more specifically for assessment and implementation. For example, "In no case shall nutrient concentrations of a body of water be altered so as to cause an

imbalance in natural populations of aquatic flora or fauna," but as much as possible we try to use numeric for clear understanding of attaining vs. not attaining. For those waters that do not have numeric nutrient criteria, the narrative criteria still apply. TMDLs, once adopted as rules and approved by EPA, can establish Site Specific interpretations of the narrative that supersede any more broad regional numeric nutrient criteria.

WQ1-D **Do your water quality standards reflect ecoregional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?**

Yes, for nutrients and biology. Currently revising the DO criteria to be more site specific and regionalized. Estuaries have site specific water quality standards. A statewide TMDL for mercury is in progress.

WQ2 **Which indicator bacteria do your state use – fecal coliform, e-coli or entrococci?**

Fecal coliform is currently used. With climate, have problem with regrowth of bacteria. Switching to E Coli or entrococci didn't change results. Currently, Florida is developing a program for microbial source tracking in order to better develop TMDL allocations.

EPA just rolled out updated national indicator criteria for recreational waters that do allow states to have flexibility in how the criteria are applied.

WQ3 **How often are your states water quality standards reviewed? Revised?**

Constantly updating, but formally updated per the triennial review – Reviewed in 2012 for human health based criteria (to reflect greater fish consumption) and dissolved oxygen criteria (<5 mg/L, which per subtropical environment is not accurate). The DO standard would be adjusted to reflect topography and stream temperature.

Process and Data for Listing/Delisting

WQ4 **What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?**

Water quality assessments – Impaired Surface Water Rule (Rule 62-303 FAC) – outlines process for identifying waterbody segments and impairment. Use EPA's guidance for developing the IR, but includes more information than the guidance recommends.

WQ5 **What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?**

Monitoring data provided by state monitoring, local and environmental groups (~79 data providers). Currently accept data from volunteer programs. Data submitted into FL-STORET database is primary data source. A small proportion of data is from 3rd parties without being loaded into FL-STORET. In order to submit data, 3rd parties have to agree to QA requirements as outlined in 62-160 FAC. FDEP has authority to audit data (not regularly).

Monitoring data falls into three tiers of monitoring (Tier 1, 2, and 3), with Tier 1 being ambient monitoring and Tier 3 being targeted, site specific monitoring for TMDL development. The water quality assessment program uses monitoring data from all tiers.

WQ5-a **Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/ delisting decisions?**

FDEP initiated the Strategic Monitoring (SM) program. Before monitoring, staff queries FL- STORET and Legacy Storet to avoid duplication. The SM approach is consistent with 2003 EPA guidance "Elements of State Water Monitoring and

Assessment Program". As part of SM approach, closely coordinate with data providers and Districts to prevent duplication and maximize number of waterbodies monitored.

Florida Water Resources Monitoring Council facilitates discussion and communication amongst monitoring stakeholders. Comprised of federal, state, local, and volunteer monitoring organization. Currently developing a statewide monitoring atlas to make sure required waterbodies and stations are being monitored. Online catalog of monitoring to track who else is monitoring in a watershed.

WQ5-b **If 3rd party data are used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/ delisting decisions? Can 3rd party data be used for TMDL development as well?**

DEP 972 (Program directive) indicates shared responsibility for maintaining QA control for waters and required updated QA manuals and procedures from all organizational units.

Data quality requirements outlined in Rule 62-160 FAC. Includes field staff SOPs and sets limitations on what 3rd party data can be used for (Florida Lakewatch data only used for non-regulatory/ enforcement activities. Water quality samples from FDEP and a few other entities are sent to FDEP Central Lab but some external/ overflow labs used as well. Lab certification (NELAC) required per Quality Assurance rule. Data from third parties can be used to aid in TMDL development, but it must be established that those data accurately represent the condition of the waterbody.

- Defined data submission timeframe/ period?

There is no defined submission period. Data can be download whenever, but may not be used. Email reminders are sent out for basin groups scheduled for assessment during the year. FDEP staff works with data providers to get data submitted.

- Common issues/ problems?

Statewide database is cumbersome for getting data into database. Have key staff assigned to help (which is a big effort).

Data is occasionally not representative (either gathered from locations that aren't representative or during times not representative). Data subject to additional review before included in the IWR assessment process. Data errors (conversions, data handling, etc) may preclude data from being used.

WQ5-c **What are the age limitations/ restrictions on data used for listing/ delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate waterbody as a Category 2 instead of 5)?**

FDEP is required to consider all available data. A "verified period" is established of 7.5 yr period (from the previous 7 years to June 30 current year). FDEP required to look at entire period of record for potential impairment if don't have adequate data for the 7.5 years verified period. A segment may be placed on planning list if only older data available and QA or representativeness of data cannot be established. Have listed few segments based on old data, but have never delisted a waterbody because of the age of the data.

WQ5-d **How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?**

If new data available, it will be added to the data set. If adequate data available for 7.5 year period, then will only use 7.5 years of data.

WQ5-e **Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?**

Yes, FDEP currently conducts over 10000 assessments/ yr and are able to maintain our assessment schedule with the data available.

Methods for Listing/Delisting

WQ6 **How is the water quality data compiled in order to make listing/ delisting decisions?**

During Phase I of any basin rotation cycle, FDEP evaluates all available water quality data using methodology described in the IWR by querying the FL-STORET database. All data are extracted, but efforts focused on the basin group being evaluated for the year.

WQ6-a **Are narrative criteria used to make listing/ delisting decisions?**

Yes, using a "weight of evidence" approach.

WQ6-b **In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?**

For most fresh and marine surface waters, the assessment of nutrients uses chlorophyll a or TSI (for lakes) as surrogates. In addition, comparisons are made to historic 5-year annual averages and trends are examined. For springs, nitrate concentrations are examined as a basis for listing. FDEP uses photo documentation showing algal blooms, invasive, etc and a weight of evidence approach, as well as establishing limiting parameter (may be TN or TP or both). The narrative criterion that is most often implemented is for nutrients where we have to document an imbalance of flora or fauna. We use nutrient concentrations in addition to field surveys that map plants/algae, photos of the sites, etc. to build the record in support of our assessment decision.

WQ7 **Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.**

State uses biological indices to characterize condition of surface water or support assessment determinations (i.e., list as Category 4c if natural occurrences). Have provisions in rule that if exceed indices, can list as impaired but need to identify causative pollutant (usually listed as Category 4d that requires additional monitoring). Typically use:

Stream Condition Index (SCI) – calibrated macro index. Threshold determined through analysis of reference site data and Biocondition gradient exercise.

BioRecon – used as a screening tool (can't list based on results). Would need to supplement with SCI.

Other indicators include:

Lake Vegetation Index (LVI)

Linear Vegetation Survey (LVS)

Rapid Periphyton Survey (RPS)

Biological data are primarily (99%) collected by FDEP. We require FDEP certification prior to accepting these data from third parties.

WQ8 In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?

Yes, rule just amended to include provision that trending towards impairment can lead to listing during the regular assessment cycle. This is applicable primarily for nutrients.

WQ9 Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?

Don't really have a formal validation process. Listing as a Category 4d indicates that additional monitoring needed to confirm listing decision. Otherwise, public has opportunity to comment.

Publication of Listing/Delisting Decisions

WQ10 Please describe the public process for considering comments to the state's water quality program policy.

FDEP works with stakeholders to develop draft Verified List of Impaired Waters and waters proposed for delisting. Draft lists placed on website and sent by request to interested parties. Public workshops advertised and held in each basin to explain process for developing List. Workshops are noticed in Florida Administrative Weekly and on website. Stakeholders are given opportunity to comment in workshops and through email/ letters.

WQ11 Can you describe the public process for review of the Integrated Report and associated listing/ delisting decisions? How does that process correspond with EPA's review?

See above.

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/ review of data associated with listing/ delisting decisions? Did the reconsideration result in changes to the listings?

Yes (all the time). If additional data or comment is provided that results in a change, FDEP creates a revised draft Verified List/Delist list for review and comment before providing to Secretary (secretarial order) and EPA.

WQ13 How often do you update your water quality assessment report and the 303d list?

The assessment report is updated biannually and the 303(d) list is updated annually.

Program Implementation

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data? Due to effective TMDL implementation?

Happens regularly as a result of updated data or changing assessment methods. There appears to be a trend towards category 2 listing but can not recall any delisting due to successful TMDL implementation. There are a number of success stories, but difficult to capture in listing.

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

UAA would be helpful but none conducted to support listing/ delisting. Current efforts focused on refinement of beneficial use (Class III limited) and updating the DO standard.

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

Category 4b is used by local entities to formulate reasonable assurance plans. Define restoration targets, schedule for activities, types of activities, and a dedicated funding source. Entities submit plan to FDEP and the plan is adopted by secretarial order (enforceable action). The DEP highly encourages waters being placed on the 4b list rather than Category 5. This saves DEP resources, so they can focus on more complex TMDLs, such as estuaries or multi-district TMDLs. Tampa Bay is one example.

TMDL Prioritization Questions

TP1 Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.

The initial TMDL prioritization process was pretty rudimentary. Florida had a Consent Decree (signed between Earthjustice and EPA in 1999) that required all listed segments per the 1998 303d list to assessed, and if determined to be impaired, have a TMDL developed in the next 13 years. The Identification of Impaired Surface Waters (IWR, Chapter 62-303, Florida Administrative Code) revised the initial prioritization requirement, allowing for development of a planning and verified list, and TMDLs to be developed only when on the verified list.

Per the Florida TMDL Program Summary (2005), over the first 5 years of TMDL development, TMDLs focused on high priority waters but continuing to identify impaired; if in same geographic location, would pick up those waters on the way. Currently, waterbodies with a human health concern are high priority and urban stormwater ditches as lower priority.

TP1-a If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?

Public health a high priority (not specified in rule). See below.

TP1-b What factors influence when and which TMDLs are initiated in any given year?

Generalized TMDL prioritization procedures are outlined in the IR, page 117. Priority ranking considers severity of impairment and designated use of the segment. Segments identified as impaired are initially assigned medium priority. High priority is assigned if 1) impairment poses a threat to potable water supplies or human health, and 2) impairment is due to a pollutant that has contributed to the decline or extinction of a federally listed threatened or endangered species. Little human health risk anymore.

Impairment due to fecal coliform exceedance assigned low priority. Focus on refinement of standards rather than TMDL.

Statewide mercury TMDL – prioritized last in consent decree because of limited data and understanding of how mercury cycles in the environment. Just adopted for all impaired waters in FL. Based on >30,000 fish tissue samples analyzed by DEP; shared with Florida Department of Health and recorded fish consumption advisories – over 1100 verified segments – University of Michigan collecting atmospheric (both wet and dry deposition) mercury samples. There is no BMAP at this time. Found that the bulk of mercury is due to air deposition (99.5% mercury), much of it coming from sources outside of Florida. Industrial/ domestic wastewater will have to measure mercury and take steps to minimize. MS4s held harmless due to falling out of sky unless a specific source was identified.

- Does data availability factor in?

It may play into decision if more monitoring is needed. Currently solicit public comment on TMDL priorities (trying to improve). Focus on nutrient TMDLs for larger waterbodies, lakes, and estuaries. Bacteria TMDLs are easier to develop. Staff continually working through list as established with consent decree. Interaction with stakeholders happens with listing process.

- Does the need to revisit existing TMDLs factor into development prioritization?

There are a number that are getting revisited based on better data or knowledge. It's not uncommon; however it does divert resources from developing new TMDLs.

TP2 Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.

TMDL priorities are reviewed at the same time the list (verified) is out for public comment. Segments on the verified list are prioritized as high, medium or low for TMDL development, and priorities change fairly often.

TMDL Development Questions

General Questions

TD1 About how many TMDLs are in progress at any given time? Across all Basin Groups?

Approximately 50 new TMDLs are in progress each year (~100 ongoing and ready to be approved). Bacteria TMDLs are expedited and can be developed much quicker than the nutrient TMDLs.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

Per publication of the 2012 Integrated Report, FDEP has adopted a total of 234 TMDLs. (Note: there is no consistent measure of how TMDLs are counted among the states adopting TMDLs. In addition, Florida has taken on the challenge of adopting TMDLs in many of its highest profile and challenging waterbodies,)

TD3 Does your state list 4a (waters that have a TMDL) waterbodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may delist while others remain listed?

Waterbodies are listed by segment. When a waterbody and/or segment-analyte combination has demonstrated that it is meeting water quality criteria, it can be proposed for delisting. If water quality criteria are met for some but not all parameters, FDEP may propose a partial delisting for those parameters.

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

TMDLs are adopted as rules into Chapter 62-304, Florida Administrative Code. TMDL development procedures are outlined per 403.067, Florida Statutes (above rules). Initial allocations outlined in the TMDL (designation between point and overall nonpoint sources); detailed allocations are included in the BMAP, which is adopted by secretarial order. Process for developing a BMAP is also included in Florida Statutes (403.067).

A Basin Working Group is involved during TMDL and BMAP development. TMDL development affected by EPA- Earthjustice Consent Decree which includes a binding schedule for TMDL issuance, which makes it difficult to conduct a comprehensive watershed assessment – occasionally has to adopt premature TMDLs or hasn't fully calculated specific load allocations.

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

Once a segment is located on the Verified List, high priority segments are scheduled for TMDL completion within 5 years; medium priority from 5-10; and low priority within 10 years. During Phase 3 (TMDL Development) the Basin Working Group is involved in the identification of sources, modeling methods, scenarios, etc.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

Category 4b or 4e is usually assigned to segments where implementation/ restoration activities are being conducted to address the water quality issue. Such restoration plans are submitted to FDEP and approved by secretarial order, making them enforceable. The 4b plans can be done in lieu of a TMDL.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

No, load and wasteload allocation refinement is included as part of the Basin Management Action Plan (BMAP). However, the TMDL typically assigns specific Wasteload Allocations for all NPDES (IW/DW) point sources within the affected area. MS4 permittees and traditional nonpoint sources will receive specific allocations as part of the BMAP process.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

Tribes conduct their own assessment/ reporting to EPA. However, when a Florida TMDL may impact the Florida tribes, they receive notification via e-mail, using our distribution list of interested stakeholders. This was done most recently during the development of the statewide mercury TMDL. In this case, the tribes were treated as though they were another state, as sources on tribal lands could have to be addressed (however, we think this is unlikely in the case of mercury).

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

Currently have revisited based on changing water quality standards and receipt of new data/ information. Once TMDL implementation effects are observed, there may be additional reasons.

Data for TMDL Development

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

TMDL program uses all available data. TMDL development includes evaluation of data in FL-STORET (consistent QA procedures would apply as with the submittal of data for assessment purposes). Data used only for the planning list if can't meet QA.

During workshops, sometimes 3rd party data is provided. Generally, the data used to develop TMDLs doesn't go through as rigorous QA/QC process. Staff will look to see if data are out of whack and if they look consistent, would still use them. Additional monitoring by FDEP will be conducted to supplement available data.

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

No, all information available is used.

TMDL Development based on Narrative Criteria

TD9 How (if applicable) are narrative standards considered in TMDL development?

Narrative standards are used to support listing decisions but prior to being placed on the Verified List and prior to TMDL development, a causative pollutant has to be determined. Trends analysis being conducted supports this determination. Causative pollutant determination is based on limiting nutrient. For Lakes, the trophic state index (TSI) is used.

TD9-a Have load or wasteload allocations been established based on narrative criteria?

Yes, per impaired water rule; TMDL developed to determine what TN/ TP should be. Based on failure of narrative criteria. Intensive study to study wet/dry weather flows and loading.

As an example, the Wakulla River used biologic indicators to identify an impairment and causitive pollutant per SCI.

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

Florida does not have high velocity runoff from impervious surfaces (urban) and concerns related to hydromodification that would typically affect or drive the use of surrogates, due to sandy conditions and flat slopes. Florida was the first state in the Country to require treatment of stormwater from all new development. Florida has a statewide stormwater permitting program. The statewide Stormwater Rule establishes design criteria and technology based effluent limits used to define load/ wasteload allocations.

- If yes, which surrogates parameters have been used? NA
- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion? NA

TMDL Development based on Numeric Criteria/ Water Quality Standards

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

As noted above, TMDLs can serve to establish site specific water quality targets for nutrients. No phased TMDLs have been issued; however, the implementation of the TMDL may be phased, such that restoration activities may take decades to fund or for water quality standards to be achieved. TMDLs are also iterative, such that if the science evolves, standards are changed, or newer data indicate a different interpretation is warranted, then TMDLs can be re-proposed and re-adopted as rules.

TD10-a Is TMDL development ever "phased" based on data availability or anticipated implementation issues?

Unless driven by a strict timetable (e.g., a consent decree or by legislative request), TMDL development can allow for the collection of added water quality or flow data, or other information critical to the understanding of how a system operates and responds. In addition, once a TMDL is adopted, additional studies can be conducted to refine the water quality target(s), thus postponing the full implementation until those issues are resolved.

TD10-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?

No, see previous response under narrative criteria.

- If yes, which surrogates parameters have been used?
- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

TD11 Is there a process or protocol in place to revisit TMDLs based on changes to a numeric water quality standards?

There is not a formal process other than the 5-year rotating assessment cycle. Most TMDLs are developed to be more stringent than the water quality criteria. Generally the TMDL allocations would trump water quality criteria because the evaluation is more site specific and is a better analysis than a statewide criteria.

TD11-a If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?

Yes, for example, total coliform TMDLs throughout Florida were withdrawn after the state dropped total coliform as a surface water criterion. In the case of the initial nutrient TMDL for the Lower St Johns River, after initially approving the TMDL, litigation was filed at the Federal level. EPA decided the target was not defensible and pulled back its approval. The TMDL was re-evaluated, a SSAC for DO was adopted and the TMDL was re-adopted by Florida and approved by EPA. In the state of FL – numeric nutrient criteria are developed to be site specific, and therefore adjustments are not proposed based on regional numbers because TMDLs developed supersede those more broadly applied regionally-based interpretations of the narrative criteria.

TD11-b **In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?**

No; however, in the case of nutrients, TMDL development generally results in more stringent thresholds than what is provided by the water quality standards. We have yet to experience a time where the underlying standard has changed that might prompt the need to re-visit an adopted TMDL.

TD12 **Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.**

There are in-house guidelines but no rules for determining the MOS. Generally, they are established and documented as part of the model development. There was a report written in 2001 that includes a discussion for implicit/ explicit MOS. 9 out of 10 TMDLs use implicit MOS because it is conservative (conservative implicit assumption (90th percentile for flow/ concentrations). Have done implicit + explicit MOS.

BMAP includes monitoring towards making progress. Once standards and designated uses met, you are ok and can stop doing any added pollutant reduction activities.

Establishing Load and Wasteload Allocations

TD13 **Which categories of pollutant sources are used to establish wasteload and load allocations? Please provide examples.**

Pollutant sources generally include municipal stormwater programs (permittees), NPDES permittees (wastewater, industrial, etc), agriculture, septic systems (for bacteria), SSOs, etc. The BMAP defines activities for sources to conduct but (per Lower St John BMAP) doesn't specify allocations for individual sources.

TD14 **What is the typical process or method for establishing load and wasteload allocations?**

Model used to evaluate loading. Sources are identified and allocations established. General allocations defined in TMDL. Refinement of allocations in BMAP.

Agriculture is one of the largest non point sources, and is generally not subject to permits. However, the Dept. of Agriculture develops and adopts BMPs by rule (after FDEP provides initial verification as to their effectiveness).

TD14-a **How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?**

FDEP uses statewide compiled Event Mean Concentration Data by land use to estimate the load from various sources. BMP toolboxes used to determine various activities to reduce load.

TD14-b **How do you differentiate MS4 wasteload allocations from non-point load allocations?**

Proposed load reductions are assigned for both point and non point sources.

TD14-c **How are load and wasteload allocations typically represented for bacteria and nutrients?**

Bacteria LA and WLA typically are depicted as a % reduction using the Hazen method.

Nutrient allocations are typically expressed as a % reduction (except for point sources). BMAPs include appropriate adopted BMPs for each nonpoint source to implement/ maintain for compliance.

TD14-d **How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).**

TMDLs will assess are potential causes linked to a failure to meet one or more water quality standards. For example, low dissolved oxygen levels may be a result of man-induced causes and natural conditions. We use models to assess the DO levels under natural land use conditions and don't attempt to remediate beyond those levels. Anthropogenic activities may impact dissolved oxygen by the addition of nutrients (leading to algal blooms) or organic material (in the form of BOD or SOD) may also deplete oxygen. The challenge is to identify those sources of nutrients/BOD/SOD that need to be reduced. Florida is a very flat state (max elevation above sea level is less than 400 feet). Therefore, water is often left standing and is poorly aerated. Springs, wetlands, and hydrologic modification (e.g., to prevent flooding, provide agricultural water supplies, and for drinking water, and to maintain recreational waters) also result in low DO levels. Florida differentiates between pollution and pollutants, and between man-induced and natural conditions. TMDLs can not be done to improve upon natural conditions, and TMDL will not be done if hydrologic modification is the primary cause of the impairment. Causative pollutant(s) typically identified prior to placement on Verified List. During BMAP, activities may be identified that address multiple pollutant causes/ sources.

TD15 **Are their methods in place to refine or revisit TMDL development and load/ wasteload allocations depending on use attainability? If yes, please describe.**

FDEP develops the BMAP over a multi-year period, using their EMC values and toolboxes, to determine appropriate activities to address required load reductions. Activities are documented in the BMAP by source and responsible party.

TD16 **Do you use the statistical rollback method to establish reduction targets for indicator bacteria?**

No mixing zone assumed for WLA

MS4s 80%; non MS4 reduce to 80% (during BMAP process – continue looking for sources) – fecal indicators shouldn't look. Flexibility documented in BMAP. Legal shield to tackle only what responsible .

TMDL Implementation

TD17 Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.

BMP requirements vary based on location in sensitive waters (shellfish beds). FDEP monitors and evaluates BMPs for use in development of the statewide rules, and identifies appropriate actions in the BMAP.

FDAC's office of Agricultural Water Policy has to develop and adopt BMP activities as proposed by FDEP. Under state law, FDEP is responsible for verifying that BMPs protect water quality. The BMP verification process is undertaken with Dept of Agriculture and Consumer Services. FDEP employs a general verification process with monitoring program targeted at before and after implementation.

The State's Environmental Resource Permit Program requires installation of BMPs for new development.

TD18 How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?

The Department of Agriculture has regulations for implementing BMPs and for measuring effectiveness, based on load reduction in pounds. If not, the number of BMPs are increased or updated until reduction is effective.

FDEP helps fund non point sources restoration measures and retrofits (319 grants, TMDL Water Quality Restoration Grants). FAC 62-305 sets forth procedures for administering grant funding.

During Phase 5 of the Water Quality Assessment process, FDEP coordinates implementation of TMDLs that may be carried through non regulatory and existing regulatory programs. Department of Agriculture and Silviculture (individually) takes lead in ensuring that non point sources are met and funding sources are identified.

TD19 Has your state issued TMDLs that use adaptive implementation?

Yes, added studies can be conducted during the implementation phase that may refine the initial TMDL reduction goals. In any case, if subsequent monitoring indicates water quality standards are being consistently maintained, then no further reductions are required, even if the TMDL target (load, concentration, or percent reduction) has yet to be attained. The phased approach assumes adaptive implementation.

Questions Related to Incorporating TMDLs into MS4 Permits

P1 **Are TMDL requirements incorporated into MS4 permits?**

Potential contact - Eric Livingston

The MS4 permits prioritize activities (BMPs) to address with the TMDL per the BMAP proposal; permittees must describe describe how they are going to influence using quantiative descriptors as possible.

P1-a **If so, how are requirements expressed in the MS4 permits (e.g. numeric effluent requirements, development of pollutant load reduction benchmarks, implementation of actions such as focused IDDE or riparian tree planting)?**

Activities would include retrofits, septic tank replacements, ordinance and code requirements (as documented in the BMAP).

P1-b **Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?**

P1-c **Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.**

Yes, in accordance with activities specified in the BMAP. See permit drafts.

P1-d **Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?**

BMAP and modified allocations developed based on implementation of BMPs, which include retrofits and other programs that (per modeling) would allow for achievement of the allocations. State program already requires BMPs for development activities. Flow/ volume reduction is not a focus (see previous responses).

Concluding Questions

1 **Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.**

Jan Mandrup-Poulsen

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Appendix B3: Ohio Interview Responses

Introductory/ General Questions (Questions G1 – G5)

G1 Please describe your current job position. How does your position involve/affect TMDL issuance within the state?

Beth Risley – EPA, Ohio State – TMDL Development, Prepares Integrated Report

Trinka Mount – EPA, Ohio State, Supervisor, TMDL, Lake Erie, and Inland Lakes Programs

Jason Fyffe – Supervisor, Stormwater Unit

Mark Mann – Manager Stormwater Program

G2 Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program? Why or why not?

Yes. State code provides authority to oversee discharges and water quality.

G2-a Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments, and issuing and implementing TMDLs? Can you provide citations or references?

Ohio's rule-making process is outlined here (http://www.lsc.state.oh.us/membersonly/127rulemaking.pdf).

Water quality standards are contained in Ohio Administrative Code 3745-1. The only rules concerning TMDLs are in OAC 3745-2-12. How Ohio EPA conducts water quality assessments is outlined in the state water quality management plan. However, the credible data law (ORC 6111.50 to 6111.56) requires that only data of highest quality may be used for determining attainment status, listing, and TMDLs and WQ assessments meet this threshold.

G2-b What is the current process for defining and updating state water quality standards? Conducting water quality assessments? Issuing and implementing TMDLs?

Water quality standards are established through a rule making process. Assessments and TMDLs are completed on a rotating basin according to the state's water quality management plan. TMDLs don't go through a rule making process.

G3 Which elements of your state's TMDL program need to be strengthened?

Generally, more resources and better ways to track progress.

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

The limited ability to track projects (TMDL) once in progress.

G4 What are the strongest elements of your state's TMDL program?

Stable workforce; a long history of utilizing biologic criteria to support defining water quality impairment; acceptance of state program by point source dischargers, a long history of state collected monitoring data; state-developed guidance documentation and templates that can be used for each project. Ohio uses an integrated and collaborative approach to TMDLs – 12 step process (steps 4-8 required by U.S. EPA); watershed based monitoring feeds into process. Long history coordinating with point source dischargers.

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

Use of biological criteria limits the ability to compare with other state programs. Minnesota highly regarded in Region 5. Michigan has unique features of their MS4 permitting process that could be reviewed/ considered. Not sure who to contact.

Water Quality Standards and Listing/ Delisting (Questions WQ 1 – 16)

Water Quality Standards (Questions WQ 1 – 3)

WQ1 Can you describe/ provide background regarding your states water quality standards and how the standards are implemented. First, how are waterbodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

By assessment unit (reach or lake), defined based on HUC 12 designation and drainage area.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/ vary by beneficial use designation?

4 specific beneficial uses – human health impacts related to fish tissue, recreation, human health impacts related to drinking water, and aquatic life.

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban waterbodies, seasonal/ wet weather standards/ tiered standards based on level of urbanization, etc.?

Water quality standards are tiered within each use designation, it is possible to get variances.

Standards are identified for season - the recreation standard looks at *E. coli* concentration as a geomean over recreation season, and a single event maximum (for bathing waters).

Tiered criteria are not specifically associated with urbanization. Aquatic criteria are based on 6 categories ranging from coldwater habitat to limited resource water. Key attributes for each category are based on the historical basis of aquatic species, which would be affected by land use and historical uses.

See Table D-1 in the integrated report. Categories based on expectations and status is based on whether improvement is observed. May refine categories or expectations.

WQ1-c Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?

Yes – narrative and numeric. See OAR 3745-1-04 for description of narrative. Numeric located in 3745-1.

WQ1-d Do your water quality standards reflect ecoregional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?

Yes

WQ2 Which indicator bacteria does your state use – fecal coliform, *E. coli* or entrococci?

E. coli – Made change in 2010

WQ3 How often are your states water quality standards reviewed? Revised?

We complete a triennial review as required by U.S. EPA and a state-required review every 5 years for all rules.

Process and Data for Listing/Delisting (Questions WQ 4 – 5)

WQ4 What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?

Guidelines are contained in technical reports, not defined in code. Policies are based on EPA's 2002 Integrated Water Quality Monitoring and Assessment Report Guidance, although have deviated from the procedures based on four use designations. In 2010, Ohio began listing by beneficial use within each assessment unit.

WQ5 What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?

Most data acquired from state monitoring program. Ohio recently (2003) revised rules for use of credible data, specify three tiers of data for purposes of water quality assessment including TMDL, standards, etc. The Credible Data Law requires only Level 3 data for decisions re: beneficial uses, listing and delisting, and TMDL calculations. Level 3 data can only be obtained from a qualified data collector. There are only a few Level 3 QDC including Department of Natural Resources, USGS, Ohio State University, Cuyahoga County Board of Health, NPDES-permitted point sources, etc. A few individuals (e.g., consultants) have done training to become level 3 data collectors. Lower level data (Levels 1 and 2) can be used for trends, education.

WQ5-a Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/ delisting decisions?

State has robust monitoring program. State divided into 25 areas (aggregations of major basins to align with Ohio EPAs five district offices). Each area assigned to one of five basin years. Original goal was to complete cycle in 5 years; resource limitations are adjusting the schedule to every 10 years. Monitoring activities consist of biologic and chemical surveys, physical survey. Modeling and biologic sampling staff are centrally located, chemical sampling per District offices. Individual assessment units targeted and same monitoring sites maintained. Monitoring program very integrated. Same data is used to do scientific analysis trends, inform reports, TMDLs. 15-20 projects going on at any one time (TMDL project).

WQ5-b If 3rd party data is used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/ delisting decisions? Can 3rd party data be used for TMDL development as well?

Updated (by Ohio EPA) rules establish criteria for the three levels of credible data and specify necessary training and experience of person(s) to submit data.

- Defined data submission timeframe/ period?

There is a defined time frame as part of the IR process, but QDCs can submit data at any time through the online credible data database. A request (via letter) was sent June 6, 2011 to Level 3 QDCs requesting data for Ohio's 2012 Integrated Report. Data are considered during the Integrated Report preparation period.

- Common issues/ problems?

NA if submitted under the Level 3 guidelines.

WQ5-c What are the age limitations/ restrictions on data used for listing/ delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate waterbody as a Category 2 instead of 5)?

Water quality assessment program does take age into account by identifying/ notating that a 303d listing uses aged data. Generally, 10 year data age maximum for aquatic life and human health (fish contaminant) criteria, 5 year data age for recreation/ drinking water. Can't delist based on aged data.

WQ5-d **How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?**

New data added to data set. If returning to watershed at same sampling location for fresh survey, older data replaced. For recreation use criteria, a separate geomean analysis is conducted for each year of available data (using both new and old data sources).

WQ5-e **Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?**

Yes, monitoring data available for majority of waters. About ¼ of large river assessment units and 1/3 of watershed assessment units lack biological sampling information (or water quality information to supplement the biological information).

Methods for Listing/Delisting (Questions WQ 6 – 9)

WQ6 **How is the water quality data compiled in order to make listing/ delisting decisions?**

Guidelines outlined in OAC 3745-4-06 and the 2012 IR (Section D). Only Level 3 data can be used for determination.

WQ6-a **Is narrative criteria used to make listing/ delisting decisions?**

Narrative criteria are not used to list/ delist. Narrative description for each aquatic life use is provided.

WQ6-b **In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?**

N/A

WQ7 **Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.**

Yes, quantitative numeric biological criteria exists for three (of the seven) most commonly used aquatic life criteria. Indices are Index of Biotic Integrity (IBI), Modified Index of Well Being (Miwb) and Invertebrate Community Index (ICI). Must achieve attainment criteria for all indices. Partial and non-attainment may result. Analysis of sources and causes of impairment (using water quality data, sediment data, etc.) serves as targeted pollutant parameters for TMDL development.

WQ8 **In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?**

Haven't done that; can't list or delisting based on trends.

WQ9 **Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?**

Not specifically. However, Ohio typically completes a new watershed assessment as a first step in TMDL development, and the new results are used to calculate TMDLs and to correct listings/delistings.

Publication of Listing/Delisting Decisions (Questions WQ 10 – 13)

WQ10 **Please describe the public process for considering comments to the state's water quality program policy.**

Public review process for every report. In 2010, when the program policy and methodology changed (listing by beneficial use, smaller assessment units), extra public comment periods were

provided – once to accept comments on new methodology and one as the formal public review process. Multiple meetings, releases in newspapers, web posts.

WQ11 Can you describe the public process for review of the Integrated Report and associated listing/ delisting decisions? How does that process correspond with EPA's review?

Public process for listing/ delisting consistent with process for obtaining comments on IR.

Generally one public meeting is held but more will be scheduled if there is significant public interest. We are required to provide a 30 day public comment period but generally allow a 45 day comment period. One public notice on Ohio EPA webpage, included in Ohio EPA Weekly Review, and major newspapers statewide. Typically, one public information session.

Historically Ohio EPA hasn't received too significant of comments; generally the same comments carry over from year to year. The minimum length of public review is set in the continuous planning process, per the Clean Water Act. Response to comments included in IR.

Program Implementation

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/ review of data associated with listing/ delisting decisions? Did the reconsideration result in changes to the listings?

Rarely, as a result of bringing forward additional data. Public comments more likely to influence monitoring schedule.

WQ13 How often do you update your water quality assessment report and the 303d list?

Per EPA guidelines, biannually.

Program Implementation (Questions WQ 14 – 16)

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data? Due to effective TMDL implementation?

Per 2012 IR (Section J), seven assessment units delisted due to a flaw in the original listing analysis. 70+ assessment units delisted due to new data.

Delisting due to effective TMDL implementation is not known at this time. We are just starting to revisit watersheds with approved TMDLs. Thus far no water bodies have been de-listed due to successful TMDL implementation. Although we have measured improvements in many waters, official delisting is inhibited by scale issues, conservative listing assumptions, and limited resources for full-scale follow-up monitoring.

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

Many Ohio streams and rivers were originally designated for aquatic life use in the 1978 Ohio Water Quality Standards (WQS) but the techniques used then did not include standardized approaches to the collection of in-stream biological data or numerical biological criteria. Since 1989, Ohio has incorporated a suite of tiered aquatic life uses, most of which have assigned biological criteria promulgated in the Ohio WQS. The Exceptional Warmwater Habitat (EWH) and Coldwater Habitat (CWH) uses are used to protect the best streams and rivers in Ohio, which are performing significantly better than the basic Clean Water Act (CWA) goal minimum. Most Ohio streams and rivers are assigned the Warmwater Habitat (WWH) use, attainment of which supports the CWA minimum. Some Ohio streams are assigned less than CWA goal uses (Modified Warmwater Habitat-MWH or Limited Resource Water-LRW) due to irretrievable or extremely long-

term impairments that preclude attainment of the WWH minimum and which are not likely to be remediated without widespread social and economic implications into the immediate future. For designation of these two less-than-goal uses (MWH and LRW), a use attainability analysis (UAA) is required by the CWA. The UAA justifications for these recommended uses, as well as de facto UAAs performed for recommended higher tier designations (EWH and CWH), are included in the technical reports completed for intensive watershed surveys conducted by Ohio EPA each year. These recommendations and justifications are then used as supporting data for a beneficial use designation rulemaking, which is the administrative process to assign beneficial uses to Ohio rivers and streams and codify them in the Ohio WQS.

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

4B status is impaired but TMDL not needed – other required control measures will result in attainment of use. Per the 2012 IR, three water bodies were proposed for this designation and to be removed from the 303d list (Category 5 designation).

TMDL Prioritization Questions (Questions TP 1 – 2)

TP1 Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.

State regulations do not describe procedures. Process outlined in IR (Section J).

TP1-a If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?

Since 2002 (when additional beneficial use designations were added) a point system was initiated for assessment units based on the beneficial use designation. There are 20 possible points that are divided with the total number of points weighted by use. Index scoring is used to assign priority points for the recreational and aquatic life uses. Priorities set by assessment unit as opposed to beneficial use.

The Ohio River and Lake Erie are automatically assigned a low priority for Ohio-EPA initiated action because other organizations have accepted lead responsibility for TMDLs. These TMDL development processes are ongoing.

TP1-b What factors influence when and which TMDLs are initiated in any given year?

A number of factors are considered in setting up the long-term monitoring schedule and in deciding where we will monitor in any given year.

The monitoring schedule is projected based on resources available in a given year, time since most recent assessment, priority ranking, and TMDL schedule. The schedule can change for any number of reasons; projections for three years following the current year are more certain than for later years.

The schedule depicts intense full-watershed monitoring as part of the TMDL process. As there are indications of improvements, we will revisit TMDL areas to measure water quality conditions. Such monitoring will be arranged to answer the question being posed and may not include the basin-wide structure typically used to create TMDL plans. As more "revisit" work is needed, future schedules may reflect the impact of resources redirected to this purpose.

Ohio EPA makes every effort to stretch monitoring and TMDL resources by taking advantage of opportunities to work with others. When suitable opportunities arise, we adjust the monitoring schedule to participate.

The "Five-Year Monitoring Plan" provided a framework for the schedule. Generally, the 5 color groupings on the monitoring schedule map (see http://epa.ohio.gov/portals/35/tmdl/2012IntReport/IR12MonitSched.pdf for example) depict the 5 watershed groupings of the monitoring plan, with the color intensity indicating when during the next three cycles the watershed is likely to be monitored.

Among watersheds not already being addressed by recent monitoring and TMDLs, several factors were examined to produce this schedule, including:

- amount of impervious surface;
- presence of high-value attributes;
- presence of public drinking water supply intakes;
- degree of impairment (impairment rank);
- likelihood of change (population growth);
- presence of major basin initiatives led by others;

- proximity to other selected assessment units; and
- workload capacity of Ohio EPA staff.

- Does data availability factor into TMDL development prioritization?

  Assessment units requiring a TMDL are assigned to one of next three monitoring cycles to acquire new data specifically for TMDL development.

- Does the need to revisit existing TMDLs factor into development prioritization?

  Pressing issue get worked into TMDL development schedule, depends on if need to collect additional data.

TP2 Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.

There is not a defined program. TMDL development priorities are outlined as part of public process for IR. Schedule may be influenced by local interest.

TMDL Development Questions (Questions TD 1-19)

General Questions (Questions TD 1- 3)

TD1 About how many TMDLs are in progress at any given time?

Approximately 15-20 projects (TMDLs targeted at groups of assessment units, on average ranging from 5-25 watershed assessment units). Assessment units include watershed assessment units (based on HUC-12), large river assessment units (38 segments in 23 rivers that drain more than 500 sq miles), and Lake Erie assessment units.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

51 projects (multiple assessment units in each). Ohio averages between 100 and 125 TMDLs approved per year, using U.S. EPA's counting method. Ohio does not operate under a consent decree with EPA.

Over past 5-years, TMDL projects changed from a HUC-11 to HUC-12 scale. Multiple assessment units may be included in one TMDL, at the discretion of Ohio EPA.

TD3 Does your state list 4a (waters that have a TMDL) waterbodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may delisted while others remain listed?

Listed by assessment units. Three types of assessment units:

1. Watershed assessment units – 12 digit HUC code
2. Large River assessment units – 38 segments in the 23 rivers draining more than 500 sq miles
3. Lake Erie Assessment units – 3 nearshore areas of the lake (western, central, and Lake Erie islands.

In 2010 – Ohio modified 5 category listing structure proposed by EPA to include subcatgories. Under category 1 – have t) = TMDL complete, AU now attaining water quality standards; Category 3 – have i) = insufficient data, t) TMDL complete; included in TMDLs for other units but there may be no or not enough data to assess this unit. For all categories - h) historical data

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

Yes. OAC 3745-2-12.

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

There are no explicit procedures to determine level of effort. Just based on regulations and on best professional judgment.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

  When the problem can be alleviated via the NPDES program, action may be taken.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

  All of Ohio's TMDL reports have implementation sections included.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

NA

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

Completion of most or all recommended implementation actions. This has occurred for the Upper Little Miami River, Mill Creek (Scioto), others coming up.

Data for TMDL Development (Questions TD7 - 8)

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

Ohio EPA aggregates site data into assessment units, not by individual site. 3rd party data would be used if it meets Ohio's credible data law requirements.

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

As described previously, Level 3 data is the only acceptable data used for TMDL development. Guidelines for Level 3 data are in the OARS.

TMDL Development based on Narrative Criteria (Question TD 9)

TD9 How (if applicable) are narrative standards considered in TMDL development?

Not used

TD9-a Have load or wasteload allocations been established based on narrative criteria?

No.

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

No, all tied to pollutant directly.

- If yes, which surrogates parameters have been used?

  N/A

- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion?

  N/A

TMDL Development based on Numeric Criteria/ Water Quality Standards (Question TD 10- 12)

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

TMDL development generally uses flow duration curves for analysis. Have not issued phased TMDLs historically. The rotating monitoring cycle provides opportunity for revisiting TMDLs (and associated listings) based on updated data.

TD10-a Is TMDL development ever phased based on data availability or anticipated implementation issues?

No. TMDL issuance and schedule may be influenced.

TD10-b **Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?**

No.

- If yes, which surrogates parameters have been used?

NA

- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

NA

TD11 **Is there a process or protocol in place to revisit TMDLs based on changes to water quality standards?**

No, based on best professional judgment, the affected assessment unit could be added back to the monitoring cycle rotation.

TD11-a **If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?**

No.

TD-11b **In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?**

No

TD12 **Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.**

3745-2-12

Establishing Load and Wasteload Allocations (Questions TD13 – 16)

TD13 **Which categories of sources are used in establishing wasteload and load allocations? Please provide examples.**

Identified sources include point sources (WWTP, MS4s) and non-point sources (agricultural)

TD14 **What is the typical process or method for establishing load and wasteload allocations?**

Use design flow rate (for NPDES point sources), otherwise establish based on relative area contribution (refer to OAC 3745-2-12).

TD14-a **How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?**

OAC 3745-2-12. No.

TD14-b **How do you differentiate MS4 wasteload allocations from non-point load allocations?**

Relative area contribution.

TD14-c **How are load and wasteload allocations typically represented for bacteria and nutrients?**

Typically identified as a daily load; seasonal loads are sometimes provided for additional information. Percent reduction is usually identified for nonpoint sources. Limited enforcement.

TD14-d **How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).**

Regarding adherence to benthic (biologic) criteria, partial or non attainment of the three indices results in an evaluation of causes and sources. WLA/ LA established based on chemical data and any site-specific considerations.

TD15 **Are their methods in place to refine or revisit TMDL development and load/ wasteload allocations depending on use attainability? If yes, please describe.**

No.

TD16 **Do you use the statistical rollback method to establish reduction targets for indicator bacteria?**

No.

TMDL Implementation (Questions TD 17 – 19)

TD17 **Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.**

No.

TD18 **How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?**

No.

TD19 **Has your state issued TMDLs that use adaptive implementation?**

All TMDL implementation sections have an adaptive management approach.

Questions Related to Incorporating TMDLs into MS4 Permits (Question P1 – P2)

P1 Are TMDL requirements incorporated into MS4 permits?

Yes

P1-a If so, how is requirements expressed in the MS4 permits (e.g. % reduction in pollutant loads or concentrations, implementation of actions such as focused IDDE or riparian tree planting)

In recent years, NPDES permit renewals are integrated with TMDL process. Permit writers included on TMDL teams, and work with permittees and TMDL teams developing permit language necessary to implement TMDL.

Ohio has 4 MS4 Phase I (individual permits); 294 general MS4 permits (affecting 542 communities). During permit reissuance and review of Stormwater Management Plans – Ohio EPA staff looks at 303d list and applicable TMDLs in crafting permit requirements and BMP expectations.

TMDLs include programmatic/implementation activities. Example – two TMDLs resulted in development of two alternative watershed specific construction storm water general permits. These two alternative construction storm water permits contain additional requirements beyond the standard statewide construction storm water general permit. These additional requirements include riparian setback requirements, groundwater recharge (use of infiltration for post-construction) and construction/post-construction requirements. Likewise, MS4 permits within these watersheds require the MS4s' construction/post-construction regulations to be at least as stringent as the requirements found within these alternative construction storm water general permits.

MS4 permits do not require development of pollutant load assessments or TMDL benchmarks. Temperature hasn't been an issue historically – there is one temperature issue but haven't decided yet how to address. Monitoring is required for Phase I MS4s but data is not requested by TMDL staff or actively assessed to determine TMDL compliance to date.

P1-b Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?

Procedures and criteria for incorporating TMDLs into MS4 permits are not explicitly prescribed in state regulations. There are no state-specific guidelines or references.

P1-c Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.

Stormwater staff conducts TMDL/ 303d audits in order to draft permit language and conduct MS4 evaluations. There is not a lot of variability or range of options for implementation activities outlined in TMDLs. IT is up to the discretion of permit writers how to incorporate the applicable BMPs into the permit language.

P1-d Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?

No – not yet.

P2 Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.

Additional information related to the incorporation of TMDL requirements into MS4 permits may be obtained from Jason Fyffe jason.fyffe@epa.ohio.gov

Appendix B4: South Carolina Interview Responses

Introductory/ General Questions

G1 Please describe your current job position. How does your position involve/affect TMDL issuance within the state?

Wade Cantrell – Section Manager 303d and TMDL Department

Matt Carswell – 303d and TMDL Coordinator

Jill Stewart – Manages Stormwater Permitting Section. Permits include construction, industrial, and MS4

G2 Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program? Why or why not?

Yes and no, historically TMDLs were developed for continuous point sources, but over last 10 years the focus has been on TMDLs with multiple sources. South Carolina is still figuring out how to implement non-point source TMDLs. The state's non point programs aren't regulated as strongly as point source discharges, which is one area that may be improved on.

Both the 303d list and TMDLs are developed by the SC Department of Health and Environmental Control (SCDHEC) and go through public notice. There is a prescriptive state process that goes beyond public process – Notice of Department Decision (referenced in 61-110) – 15 day period in which 3rd parties can appeal to board. However, the 303d list and TMDLs are not adopted through a legislative process

G2-a Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments (developing the Integrated Report), and issuing and implementing TMDLs? Can you provide citations or references?

Defining Water Quality Standards – SC Regulations 61-68; Classified Waters – SC Regs. 61-69 (includes designations and any site specific criteria).

Conducting Water Quality Assessment s – There is no formal code or policy defining the assessment methodology. The assessment methodology is described in the Integrated Report.

Issuing TMDLs – SC Regulations 61-110

Prioritizing TMDLs – There is no formal methodology, just a footnote in assessment methodology (per the IR), designed to incorporate evolving conditions (such as funding of the state's 319 Program). As an example, mercury in fish tissue was listed in first 303d list, but the state is not close to issuing a TMDL.

Implementing TMDLs – There is no formal implementation requirements established in code. In conjunction with the state's 319 program, the state often issues RFPs for external development of watershed based plans developed to implement TMDLs.

G2-b What is the current process for defining and updating state water quality standards? Conducting water quality assessments? Issuing and implementing TMDLs?

Updating Water Quality Standards – Conducted continuously but reported to EPA as part of a three year (triennial) review.

Conducting Assessments - Conducted every two years in accordance with EPA's requirements.

Issuing/ Implementing TMDLs – Conducted continuously. When draft complete, notice posted on website and EPA preview. Then out for 30 day public comment (extended to 60 days for more contentious TMDLs). Like with the 303d list, there is a Notice of Department Decision (15 d) prior to EPA approval process (30 d).

G3 Which elements of your state's TMDL program need to be strengthened?

Non-point source implementation of TMDLs.

Obtaining adequate monitoring data. The Department's monitoring program has seen a 50% reduction in funding since 2008 – previously used a basin cycle for ongoing data collection, permitting, and monitoring for TMDL development. There are currently a limited number of fixed, monitoring sites that are monitored bi-monthly every year (trends monitoring). The Department also relies heavily on a probabilistic method to identify sites for annual data collection. Therefore, have lots of sites with one year of data, but its considered best available data and used to make water quality decisions.

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

See above. Funding and regulatory authority for the non point source program.

G4 What are the strongest elements of your state's TMDL program?

SCDHEC seems to work well together as an agency. TMDL/ 303d staff are located down the hall from MS4 compliance/ permit writers so there are good lines of communication.

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

Florida – very prescriptive state regulations.

North Carolina/ Georgia – SC currently consults with them on certain waterbodies.

Water Quality Standards and Listing/ Delisting

Water Quality Standards

WQ1 Can you describe/ provide background regarding your states water quality standards and how the standards are implemented. First, how are waterbodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

Waterbody classifications reported alphabetically in SC Regs 61-69. Classifications vary by freshwater and saltwater and include outstanding national resource waters, outstanding resource waters, trout waters (freshwater for stocked trout, recreation, industrial/ ag uses), shellfish harvesting (saltwater for harvesting shellfish, recreation, fishing for human consumption), Class SA and SB (saltwater).

Evaluation of Water quality standards and 303d listing is developed by station or site, not reach. This is a decision by the Department to defend the extent of impairment upstream and downstream, where the reach is identified as the location of the monitoring site

TMDLs developed on watershed basis – looking at clustered stations. TMDLs are traditionally defined by bottommost/ downstream water quality monitoring site. A single TMDL effort/ report could be on a watershed basis, but sources contributing to each site could have variable LA/ WLA based monitoring at the individual station.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/ vary by beneficial use designation?

Beneficial use designations are used to baseline the parameters to consider for each site/ station:

Contact recreation (applies to bacteria)

Human consumption/ Drinking water (mercury/ PCBs in fish tissue)

Shellfish harvesting (fecal)

Aquatic life uses (fresh and marine) (applies to biologic criteria, DO, pH, metals, nutrients, and turbidity)

Agricultural and Industrial uses

Currently, water quality standards vary by classification (see above).

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban waterbodies, seasonal/ wet weather standards/ tiered standards based on level of urbanization, etc.?

Water quality standards vary based on waterbody classification. Waterbody classifications reported alphabetically in SC Regs 61-69. Classifications include freshwater and saltwater classifications. Categories include outstanding national resource waters, outstanding resource waters, trout waters (freshwater for stocked trout, recreation, industrial/ ag uses), shellfish harvesting (saltwater for harvesting shellfish, recreation, fishing for human consumption), Class SA and SB (saltwater)

There is additional flexibility in terms of allowing site specific standards for pH and DO (based on naturally occurring conditions), not specific for urban. Current water quality standards have been established based on a deviation from natural conditions (i.e., 0.1 mg/L deviation for DO allows for some assimilation).

Water reclassification, No Discharge Zone (NDZ) designations, and site specific criteria are amendments to state regulations and required to be approved by SC General Assembly.

WQ1-c **Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?**

Water quality standards include both narrative and numeric criteria. Numeric criteria are the criteria used to list waterbodies. Only site-specific numeric criteria allowed. Numeric criteria include deviation from natural conditions.

Narrative biologic criteria are used to ensure maintenance of a balanced indigenous aquatic community – narrative can be used in naturally low systems to define natural conditions. Generally there is less biological data, but a waterbody can be listed based on narrative biological criteria (listed as BIO impairment due to impaired macroinvertebrate community).

WQ1-d **Do your water quality standards reflect ecoregional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?**

Yes, numeric nutrient criteria for lakes are based on an ecoregional approach that takes into account the geographic location within the state.

Water quality criteria (temperature, bacteria) vary for freshwaters and saltwaters based on the classification.

WQ2 **Which indicator bacteria do your state use – fecal coliform, e-coli or enterococci?**

Freshwater – current fecal, changing to E coli. Amendment to 61-68 initiated in 2011 to change from fecal coliform to E coli as the indicator species for recreational use in freshwaters. EPA is close to approving new standards, but is currently reviewing implementation language.

Enterococci are used for recreational use in tidal saltwaters. Otherwise fecal is used for shellfish harvesting

WQ3 **How often are your states water quality standards reviewed? Revised?**

Pursuant to Section 303(c)(2)(B) of CWA, SC reviews standards to ensure compliance with federal regulations once every three years (triennial review). Revisions may also occur outside the triennial review process, on an as needed basis.

Process and Data for Listing/Delisting

WQ4 **What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?**

Water quality assessment and 303d list developed using EPA Region 4-approved assessment methodology.

Assessment methodology is advertised during 30 day public comment period for the 303(d) list of impaired waters.

WQ5 **What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?**

State monitoring and non-DHEC data used.

Statewide ambient water quality monitoring program includes ongoing fixed-location monitoring and probability-based monitoring. Fixed-location monitoring at base sites is conducted at regular intervals over extended periods of time to provide baseline data and detect changing trends.

Probability-based monitoring is conducted for one year at randomly chosen locations to provide statistically valid conclusions from relatively small sample sets.

The state-owned electrical utility is the primary non-DHEC supplier of data. Non DHEC data can consist of a variety of sources, but DHEC rarely gets outside data. Future – data submitted as part of the permit requirements (MS4) may be a major contributor. The Department requires an approved QAPP before data collection in order to use outside data for 303(d) list development.

WQ5-a **Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/ delisting decisions?**

Yes, statewide Ambient Water Quality Monitoring program used to assess water quality standards attainment, identify impaired waters, identify sources and causes of impaired waters, and establish/ review/ and revise WQ standards.

Ambient WQ Monitoring program has two major components, fixed site and probability based monitoring. Monitoring data from fixed sites and probability based site selection are used for 303(d) list development and TMDL development targeted at streams, lakes, and estuaries. A third type of monitoring (rotating basins sites) used to be conducted as part of a 5-year basin cycle among the 5 administrative basins in SC. Data is still being used but the state no longer does this monitoring. Currently, there are 245 fixed sites where data is collected bimonthly and every year. For probability based monitoring, approximately 30 sites in streams, 30 sites in lakes and 30 sites in estuaries are sampled each year. Each probabilistic site is sampled monthly for one year only. Macroinvertebrate community sampling surveys were formerly conducted at many wadeable freshwater streams although the program has been temporarily suspended due to budget cuts.

The fixed site data can be used to supplement probabilistic data and can be used for listing/ delisting and TMDL development.

Quality control adhered to in the SCDHEC Quality Assurance Management Plan; a DHEC-approved QAPP must accompany outside data in order to be used for 303(d) list development.

Data stored in LIMS/ SIMS database; then there is an intermittent database for QAQC database. Final data stored in EPA STORET database (internal).

WQ5-b **If 3rd party data is used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/ delisting decisions? Can 3rd party data be used for TMDL development as well?**

To be considered for the 303d list, 3rd party data must be representative of current water quality conditions and use laboratories certified by the DHEC Office of Environmental Laboratory Certification for the test methods of record. Submittal of a DHEC-approved QAPP is also required.

3rd party data considered includes federal and state resource agencies, 319 grants, data from N Carolina and Georgia (for shared waterbodies), USFW, SC Department of Natural Resources, and SC statewide electrical utility.

3rd party data must be provided within 5 year timeframe – handled in independent database – not imported into STORET.

3rd party data can be used for TMDL development if it has approved QAPP.

- Defined data submission timeframe/ period?

Non-DHEC data may be submitted for consideration at any time during the listing year, but only data submitted before September 1 of each odd numbered year will be considered for the following year's 303d list

- Common issues/ problems?

As an agency, require a QAPP prior to data collection. Portion of 3rd party data often does not include QAPP. Also, often the 3rd party interest is to demonstrate a specialized/ localized condition as opposed to representative condition so there can be a bias in the data.

WQ5-c What are the age limitations/ restrictions on data used for listing/ delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate waterbody as a Category 2 instead of 5)?

303d list traditionally developed using five years worth of data. New listings are based on an assessment of data collected during a 5-year window but not necessarily 5 years worth of data (could be less). Old listings would not be removed if no new data exists; sites are kept on the list in the absence of current data showing attainment. There is no separate category listing for older data.

WQ5-d How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?

If new data is available, only data within the 5 year evaluation window would be used (replacing older data).

WQ5-e Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?

More quantity would be better, especially with monitoring reductions since 2008. DHEC staff is comfortable with data quality given QAPP requirements.

Methods for Listing/Delisting

WQ6 How is the water quality data compiled in order to make listing/ delisting decisions?

Assuming QAPP information is available, all available water quality data is compiled for 5-year period of record. Data may include external data and additional data from state-owned electrical utility.

The Monitoring and Assessment group compile and format data and develops program to do assessment. 303d list developed based on whether the site is meeting water quality standards or not. Standards include some subjectivity per natural conditions.

EPA Categories (1-5) are not used – This is a Departmental decision. EPA only has ability to approve 303d list, and independently looks at 305b program (make assumption of water quality for Congress). State believes concept of 303d and 305b are not integrated as they are used for different purposes. Therefore, only information about current water quality status is reported

Comparison to natural condition is standard criteria used. For aquatic life use, if the appropriate criterion for DO and pH are exceeded in 10% or less, criteria is supported. For heavy metals, if it's exceeded more than once the criterion is not supported. Similar guidelines established for TP, N, and Chlorophyll a. Macroinvertebrate community data may be used to support determinations or if biological conditions are met (and chemical/ physical are not), the site may not be listed.

For recreational use, if the concentration is greater than 400/ 100 mL in 10% or more of samples, use is fully supported. There is also a geometric mean criterion, but generally not enough data

collected to support that assessment so the instantaneous component of the standard 400/ 100 mL is used.

WQ6-a **Is narrative criteria used to make listing/ delisting decisions?**

See previous responses, narrative criteria related to biological condition can be used to support decision or list.

WQ6-b **In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?**

Use of narrative criteria is specified in 61-68. Process is conducted on a case by case basis.

WQ7 **Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.**

Yes, biological criteria are considered narrative criteria that can be used to list. State just assesses macroinvertebrates in freshwaters. Can list exclusively based on survey if there is not any supporting data. Still have listings due to impaired macroinvertebrate community. Chemical/ physical data used to support the listing if happen to be collected, but don't target biological sites for additional chemical/ physical data collection.

Biological data are the ultimate deciding factor for the aquatic life use, regardless of chemical conditions. If biologic data shows health, balanced community, the use is considered supported event if chemical parameters don't meet applicable criteria. The EPT Index and North Carolina Biotic Index (BI) are used.

In 2008, waterbodies listed for BIO. Waterbodies removed from 2010 list unless causative pollutant identified (then they remain on the list for the causative pollutant).

Waterbodies removed from list if biological data shows full use support despite chemical/ physical standard excursion

WQ8 **In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?**

No, SC doesn't list threatened waterbodies. Have allowance if modeling information indicates that a site is exceeding (even if monitoring data doesn't show it), the site can be listed but this hasn't ever occurred.

WQ9 **Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?**

The Department has flexibility for special monitoring studies but don't really use it due to budget cuts.

Publication of Listing/Delisting Decisions

WQ10 **Please describe the public process for considering comments to the state's water quality program policy.**

As described previously, program policy can be commented on during triennial review/ TMDL development process/ and integrated report publishing. Sometimes is done in conjunction with NPDES permit issuance.

WQ11 **Can you describe the public process for review of the Integrated Report and associated listing/ delisting decisions? How does that process correspond with EPA's review?**

Solicitation for 3rd part data (the year before the report is published) traditionally kicks off the public process for the IR.

After the solicitation, the notice for 2010 Assessment and list went out February 8, 2010 to public newspapers and direct to interested parties and grouped and requested comments on methodology (30 days). Notice also posted on website. 31 day period provided to Department to respond. Additional public input solicited through regular interactions between Department staff and public/ stakeholder groups. Rarely stakeholder meetings for 303d list development. Once a responsiveness summary is drafted, the list is forwarded to EPA Region 4 for final approval.

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/ review of data associated with listing/ delisting decisions? Did the reconsideration result in changes to the listings?

Yes, it has resulted in listing changes. There have been questions on data source, new data has been provided, and questions on interpretation of data.

WQ13 How often do you update your water quality assessment report and the 303d list?

Updated every 2 years.

Program Implementation

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data? Due to effective TMDL implementation?

Delisting generally associated with 1) most recent data indicates standards are being met; 2) TMDL has been developed or approved; and 3) previous listing analysis contained errors.

TMDL implementation for non point sources requires monitoring – before and after implementation efforts. Department hasn't directly assessed whether listing/ delisting influenced by effective TMDL implementation, but review of available non point monitoring may justify why some listing some sites are now meeting standards.

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

No

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

Have explored using Category 4b but SCDHEC doesn't not call sites out as Category 4b. There is much justification needed to ensure that Category 4b is justified ("The bar for 4b is so high and there are questions about the bar").

The Department is exploring alternative ("4B-light" or 5R categories) – the site retains position on 303d list but assumes a bottom up approach to meeting standards. The state currently is exploring a pilot project using this implementation approach. Ongoing monitoring a big part of that. Limited data is available from the state at this point because DHEC is still trying to establish stakeholder buy in. Sites (or waters) included in this category are NOT removed from the 303(d) list. In effect, they are still Category 5 waters.

TMDL Prioritization Questions

TP1 Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.

TMDL Regulations included in SC Regs 61-110, but don't include information on prioritization. The IR and 303d assessment methodology includes a discussion of how TMDLs are prioritized (see below). In reality there may be a lot of internal and external pressures to develop/ not develop TMDLs so there is a need to keep things flexible.

TP1-a If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?

All listed waters are (generally) required to have TMDL developed between 2 and 13 years after listing. The priority TMDLs are those that are scheduled for the next 2 years.

TP1-b What factors influence when and which TMDLs are initiated in any given year?

TMDL priorities are associated with the severity of pollution, classified use, aquatic endangered species, adequacy of existing and readily available data and information for TMDL development, adequacy of technical tools, hydrologic connection for bundling TMDLs, funding sources, degree of public interest, ongoing activities and initiatives, recreational/ aesthetic/ economic importance, other priorities.

Do make an effort to ascertain whether TMDL will be implementable.

- Does data availability factor in?

Yes

- Does the need to revisit existing TMDLs factor into development prioritization?

SCDHEC is currently revising one TMDL based on new data and modeling efforts. The TMDL was issued in 2002 as a phased TMDL for DO (Charleston Harbor), and designed to be revised. Phase 2 to be scheduled when better model methods are developed and additional data collection has occurred.

TP2 Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.

TMDL issuance schedule included in the 303d list so no separate public process for prioritizing TMDLs.

TMDL Development Questions

General Questions

TD1 About how many TMDLs are in progress at any given time?

Variable – TMDLs are currently in progress to address 50 impaired locations with a total of 7 documents. Current TMDLs being developed are for fecal coliform in freshwaters, fecal in shellfish harvesting waters and nutrients in lakes and dissolved oxygen.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

Currently, over 450 sites or stations are covered under a TMDL, and approved by EPA Region 4. Approximately 400 of these approved TMDLs are for fecal coliform.

TD3 Does your state list 4a (waters that have a TMDL) waterbodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may be delisted while others remain listed?

Listed by stations, as the Department recognizes that the extent of impairment us unknown and varies by pollutant type.

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

TMDL development is referenced in 61-110, but doesn't include specifics related to development methods.

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

Current determination mirrors the process for developing WLAs. Each TMDL is discussed internally, bacteria TMDLs follow EPA methodology. More in depth discussions on methodology surrounding nutrients in lakes.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

  Yes, if enough information is available to develop a watershed based plan before TMDL (usually done afterwards), per the new 319 guidance. This is done less often in SC than other states.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

  There is implementation language in the TMDL for informational purposes that present range of options, but because EPA region 4 doesn't approve implementation actions for TMDLs, implementation plans are not provided.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

There is only one federally recognized tribe. One TMDL (in progress) includes reservation boundary but doesn't include much more information at this point (i.e., TMDL is still in progress so the state hasn't determined if the tribe would be referenced as a DMA). Tribes have designated water quality responsibilities to the state but not sure how implementation would be defined. SCDHEC anticipates coordination with EPA Region 4.

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

The only TMDL being revisited is due to the originally scheduled phasing (i.e., final implementation allowed for a new study and revision). The same pressures that apply to scheduling TMDL development would also apply to revisiting TMDLs. Typically, TMDL revisions would involve point sources and involve reallocation for the purpose of reissuing NPDES permits.

Data for TMDL Development

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

There is not usually a separate monitoring effort/ data collection effort associated with TMDL development. 3rd party data can be used so long as an approved QAPP was provided. Often, 3rd parties (USGS) collect data in support of TMDL development like hydrodynamic data for larger projects and they don't follow traditional QAPP guidelines as they have their own QC protocol.

Data used to make listing/ delisting decision compiled. Data gaps identified.

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

Just normal QAPP process. Have used non QAPP data for TMDL periodically but not regularly (i.e., USGS data).

TMDL Development based on Narrative Criteria

TD9 How (if applicable) are narrative standards considered in TMDL development?

Narrative criteria are usually considered when making listing/ delisting decisions. TMDLs are not developed based on Biological criteria exceedance, but are based on the identified causative pollutant. In some cases, narrative criteria may be considered in the MOS.

TD9-a Have load or wasteload allocations been established based on narrative criteria?

No.

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

No but recently tried to develop surrogate TMDLS for impervious/ flow to address macroinvertebrate (biological criteria) exceedance. TMDL never went out for public comment due to national court challenges (followed VA methodology).

- If yes, which surrogates parameters have been used?

  NA

- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion?

  NA

TMDL Development based on Numeric Criteria/ Water Quality Standards

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

Example – SC currently is considering pathogen indicator change for recreational use. SCDHEC initiated a work group for determining how bacteria change is effected- developed correlation factors for fecal/ E. coli, using translator to recalculate load (already documented in TMDL). Also % reduction the WLA/ LA for bacteria was found to apply to either fecal or E coli.

Other parameters – may look at on a case by case basis. SCDHEC has developed allocation tools that local stakeholders (point sources, not stormwater) can use to redistribute wasteload allocation spatially within TMDL sources. TMDLs written accordingly to allow flexibility in distribution of load.

TD10-a **Is TMDL development ever phased based on data availability or anticipated implementation issues?**

Yes, see previous example.

TD10-b **Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?**

No, see previous reference for narrative criteria. Surrogate parameters have been used.

- If yes, which surrogates parameters have been used?

  BOD5 and Ammonia (for DO)

- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

  Analysis to determine limiting nutrient based on site specific modeling.

TD11 **Is there a process or protocol in place to revisit TMDLs based on changes to numeric water quality standards?**

Similar process as described for the pathogen change. Department would begin discussion before; a work group established to look at implications. Rare that standards change. Recent change of pathogen indicator in freshwaters. Prior to this, there adoption of nutrient criteria in lakes greater than 40 acres (2001).

TD11-a **If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?**

No, this would be addressed in the scheduling of TMDLs.

TD11-b **In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?**

Yes, there would be.

TD12 **Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.**

No – usually rely on an implicit MOS, but no procedures in place. Models generally used conservative procedures (i.e., permit limits as constant input to the models). Pathogen TMDLs typically include an explicit 5% MOS.

Establishing Load and Wasteload Allocations

TD13 **Which categories of pollutant sources are used to establish wasteload and load allocations? Please provide examples.**

WLA's - NPDES permits (individual) including wastewater treatment plants and NPDES-regulated MS4s

LA's - Nonpoint sources usually lumped together and a single % reduction assigned. Non point sources would include agricultural runoff, urban runoff (not Phase I MS4 permittee), confined feeding operations.

EPA is starting to look at a more explicit breakdown (disaggregation) amongst non-point sources so starting to look at that.

TD14 What is the typical process or method for establishing load and wasteload allocations?

Can be looked at spatially, but usually reductions are as a loading for wastewater sources and a % for MS4s. Sometimes SCDHEC coordinates with DMAs to help divide up the allocation and assign distributions. Spreadsheet-based allocation tools have been developed in some cases to facilitate allocation process and allow flexibility for continuous point sources (i.e., not MS4s). The tools mimic the underlying water quality model and simply allow rapid scenario testing by non-technical stakeholders for whom the actual model is not readily accessible.

TD14-a How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?

If site specific info is available, it can be incorporated but not always needed.

TD14-b How do you differentiate MS4 wasteload allocations from non-point load allocations?

Separate WLA for NPDES-regulated MS4, otherwise non-permitted MS4s are assigned as a non point LA.

TD14-c How are load and wasteload allocations typically represented for bacteria and nutrients?

Bacteria typically represented as a % reduction for regulated and non-regulated MS4s. Continuous sources of discharge may have an effluent limit as assigned in their permit.

For other numeric criteria, LA and WLA are assigned as part of modeling analysis – sometimes annual average load/ sometimes concentration.

The state's allocation tool can be used make allowance for loading. Once overall loading is confirmed against the model, the tool allows local group to make adjustments to spatially reconcile WLAs. The tool is used (currently) for continuous point sources (WW facilities – process water – assumes all variability is known) – haven't tried for MS4s (regulated and non regulated).

TD14-d How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).

DO water quality impairments are not traditionally the result of eutrophication so TMDL development has not generally haven't looked at nutrient loading. Instead considered a direct DO sag associated with ammonia/ BOD5. TMDLs developed either BOD, ammonia or both constituents.

Chlorophyll a/ nitrogen/ phosphorus water quality impairments require complex modeling to establish WLA/ LA. SC only has two nutrient TMDLS – phosphorus is the limiting nutrient.

TD15 Are their methods in place to refine or revisit TMDL development and load/ wasteload allocations depending on use attainability? If yes, please describe.

No

TD16 Do you use the statistical rollback method to establish reduction targets for indicator bacteria?

No

TMDL Implementation

TD17 Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.

There are no explicit procedures, just informal guidance documentation.

There is the SC simplified Guide to Developing Watershed Based Plans (used to assist non point sources with their TMDL implementation).

MS4 permits are relatively new for the state. Phase I permits (4) range from their 1st to 3rd permit term. Permit requirements require identification of TMDL waterbodies and reference to incorporating any requirements specific from the TMDL (there aren't many). SC has also published a memorandum of guidance, Evaluating the Progress of MS4 Programs, to help establish permit language for MS4s. Used as a starting point. Permit writers trying to work more TMDL development staff during TMDL development activities.

When permits reissued – more stringent requirements are expected to be incorporated. Permits haven't issued more since EPA's guidance. The Department currently (through the permits) is responsible for linking permit requirements to TMDL parameters.

TD18 How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?

Per Section 319 grant funding and the state's 319 program, development of watershed based plans include reduction goals and incentives for non-point sources. In SC, there is very limited enforcement authority for load allocations.

TD19 Has your state issued TMDLs that use adaptive implementation?

State has issued TMDLs that might be described this way. The 2002 Charleston TMDL was phased to allow additional study before final reductions were implemented. Department is revising it now. Also, most TMDLs allow MS4s to meet to the Maximum Extent Practicable which can be a progressive implementation.

Finally, TMDLs have adaptive implementation language which essentially says it can be revised based on new data if it becomes available. Department is looking at TMDL alternatives where adaptive implementation would play a bigger role, but have not applied this yet.

Questions Related to Incorporating TMDLs into MS4 Permits

P1 Are TMDL requirements incorporated into MS4 permits?

Yes. State has 4 individual Phase I NPDES MS4 individual permits (SC DOT, Greenville County, Richland County, and City of Columbia). City of Columbia's was one of the last Phase I permits issued in the country. There are also a number of MS4s covered under a Phase II Small MS4 permit.

P1-a If so, how are requirements expressed in the MS4 permits (e.g. numeric effluent requirements, development of pollutant load reduction benchmarks, implementation of actions such as focused IDDE or riparian tree planting)?

At this time, TMDL requirements are reflected as programmatic activities. Language in TMDL includes that implementation of the NPDES MS4 permit meets compliance with TMDL. The TMDL differentiates between continuous point sources and non point sources (references MS4s as a non-point source). For the DOT, bacteria TMDL requirements are reflected in the form of a BMP implementation matrix with has various activities by traffic count.

TMDL implementation plans are referenced as a requirement in recent, reissued permits and guidelines are set for preparing those plans in the permit. There is limited implementation language established in the TMDL because EPA generally doesn't want to see or review implementation language.

The permits acknowledges TMDL implementation is an iterative approach and improvements are readily observed. Permit provisions include language to continually upgrade and assess controls. Greenville and Columbia (2007 and 2012) require results of monitoring to establish pollutants reduction measures.

b) Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?

Per State's memorandum of guidance, **Evaluating the Progress of MS4 Programs**, approaches that may be used by permit holders include:

- Calculation of pollutant load reduction for each BMP employed (LID, scoop the poop, street sweeping, etc.)
- Description and documentation of programs directed towards reducing pollutant loading (IDDE, structural BMP installation, etc.)
- Description and documentation of social indicators, outreach, and education programs
- Water quality monitoring

P1-b Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.

Somewhat, probably more so in the future, but haven't done it too much yet. Anticipate difficulties with nutrient TMDLs. MS4 communities are the most vocal commentary on TMDL development.

P1-c Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?

No. Have not issued TMDLs with surrogates yet, although hydromodification is an issue and there are some biologic community TMDLs (which could be traced back to flow).

Concluding Questions

1 Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.

Appendix B5: Washington Interview Responses

Introductory/ General Questions

G1 Please describe your current job position. How does your position involve/affect TMDL issuance within the state?

Melissa Gildersleeve – Concerns with whether legal authority is reflected in assessment

Stephanie Brock – Environmental Assessment Program

Jessica Archer – Environmental Assessment Program, coordinate technical portion of water quality assessment, data collection and distribute data to technical staff developing TMDLs

Paul Picket – Environmental Assessment Program, TMDL Technical consistency, pulling together TMDLs into NPDES permits

Chad Brown – Water Quality Standards, formerly Environmental Assessment program 2004/ 2008, update of WQ Policy after EPA 2006 guidance

Susan Brayley – Supervisor WQ standards and assessment

Bill Moore – Stormwater Permitting

Helen Bresler – Non-point program and TMDL development, Category 4b assessment

G2 Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program?

Yes

G2-a Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments (developing the Integrated Report), and issuing and implementing TMDLs? Can you provide citations or references?

Yes. WQS are in WAC 173-201A.

Washington's Water Quality Assessment policy is described in WQP Policy 1-11, which was revised in July 2012.

G2-b What is the current process for defining and updating state water quality standards? Conducting water quality assessments? Issuing and implementing TMDLs?

See above. WQS are reviewed as part of triennial review, which identifies and prioritizes needed updates. WQAs are conducted every two years, alternating between freshwater and marine water bodies.

G3 Which elements of your state's TMDL program need to be strengthened?

Varies. Consistency is important.

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

As documented in Ecology's 2008 workload assessment (online) fiscal limitations and reduction in workforce (particularly monitoring) are a challenge. Also, some recent TMDLs have been technically challenging and required complex modeling, etc. (e.g., Lake Whatcom, Spokane River DO).

G4 What are the strongest elements of your state's TMDL program?

Helen – Ecology has a good relationship with EPA and collaborates on technical work. Ecology has a separate technical group focused on TMDL development.

Jessica – We use all available, qualified data in water quality assessments. The EIM database sets the quality of data – current assessment has 4 million records. Generally TMDL development uses data collected by Ecology and any other federal data (with robust QA).

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

CA, WI, OH, FL, CN all appear to have strong programs. Oregon, NY, NC are also strong.

Water Quality Standards and Listing/ Delisting Questions

Water Quality Standards

WQ1 Can you describe/ provide background regarding your states water quality standards and how the standards are implemented. First, how are water bodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

By reach.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/ vary by beneficial use designation?

WAC 173-201A specifies designated uses and the water quality criteria that apply to each designated use.

All marine water use designations are provided in Table 173-201A-612.

For freshwater, there are general use designations assigned by rules described in 173-201A-600 which specify a set of numeric criteria. In addition to these general use rules, Table 602 lists the designated uses for certain specified fresh waterbodies in the state. 173-201A-602 also includes waterbody-specific numeric criteria for some waters in this table, (shown as 'Notes' at the end of each section). Lastly, supplemental seasonal temperature criteria are described in rule for certain waters protected for salmon spawning and incubation, (173-201A-200(1)(c)(iv)) – the map of these waters are provided in Ecology publication 06-10-038.

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban water bodies, seasonal/ wet weather standards/ tiered standards based on level of urbanization, etc.?

Chad - Standards are written to meet designated use (based on biology of system) – Ecology can propose changing a designated use through a use attainability analysis (therefore the criteria change to those associated with the updated use), or Ecology can propose changing the specific criteria associated with a use on a discreet waterbody through the development site-specific criteria (this would result in the 'Notes' in table 602 described in the question above. Both of these options require analysis and a change in rule.

Bill – State water quality standards need to be reviewed and approved by EPA. Need to jump through lots of hoops in order to change standards, which limit Ecology's options for making standards more flexible. The State has never done a UAA (currently working on science to support one). UAA needs to go through a rule revision. The opportunities are out there, they just aren't utilized.

No site specific WQS have been established to date. EPA has not been very flexible regarding site specific standards and UAAs.

WQ1-c Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?

Yes. WAC 173-201.

WQ1-d **Do your water quality standards reflect ecoregional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?**

Metals criteria (vary by hardness); marine versus freshwater criteria. Ecology has lake "action levels" for nutrients that identify when it is necessary to do a detailed study and set criteria.

WQ2 **Which indicator bacteria do your state use – fecal coliform, e-coli or enterococci?**

Fecal Coliform (FC) for freshwater and shellfish and marine primary contact recreation. Enterococci is specified for marine secondary contact recreation.

WQ3 **How often are your states water quality standards reviewed? Revised?**

Federal regs require triennial (every three years) review or after major rule-making. Review is not part of rule-making; rather it helps Ecology set priorities for rule making, etc. Revision of the surface water quality standards requires public participation through the state administrative procedures act and also requires approval from EPA in which the federal process often requires ESA consultation with the Federal services (NOAA, USFW), therefore EPA approved rule changes often take multiple years to achieve.

Process and Data for Listing/Delisting

WQ4 **What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?**

WQP 1-11 guides the WQA. WQP 1-11 was revised in July 2012.

State Water Quality Data Act requires credible data be used.

WQ5 **What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?**

State has a formal WQ monitoring program and 3rd party (QA'd) data.

State also conducts status and trends (probabilistic monitoring approach) to address 305b needs, but not generally used within Integrated Report context and CWA.

WQ5-a **Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/ delisting decisions?**

Yes, but main focus is on status and trends. Some data collected are not robust enough for compliance assessment or 303(d) listing, but can help identify potential causes for impairments.

WQ5-b **If 3rd party data is used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/ delisting decisions? Can 3rd party data be used for TMDL development as well?**

Per WQP 1-11, 3rd party data has to meet QA guidelines (automated per EIM) for use in the water quality assessment. 3rd party data submitted independently from EIM would need to submit QAPP. Even data not used in the assessment (because it doesn't meet the needs of the assessment) is recorded and tracked.

- Defined data submission timeframe/ period?

  Yes

- Common issues/ problems?

Typically data sources (for 3rd party data) that submit regularly and often coordinate frequently with Ecology. Ecology would notify them if there is a problem.

WQ5-c **What are the age limitations/ restrictions on data used for listing/ delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate water body as a Category 2 instead of 5)? Does a water body stay on list with old data?**

Recent data of sufficient quality is required to delist. EPA requires full documentation of why something was delisted. Can't delist solely based on age of data.

WQ5-d **How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?**

All qualified data is used. New data must meet credible data criteria. Each parameter methodology specifies the requirements for listing in each category including Category 5 (listed) and Category 1 (meets tested standards or "not listed").

WQ5-e **Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?**

The answer varies by parameter. Limited data available for some parameters.

Susan – Yes, especially now that methods are in place to ensure sources (anthropogenic) are readily identified (prior to TMDL development). Ecology staff is looking into the specific numbers. **Answer to follow-up**: Ecology estimates that only 5-10% of waters have been assessed for the integrated report. However, data are more often collected in human impacted areas where pollution is more prevalent. Therefore the available data, although limited statewide, are focused on areas where clean-up is needed. In terms of the requirement to report the status of all state waters (305b) much more data is needed. In terms of identifying impaired waters (303d) the statewide assessment is more robust.

Methods for Listing/Delisting

WQ6 **How is the water quality data compiled in order to make listing/ delisting decisions?**

See WQP 1-11. All qualifying data are aggregated per assessment unit, medium, and pollutant parameter to determine the Category of the water.

WQ6-a **Is narrative criteria used to make listing/ delisting decisions?**

Water quality Policy – page 20 – there are not many narrative listings; there has to be a connection to an anthropogenic source per policy. The policy outlines the guidelines for listing based on narrative criteria alone. Example – sediment. In general, Ecology focuses on more quantitative data collection as opposed to narrative characterization.

In order to delist narrative and numeric criteria would have to be addressed.

WQ6-b **In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?**

In the case of bioassessment impairments, Ecology used EPA's stressor identification to develop "Guidance for Stressor Identification of biologically Impaire Aquatic Resources in Washington State."

https://fortress.wa.gov/ecy/publications/summarypages/1003036.html

For other listing which are based on narrative (non-numeric) criteria but are directly based on a pollutant such as fine sediment or sedimentation of spawning gravels, the pollutant sources identification and reductions are assessed similar to other pollutants for which numeric criteria exist

Few listings to date based on narrative criteria.

WQ7 Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.

Yes, biologic criteria originally listed in 2006, and placed in Category 2. In 2008 – placed in Category 5 based on RIVPACS and BIBI. If listed based on a biologic criteria, that initiates a detailed study to identify the causes or stressors. No TMDLs have been issued for biological impairments. Ecology is utilizing EPA's stressor identification guidance (and Ecology is currently developing their own stressor identification process).

All invasive species are in category 4c. Category 4c- Ecology doesn't actively work to populate or clean up through the TMDL process. Category 4c is for those impairments where a TMDL process is not the appropriate tool. In many cases, Ecology and other state agencies have programs that address problems identified in Category 4c although the presence of a waterbody in this category may or may not be the reason for these programs.

WQ8 In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?

Yes, WQP policy 1-11 states that a waterbody segment may be placed in Category 5 if it is currently meeting standards, but credible trend information and data collected through a valid statistical methodology indicates that the water body is not expected to meet applicable water quality standards by the next assessment cycle.

WQ9 Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?

TMDL takes precedence over point data for listing decisions. Some at EPA believe entire water body must be in compliance before it can be delisted. However, Ecology sees the value of in recognizing success even if it's not 100%.

The integrated report is developed in consultations with regional TMDL lead staff. Waterbody segments may be moved to Category 1 if TMDL implementation is showing positive results, sufficient data are available to show the assessed waterbody segment is meeting standards and, there are not known sources in the vicinity or the monitoring location that would contribute to an impairment at a downstream location. See WQP Policy 1-11, p.23, "Assessment of water bodies within a TMDL boundary".

Publication of Listing/Delisting Decisions

WQ10 Please describe the public process for considering comments to the state's water quality program policy.

When revised, Ecology's WQP Policy 1-11 goes through a public review period which includes a comment period and an Ecology response to comments.

WQ11 Can you describe the public process for review of the Integrated Report and associated listing/ delisting decisions? How does that process correspond with EPA's review?

Ecology provides the draft WQ Assessment to interested Tribes and also to EPA for review and comment. These comments are incorporated and then the draft WQA is provided for public review

and comment. Ecology develops a response to comments then finalizes the list for submittal to EPA for approval.

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/ review of data associated with listing/ delisting decisions? Did the reconsideration result in changes to the listings?

Yes, frequently. When Ecology goes through the assessment process there are comments from tribes, counties, etc. Comments often question how data is being applied. Ecology generally does not change water quality categories based on data submitted outside of the "call for data" for each assessment cycle because they want to base listing decisions on all available data, of sufficient quality, within a specific period of time. This ensures that all data available have been considered as of a specified period of time and provides for a consistent assessment effort for each waterbody and parameter.

WQ13 How often do you update your water quality assessment report and the 303d list?

Every two years, alternating between marine and freshwater based on EPA's allowance for states to report using a "rotating basin" approach as long as all waters are assessed within a 4-year period.

Program Implementation

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data? Due to effective TMDL implementation?

Since Ecology began developing the WQ Assessment in the 1990's, 15 waterbody segments have removed from Category 4a (TMDL). Also, 917 waterbody segments have removed from Category 5 – While the majority of Category 5s have been removed due to newer data showing that the standards were being met, some changes were due to the discovery of an assessment or administrative error.

Rarely see delisting due to effective TMDL implementation (changes from 4a to category 1). Water Quality Policy 1-11, pg 23 - Assessment group can not make delisting decision independent from TMDL group. TMDL group has done more site specific assessment that will help inform. Process is for assessment staff to coordinate with TMDL staff to ensure TMDL is being implemented and monitoring data supports delisting.

Need to wait for next WQA before de-listing (in case other data come in that indicate water quality is not meeting TMDL targets).

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

No, UAAs have been finalized and approved by EPA, however, current work is being done by Ecology that will likely result in a UAA submittal to EPA for a designated use change. Ecology will determine at the end of the project whether enough information is available to support the UAA proposal.

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

e.g., water body with a CERCLA sediment clean-up plan. Ecology works closely with EPA to determine where 4b is applicable. EPA has stringent criteria to ensure that a 4b determination is as robust as a 4a determination. In other words, a 4b pollution control strategy must have all of the components required by a TMDL for EPA to approve moving a waterbody from Category 5 to 4b.

TMDL Prioritization Questions

TP1 Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.

Memorandum or Agreement with EPA lays out general priorities.

TP1-a If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?

Regions look at listings within region and review listings with prioritization criteria per WQP 1-11 (Section 9).

TP1-b What factors influence when and which TMDLs are initiated in any given year?

Staff availability, data availability,

- Does data availability factor in?
  Yes.

- Does the need to revisit existing TMDLs factor into development prioritization?

  No, Ecology operates under their 1996 MOA with EPA. MOA requires that Ecology develop TMDLs for about 700 water bodies. MOA takes precedence over revisiting existing TMDLs. Effectiveness monitoring studies are conducted post TMDL in order to validate TMDL findings.

TP2 Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.

No, it's part of WQA.

TMDL Development Questions

General Questions

TD1 About how many TMDLs are in progress at any given time?

Currently, 29 TMDL projects and 3 STIs. We are unsure if this is typical.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

(I have Diane Dent looking into this number)

TD3 Does your state list 4a (waters that have a TMDL) water bodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may delisted while others remain listed?

There are currently varying opinions on whether can delist once a TMDL is developed. Some feel that segments can't be delisted for any parameter if there are parameters that are still being exceeded. However, WQP Policy 1-11 allows for TMDL listed segments. The integrated report is developed in consultations with regional TMDL lead staff. Waterbody segments may be moved to Category 1 if TMDL implementation is showing positive results, sufficient data are available to show the assessed waterbody segment is meeting standards and, there are not known sources in the vicinity or the monitoring location that would contribute to an impairment at a downstream location. See WQP Policy 1-11, p.23, "Assessment of water bodies within a TMDL boundary".

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

RCW 90.48.260 provides Ecology's authority for implementing the federal clean water act which includes developing TMDLs, and we must meet the requirements for developing TMDLs as established in the Clean Water Act.

There is Water Quality program guidance and procedures for developing TMDLs to meet the Clean Water Act criteria but the explicit procedures are not codified in law. In addition, a Quality Assurance Project Plan is required for all new data collection efforts for developing TMDLs. The quality assurance requirements are part of Ecology's Quality Management Plan (Ecology Publication no. 10-03-056) and is the cornerstone of Ecology's participation in the EPA's quality system. For a list of quality assurance policies see: http://www.ecy.wa.gov/programs/wq/qa/policies.html

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

Methods - Data collection by Ecology's Environmental Assessment Program must follow the Ecology protocols for the specific type of pollutant being studied. Staff from the Environmental Assessment and Water Quality programs work together to develop a Quality Assurance Project Plan for the TMDL data collection and analysis.

Level of Effort - The level of effort associated with a TMDL study is determined based on: the size of the project area, the number and complexity of the pollutants and the hydrologic characteristics of the project area, and best professional judgment (based on over a decade of experience) of the resources needed for an individual project. The TMDL project proposal process requires completion of a form

that provides all of the information needed to scope the resources needed for an individual project. The form can be provided upon request.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

  Yes, there are examples from Ecology's eastern regional office of straight to implementation projects where the pollution sources are easily identifiable and no NPDES permitted sources are present. Stream temperature is a commonly addressed pollutant for this approach.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

  Yes, the strategy of combining a TMDL submittal report and implementation plan (more detailed plan than the implementation strategy contained in a submittal report) was first realized with the Willapa River Temperature TMDL (publication #05-10-073) in 2005. The inclusion of a detailed implementation plan with a TMDL submittal has been encouraged and is increasingly the path taken with the development of new TMDLs.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

Ecology has procedures for government to government relations that TMDL development must adhere to.

Tribal stakeholders are usually members of a TMDL technical coordination committee and have input to the development of TMDLs through that process. Where tribes have water quality data that is helpful for developing a TMDL, and the data meets Ecology's data quality guidelines, that data is included in the TMDL analysis. Because tribes are sovereign nations, Ecology does not have authority to establish pollutant load allocations on tribal designated lands, but as partners in a TMDL, the tribes usually adopt implementation actions and plans that support the goals and objectives of the TMDL.

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

TMDL waters are required to be revisited. Each is given a schedule for reassessment - usually on a 5-yr interval. These are done under the 'Effectiveness Monitoring' program within EAP and those cleanup plans that have been partially or fully implemented are prioritized for effectiveness monitoring. Reports can be viewed at http://www.ecy.wa.gov/programs/eap/tem/index.html.

Although no TMDL to date has been reopened or recalculated, a change to the surface water quality standards, or other rule-making effort that affects pollution requirements could lead to a reopening of the TMDL analysis. With Ecology's current resources, we prioritize the development of TMDLs and new cleanup plans where impaired waters are identified, but would reopen a TMDL if we determined that (an existing) TMDL's requirements were no longer appropriate.

Data for TMDL Development

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

Typically, a review of all potentially relevant water quality and beneficial use data is conducted. Data are compiled from all available local, tribal, state and federal sources. If 3rd party data are found to be valid (e.g. a QAPP and standard protocols are followed in compliance with the WQDA -

see #12 above), then the data become part of the assessment database. Sometimes 3rd parties are hired under an Ecology or EPA contract to complete monitoring work used for TMDLs, and are required to use a QAPP that has been reviewed and approved by Ecology.

Analytical methods used in TMDLs can be found in 40CFR 136. Standard Operating Procedures for field processes can be found at http://www.ecy.wa.gov/programs/eap/quality.html.

Data are analyzed and compared to TMDL study objectives to determine which are from time periods and locations that are relevant. A QAPP is written to document the study design, data and modeling quality objectives, the quality of existing data for use in the TMDL, and the sampling methods of any additional monitoring data that are needed to fill data gaps identified in the review process. The QAPP also documents compliance with the Water Quality Data Act (see answer to question 12).

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

Yes. Water Quality Policy 1-11, Chapter 2 outlines requirements by the Water Quality Data Act (WQDA) codified in RCW 90.48.570 through 90.48.590 http://www.ecy.wa.gov/programs/wq/qa/wqp01-11-ch2_final090506.pdf.

The policy covers quality assurance procedures for all planning, data collection, analytical protocols, and modeling reviews for TMDLs.

Individual field protocols in QAPPs are available at: http://www.ecy.wa.gov/programs/eap/quality.html.

Other relevant guidance documents for data quality are available at: http://www.ecy.wa.gov/programs/wq/qa/index.html

TMDL Development based on Narrative Criteria

TD9 How (if applicable) are narrative standards considered in TMDL development?

Narrative criteria can indicate that one is not addressing a beneficial use, but generally a pollutant is defined to attribute to the narrative criteria.

TMDL development would be based on the identified pollutant.

TD9-a Have load or wasteload allocations been established based on narrative criteria?

No

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

Yes, as en example, Ecology uses TSS to address narrative "deleterious effects on aquatic life." We are defining "surrogate" as any pollutant or other parameter used in TMDL allocations other than a direct pollutant. Direct pollutant is a pollutant being allocated that is directly related to the criteria being protected, such as: 1) kg/day of copper to protect copper toxicity criteria; 2) kg/day of BOD to protect dissolved oxygen critiera; 3) cfu/day of fecal coliform to protect fecal coliform criteria; 4) BTUs per day to protect temperature criteria.

- If yes, which surrogates parameters have been used?
  Total phosphorus to protect aesthetics in lakes (tropic status, i.e. secchi depth and Chlorophyl-a)

TSS allocations used to protect aquatic life (salmon spawning) – Hangman Creek

- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion?

  For Hangman Creek, the use of the surrogate was based on linkages established in Newcombe and Jensen (1996). Daily TSS concentrations generated by multiple regression models at three sites in the Little Spokane River watershed were reviewed for periods of elevated TSS. Severity scores were calculated for juvenile and adult salmonids as described in Newcombe and Jensen (1996). Ecology used this scoring tool to determine the level of control needed to fully protect redband trout, rainbow trout, whitefish, and other salmonids that are considered keystone sensitive species in the watershed. These analyses were used to determine how much TSS must be reduced in duration and intensity to fully protect aquatic biota. The range of severity scores used by Ecology to estimate full protection for the designated and existing uses in the watershed is 0-4. The score of 4 represents a short-term reduction in feeding rate or feeding success, which should only be rarely exceeded in the critical period, as during extreme rain-on-snow or extreme storm events. The scores below 4 should be the norm within the watershed during the spawning and incubation season, and found in channel refuge areas during the high-flow season.

TMDL Development based on Numeric Criteria/ Water Quality Standards

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

Yes. One example is the change in the stream temperature standard from a Daily Maximum metric to a 7-day average of the daily maximum temperatures; TMDL studies and pollutant load allocations were adjusted to adhere to the updated temperature standard.

Additional Question: Do we ever go back and revisit existing TMDLs and change allocations when standards change? For example, when the stream temperature standard from a Daily Maximum metric to a 7-day average of the daily maximum temperatures?

No. However, the success of the TMDL in attaining standards would be measured against the new standards. Also, this would not rule out revisiting a TMDL in the future to address new allocations for meeting revised standards. But due to our commitments under our MOA with EPA, agency resources have been focused on developing TMDLs for 303d-listed water bodies without TMDLs, and no circumstances have arisen with sufficient urgency to change those priorities.

TD10-a Is TMDL development ever phased based on data availability or anticipated implementation issues?

A phased TMDL (for purposes of implementation actions for NPDES permittees) has been based on data availability and anticipated implementation issues (e.g. Little Spokane River TMDLs, Palouse River TMDLs, Hangman Creek TMDLs, Stillaguamish River TMDLs, among others). Phased implementation actions are reflected for NPDES permittees with wasteload allocations according to a TMDL compliance schedule that is incorporated into their permits. In cases such as the Oakland Bay TMDL and Little Spokane River TMDLs there are multiple pollutants studied at the

beginning of a TMDL project, but the pollutants may be dealt with in separate TMDL reports that are submitted to EPA at different times.

TD10-b **Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?**

No, surrogates do not replace water quality criteria. However, TMDLs can use allocations of surrogate measures to meet numeric criteria. All surrogate allocations need to be linked through scientific analysis to numeric water quality criteria. The Yakima and Walla Walla TMDLs use turbidity and TSS allocations to ensure compliance with DDT criteria. One of the Stillaguamish TMDLs use TSS allocations to protect mercury critieruia (see first paragraph, last sentence, pg 116, of the Stillaguamish Multiparameter TMDL from 2005) https://fortress.wa.gov/ecy/publications/SummaryPages/0510044.html

Temperature TMDLs use Effective Shade allocation to protect temperature criteria.

Lake Whatcom TMDL uses developed acres and phosphorus allocations to reduce phosphorus loading and protect DO criteria. (TMDL in progress, not yet approved by EPA.)

Many DO TMDLs use nutrient allocations to protect DO criteria.

- If yes, which surrogates parameters have been used?

- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

  In general, scientific research information, models, statistical analyses, and other analytical tools are used to establish relationships between the surrogate and the criteria. Large amounts of site specific data are used to establish relationships between the surrogate and the criteria parameter to demonstrate the goodness-of-fit and error statistics (e.g. TSS and DDT in the Yakima River).

  Although the scientific understanding of the relationship between the surrogate and the criteria may be well-established (e.g. nutrients and biomass growth influencing DO and pH),site specific data are still used to calibrate models and predict allocation responses. For Temperature TMDLs the linkage between Effective Shade and stream temperature has been established through many research projects and through water quality modeling. References: Snoqualmie Temperature TMDL (https://fortress.wa.gov/ecy/publications/SummaryPages/1110041.html)

  Yakima TSS TMDL (https://fortress.wa.gov/ecy/publications/SummaryPages/97321.html)

  Lake Whatcom used a lake model and a watershed model combined with land use covers and water quality data - see the Lake Whatcom technical report: https://fortress.wa.gov/ecy/publications/SummaryPages/0803024.html

TD11 **Is there a process or protocol in place to revisit TMDLs based on changes to a numeric water quality standards?**

No

TD11-a **If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?**

No

TD11-b **In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?**

No

TD12 **Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.**

No, Ecology has no specific detailed guidelines. Determining MOS follows EPA guidelines and past TMDLs that have been approved by EPA. MOS is established during the development of the TMDL. It is sometimes explicit (set aside as part of the target), but usually implicit (part of the assumptions). MOS varies for every project due to the nature of the parameter, the study methods, and watershed.

Establishing Load and Wasteload Allocations

TD13 **Which categories of pollutant sources are used to establish wasteload and load allocations? Please provide examples.**

The sources included in a TMDL analysis are TMDL-specific. Generally as part of the development of the TMDL study plan, sources are identified in a variety of ways. Permitted sources are reviewed jointly with regional staff to determine which are like to be potential sources of the pollutant of concern. Point sources and other sources (e.g. MS4 permit holders, dairies under NPDES permit, state land application discharge permit holders) with NPDES or state discharge permits are given wasteload allocations.

Land uses in the watershed are reviewed to identify potential nonpoint sources. The study is designed to characterize these sources to the extent possible given the resources available and logistics of sampling. The nonpoint sources are usually described in the report narrative and implementation plan, but only ultimately receiving general load allocations for a tributary or reach – not a specific land use. These are usually calculated by difference [Load capacity – (WLAs + natural background + growth and/or margin of safety) = nonpoint source LA]. (Shade allocations for temperature TMDLs are slightly different in that the riparian shade necessary to meet system potential shade is calculated on a 100m interval from current riparian conditions.)

The newer guidance from Ecology Water Quality Program is to be more specific about certain nonpoint source types. These will be prescribed TMDLs or PTMDLs. GIS analysis, combined with ground-truthing and targeted water quality monitoring should provide the data necessary to allocate loads to specific types of land uses, e.g. row crop farming, construction activities, irrigated agriculture, non-commercial farms, etc. No PTMDLs have been conducted yet.

To date, load allocations have been not been given to specific non-point sources.

TD14 **What is the typical process or method for establishing load and wasteload allocations?**

As part of the TMDL technical study, the technical lead determines the Loading Capacity of the waterbody (the amount of pollutants that can be assimilated and still meet standards). To determine the Loading Capacity, existing loads usually need to be reduced. This usually results in one or more scenarios of reduced loading from sources, which serve as examples of potential load and wasteload allocations. These scenarios are a starting point for a process where the regional

water quality lead works with local stakeholders to identify the allocation scenario that is most reasonable to be implemented. This is an iterative process where discussions with stakeholders may result in new allocations scenarios being developed and modeled, until a set of load and wasteload allocations are selected for inclusion in the final TMDL.

TD14-a **How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?**

See above response. Site-specific discharge data is preferable, but sometimes inadequate or unavailable due to factors such as intermittent discharge, limited resources and TMDL study scope, or to a lack of information about or access to outfalls. Pollutant loadings may be estimated through watershed or site loading calculations and modeling assessments.

TD14-b **How do you differentiate MS4 wasteload allocations from non-point load allocations?**

Before the MS4 program was put in place, all stormwater was covered by load allocations. Since then, MS4 WLAs are always specified separately from other WLAs and from LAs in the TMDL. However, the quantity and location of MS4 pollutant discharges is often uncertain. Therefore, the technical method for identifying those discharges and separating them from stormwater LAs are TMDL-specific and depend on the study methods and the amount of information available about the stormwater system. This is an area still under development, and innovative methods are being explored to address this challenge.

TD14-c **How are load and wasteload allocations typically represented for bacteria and nutrients?**

Typically, bacteria allocations are set as concentrations. Bacteria reduction targets are usually also included to aid in implementation. EPA can require a calculation of bacteria loading to comply with "load is a load" court decisions, but the calculated bacteria load does not add much value to either implementation or compliance.

Nutrient loads are typically in mass per time. The time period depends on the source and the receiving water, and could be per day, month, season, or year, or some other appropriate time frame.

TD14-d **How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).**

See #1 above. Causes, like sources, are scoped as part of the TMDL technical study. The study methods take those potential causes into consideration and strive to quantify the contributions of different causes. The study will be designed to differentiate and quantify causes through data collection, field studies, modeling, statistical analysis, and other environmental study tools. The study results will then be used to set allocations as described.

TD15 **Are their methods in place to refine or revisit TMDL development and load/ wasteload allocations depending on use attainability? If yes, please describe.**

No specific methods are in place or written into Ecology policy. Use attainability has its own process including studies and ultimately WQ Stds rule-making through the Administrative Procedures Act (APA).

To date, no approved TMDL has been reopened to revise the technical analysis and allocations, other than some minor amendments to make corrections. But if a change in WQ standards (for example, a UAA) resulted in a decision to reopen a TMDL, the process would be described in the Implementation Plan that is a part of the rule-making Concise Explanatory Statement required by the APA.

TD16 Do you use the statistical rollback method to establish reduction targets for indicator bacteria?

Yes, but not always. But since both parts of bacteria criteria must be met (geometric mean and 10th percentile), alternative methods are usually virtually equivalent to the statistical rollback method.

TMDL Implementation

TD17 Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.

Implementation actions for NPDES dischargers must meet the requirements outlined in Water Quality Program policies and guidance such as the Stormwater Management Manuals for Washington and others to be found here: http://www.ecy.wa.gov/programs/wq/stormwater/municipal/resources_training_guidance.html and the selection of implementation actions for nonpoint sources is tailored to the land use activity that needs correction. Nonpoint implementation actions must demonstrate they will result in nonpoint discharges that do not violate water quality standards.

We use effectiveness monitoring and cataloguing of implementation measures taken since the TMDL was established.

TD18 How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?

Ecology has authority under RCW 90.48 to take enforcement actions to correct documented pollution problems that violate surface water quality standards.

TD19 Has your state issued TMDLs that use adaptive implementation?

Except for some TMDLs established in the 1990's, all TMDLs include adaptive implementation as part of the TMDL implementation strategy in the submittal report or in the subsequent TMDL detailed implementation plan.

Questions Related to Incorporating TMDLs into MS4 Permits

P1 **Are TMDL requirements incorporated into MS4 permits?**

Yes

P1-a **If so, how are requirements expressed in the MS4 permits (e.g. numeric effluent requirements, development of pollutant load reduction benchmarks, implementation of actions such as focused IDDE or riparian tree planting)?**

Typically, through the implementation of activities. Appendix 2 of the MS4 permits identifies actions that go above and beyond typical permit activities to address applicable TMDLs. TMDL development identifies what actions need to be done (as opposed to the permit writer). Standard recipe book not available (or at least not known at this point) to translate loading back to achievement of the WLA.

P1-b **Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?**

TMDL leads convert the TMDL targets into actions, which permit writers incorporate in MS4 permits.

Additional question: **Does Ecology have any written guidance or procedures to guide your permit writers for this activity?**

We have an internal memo of procedures the municipal stormwater permit team developed during the 2012 reissuance process to promote statewide consistency: "Guidance for Translating TMDLs into MS4 Permit Requirements."

P1-c **Do MS4 permit requirements vary by TMDL parameter? If so, provide examples.**

Yes, by parameter and by TMDL (for each parameter).

P1-d **Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?**

Current MS4 permits don't have requirements to comply with TMDL surrogates. Any TMDL requirements that come into permit only come in after separate public review under MS4 permit issuance.

Concluding Questions

1 Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.

Follow up scheduled with Jessica Archer on TMDL development.

Appendix B6: Wisconsin Interview Responses

Introductory/ General Questions

G1 Please describe your current job position. How does your position involve/affect TMDL issuance within the state?

Aaron Larson – Statewide Impaired waters coordinator, implementation of assessment methodology. Oversees the water quality standards attainment for specific stream segments and coordinated Tier 2 monitoring activities (Tier 1 monitoring done separately). Helps develop guidance documentation.

Kevin Kirsch - Statewide TMDL development coordinator. Oversees development of TMDLs and assists in implementation issues associated with MS4s, nonpoint reductions, and water quality trading.

G2 Before we get started, we are looking for a little more information about your overall thoughts on the TMDL program and where improvements may be needed. Starting with activities authorized by code, do you feel current state regs provide adequate authority and detail to implement the state water quality program? Why or why not?

State regs provide adequate authority but there are several areas should be updated/ are being updated. Specifically, total phosphorus water quality criteria, select use designations, and codification of the process for identifying/ determining use attainability, specifically with respect to biologic criteria and recreational use criteria.

Wisconsin is in the process of revising their beneficial use designations into natural community designations. Natural community's take into account physical features (flow, temperature, drainage areas) and are not fish centric as the fish and aquatic life criteria are. State is currently using it. If there is a conflict between the natural community and the traditional use criteria, the more conservative criteria is used. There are plans to codify natural community classifications (in discussions and in scoping stages). Contact - Kristy Minihan.

G2-a Do your state code and policies authorize these processes for defining water quality standards, conducting water quality assessments (developing the Integrated Report), and issuing and implementing TMDLs? Can you provide citations or references?

Water Quality Standards – Defined in Department of Natural Resources (NR) Chapters 102, 103, 104, 105, and 207. Includes numeric and narrative criteria. Chapter 102.04 applicable to surface waters. Threshold values in documented in code, but information related to frequency and magnitude of exceedances are documented in guidance documents.

Water Quality Assessment Procedure – Wisconsin 2012 Consolidated Assessment and Listing Methodology (WisCALM) (April 2012).

TMDL – There is a coarse prioritization procedure referenced in WisCalm. Currently state is developing updated guidance for developing and implementing TMDLs (Kevin Krisch). Traditionally, state has referenced EPA procedures.

G2-b What is the current process for defining and updating state water quality standards? Conducting water quality assessments? Issuing and implementing TMDLs?

Defining and updating water quality standards – there is a legislative process for revisions. Generally revisions conducted per the triennial review. Currently the 2011-2014 triennial

review periods is in progress and are incorporating site specific criteria for phosphorus and antidegradation updates. Standards go through a legislative process. Rule revisions have to have an economic impact analysis. The thresholds and beneficial uses are codified.

Conducting water quality assessments – Solicit data from the public and SWIMS (the raw data repository) on a biannual basis. 303(d) list does not go through legislative, just in guidance form. During the first year of the 2-year period, Tier 1 monitoring is used to conduct general condition assessment. Tier 1 monitoring is based on a random, stratified design (200 random sites per year) – primarily for biologic and conventional parameters. Information is used for flagging/ screening of impairment sites. If identify, 2nd year of assessment is used to do more intensive monitoring to meet minimum data collection requirements (minimum of 6 samples).

Water quality thresholds are used to identify impairment. Thresholds are consistent with numeric, codified criteria (if criteria exist). Otherwise thresholds used to address narrative criteria (example chlorophyll a (have threshold not codified). Depending on parameter, have automated assessment tool in SWIMS to make impairment determination. Otherwise, rely on regional staff to make recommendations based on data collected and assessment methodology. Assessment results stored in WATERS

TMDL issuance - Every 2 years, impaired waters list is prioritized – high, medium, low (how much info is available). Public interest is not really taken into account into prioritization, but in selection of upcoming TMDLs. Generally develop TMDLs to address clustered impaired waterbodies in particular watershed. Lower Rock and Lower Fox TMDLs recently completed (100's of listings). Large portion of state (geographically) is currently covered by existing TMDL.

G3 Which elements of your state's TMDL program need to be strengthened?

G3-a What are the greatest barriers to strengthened 303(d) assessment and TMDL programs?

Rulemaking process (slow process) – up to three years to codify water quality standards;

Lack of resources to develop and implement TMDLs. Specifically a lack of sufficient resources to implement nonpoint reductions and track the reductions.

G4 What are the strongest elements of your state's TMDL program?

Well rounded staff; biologists doing monitoring are involved in whole process and assisting in the listing decisions. There is a devoted section of the agency for science services (to help resolve technical issues).

G5 Do you know of other states that have robust listing/delisting and TMDL regulations and programs? If so, do you have recommended people we should contact?

Wisconsin does look to neighboring states for guidance. Currently works with EPA directly as well.

Minnesota (well staffed) and Maine has an approvable approach to incorporating biologic indicators into nutrient criteria that EPA touting as good example. Wisconsin is referencing those states in their work to develop the biologic component to phosphorus listings. The water quality criteria for phosphorus don't currently contain biologic indicators, and is working to incorporate into code and rules currently.

Water Quality Standards and Listing/ Delisting

Water Quality Standards

WQ1 Can you describe/ provide background regarding your states water quality standards and how the standards are implemented. First, how are waterbodies designated for purposes of 303d and TMDL implementation (by HUC, by stream reach)?

An assessment unit is used to define (portion of stream), segmentation varies based on changes in designated use, landscape, etc; Lake assessment unit (whole lake or partial lake)

State also conducts watershed assessment updates every two years. The state has existing watershed reports posted online for people to use for resource planning as a courtesy. They are also used for TMDL development/ implementation. State assesses 24 (HUC 12) watersheds every two years. For each selected watershed, state takes any Tier 1 or 2 monitoring data and incorporates into report.

WQ1-a What beneficial use designations are used to establish water quality standards? Are the standards established/ vary by beneficial use designation?

Beneficial uses: Fish and Aquatic Life (FAL), Recreation, Public Health and Welfare, and Wildlife. Multiple subcategories for FAL to include cold water species, warm water sport, warm water forage fish, limited forage fish, and limited aquatic life.

Standards do vary by beneficial use and subcategory. Standards (criteria) are evaluated during the impairment assessment and are specified in accordance with various "impairment thresholds". Impairment thresholds are the water quality criteria or associated numeric criteria if codified water quality criteria don't exist. For parameters that don't have codified water quality criteria, the impairment threshold may be used as guidance for listing, but a waterbody would not have to be listed based on that parameter alone.

Assessment is focused on FAL and recreation. Other uses play in when data is available. Public health and welfare are based on is fish consumption advisory occurred.

Streams and rivers are currently being evaluated for placement in a revised aquatic life use subcategories (classification) called Natural Communities. Natural Community designations are currently being used and are defined using model predicted flow and temperature ranges, and will also identify fish index of biologic integrity (F-IBI) for use in defining biologic impairment.

WQ1-b How do the water quality standards allow for flexibility? Are there site-specific standards for urban waterbodies, seasonal/ wet weather standards/ tiered standards based on level of urbanization, etc?

Flexibility is provided in rules and guidance with respect to using only representative data in the assessment (i.e., consideration of flow). The state is currently working on a process to better indicate what representative data is and what sampling protocols are appropriate. What's a representative year (temperature, flow) in order to ensure that appropriate data is being used? This update is planned in 2014

Current efforts focused on development of site-specific total phosphorus standards with the goal of codifying a process for site specific criteria.

Having multiple beneficial uses/ thresholds for the FAL designation also allows for flexibility. There are separate standards for lakes and streams/ rivers. Use of thresholds give flexibility to define when waterbody will be listed and by establishing impairment by specific waterbody and resource type (for those parameters without established numeric criteria).

WQ1-c **Do water quality standards contain narrative and numeric criteria? Are both numeric and narrative criteria used to assess and list a water body?**

Yes. Both numeric and narrative can be used to assess waterbody condition during impairment assessment using thresholds and indicators. Have made listing decisions made off of parameters that don't have criteria or listing thresholds (TSS – narrative standard and based on biologic monitoring)

WQ1-d **Do your water quality standards reflect ecoregional or physiographic criteria that incorporate factors related to natural assimilation of pollutants?**

Water quality standards don't but the use designations and associated impairment thresholds (defined in WisCALM) can. The beneficial uses and thresholds are more based on physical features and not geography.

WQ2 **Which indicator bacteria do your state use – fecal coliform, e-coli or entrococci?**

State rules (criteria) are limited to fecal for recreational beneficial use designation; Impairment thresholds have been established for E coli on beaches and great lakes.

WQ3 **How often are your states water quality standards reviewed? Revised?**

WDNR reviews water quality standards and selects specific standards for review/ revision every three years (triennial review). Opportunity for public participation in assigning priorities for the triennial review and comment on rulemaking. Priorities include site-specific standards for total phosphorus and antidegredation (per the Outstanding and Exceptional Waters).

Process and Data for Listing/Delisting

WQ4 **What policies or guidelines do you follow in developing your water quality assessment and Integrated Report? Refer to EPA's guidance?**

WisCALM is used for the assessment and IR methodology. Basis for WisCALM is the EPA Consolidated Listing and Assessment Methodology (CALM) (2002).

WQ5 **What are the sources of water quality data (e.g., state monitoring, NPDES permittees, others) used to develop your Integrated Report?**

WDNR biennially seeks information from partners and public. Partners include USGS, EPA, UFWS, regional planning commissions, etc. Currently trying to amend the DNR database to be compatible with USGS' database.

WDNR supports citizen based monitoring using a three level monitoring certification process. For lakes, citizen based monitoring using WDNR trainers are used to provide a majority of the monitoring data. Volunteer-based monitoring personnel that have been trained have access to monitoring network to upload data. Independent groups can send information in, but they do not have access to the database.

State monitoring efforts in support of Tier 1-3 monitoring are also used. All data in support of the assessment effort is stored in the state SWIM database. Monitoring data to make assessment decisions is stored in the WATERS database. Public can view info spatially using an interactive tool. Data exclusion is conducted within WATERS database.

WQ5-a **Does your state have a formal water quality monitoring program to assess compliance with water quality standards in support of listing/ delisting decisions?**

Wisconsin's water quality monitoring program is a Division level effort by the drinking water and groundwater dept, the fisheries dept, and the watershed department. There is a "Water Division Monitoring Strategy", which defined protocols.

A three tier monitoring effort is conducted. Tier 1 is statewide baseline monitoring that conducts baseline chemical, physical and biologic data at a broad spatial scale to determine status and trends. Stream monitoring conducted as a random, probabilistic effort. This information is used to support the general condition assessment results. Problems identified under Tier 1 monitoring are prioritized for Tier 2 monitoring. Tier 2 monitoring is targeted at individual water segments identified as fair or poor condition under tier 1 monitoring. Tier 2 is also more rigorous for TMDL development. Tier 3 is follow up monitoring to assess implementation of management plans and permit conditions.

WQ5-b **If 3rd party data is used, what state regulations, guidelines and policies are adhered to with respect to submitting and using data for listing/ delisting decisions? Can 3rd party data be used for TMDL development as well?**

All Tier 1 monitoring requires QA measures per Wisconsin DNR Water Division Monitoring Strategy document. QAPP development is based on EPA's template. If after review, the data meets QA requirements, will incorporate into the database. Only certified labs can do analysis. Dups and blanks collected through process.

Level 2 or 3 citizen monitoring (3rd party) for streams or lakes can be rolled into the Department database and used to support status and trends (Tier 1) if complying with defined QA/QC. 3rd party monitoring can also be used for Tier 2 monitoring.

A water can be de-listed for a certain parameter but it won't be taken off the 303d list unless all parameters can be delisted. Waters may be subdivided to refine the area of listing/ delisting.

- Defined data submission timeframe/ period?
  There is a public notice and a 2 month window with which to submit data. Data was submitted via an online data form (GeoDelivery) to streamline data submittal and WDNR review. All public data had to meet specified QA/QC.

- Common issues/ problems?

  Not aware of need to submit a QAPP – then can't use data. Also there are occasionally issues with data formatting.

WQ5-c **What are the age limitations/ restrictions on data used for listing/ delisting decisions? (e.g. if the only excursions occurred >10 years ago, designate waterbody as a Category 2 instead of 5)?**

Data from the most recent 10 year period used to assess waters (for lake Total Phosphorus and chlorophyll a, a 5-year range is used to make impairment decisions, but data up to 10 years may support impairment decisions). WDNR not obligated to use all data, if data are not quality assured or sampling protocol requirements are not met. A minimum sample size is required to make listing-delisting decision, although professional judgment is also used. Insufficient data may place water on the "Watch Water" list (Category 3)

Waterbody would remain on list until new data within 10 year period collected.

WQ5-d **How is newly submitted data used to supplement existing data for purposes of listing and delisting analysis?**

Old data (outside of the 10-year time frame) is thrown out. For phosphorus, there is a focus on more recent data, 3-year period. The required timeframe for data age is built into database (SWIM).

WQ5-e **Do you feel data is sufficient in quantity and quality to support the water quality assessment? What % of data is available?**

Yes and no. We do a good job covering our huge state and using our Tiered monitoring. Based on 2012 IR, the state has over 88,000 miles of stream and only 35,000 miles (40%) entered into assessment database. Lake data uses satellite imagery for initial condition assessment and lakes have more citizen monitoring, so more data is available for lakes. Still, there is limited data with which to conduct the general condition assessment and less to evaluate impairment.

Therefore, more intensive data collection is targeted at predetermined issues and areas.

Methods for Listing/Delisting

WQ6 **How is the water quality data compiled in order to make listing/ delisting decisions?**

3rd party data is solicited, reviewed and added to the SWIM database.

A general Condition Assessment first conducted to determine whether excellent, good, fair, poor – based on F-IBI and M-IBI or TSI score (for lakes). All data for assessments and impairment determination is housed in WATERS program.

For those waterbodies defined as fair or poor condition, an impairment assessment evaluates condition with respect to water quality criteria/ impairment thresholds. The term "indicator" is used to describe the various criteria applicable to the concerns of the waterbody and include conventional pollutants, toxic pollutants, biologic indicators, and Lake Eutrophication indicators.

After monitoring data collected as evaluated, impairment decisions based on exceedance of specified thresholds for specified indicators.

WQ6-a **Is narrative criteria used to make listing/ delisting decisions?**

See previous

WQ6-b **In cases where narrative criteria are used, do you have a defined process or protocol to define the cause for the impairment?**

In cases where narrative criteria is used (and thresholds are developed), the listing determination can be based on best professional judgment. Example TSS/ degraded habitat – There is no direct guidance for defining the cause of impairment. Tier 1 monitoring is focused on biologic monitoring component so able to justify impairment for a use.

WQ7 **Have you listed any water bodies based on BIBI or other biological criteria (e.g., invasive plants)? If so, please describe the method and criteria used.**

Yes, biological data is used for the initial, general conditions assessment, and so long as the minimum data requirements are met, it can be used to list water as impaired. For FAL, the minimum requirements are 2 fish surveys and 3 macro samples and two of the samples need to

be below poor rating. If corroborating water quality/ physical habitat data exists, one biologic sample can indicate impairment.

For rivers/ streams, total phosphorus can be link as the causative pollutant for impaired biologic community. WDNR requires evidence of biologic impairment to list water impaired for TP criteria. If biologic data not available or don't indicate impairment, waterbody is listed as Category 5P.

Haven't gotten to TMDL development based on biologic impairment – have to go through stressor identification.

WQ8 In your state, can a water body be placed on the 303(d) list if it is currently meeting water quality standards but trend/modeling data indicates otherwise?

Yes, waters would be designated as threatened and become a formal part of the Impaired Waters List. No guidance currently exists, but waters evaluated on a case by case to show a declining trend. This is focused primarily on those exceptional waters per the antidegredation criteria.

WQ9 Are procedures in place to verify and validate listing and delisting decisions (i.e., field work, state monitoring)?

Tier 1 (random sampling) and Tier 3 monitoring is focused on reviewing status of waters to validate assessment status and implementation activities. No specific monitoring schedule.

Publication of Listing/Delisting Decisions

WQ10 Please describe the public process for considering comments to the state's water quality program policy.

The public process is tied to the overall water quality assessment program and IR.

WQ11 Can you describe the public process for review of the Integrated Report and associated listing/ delisting decisions? How does that process correspond with EPA's review?

The Wisconsin DNR website is updated with pertinent background information prior to public comment period. 60 day public comment period for 2012 IR. A webinar with a live chat feature used to inform on methodology and solicit questions and answers. All comments summarized and responded to; comments posted online.

WQ12 Has public or stakeholder feedback alone resulted in reconsideration/ review of data associated with listing/ delisting decisions? Did the reconsideration result in changes to the listings?

Comments can lead to consideration but data rarely reevaluated (did not open door for new data to be considered.

WQ13 How often do you update your water quality assessment report and the 303d list?

Every two years.

Program Implementation

WQ14 How many water bodies in your jurisdiction have been delisted due to updated data or new information/data? Due to effective TMDL implementation?

Generally, don't have enough information to distinguish the cause of delisting. Wisconsin DNR employed a revised methodology and practices that have went into place for beach assessments (See pages 37-38 of 2012 WisCALM: http://dnr.wi.gov/topic/surfacewater/documents/FINAL_2012_WisCALM_04-02-12.pdf). Some of the areas (in 2012) where beach and stream delisting have occurred are areas where implementation activities have been conducted.

WQ15 Have any Use Attainability Analyses been completed for waters bodies in your state? If yes, did they result in changes to the designated uses or water quality criteria for the affected water bodies? Which UAA procedures/criteria were used?

Yes, during the impairment assessment phase, WDNR will determine whether criteria exceedance expected due to natural causes. If so, a Use Attainability Assessment ("Six Factors" of use Attainability Assessments 40 CFR 131.10(g)) should be pursued to modify the designated use or associated criteria (threshold?). Waterbody placed in Category 5C in the interim.

WQ16 How does your state define 4b (waters that have a pollution control plan) status? Please provide an example if possible.

Category 4b = required control measures expected to achieve attainment of standards in a reasonable period of time. Environmental Accountability Projects may be proposed as an alternative to TMDL development

TMDL Prioritization Questions

TP1 Do your state regulations contain explicit procedures for prioritizing water bodies for TMDL development? If yes, please provide citation or reference.

No, general procedures are listed in the WisCALM.

TP1-a If your state regs don't contain explicit procedures, how do you determine priorities for developing TMDLs?

Methodology listed in WisCALM. Waters on impaired list ranked by priority for TMDL development as "high", "medium", or "low". Rankings evaluated during each listing cycle to determine if TMDL development can be completed based on staff and fiscal resources. TMDL in development is "high"; "Medium" indicates that info is currently being gathered for future TMDL development (all category 5B waters – impairment due to mercury – are medium), future TMDLs are low.

TP1-b What factors influence when and which TMDLs are initiated in any given year?

Factors include: 1) availability of information (waters with readily available data more likely done in next 2-5 years); 2) likelihood to respond to implementation action; 3) severity of impairment (i.e., acute toxicity problems) and 4) public health concerns.

- Does data availability factor in?

  Yes.

- Does the need to revisit existing TMDLs factor into development prioritization?

  Not really – most TMDLs are pretty recently developed.

TP2 Do you have a defined program (separate from the public review program for the Integrated Report) for obtaining public and stakeholder input regarding priorities for TMDL development? If yes, please describe.

Public can comment on prioritization outlined in WisCALM and IR. Most new listings low priority.

TMDL Development Questions

General Questions

TD1 About how many TMDLs are in progress at any given time?

Varies; MDLs are developed on watershed and basin scales.

TD2 How many TMDLs have been established (approved by EPA) in the last 5 years?

A list of approved TMDL reports by year can be found at:
http://dnr.wi.gov/topic/TMDLs/tmdlreports.html

A list of all approved TMDLs can be found at:

http://dnr.wi.gov/topic/impairedwaters/approved_tmdls.html

TD3 Does your state list 4a (waters that have a TMDL) waterbodies by reaches or segments? Are they at a small enough scale such that an individual reach or segment may delisted while others remain listed?

Depending on attainment, water segments may be further broken from original assessment scale to support listing/ delisting and TMDL compliance.

Process for TMDL Development

TD4 Do your state regulations contain explicit procedures for developing TMDLs? If yes, please provide citation or reference.

TMDL Monitoring and Modeling Guidance (2001). Updated guidance documentation is currently being considered. No specific rules have been developed to date for TMDL development.

TD4-a If not, then how does your state determine the methods and level of effort you will use to develop a given TMDL (e.g. regulations, policy memo, and best professional judgment)? Please provide reference.

Wisconsin does not have a consent decree with EPA that requires expedited TMDL development. TMDLs are developed based on extensive stakeholder input and are developed so that they can be implemented.

- Does your state ever go "straight to implementation" to address water quality problems (instead of developing a TMDL report and implementation plan)?

  Wisconsin had a Priority Watershed Program for decades that did just this but it has been phased out. EPA requires TMDLs for impaired waters.

- Does your state ever "fast-track" TMDLs (e.g., combine TMDL and implementation plan in one document)?

  Yes.

TD5 Are Tribal stakeholders involved the TMDL development/issuance process? If so, how?

Yes. Just like any other stakeholder.

TD6 What factors or criteria are used to determine whether an existing TMDL should be reassessed or revisited? Has this happened?

This has not happened yet. We are still trying to complete first round TMDLs.

Data for TMDL Development

TD7 How are data typically collected or compiled for use in TMDL development? Can 3rd party data be used in TMDL development?

3rd party data may be used.

TD8 Are there alternative guidance or protocols containing criteria for TMDL data quality, quantity, and analytical requirements? If so, please provide citation or reference. If not, how are these requirements determined for a given TMDL?

TMDL Development based on Narrative Criteria

TD9 How (if applicable) are narrative standards considered in TMDL development?

Either a reference watershed approach has been used or numeric targets are calculated.

TD9-a Have load or wasteload allocations been established based on narrative criteria?

Yes.

TD9-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets for narrative criteria?

No.

- If yes, which surrogates parameters have been used?
- If yes, how do you establish the linkage between the surrogate and the relevant narrative criterion?

TMDL Development based on Numeric Criteria/ Water Quality Standards

TD10 How do your TMDL development methods allow for flexibility and consistency with changing water quality standards? Have any Phased TMDLs been issued?

TMDLs are developed to meet existing water quality standards in effect at time of development. No phased TMDLs have been issued.

TD10-a Is TMDL development ever phased based on data availability or anticipated implementation issues?

No, but projects are started by first collecting data if insufficient data exists. Each TMDL has a project plan.

TD10-b Does your state use "surrogates" (e.g. impervious area, developed area, flow control volume, treatment volume, benthic score) as TMDL targets in place of numeric water quality criteria (e.g. [DO], [TP], [bacteria])?

No.

- If yes, which surrogates parameters have been used?
- If yes, how do you establish the linkage between the surrogate and the relevant water quality criterion?

TD11 Is there a process or protocol in place to revisit TMDLs based on changes to a numeric water quality standards?

No.

TD11-a **If so, have affected TMDLs been revised or withdrawn to be consistent with the new WQS?**

No.

TD11-b **In cases where the water quality standard becomes more stringent, is there a priority on revisiting those TMDLs and allocations?**

No, this has not happened yet.

TD12 **Do you have detailed guidelines for determining the Margin of Safety for the TMDL? Please describe.**

No, it depends on the data used in TMDL, the calibration/validation of any models used, and current EPA guidance.

Establishing Load and Wasteload Allocations

TD13 **Which categories of pollutant sources are used to establish wasteload and load allocations? Please provide examples.**

Do not understand question; allocations are calculated for chemicals, nutrients, and TSS.

TD14 **What is the typical process or method for establishing load and wasteload allocations?**

Proportional allocation method from baseline loads.

TD14-a **How are WLAs generated? Is site-specific discharge data necessary to assign wasteload allocations (WLAs)?**

Proportional allocation method based on permitted flow and effluent limits.

TD14-b **How do you differentiate MS4 wasteload allocations from non-point load allocations?**

Yes, EPA requires this.

TD14-c **How are load and wasteload allocations typically represented for bacteria and nutrients?**

In relevant units; either bacterial counts or mass of nutrients or TSS.

TD14-d **How do you determine load and wasteload allocations for impairments with multiple causes (e.g., DO affected by N, P, temperature (shade), sediment, invasive plants, riparian cover; BIBI affected by flow pulses, low based flow, poor substrate, lack of LWD, toxics, invasive, etc.).**

Allocations are given for the listed pollutants.

TD15 **Are their methods in place to refine or revisit TMDL development and load/ wasteload allocations depending on use attainability?**

If yes, please describe. EPA requires that changes like this require modification of the TMDL.

TD16 **Do you use the statistical rollback method to establish reduction targets for indicator bacteria?**

Do not understand the question. We have bacteria standards in place.

TMDL Implementation

TD17 **Do your state regulations, guidelines or policies contain explicit procedures for selecting implementation actions to meet TMDL targets? If yes, please provide citation or reference.**

Yes NR 217 contains procedures for point sources, MS4 permits contain language and Wisconsin has nonpoint performance standards contained in NR 151.

TD18 How are other stakeholders obligated by TMDL plan requirements if they are not subject to a NPDES permit? Is there enforcement authority for load allocations?

NR 151 contains performance standards. If the TMDL requires additional reductions, rule making is needed to make these requirements enforceable.

TD19 Has your state issued TMDLs that use adaptive implementation?

What is adaptive implementation? Seems like the whole process is always adaptive.

Questions Related to Incorporating TMDLs into MS4 Permits

P1 Are TMDL requirements incorporated into MS4 permits?

Yes.

P1-a If so, how are requirements expressed in the MS4 permits (e.g. numeric effluent requirements, development of pollutant load reduction benchmarks, implementation of actions such as focused IDDE or riparian tree planting)?

Still finalizing approaches, however, allocations must be expressed in the permit.

P1-b Are the procedures and criteria for incorporating TMDLs into MS4 permits prescribed in state regulations or guidelines? If yes, please provide the citation or reference. If not, what procedures and criteria are used?

Under development.

P1-c Do MS4 permit requirements vary by TMDL parameter? If so, provide examples. Not sure what this means.

The WLA is reflected in the permit and the WLA will vary by parameter.

P1-d Have you issued any MS4 permits that require compliance with TMDL surrogates (e.g., % reduction in effective impervious area, % reduction in flow volume, % of developed area runoff that is treated)?

No.

Concluding Questions

1 Based on the types of questions asked, should we talk with anyone else within your organization or the regulated community? If yes, please provide contact info.

No. These questions are very general and we are still developing guidance.

Appendix C: Results Matrix

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
General policies and program information								
Lead agency	G1	Department of Ecology	State Water Board (sets statewide policies) 9 regional water boards (exercise rulemaking)	Department of Natural Resources	Ohio Environmental Protection Agency (Ohio EPA) Division of Surface Water	Florida Department of Environmental Protection	South Carolina Department of Health and Environmental Control	
Administrative policies and guidance references	G2, G2-a, WQ4	Water Quality Standards = WAC 173-201 http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201A Water Quality Assessment Policy = WQP Policy 1-11 http://www.ecy.wa.gov/programs/wq/303d/policy1-11.html Issuing TMDLs = RCW 90.48.260 (authority for implementing the CWA and developing TMDLs) http://apps.leg.wa.gov/RCW/default.aspx?cite=90.48.260 Developing TMDLs = WQP Policy 1-11 provides guidance but no specific procedures are codified	Water Quality Standards = CWC Section 13001 (authorizes regions to establish water quality control plans—Basin Plans—for beneficial uses, water quality objectives [criteria], and implementation) http://www.weblaws.org/california/codes/ca_water_division_7_water_quality Water Quality Assessment Policy = SWCB Resolution 2004-0063 http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/ffed_303d_listingpolicy093004.pdf Issuing TMDLs = SWCB Resolution 2005-0050 http://swrcb2.swrcb.ca.gov/water_issues/programs/tmdl/docs/iw_policy.pdf Developing TMDLs = SWCB Resolution 2005-0050	Water Quality Standards = Wisconsin Administrative Code Natural Resources (NR) Chapters 102, 103, 104, 105, 207 http://docs.legis.wisconsin.gov/code/admin_code/nr/100/102.pdf http://docs.legis.wisconsin.gov/code/admin_code/nr/100/104.pdf http://docs.legis.wisconsin.gov/code/admin_code/nr/100/105.pdf http://docs.legis.wisconsin.gov/code/admin_code/nr/200/207.pdf Water Quality Assessment Policy = Wisconsin Consolidated Assessment and Listing Methodology (WisCALM) http://dnr.wi.gov/topic/surfacewater/documents/FINAL_2012_WisCALM_04-02-12.pdf Issuing/developing TMDLs = currently in progress	Water Quality Standards = OAC 3745-1 http://www.epa.ohio.gov/dsw/rules/3745_1.aspx Water Quality Assessment Policy = State Water Quality Management Plan http://epa.ohio.gov/dsw/tmdl/OhioIntegratedReport.aspx Issuing/developing TMDLs = OAC 3745-2-12 http://www.epa.state.oh.us/portals/35/rules/02-12.pdf	Water Quality Standards = FAC 62-302 http://www.dep.state.fl.us/legal/Rules/shared/62-302/62-302.pdf Water Quality Assessment Policy = Impaired Surface Waters Rule (FAC 62-303) https://www.flrules.org/gateway/ChapterHome.asp?Chapter=62-303 Prioritizing TMDLs = FAC 62-303.500 https://www.flrules.org/Gateway/View_notice.asp?id=2230047 Issuing/developing TMDLs = Florida Statutes 403.067 (authority to regulate point and nonpoint sources) http://www.leg.state.fl.us/Statutes/index.cfm?App_mode=Display_Statute&URL=0400-0499/0403/Sections/0403.067.html	Water Quality Standards = South Carolina Regs 61-68 and 61-69 http://www.scdhec.gov/environment/water/regs/R.61-68.pdf http://www.dhec.sc.gov/environment/water/regs/R.61-69.pdf Water Quality Assessment Policy = no formal policy. Methodology described in Integrated Report. http://www.scdhec.gov/environment/water/tmdl/docs/tmdl_10-303d.pdf http://www.dhec.sc.gov/environment/water/tmdl/docs/tmdl_10-305b.pdf Issuing/developing TMDLs = South Carolina Regs 61-110 (issuing). No formal policy for developing/implementing. http://www.dhec.sc.gov/environment/water/regs/r61-110.pdf	Consider additional regulations for nonpoint sources.
Water body designation method for WQA and TMDL development	WQ1, TD3	By segment township & range for creeks, grid for open waters. Starting in 2012, Ecology began moving to segmentation system based on National Hydrology Dataset.	By reach. Spatial scale varies by region.	By assessment unit (reach or lake), defined based on change in designated use, landscape, etc.). State conducts watershed assessment updates every 2 years. Watershed defined by HUC 12 designations. Assessment used for TMDL development.	By assessment unit (reach or lake), defined based on HUC 12 designation and drainage area (>500 mi^2).	By reach. Spatial scale based on 1:24,000, resulting in 6,600 assessment units (WBID).	By station/site (for WQS and listing/de-listing). Decision by the Department not to define extent of impairment. TMDLs developed on a watershed basis (looking at clustered stations). Water bodies could have variable WLA/LA.	
Challenges identified by agency staff	G3, G3-a	Fiscal limitations, reduction in work force (particularly monitoring), technically challenging TMDLs (e.g., Spokane River, Lake Whatcom).	TMDL implementation (funding and guidance); statewide consistency related to incorporation of TMDLs into MS4 permits.	Slow rulemaking process to codify beneficial uses and standards. Lack of resources to develop and implement TMDLs (specifically nonpoint sources).	Fiscal limitations and need for improved method for tracking progress on TMDL implementation.	Activities need to be authorized by code to be enforceable. Current DO standards are outdated. Per consent decree with EPA, state must develop TMDLs for waters that fail DO criteria. Current state rules limit flexibility on numeric criteria.	Nonpoint source implementation of TMDLs. Funding for state monitoring efforts (due to funding cuts).	· Increase funding for monitoring to revise standards and assess TMDL compliance. · Reference fish consumption assumptions and adequate monitoring.
Success areas identified by	G4	Good working relationship with EPA, good	Well-established legal authority (Porter-	Plan to update/codify beneficial use	Stable work force; a long history of	Florida Watershed Restoration Act	Departmental collaboration and open	Review legal authority related to

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
agency staff		data quality used in assessments (as required with use of EIM database), large data record (current assessment has 4 million records).	Cologne Water Quality Control Act, NPS Program Plan (1999) to regulate nonpoint and point sources and conduct implementation activities (potentially through TMDLs). Strong stormwater permitting program and designated responsibility at the regional level.	designations to align with natural community designations (accounting for flow, temp, etc. and less fish-centric than typical fish/aquatic life criteria). Currently in scoping stages. Well-rounded staff. Same staff is involved in monitoring and assessment.	using biologic monitoring to define water quality impairment; robust state water quality monitoring program.	(1999) and Florida Statutes 403.067, authorizes TMDL program to regulate point and nonpoint sources of pollution. Deviation from use of EPA classification categories for water bodies. Additional subcategories defined by state. Rotating-basin approach to WQAs.	lines of communication. WQA staff coordinates with compliance staff (permit writers).	implementation and enforcement measures for nonpoint sources.
Listing and de-listing processes								
Water quality standards								
Water body classifications/ designated uses	WQ1-a	Specified in WAC 173-201. Freshwater aquatic designated uses include char spawning and rearing; core summer salmonid habitat; salmonid spawning, rearing, and migration; salmonid reading and migration only; non-anadromous interior redband trout; and indigenous warm water species. Marine aquatic designated uses include extraordinary, excellent, good, and fair quality. Lake nutrient criteria are specified by ecoregion and trophic state action values. Other designated uses include shellfish harvesting, recreational use, and miscellaneous use (habitat, harvesting, navigation, boating, etc.).	Established by region and documented in Basin Plans. Statewide standard list (25) of beneficial uses that includes municipal/domestic supply, agricultural supply, groundwater recharge, freshwater habitat, etc. NOTE: Water quality criteria are legally different from California's water quality objectives. Objectives provide reasonable assurance and criteria/standards to protect most sensitive use. Water quality objectives are defined as California's term for water quality criteria pursuant to the CWC and adopted by RWCB in their Basin Plans. Water quality criteria are established to protect the uses of a water body under the CWA. Both are used for listing/de-listing in California in a hierarchical manner.	Fish and aquatic life (FAL) designated aquatic uses include cold water, warm water sport, warm water forage, limited forage, and limited aquatic life. Current plans to update FAL classification into natural community designations, which will identify F-IBI for defining biologic impairment. Other designated uses include recreation, public health and welfare, and wildlife. Assessment is focused on FAL and recreation.	Aquatic life (AL) beneficial uses include cold water, seasonal salmonid, exceptional warm water (EWW), warm water habitat (WWH), modified warm water habitat (MWH), and limited resource water. Other designated uses include human health (via fish tissue), human health (public drinking water), and recreational (bathing: Lake Erie, primary and secondary contact).	Designated uses include drinking water (Class 1), primary contact and recreation (Class 2), aquatic life use (fishable and swimmable) (Class 3), agricultural, and industrial (no waters in this class). Water quality criteria specified for marine or freshwater for Class 2 and 3. No cold water streams or land use based designations.	Defined in South Carolina Regs 61-69. Freshwater classifications include outstanding national resource, outstanding resource, trout waters (for supporting reproduction/ stocked trout population), and freshwater (for agricultural/industrial). Saltwater classifications include outstanding national resource, outstanding resource, shellfish harvesting, Class SA, and Class SB. Beneficial uses: contact recreation, human consumption, shellfish harvesting, AL, agricultural/industry.	
Criteria for listing decisions	WQ1-c	Both numeric and narrative criteria used to make listing decisions (although few have been based on narratives). Required connection to anthropogenic source and quantitative data collection.	Both numeric and narrative criteria used to make listing decisions. Numeric listing factors are evaluated first. Narrative water quality objectives include evaluation guidelines (numeric values scientifically based and peer reviewed applicable to beneficial uses). RWCB assesses appropriateness of applying evaluation guidelines.	Both numeric and narrative criteria used to make listing decisions. Uses "indicators and impairment thresholds" to assess. For parameters without codified numeric criteria, the "impairment thresholds" may be used as guidance for listing.	Both numeric and narrative criteria used to make listing decisions. Narrative standard for each AL use. For three most common AL (EWW, WWH, and MWH) uses, there are numeric biological criteria for three separate indices: Index of Biologic Integrity (IBI), Modified Index of Well Being (fish) (MIwb), and Invertebrate Community Index (ICI). See OAC 3745-1-07. Water body must meet all applicable biologic criteria. Numeric criteria depended on inside or outside mixing zone.	Both numeric and narrative criteria used to make listing decisions. Narrative criteria used for nutrients in certain water bodies. TMDL development and adoption can establish site-specific interpretations of the narrative.	Only numeric (site-specific) criteria used to make listing decisions. Numeric includes deviation from natural condition. Narrative biologic criteria used to classify as impaired. Listed as "BIO" impairment (due to impaired macroinvertebrate community).	

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
WQS flexibility and use of site-specific standards	WQ1-b, WQ1-d	Aquatic life use associated with multiple categories of marine and freshwater species uses. Lake nutrient criteria can be based on criterion established in a lake-specific studies, based on "action values" defined by ecoregion in WAC 173-201A-230 (Table 1), or based on narrative criteria. No site-specific WQS have been established except for water bodies where natural conditions (e.g., lake stratification) cause or contribute to pH and DO excursions.	Multiple categories of beneficial uses. Seasonal standards depend on pollutant and beneficial use. Criteria and beneficial uses developed at region scale. Procedural challenges with implementing site-specific standards. One example was completed for copper in San Francisco Bay (very expensive to implement).	Multiple beneficial use designations. Impairment thresholds (for narrative criteria) based primarily on physical features. Rules and guidance allow only "representative data" to be used in assessment (formal guidance scheduled for 2014). Current efforts to codify a process for site-specific criteria (in conjunction with updated total phosphorus standards).	Multiple beneficial use designations. Identification of a causative pollutant (per biological criteria) allows for site-specific evaluation. Site-specific biologic criteria. Numeric criteria based on inside or outside mixing zones.	Listing categories expanded from EPA's recommendation to include 3a and 3b (to distinguish between no data and where data are available but do not meet sufficiency requirements), 4d (not attaining but no causative pollutant), and 4e (not attaining but restoration activities expected to achieve use). WQS allow development of site-specific alternative criteria (SSAC) but procedure is not defined in code. Alternative DO criteria typically established with NPDES permits but can be done with TMDLs.	Multiple beneficial use designations (water body classifications). Numeric nutrient criteria for lakes based on ecoregional approach, accounting for geography. Site-specific standards for pH and DO (based on naturally occurring conditions).	Consider current legal proceedings that are questioning use of natural conditions criteria in lieu of numeric criteria (OR – temperature standards).
Indicator bacteria	WQ2	Fecal for freshwater and shellfish; enterococci for secondary contact recreation.	Primarily use fecal, but E. coli and enterococci also used (varies by region).	State rules (numeric criteria) use fecal. Impairment thresholds established for E. coli.	E. coli for all uses. Established in 2010.	Fecal coliform. Concern about potential regrowth of FC. Currently developing microbial source tracking program to better develop TMDL allocations.	Currently fecal for fresh water, but changing to E. coli. Enterococci for recreational use in salt water; fecal for shellfish harvesting.	Switch to E coli standard method for fecal coliform do not assess bacteria that originate in the intestinal track of animals. Site Hicks publication 2002.
Revision process	WQ3	WQS reviewed as part of triennial review (3 years) or after major rulemaking.	WQS reviewed as part of triennial review (3 years). During TMDL development, review of standards may be conducted (outside of the triennial review) to determine whether standards can be achieved. In lieu of developing TMDL, may refer back to water quality standards staff.	WQS reviewed as part of triennial review (3 years) or after major rulemaking.	WQS reviewed as part of triennial review (3 years). State-required review every 5 years for all rules (including WQS).	WQS formally reviewed as part of triennial review (3 years). Ongoing updates are made. DO standard in process of revision to reflect topography and stream temperature.	WQS reviewed as part of triennial review (3 years). Revisions may also occur outside of triennial review (as needed).	Consider review of water quality standards in conjunction with TMDL development (adaptive management tool).
Data sources								
Third-party data sources	WQ5	Municipalities (NPDES permittees), environmental groups, WDOH, tribes, federal agencies (e.g., USGS), private citizens, etc.	Municipalities (NPDES permittees), USGS, major regional monitoring programs (Southern California Coastal Water Research Project, BPTAC, Regional Monitoring Program of San Francisco Estuary Institute).	USGS, EPA, USFW, regional planning commissions, municipalities (NPDES permittees), universities, and citizen-based monitoring groups.	USGS, Ohio DNR, Ohio Department of Health, NE Ohio Sewer District, universities, and private consultants.	Multiple. Federal agencies (e.g., USGS, EPA, USFS), water management districts, municipalities (NPDES permittees), universities, private consultants, and citizen-based monitoring groups.	Limited. Federal agencies (USGS, USFW), other states (for shared water bodies), state-owned electrical utility, South Carolina Dept. of Natural Resources.	
Third-party data submittal process	WQ5-b, WQ5-d	Ecology conducts a biennial assessment of readily available water quality data, alternating between freshwater and saltwater. Public "call for data" occurs over a 2-month period (February to April) corresponding with the assessment year (2012, 2014, etc.). Electronic data submittals to state Environmental Information Management (EIM) must include calculated values from continuous data sets (i.e., 7DADMax) as opposed to the raw continuous data.	SWCB solicits all readily available public data over a defined period, but focuses on new data collected since the previous assessment. Given the quantity of data statewide, the "call for data" is usually conducted 2+ years prior to the assessment year. Third-party data are obtained in electronic format (consistent with the format used by the state's Surface Water Ambient Monitoring Program [SWAMP]). Data are processed by RWCB into lines of evidence (LOE) in the state's California	DNR biennially seeks all readily available water quality data. There is a public notice and 2-month data submission window. Third-party electronic data submitted using an online data form (GovDelivery) to streamline data submittal and WDNR review. Monitoring data are directly uploaded to the state's Surface Water Integrated Monitoring system (SWIMS) database. For citizen-based monitoring, a monitoring certification program is in	Per Ohio Credible Data Law, only data collected by Ohio EPA and Level 3 Qualified Data Collectors (QDC) are used. A public notice is mailed to all Level 3 QDC. A Web page is established with instructions on what qualified data (time frame) should be submitted, test methods and descriptions, QA/QC specifications, and instructions on how to submit data. It also contains a list of what data are already received and available for use. Third-party data are obtained directly by	FDEP receives data from third parties continually. E-mail reminders are sent out to groups monitoring in basins eligible for assessment during the year. Key staff is assigned to assist in uploading data to FL-STORET.	SCDHEC receives data from third parties continually. Only data submitted by September of the odd-numbered year are included in assessment. Data must be representative of current water quality conditions (5-year time frame) and use certified laboratories. Data downloaded to separate (independent) database from state collected data.	· Accept third-party data continually. · Consider implementation of a citizen-based monitoring certification program to ensure improved data quality on part of 3rd parties (see WI program). Data quality should be higher priority than data quantity. · Strengthen credible data policy. Lower level data collection efforts can be used for public information but shouldn't be

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
			Water Quality Assessment (CalWQA) database. LOEs include specific information for each water body segment and pollutant combination. Each LOE is documented in a fact sheet.	place. Only Level 2 citizen monitoring data can be uploaded to the database (program uses WDNR trainers).	identified Ohio EPA staff and uploaded to SWIMS database.			used for listing/ permit requirements. For regulatory purposes, clarify appropriate level in EIM that should be used. · 3rd party submitted data should represent current conditions (within 5 yr. time frame).
Third-party data quality requirements	WQ5-b	Third-party numeric data must be submitted through state EIM system (with automated QA requirements) unless prior arrangements with Ecology were made and an approved QAPP is submitted.	Third-party numeric data require a QAPP pursuant to 40 CFR 31.45 (per Policy 2004-0063). A QAPP must be submitted with the data. QAPP adequacy is documented on the LOE. Data from major monitoring programs SWAMP, USGS, etc. are considered credible and relevant for listing.	Third-party numeric data require a QAPP (referred to EPA's guidance for QAPP development). Third-party data submitted for assessment purposes are reviewed by DNR and must include QA/QC documentation consistent with the state's procedures (outlined in the state Quality Management Plan).	Only prequalified Level 3 QDCs are permitted to submit data for assessment purposes. Data submitted must include QA/QC specifications consistent in the Standard Methods for Examination of Water and Wastewater or the "Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices" (2009).	Third-party data numeric data must adhere to data quality requirements outlined in Rule 62-160 FAC. Requirements include lab certification and field SOPs.	QAPP must be submitted to DHEC for approval prior to initiating sampling. Guidance for QAPP development: http://www.scdhec.net/environment/envserv/qapp.htm.	Prefer explicit QAQC documentation and lab certification requirements.
State monitoring program activities	WQ5, WQ5-a	State has a formal monitoring program, but focus is on status and trends (probabilistic monitoring) for 305(b) compliance. Probabilistic monitoring is not designed to determine listing/de-listing needs, but results can help identify causes of impairments. Limited state data collection for listing/ de-listing or TMDL development.	State's SWAMP comprises 50%–75% of the data used in the WQ Assessment. Program has standardized SOPs and QAPP. Program has an interactive database and uses regional data centers to collect and store information.	State has coordinated a monitoring program with Drinking Water and Groundwater Depts., Fisheries Dept., and Watershed Dept. Protocols are outlined in the state's Water Division Monitoring Strategy. State has a three-tier monitoring program. Tier 1 is statewide baseline monitoring that includes biologic monitoring. Problem areas identified under Tier 1 are prioritized for Tier 2 monitoring. Tier 2 is targeted at individual water segments and used for TMDL development. Tier 3 is follow-up monitoring to assess implementation of TMDLs and permits.	State has a robust monitoring program. State is divided into 25 areas (aggregations of major basins corresponding to 5 district offices). Each area is assigned to 1 basin year. Schedule currently is to monitor each area every 10 years. Monitoring data include biologic and chemical surveys, physical surveys. Consistent data used for trends and assessments. Consistent monitoring sites maintained.	Florida Water Resources Monitoring Council facilitates monitoring activities among stakeholders (federal, state, and local). Currently developing statewide monitoring atlas to ensure targeted monitoring activities. State has Integrated Water Resources Program that includes status and trends monitoring (Tier 1 monitoring) and Strategic Monitoring (SM) Program (Tier 2 monitoring) for assessment purposes. SM Program implemented using Strategic Monitoring Plans developed annually. Before SM staff queries the FL-STORET and Legacy STORET to avoid duplication. FDEP SOPs and QA/QC are included in rule 62-160 FAC.	State has Ambient Water Quality Monitoring program. Monitoring includes fixed sites and probability-based site selection. Both are used for listing/de-listing and TMDL development. Fixed site monitoring includes 245 sites where data are collected bimonthly every year. Probability-based monitoring includes 30 sites (streams), 30 sites (lakes), and 30 sites (estuaries), and data are collected monthly for a year. Macroinvertebrate sampling temporarily suspended due to budget cuts. Quality control adhered to in SCDHEC Quality Assurance Management Plan.	· Expand Ecology's monitoring program to provide consistent data collection process for listing/de-listing and reduce reliance on third parties. · Consider a phased approach to state-implemented monitoring in order to prioritize areas with current needs. Monitoring to focus on listing/ de-listing and TMDL effectiveness. · Maintain explicit QA/QC requirements for state submitted data.
State data submittal process	WQ5-a, WQ5-d	Data submission uses EIM system.	Data submittal consistent with method for third-party data.	Data submitted to SWIMS directly. State data submission follows QA/QC procedures in the state Quality Management Plan (internally available).	Data submitted to SWIMS directly. State data submission follows QA/QC procedures in the Manual of Ohio EPA Surveillance Methods and Quality Assurance Practices" (2009).	Data analyzed by FDEP Central Laboratory and uploaded to FL-STORET.	Data initially stored in LIMS/SIMS database. Final data stored in EPA STORET database.	
Data age and data use limitations	WQ5-c	All qualified data collected within 10 years of the published "call for data" used. Newly submitted data will be added to previously assessed data less than 10 years old. However, data older than 10 years are used only if more recent data are not available. Cannot de-list solely based on age of data.	No data age limitation is referenced in policy due to the long public process and delay from submittal to published list. RWCB has discretion in determining how data and information are to be evaluated, including flexibility to determine segmentation, scale, and temporal data to be reviewed. All assumptions are listed in the fact sheets.	All qualified data from the most recent 10-year period are used. For lake total phosphorus and chlorophyll a, a 5-year range is used. WDNR is not obligated to use all data. Data older than 10 years may be used if the minimum sample size is not met and available data provide overwhelming evidence of impairment.	Generally, a 10-year data age maximum is used for aquatic life and human health designated uses. A 5-year data age maximum is used for recreation and drinking water uses. Cannot de-list based on aged data. Aged (10+ years) data are noted in the 303(d) listing.	FDEP considers all available data. A "verified period" of 7.5 years is used for assessment. If adequate data for a 7.5-year period is unavailable, may look at entire period of record. If only older data are available and representativeness is not established, segment may be placed on planning list.	303(d) list traditionally developed using 5 years' worth of data. New listings are based on assessment of data collected during 5-year window (but could be less than 5 years of data). Cannot de-list based on aged data.	· Add category (e.g., 5b) to denote waters listed as polluted based on old data. This list could be used to set priorities for monitoring. · Placement on planning list if only older data is available. May include in categorization recommendation.

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
				Cannot de-list solely based on age of data.		Cannot de-list based on aged data.		
Are data sufficient in quality and quantity to conduct assessments?	WQ5-e	Varies by parameter and assessment need. 5%–10% of waters assessed for IR, but those are waters most impacted by anthropogenic sources. Therefore, Ecology believes that data quantity is robust in terms of identifying impaired waters (303(d) list), but limited in terms of reporting the status of all waters (305(b)). Data quality is adequate due to detailed QA requirements per EIM or Policy 1-11 (for separately submitted data).	Varies by parameter and region.	Varies by parameter and assessment need. 40% of waters assessed for IR. DNR believes that tiered monitoring efforts are well implemented but limited, targeted data collection efforts are conducted. Data quality is adequate due to detailed QA requirements per WisCALM.	Yes. Biologic sampling information is available for about 75% of the large river assessment units and 60% of the watershed assessment units. Data quality is adequate due to Ohio Credible Data Law implementation.	Yes. FDEP conducts 10,000 assessments/year and maintains assessment schedule with data availability.	No. Statewide monitoring cuts result in limited quantity (especially biologic). Data quality is adequate due to QAPP requirements.	· Expand Ecology's monitoring program to provide consistent data for listing/de-listing and reduce reliance on third parties. · Reflect more quantitative QAQC requirements.
Assessment methods and publication								
Determining attainment (numeric criteria)	WQ6	All qualifying data aggregated per assessment unit, medium, and pollutant parameter (Policy 1-11, Section 6). Section 8 of Water Quality Policy 1-11 includes data requirements for listing in each category and parameter. Natural condition (as opposed to numeric standard) may be used to assess attainment, if supporting evidence is provided to justify the natural condition.	All qualifying data aggregated per assessment unit, medium, and pollutant parameter by RWCB (Policy 2004-0063). Lines of Evidence (LOE) established for each water body segment and pollutant combination. Fact sheets are prepared describing LOE to support each proposed inclusion or deletion from the 303(d) list. California recognizes 10 listing factors to determine whether a water body should be listed/de-listed. Adherence to numeric water quality criteria comprises three of the listing factors. Policy 2004-0063 (Section 3 and 6) includes data requirements (sample size, binomial distribution) for numeric criteria listing for each parameter.	Biologic data collected from DNR's Tier 1 monitoring program used to conduct a general condition assessment. General assessment thresholds for F-IBI and M-IBI (or TSI for lakes), are used to evaluate water bodies as excellent, good, fair, or poor condition. Impairment assessments are conducted on water bodies identified as fair or poor condition based on Tier 1 monitoring results. DNR compiles all qualifying available data. Assessment uses "indicators" and "thresholds" to define impairment (see WisCALM, Table 12a). Impairment thresholds include parameters without codified numeric water quality criteria and applicable narrative criteria.	All "new" qualifying data since the last assessment period incorporated into the assessment database. Assessment methods including scoring (see IR, Sections E, F, and G) used to determine impairment. For FAL criteria, impairment evaluated based on biologic data per assessment methods. Per IR, Section J, impaired waters were prioritized to develop 303(d) list. Prioritization criteria and points were assigned based on beneficial uses and assessment unit score. Updated state goal to achieve full AL use in 80% of streams by 2020.	State implements a rotating-basin approach (Basin Management Cycle) using five phases for assessment and TMDL development. Phase I queries all available data, develops planning list and strategic monitoring plans. Phase II acquires new data and develops verified list of Impaired Waters. During Phases I and II all water quality data (collected under Tier 1,II, and III monitoring efforts) is compiled. Per the Impaired Water Rule (62-303 FAC),class-specific water quality criteria is compared to available data and used to list water bodies under each parameter.	All qualifying data aggregated per assessment unit and pollutant parameter for 5-year period. The Monitoring and Assessment group compiles and formats data. Data requirements for listing are described directly in the IR (Part 1 303(d) list) and criteria included in South Carolina Regs 61-68. Natural condition (as opposed to numeric standard) may be used to assess attainment, if supporting evidence is provided to justify the natural condition.	Recommend WA re-look at or further explain move away from use of binomial probabilities. California and Florida both use sample sizes by parameter and binomial distributions to determine true probability of impairment or non-impairment.
Determining attainment (narrative criteria)	WQ6-a, WQ6-b	Few listings have been based on narrative criteria alone. Placement in Category 5 is required for waters impaired by anthropogenic pollutants. Waters impaired by pollution (e.g., invasive species) are placed in Category 4c. Listings require documentation of (1) environmental alteration related to chemical or physical alternation, measured by indices of resource condition/characteristic and (2) impairment of an existing or designated use.	Narrative/semi-qualitative criteria are the basis for three of the listing factors. Listing decision is based on reference condition (defined on a case-by-case basis) and use of evaluation guidelines (that convert narrative standards to quantitative evaluation) and represent standards attainment or beneficial use. Policy 2004-0063 (Section 6.1.3) outlines process for selection of evaluation guidelines. Pre-developed evaluation guidelines are in place for sediment quality, fish consumption, and bioaccumulation. Appropriateness of alternative evaluation guidelines must be documented in fact sheets.	See above.	No listings based on narrative criteria alone. For AL uses without numeric biologic criteria (CWH, LRW), attainment status is based on use of biological data attributes and/or interim assessment index benchmarks to assess consistency with narrative AL use definitions in the WQS.	Narrative criteria apply to nutrient exceedance (imbalance in flora or fauna). Placement on the verified list (Category 5) requires identification of causative pollutant (i.e., limiting nutrient). Chlorophyll a or Trophic Status Index (TSI) (for lakes) can be used as a surrogate. Photo documentation of algal blooms and invasive species commonly used in a weight-of-evidence approach. The Impaired Water Rule (62-303 FAC) includes guidelines for numeric interpretation of narrative criteria.	Biologic criteria are considered narrative criteria (South Carolina Regs 61-68). For AL designated use, biological criteria can be used exclusively to list water body. If chemical/physical data are available, they can be used to support listing but are not required. State uses the EPT Index and North Carolina Biotic Index (BI) and compares based on a reference condition. De-listing may occur if biological data show full support despite chemical/physical standard exceedance. Water bodies listed for "BIO."	Use identifiers to identify the rationale for listing (e.g., BIO if listed for biologic criteria)

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
Has biologic impairment ever resulted in a listing?	WQ7	Yes, beginning in 2008, based on RIVPACs and BIBI scores. Listing initiates study to identify cause or stressors of impairment. Ecology developed "Guidance for Stressor Identification of Biologically Impaired Aquatic Resources in Washington State" (2010). No TMDLs issued for biologic impairments. Stressors identified as invasive species result in listing as Category 4c.	Indirectly. Biologic monitoring data are used to support the line-of-evidence listing factor, but no direct listing is currently based on biologic impairment.	Yes. Biologic data are used for general condition assessment, and if minimum data requirements are met, can be used to list waters. For FAL designated use, two fish surveys and three macroinvertebrate samples are required, and two of the samples need to be below the poor rating. DNR requires evidence of biologic impairment in order to list water as impaired due to total phosphorus.	Yes. Quantitative, biological criteria exist for three (of the seven) FAL designations: EWH, WWH, MWH. Indices include Index of Biologic Integrity (IBI), Modified Index of Well Being (Miwb), and Invertebrate Community Index (ICI). Attainment must be achieved for all indices, otherwise indicated as impaired. Biologic criteria rationale: http://www.epa.ohio.gov/Portals/35/documents/Vol1.pdf Analysis of pollutant source and cause (using chemical data) serves as targeted pollutant for TMDL development.	Indirectly. Biologic impairment used to characterize condition of water body and identify whether to place on the planning or study list (Category 4d). FDEP collects 99% of all biologic data. Indices include Stream Condition Index (SCI) and BioRecon. Inclusion on the verified list (Category 5) requires identification of a causative pollutant.	See above. Biologic criteria alone can be used to list a water body. SCDHEC collects macroinvertebrate data.	· Given the recent use of biological monitoring and biologic impairment driving watershed planning and rulemaking, recommend additional research and focus on this area. · Consider Florida's approach to biologic monitoring where it indicates impairment but requires causative agent prior to listing.
Use attainability	WQ15	None currently finalized and approved by EPA. Current work by Ecology will likely result in a UAA proposal to EPA for a designated use change. Ecology will determine at the end of the project whether enough information is available to support the UAA proposal. (Not yet submitted to EPA).	Usually conducted in conjunction with TMDL development. Region 6 recently conducted UAA to change beneficial use of select water bodies. Region 2 conducted UAA to remove contact recreational as a designated use for a wetland.	Yes. Per WisCALM, a UAA is pursued to modify the designated use and/or applicable criteria if during the assessment phase; DNR determines that the natural background levels may cause the exceedance. Water body categorized as 5c in the interim.	Yes. UAA justification required for designation of MWH and LRW AL designated uses because goals are less than the CWA goals due to long-term impairment. UAA used as justification for beneficial use rulemaking and codification in WQS.	None currently conducted to support listing/de-listing.	None currently conducted to support listing/ de-listing.	
Categorization (e.g., 4b, 5, etc.)	WQ16	Not Impaired Category 1: Segment meets tested criteria Category 2: Segment is a water of concern (applies when data show some excursion of water quality criteria but insufficient to warrant Category 5 listing) Category 3: Segment lacks sufficient data (applies when lacks information for placement in any other category). Category can also be used when segment is within a boundary for a TMDL in progress. Segments with incomplete datasets will be reassessed after the TMDL has been approved by EPA.) Impaired Category 4a: Segment has TMDL approved by EPA Category 4b: Segment has a pollution control program (e.g., CERCLA sediment cleanup program) Category 4c: Segment impaired by a non-pollutant (including when biologic impairment is not linked to a specific pollutant) Category 5: Segment is on 303(d) list	California requires all waters that do not meet WQS to be placed on the 303(d) list. Therefore, Categories 4a, 4b, and 5 are submitted to EPA for the 303(d) list. Not Impaired Category 1: Supports beneficial uses Category 2: Supports some beneficial uses and can have other uses not assessed (due to lack of information) Category 3: Lacks sufficient quality or quantity of data Impaired Category 4a: All 303(d) listings are being addressed and at least one is addressed through an EPA-approved TMDL Category 4b: All 303(d) listings are addressed by actions other than TMDLs Category 4c: Segment impaired by a non-pollutant related causes Category 5: Standards are not being met and a TMDL is required but not yet completed	Wisconsin uses one category per water body, based on the more protective/restrictive category. Water body remains in impaired until all designated use/pollutant parameter combinations are restored. Not Impaired Category 1: All designated uses are met Category 2: Available information indicates one or more designated uses are met (applied to waters restored and removed from impaired waters list) Category 3: Insufficient available data/information to assess Waters where a TMDL is approved or not required Category 4a: TMDLs approved or established Category 4b: Required control measures expected to attain water quality standards Category 4c: Impairment is not caused by a pollutant Waters where a TMDL is required Category 5a: At least one designated	Ohio uses multiple categories per assessment unit. Not Impaired Category 1h: Use attaining—historical information Category 1t: Use attaining—TMDL complete and AU attain WQS Category 1x: Retained from (previous) IR Category 2: NOT USED Category 3h: Attainment unknown—historical information Category 3i: Attainment unknown—insufficient information Category 3t: Attainment unknown—TMDL complete for other units but not enough data to assess this unit Category 3x: Attainment unknown—retained from (previous) IR Impaired Category 4a: TMDLs complete Category 4b: Other control measures will result in attainment of use Category 4c: Impairment is not caused by a pollutant Category 4h: Impaired—historical	Florida uses one category per water body. Not Impaired Category 1: All designated uses are met: not used by FDEP Category 2: At least one beneficial use is attained and insufficient information to determine if other uses are obtained Category 3a: No data available to determine if any designated use attained Category 3b: Some data available, but are insufficient to determine if designated use attained Category 3c: Sufficient data determine at least one beneficial use is not attained using planning list methodology per IWR Planning List Category 3d: Sufficient data determine at least one beneficial use is not attained using verified list methodology per IWR Impaired Category 4a: TMDL complete and Best Management Action Plan	Departmental decision not to use EPA Categories 1–5. EPA only has authority to approve 303(d) list; therefore, only information about current water quality status is reported. State exploring options about listing as a 4B-light or 5R, which means that WQ will be achieved through an implementation-based approach to meeting standards (state currently exploring pilot project). Sites (waters) not removed from 303(d) list but will not necessarily have a TMDL developed.	· Change listing to include categories similar to WI and OH: - Non-attainment is related to background sources (e.g., atmospheric input of Hg or PCBs); - Non-attainment is due to natural or irreversible human conditions - Cause(s) of non-attainment have not been determined; so more study is needed - Listed based on old data so monitoring is needed to determine attainment · Define Category 4b to include straight to implementation actions in NPDES permits (e.g. Spokane)

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
				use is not met and TMDL is needed Category 5b: Atmospheric deposition of mercury-caused impairment Category 5c: Non-attainment of WQS may be caused by natural conditions or irreversible human-induced condition Category 5p: Applicable total phosphorus criteria are exceeded, but biological impairment not demonstrated	information Category 4n: Impaired—based on natural conditions and sources Category 4x: Impaired based on 2008 IR Category 5M: Impaired (TMDL needed)—mercury Category 5h: Impaired (TMDL needed)—historical data Category 5x: Impaired (TMDL needed)—retained from (previous) IR	(BMAP) in progress Category 4b: Other control measures will result in attainment of use (encouraged by state) Category 4c: Impairment is not caused by a pollutant or impairment due to natural conditions Category 4d: Impaired but no causative pollutant identified Category 4e: Impaired but ongoing restoration activities expected to result in attainment of use Category 5h: One or designated uses not attained (TMDL needed)—verified List		
Have water quality trends ever resulted in a listing?	WQ8	Yes, per Policy 1-11. Requires credible trend information using a valid statistical methodology that indicates the water body is not expected to meet applicable WQS by the next assessment cycle.	Yes, per one of the listing factors identified in Policy 2004-0063. If a declining trend is shown per data collected over a minimum of 3 years and impacts are observed, the water body can be listed.	Yes, per WisCALM, waters would be designated as threatened. Determined on a case-by-case basis. Limited guidance currently exists.	No, currently not listing or de-listing based on trends.	Yes, Impaired Surface Water Rule (62-303 FAC) was recently amended to allow listing based on trends during assessment cycle. Primarily applicable for nutrients.	No, South Carolina does not list water bodies based on trends. Rules allow that if modeling indicates a site is exceeding (but monitoring data do not show it), the site can be listed. This has never occurred.	
How are de-listing decisions validated?	WQ9	Regional TMDL staff is consulted. Assessment group cannot make de-listing decisions independent from TMDL group. De-listing decisions are discussed with TMDL staff in consideration of (1) data availability, (2) pollutant sources near to the monitoring location, and (3) whether TMDL implementation is showing positive results (if applicable). De-listing is generally due to acquisition of newer data or discovery of an assessment error. De-listing can not occur until the next WQA, in case other data indicates that quality is not meeting TMDL targets. Historically, de-listing is seldom due to effective TMDL implementation.	Methodology for de-listing located in Policy 2004-0063, Section 4. Verification and validation facilitated through extensive public comment process and coordination with the RWCB and SWCB. De-listing is generally due to acquisition of newer data, changing water quality standards, or discovery of an assessment error.	Wisconsin DNR tiered monitoring program (Tiers 1 and 3) is focused on reviewing status of waters to validate assessment status and implementation activities. No specific monitoring schedule.	Ohio EPA's monitoring program ensures follow-up monitoring is conducted in a timely manner. As the first step in TMDL development, Ohio conducts a watershed assessment, and the new results are used to calculate TMDLs and correct listings/de-listings. De-listing is generally due to acquisition of newer data, or change in assessment methodology. Additional data is collected by 3rd parties and the State under their rotating-basin approach.	No formal validation process for de-listing decisions. Category 4d is used to indicate that additional monitoring/follow-up is needed to support any listing decision.	No formal validation process for de-listing. SCDHEC has flexibility for special monitoring studies but does not implement due to budget cuts.	· Develop a de-listing methodology (similar to CA) that focuses on data instead of qualitative information. · Increase effectiveness monitoring by Ecology or grants to third parties.
Public comment process	WQ10, WQ11	Draft WQ Assessment (WQA) report is provided to interested tribes and EPA for initial review. Comments are incorporated and a draft WQA report and provided for public review and comment. The time frame for public comment is not specified in Policy 1-11. Ecology develops response to public comments and finalizes 303(d) list for submittal to EPA.	The RWCB presents proposed listing changes in fact sheets during a public hearing. Advance notice and opportunity for public comment provided prior to hearing. Written responses to all comments provided by RWCB. Finalized fact sheets, responses to comments, etc. provided by RWCB to SWCB. SWCB evaluates RWCB decisions. Public workshop held to review compiled fact sheets and opportunity for additional public comment provided (30-day). After workshop, SWCB approves 303(d) list.	The DNR Web site is updated with background information prior to public comment period. A 60-day public comment period is provided for the draft IR. A webinar with live chat feature is used to solicit questions and answers. All comments are summarized and responded to; comments are posted online.	Public notices (newspaper and Web) are made. One public meeting (at a minimum) is held. State provides 45-day public comment period. All comments are summarized and responses are documented in the IR.	Draft verified list (303(d) list) and water bodies proposed for de-listing placed on Web site and sent by request to interested parties. E-mails are sent to basin-specific interested parties and notice placed in Florida Administrative Weekly and select newspapers. Comment encouraged in writing or in person at basin-specific meetings/workshops. The time frame for public comment is not specified in the IR.	Notice for draft WQ Assessment report and 303(d) list is placed in public newspapers, the Web, and e-mailed to interested parties. A 30-day public comment period is established. Following public comment, SCDHEC has 31 days to respond. Response to comments summarized and included in report.	Describe more prescriptive timeframes for obtaining and responding to public comment.

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
Has public comment resulted in reconsideration/review of data? Change in listing?	WQ12, WQ14	Yes, public comment results in reconsideration/review of submitted data, but Ecology generally does not change listing/de-listing results based on inclusion of data submitted outside of the "call for data" period.	Yes, new data are often provided in conjunction with comments and all available data must be used in the assessment.	Yes, public comment results in reconsideration/review of submitted data, but DNR generally does not change listing/de-listing results based on inclusion of data submitted outside of the "call for data" period.	Rarely. Limited third-party data used in assessment. Comments generally influence future state monitoring schedule.	Yes, new data are sometimes provided that result in a change. FDEP creates a revised draft Verified List/De-list for additional public comment. Verified list approved via secretarial order prior to submission to EPA.	Yes, new data have often been provided to warrant listing changes.	Accept data continually.
Revision process	WQ13	The WQA and 303(d) list is updated every 2 years, alternating between marine and fresh water, per EPA's allowance of a rotating-basin approach as long as waters are assessed within a 4-year period.	The WQA and 303(d) list is updated approximately every 4 years, due to the required coordination between the SWCB and RWCB.	The WQA and 303(d) list is updated approximately every 2 years.	The WQA and 303(d) list is updated approximately every 2 years.	The water quality assessment report is updated every 2 years and the 303(d) list is updated annually.	The water quality assessment and 303(d) list is updated approximately every 2 years.	Accept data continually.
TMDL prioritization								
Methods for prioritization	TP1, TP1-a,	Prioritization method outlined in MOA with EPA (1996). Ecology's Water Quality Program conducts an annual project scoping effort for Category 5 water bodies. Listed waters are prioritized based on the primary criteria (listed in next row below). TMDL development conducted as a watershed approach to address multiple pollutants in a holistic way. New TMDL development also considers secondary criteria (listed below). Prioritization included as part of WQ Assessment.	Policy 2004-0063 outlines criteria for TMDL prioritization for consideration by RWCB. All listed water bodies assigned a TMDL schedule date. Schedule may fluctuate (as scheduling driven by consent decree that required all TMDLs to be developed by 2013). Schedules may fluctuate per data resources. Prioritization/schedule proposed at the same time as 303(d) list updates. Some regions also consider TMDL priorities during triennial review.	Ranking process outlined in WisCALM (Section 8.1). All listed waters ranked as high, medium, or low. Rankings are re-evaluated during each listing cycle to determine if TMDL development can be completed with staff and fiscal resources. High ranking means TMDL is in development; medium ranking means information is currently being gathered (all category 5B—impairment due to mercury—are medium); future TMDLs are low.	Prioritization method outlined in the Integrated Report (Section J). Water bodies are prioritized by assessment unit in conjunction with development of the 303(d) list. A point system is used to assign priority points for each assessment unit based on applicable beneficial use. Points for the recreation and FAL uses are assigned according to a computed index score. Scheduling of the TMDL uses additional criteria (see below) in order to assign one of the next three monitoring cycles and the projected TMDL completion date. The Ohio River and Lake Erie TMDLs are automatically assigned a low priority for Ohio EPA action because other organizations have accepted lead responsibility for TMDLs.	Water bodies on verified list (303(d)) prioritized based on severity of impairment and designated use of segment. High priority scheduled for TMDL development within 5 years; medium priority between 5 and 10 years; low priority within 10 years. All segments initially assigned medium priority. High priority assigned if (1) impairment poses threat to potable water or human health, and (2) impairment due to pollutant causing risk to endangered species. Fecal coliform is a low priority. Mercury prioritized last due to limited data and source linked to air deposition outside state boundary. Prioritization included as part of WQ Assessment (as high, medium, low).	All listed waters required to have a TMDL developed between 2 and 13 years after listing. Listed waters are prioritized in accordance with factors (listed below). Methodology references EPA Integrated Report Guidance. Target TMDL dates are listed for each water body on the 303(d) list. Priority TMDLs are those scheduled for the next 2 years.	· Revise categories as recommended above to focus TMDLs where they are most needed. - Avoid developing TMDLs where there aren't enough data, causes are unclear, impairment is caused by irreversible or uncontrollable sources (e.g., atmospheric deposition, removal of forests), listing is based on old data, etc. - Identify opportunities for straight to implementation approach in lieu of TMDL · Consider implementation of a "point-based" ranking approach to more explicitly define prioritization approach.
Factors affecting prioritization	TP1-b, TP2	Primary criteria include risk to endangered species, public health, where WQ-based effluent limits need to be established/refined, vulnerability of water body, and severity of pollution. Secondary criteria include staff availability and data availability.	Water body significance, degree the water quality objectives were not met, human/environmental health risk, potential for recovery, public concern, funding availability, and data availability.	Information availability (waters with readily available data more likely completed in next 2–5 years), likelihood to respond to implementation actions, severity of impairment, public health concerns.	Criteria affecting TMDL scheduling include resource availability, time since most recent assessment, (303(d)) priority ranking, and current monitoring status.	Data availability, level of difficulty, nutrient issues (high priority), stakeholder involvement, need to refine existing TMDL.	Severity of pollution and classified water body use, endangered species, data availability, technical tool adequacy (for development of models), and public/stakeholder pressure.	Same as above
TMDL development methods								
Development process				*Please note the following responses were provided directly by state staff. No interview was conducted related to TMDL development.*				
How many TMDLs are in progress at a given time?	TD1	Currently, 29 TMDLs in progress.	Currently, RWCB working on 120 TMDLs.	Approximately 80 TMDLs per year (counted by reach and individual parameter).	Approximately 15–20 projects, characterized by multiple pollutant and assessment unit combinations.	50 new TMDLs in progress each year. About 100 TMDLs are ongoing or awaiting approval. TMDL development driven by	Variable. Currently TMDLs in progress to address 50 stations (with a total of 7 documents).	

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		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
						consent decree.		
How are TMDL development methods determined?	TD4, TD4-a	State regulations do not specify development methods. State has Water Quality program guidance and procedures, but the explicit procedures are not codified in law. Staff from Environmental Assessment and Water Quality program work together to develop a QAPP to document the study design, data and modeling quality objectives, quality of data used, and sampling methods for additional data collection. A level of effort is determined based on project size, complexity, and best professional judgment. TMDL project proposal developed to scope resources.	TMDL development procedures outlined in TMDL Guidance—A Process for Addressing Impaired Waters in California (Resolution 2005-0050). TMDLs developed by RWCB are typically adopted as part of a Basin Plan amendment, in an underlying permit action (if TMDL affects only a single party), or in an enforcement action or other regulatory action. During the project definition phase, preliminary data are compiled and analyzed and a preliminary project definition report is developed. Next the Project Plan is developed to determine schedule and resource needs for the selected action.	TMDL development guidelines referenced in "TMDL Monitoring and Modeling Technical Guidance" (2001). Recent proposed guidance (2013) updated protocols: http://dnr.wi.gov/news/input/documents/guidance/TMDLGuidance.pdf Wisconsin does not have a consent decree. TMDLs developed based on stakeholder input and ability to be implemented. TMDLs and implementation plans amended into Area-wide Water Quality Management Plans.	TMDL development guidelines listed in AOC 3745-2-12. Ohio developed a 12-step project management-based TMDL development process. Steps include problem definition, loadings assessment and modeling, Plan development, and implementation. Selection of a calculation method and target loadings is conducted under Step 5. Method selection is usually based on best professional judgment.	TMDL and BMAP development procedures outlined in Florida Statutes 403.067. TMDL development conducted in conjunction with Watershed Management Approach and rotating basin cycle. TMDL development considered in Phase 3. A Basin Working Group is involved in identification of sources, modeling methods, and scenarios.	State regulations do not include development methods. TMDL development discussed internally. Bacteria TMDLs follow EPA methodology. More in-depth discussion related to methodology for nutrients.	· Develop on policy/ guidance document describing TMDL development procedures. · Adopt AI guidelines (Shabman et al,. 2007) · Set interim targets and perform effectiveness monitoring to adjust measures and targets based on observed results.
How are data collected/compiled for TMDL development?	TD7	All qualified, relevant water quality data are reviewed and compiled. Occasionally third parties are hired or awarded grants to complete monitoring work for use in TMDLs. Data are analyzed and compared to TMDL objectives. A QAPP is written to document the study design, data and modeling quality objectives, quality of data used, and sampling methods for additional data collection.	Data needs and schedule for data acquisition are identified in the Project Plan. A monitoring plan is developed by the RWCB to outline objectives of the method, methods, and QA procedures. Third-party data may be used.	Data contained in SWIMs used for assessment. Additional state-collected data per Tier 2 monitoring are acquired as necessary. Third-party data may be used.	Data are compiled from the SWIMS database per Step 1 of the TMDL development process. Additional data collection is conducted under Step 2 of the process. TMDL development is conducted on a watershed basis and TMDL scheduling is based on staff resources able to collect data. Third-party data are acceptable if they meet the Level 3 QDC.	All qualified available data used to develop verified list per FL-STORET initially queried. Occasionally, during TMDL development workshops, additional third-party data are provided. Additional, site-specific monitoring (Tier III) may be conducted by FDEP.	Data used for listing/de-listing compiled. Separate monitoring effort usually not initiated unless high-priority water and data gaps were identified.	
Are different data quality standards required for TMDL development?	TD8	A separate QAPP is submitted for all new data collection efforts for TMDL development (Policy 1-11, Chapter 2). Water Quality Data Act (RCW 90.48.570–590) outlines requirements for data collection and analysis.	Monitoring programs developed for collection of additional data in support of TMDL development must be consistent with current SWAMP procedures and guidelines (including field data SOPs, and analytical QA/QC).	*Question not responded to.*	No, only prequalified Level 3 data are permitted for TMDL development purposes as well as WQA.	Not intentionally. If additional third-party data are provided for TMDL development, they may not go through as rigorous of a QA process.	No, data used in WQ Assessment typically include an approved QAPP.	· Revise RCW to describe quantitative and rigorous QAQC requirements. · Adjust to align with TMDL development method and implementation approach.
Are there alternatives for traditional TMDL development (straight-to-implementation, fast-track TMDLs)?	TD4-a	Yes, straight-to-implementation used where pollutant sources are easily identified and no NPDES sources are present. Yes, combined TMDL and implementation plans is encouraged (Willapa River Temperature TMDL in 2005) and path taken with new TMDLs.	If a TMDL affects only a single party, RWCB can establish limits directly in the permit. State has encouraged straight-to-implementation (without a TMDL), but has faced challenges in establishing a schedule (example trash TMDLs for Los Angeles and San Francisco Bay, which have 0 allocations). Regions currently using flexibility of TMDL prioritization to delay TMDL issuance and focus on implementation activities prior to TMDL issuance to avoid developing a TMDL. Regions also experimenting with authority and using discharge permits to outline	Alternatives to TMDLs can be prepared as an Environmental Accountability Project or EAP. These are planning implementation actions and used when the source of impairment and appropriate management actions are readily identifiable. State used to have a Priority Watershed Program that addressed straight-to-implementation TMDLs, but program has been phased out.	Ohio is beginning to use Category 4b more often if a water quality problem is identified as related to a specific source and the NPDES program may alleviate it. Category 4b is intended to be used more frequently in the future. All TMDLs developed include an implementation component.	Listing as Category 4b or 4e assumes implementation/restoration activities conducted to address water quality issues. Restoration plans submitted to FDEP and approved by secretarial order, making them enforceable. Plans then implemented in lieu of TMDL with same enforcement authority.	Yes, this is a goal of SCDHEC. Per new 319 guidance, may develop a watershed-based plan before TMDL (instead of after) for TMDLs without point source dischargers.	· Consider use of Category 4b more often. Is it possible for these listings to count toward their TMDL totals? · See CA: use TMDL prioritization to schedule TMDL development out for potential STI TMDLS

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		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
			implementation activities prior to TMDL issuance; this will hopefully allow Category 4b designations. TMDL development with regulatory backing used more for nonpoint source management.					
Is TMDL development ever phased? When?	TD10, TD10-a	Indirectly. Multiple pollutants may be assessed up front but submitted as separate TMDL reports (on different schedules). TMDL implementation is more typically phased based on data availability and anticipated implementation issues.	Indirectly. No phased TMDLs issued. RWCB uses TMDL prioritization and preliminary TMDL development activities (during the project definition phase) to identify best course of action (whether TMDL, change in standards with UAA, etc.).	No.	No.	Due to Consent Decree and implementation of Watershed Management Approach, TMDL development is phased in developing allocations. Initial allocations in TMDL and detailed allocations in BMAP. TMDL development process is iterative such that if new technology or data become available, TMDLs can be readopted as rules.	Yes, one TMDL (Charleston Harbor) was issued in 2002 as a phased TMDL for DO. Phased TMDLs are issued when better model methods are projected and additional data collection is needed.	
Are existing TMDLs ever reassessed/revisited? When?	TD6, TD-10	Yes, TMDLs are given a schedule for reassessment on a 5-year interval, under the "Effectiveness Monitoring" program. No TMDLs to date have been reopened or recalculated based on changing WQS, but could be done per the TMDL prioritization process, However, Ecology has not had sufficient resources for routine TMDL effectiveness monitoring.	Yes, TMDLs produced by RWCB include an implementation plan requiring periodic review or review every 5 years. TMDLs developed to allow revisiting per new information. If limited data are available or WLA/LA is unattainable, this understanding is built into implementation plans. TMDLs issued under consent decree in Southern California are high priority for updating due to limited implementation information incorporated into TMDL (at the time of development).	This has not occurred yet.	Existing TMDLs are revisited when most or all of the recommended implementation actions have been completed. This has occurred for the Upper Little Miami River, Mill Creek, etc.	Yes, based on changing water quality standards and receipt of new information/data. Total coliform TMDLs withdrawn after state dropped total coliform as surface water criterion. Lower St. John River TMDL was repealed based on litigation and a SSAC for DO was adopted.	Yes, in the case of the phased TMDL. State is considering a pathogen indicator change for recreational use in fresh waters. State initiated a work group to determine effects on loading. Percent reduction allocation in existing TMDLs determined to be consistent regardless of pathogen. Future revisions to water quality standards would warrant revisiting TMDLs.	· Increase Ecology staff and/or grant funding for TMDL effectiveness monitoring. · Acknowledge situations where targets are unattainable (like CA does).
Can water bodies by de-listed if there is an established TMDL?	TD3	Currently varying opinions. WQP Policy 1-11 allows water bodies to be moved to Category 1 if TMDL implementation is showing positive results, sufficient data are available to indicate the segment is meeting standards, and there are no known sources that would cause downstream pollution. Some believe that segments cannot be de-listed for any parameter if any parameters are still being exceeded.	Category 4a is used as long as at least one 303(d) listing is addressed through TMDL. De-listing per select parameters would not change the category, although it can be done.	Depending on attainment, water segments may be broken down from original assessment scale to support de-listing based on TMDL implementation.	Because of the rotating monitoring schedule implemented by watershed, watersheds with TMDLs in place may be revisited to measure water quality conditions. Use of assessment units would support partial de-listing of reaches. However, it is unclear from the OAR whether de-listing may occur after TMDL development.	Water bodies are listed by segment. When a segment-analyte combination has demonstrated it is meeting water quality criteria, it can be proposed for de-listing. If water quality criteria are met for some but not all parameters, FDEP may propose a partial de-listing.	Water bodies listed by station in the TMDL. Individual stations may be de-listed by parameter as warranted.	Need a clear opinion and direction regarding this question. Note that most states guidelines on this are ambiguous.
How are tribal stakeholders considered in the TMDL development process?	TD5	Tribal stakeholders are usually members of the TMDL technical coordination committee and have input during process. If tribes provide water quality data that meet QAPP, they can be used in TMDL development. Ecology does not have authority to establish allocations or identify tribes as a DMA. Tribes typically adopt implementation actions and plans that support the TMDL.	When affected, tribal stakeholders are accounted for in TMDL project plans and level of involvement varies. Typically provide public comment and participation.	Tribal stakeholders are involved just like any other stakeholder.	Not applicable.	Tribes are responsible for their own reporting to EPA. When TMDL impacts tribes, tribes are notified via e-mail (recently done for statewide mercury TMDL). Tribes are typically treated as an interested stakeholder but not DMA.	There is only one federally recognized tribe. One TMDL (in progress) applies to the area within the tribal boundary, but the state has not determined if the tribe is to be listed as DMA.	

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
Evaluation methods								
How have TMDL development methods been adjusted to account for changing water quality standards? Assessment methodologies?	TD10, TD11, TD11-a, TD11-b	Changes to water quality standards do not trigger revisiting TMDLs or allocations. Success of TMDL is measured against the new standards. Use of surrogate (parameters) to establish allocations for easier implementation. Surrogate relationship based on large amounts of site-specific data (for calibration), and other analysis tools and models.	The TMDL development process allows for development of a project definition report and project plan that looks at alternatives to TMDL development. This allows for stakeholder involvement. California employs a joint fact-finding approach and scientific peer review process to support changes to standards, development of new standards, and TMDLs development methods, which has allowed politically sensitive subjects to achieve quicker buy-in from stakeholders.	*Question not responded to.*	TMDL development generally uses flow duration curves for analysis. The rotating monitoring cycle implemented by the state provides opportunity for revisiting TMDLs and associated listings based on updated data.	TMDL development methodology allows for TMDLs to serve as site-specific water quality targets for nutrients. TMDL development process is iterative such that if new technology or data become available, TMDLs can be readopted as rules. Most TMDLs are developed to be more stringent than water quality criteria, and allocations trump criteria because the evaluation is more site-specific.	State-calculated correlation factors used for the pathogen indicator change. TMDL uses percent reduction in bacteria load (that is independent of pathogen type). Work groups are established when changes to methods initiated in order to identify impacts to allocations.	· Consider pre-planning documentation (project definition or project plan) to summarize alternatives to TMDL development (with input from stakeholders) before initiation of a TMDL. · Employ a scientific peer review process to support changes in WQS or TMDL development methods. · Stop using surrogates.in TMDLs. · Include numeric measures/ estimates for implementation in the TMDL implementation report, based on BMP toolbox or other baselines effectiveness assumptions.
Have surrogates been used as TMDL targets instead of numeric criteria?	TD10-b	Surrogate parameters (turbidity and TSS) have been used for DDT. The Stillaguamish TMDL uses TSS to protect against mercury. Lake Whatcom (in progress) uses developed acres to reduce phosphorus and protect DO. Any surrogate allocation needs to be linked through scientific analysis to numeric water quality criteria.	No.	No.	No.	No. Florida does not have hydromodification issues that drive looking at flow reduction.	Surrogate parameters (BOD5 and ammonia) have been used for DO. Use is based on site-specific analysis to determine limiting nutrient.	· Stop using surrogates in TMDLs · Develop guidance on development of surrogate allocations for numeric criteria.
How are narrative criteria used in TMDL development?	TD9	Narrative criteria are used to support listing decisions, but generally a causative pollutant is determined.	Narrative criteria are linked to specific evaluation guidance (and thus quantitative target). Most common for human health and bioaccumulation narrative objectives.	Indicators established as part of the listing procedure for narrative criteria are used in TMDL development.	Narrative criteria are used to support listing decisions, but generally a causative pollutant is determined.	Narrative criteria are used to support listing decisions. Prior to placement on the Verified List (303(d) list), a causative pollutant is determined. Causative pollutant based on limiting nutrient.	Narrative criteria are used when making listing/de-listing decisions. TMDLs are not developed based on biologic criteria exceedance but rather based on causative pollutant load.	
Have load/WLAs been established based on narrative criteria?	TD9-a	No.	Yes, in accordance with the quantitative target. See description below.	Yes.	No.	Yes, in accordance with the limiting nutrient.	No.	
Have surrogates been used as TMDL targets instead of narrative criteria?	TD9-b	Yes. TSS used to address narrative "deleterious effects on aquatic life" (Hangman Creek). Total phosphorus to protect aesthetics in lakes.	Yes. Narrative criteria "adverse impacts and excessive siltation causing detriment to salmonid habitat" (North Coast TMDL, Sonoma Creek TMDL, Napa River TMDL) uses spawning gravel permeability, streambed scour, and percent fines as indicators. WLA/LA was based on reference condition for specified indicators. San Francisco Bay PCB TMDL targets a fish tissue concentration. Although numeric standard, because the driver is human health, narrative criteria were	No.	No. TMDL targets are tied to the pollutant directly.	No. Florida does not have hydromodification issues that drive looking at flow reduction.	Recently tried to develop surrogate for biological criteria exceedance based on impervious area (indirectly based on flow). Due to current legal challenges, TMDL never went out for public comment.	Stop using surrogates in TMDLs

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			used. RWCB had to develop food web model to translate levels of PCB in fish tissue to levels in bed sediment.					
How are TMDLs developed based on biologic impairment?	TD9-b, TD10-b	Analysis to determine causative pollutant and severity scoring (as applicable). Example (Hangman Creek): Analysis conducted to determine TSS loading and severity for salmonids for using multiple regression models and scoring tool.	Analysis to determine causative pollutant (or limiting nutrient).	Analysis to determine causative pollutant (or limiting nutrient).	Regarding adherence to biologic criteria, partial or non-attainment of the three indices results in an evaluation of cause and sources. The associated WLA/LA is established based on the causative pollutant (or limiting nutrient) and any site-specific considerations.	Analysis to determine causative pollutant (or limiting nutrient).	Analysis to determine causative pollutant (or limiting nutrient).	
How is the margin of safety determined?	TD12	No specific guidelines. Usually rely on implicit MOS, but sometimes explicit. MOS varies for each project due to nature of parameter, study methods, and watershed.	General guidance in TMDL Guidance (Resolution 2005-0050). May be implicit (more conservative) or explicit.	No detailed guidance. Depends on the data used and the model used.	General guidance in OAR 3745-2-12. The MOS may be provided as a portion of the loading capacity unallocated or by using conservative modeling assumptions to establish WLA and LAs.	There are in-house guidelines but no specific rules. Generally (90% of the time) TMDLs use an implicit MOS because it is more conservative, but explicit has been used as well.	No specific guidelines. Usually rely on implicit MOS, but no procedures in place. Models generally use conservative methodology. Pathogen TMDLs typically use an explicit 5% MOS.	· Use sensitivity analysis based on ranges of key input values. · Improve guidance on use of MOS
Allocations								
What is the process used to define allocations?	TD14, TD14-a, TD14-b, TD14-d	Loading capacity of water body identified. Regional water quality lead is supposed to work with stakeholders to identify appropriate allocation scenarios most reasonable to be implemented. This study includes an iterative process and includes data collection, field work, modeling, statistics, and other study tools. Identification of MS4 WLAs is TMDL-specific and depends on study methods and available information. Innovative methods are being explored to address and refine this.	All pollutant sources are identified during preliminary Project Definition. If TMDL development is pursued, during project analysis phase, allocation analysis follows a stepwise process to identify assimilative capacity of receiving water and allocation among sources. Section 5.4 of TMDL Guidance (Resolution 2005-0050) summarizes approaches. Approaches include reference watersheds, mass balance, flow duration/load duration, and modeling systems. MS4 WLAs are usually differentiated from other nonpoint areas spatially with some empirical data (if available).	Allocations must be expressed in the TMDL in terms of daily increments (per federal court decision). Water Evaluation Section staff identify sources and select allocation methods. MS4 WLAs are typically developed through a proportional allocation method based on a baseline load.	Development and finalization of allocations is listed in Phase 6 of the 12-step TMDL process. The sources are identified and loading capacity of the water body determined. If design flow information is known (for point sources), it is used but otherwise allocations are generally based on a relative area contribution. MS4 WLAs are typically separated and calculated from nonpoint source areas spatially.	Initial allocations (total point versus nonpoint load) outlined in TMDL development, but detailed allocations determined in BMAP (which is adopted by secretarial order). Model used to evaluate overall loading. Sources identified and general allocations established. Using the Basin Working Group, allocations are refined in the BMAP. MS4 WLAs are typically separated and calculated from nonpoint source areas spatially.	Identify all point sources. Coordinate with applicable DMAs during development of allocations and distributions. SCDHEC developed a spreadsheet loading tool that can facilitate allocation process (specifically for continuous point source dischargers). Tool is used by local groups to make adjustments to spatially reconcile WLAs. Have not yet been used for MS4s. Nonpoint source allocation assigned after evaluation of point sources. NPDES-regulated Phase I MS4s are separated spatially from non-permitted MS4s. WLAs are assigned as a percent reduction for each municipality, and non-permitted MS4 loading is included under the single nonpoint source LA.	· Adopt AI guidelines (Shabman et al,. 2007) · Assign load allocations to specific, identified nonpoint sources per review of legal authority. Detail implementation strategy to provide basis for compliance.
Typical point sources (associated with WLAs)	TD13, TD14-b	NPDES permittees (including regulated MS4, WWTP, and other point source dischargers)	NPDES wastewater permittees, NPDES stormwater permittees (sometimes combined and sometimes split between municipal, industrial, and commercial)	WPDES permittees (including regulated MS4, WWTP, CAFO, and other point source dischargers) Wisconsin requires livestock operations between 300 and 999 animal units to apply for a WPDES discharge permit	NPDES permittees (including regulated MS4s, industries, and WWTP)	NPDES permittees (including regulated MS4s, industries, and WWTP)	NPDES permittees (including regulated MS4s and WWTP)	Adopt AI guidelines (Shabman et al,. 2007)
Typical nonpoint sources (associated with load allocations)	TD13, TD14-b	Generally described in narrative only based on land use. A single LA represented for all nonpoint sources, calculated after point sources, natural background, and MOS accounted for. Newer guidance from Water Quality Program is to be more specific about nonpoint source types and allow for	Atmospheric deposition, Department of Agriculture (agricultural runoff).	Agricultural runoff (operations not subject to a permit, urban (non-MS4 runoff).	Agricultural runoff (operations not subject to a permit, urban (non-MS4 runoff).	Department of Agriculture (agricultural runoff), nonpoint source runoff (septic systems), SSOs	Agricultural runoff, urban (non-MS4 runoff), CAFO. A single LA usually represented for all nonpoint sources.	Adopt AI guidelines (Shabman et al,. 2007)

Table C-1. State WQA and TMDL Development Results Summary

Key evaluation area and topics	Applicable script question	State comparison						Potential recommendations
		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
		specific LAs.						
How are LA and WLAs typically represented for bacteria and nutrients?	TD14-c	Bacteria typically set as concentrations. Bacteria calculated as a load does not add much value to implementation/compliance. Nutrient loads are typically a mass per time. The time period depends on source and receiving water and could include seasonal or monthly allocations.	Varies; bacteria and nutrients typically set as a load, but in some cases is a concentration.	Bacteria and nutrients typically represented as a mass (annual/seasonal and daily).	Bacteria and nutrients typically identified as a daily load. Seasonal loads are occasionally provided depending on water quality standards. Nonpoint sources (LAs) typically use a percent reduction.	Bacteria typically depicted as a percent reduction using the Hazen method. Nutrient allocations expressed as a percent reduction (except for some point sources). BMAPs include appropriate adopted BMPs for each nonpoint source to implement and maintain for compliance.	Bacteria typically represented as a percent reduction. Continuous sources of discharge may have an effluent limit assigned in their permit (based on WLA). Nutrients can be represented as an average annual load or concentration. Chlorophyll a/N/P requires complex modeling—state has developed only two nutrient TMDLs (DO impairment is not traditionally the result of eutrophication so TMDLs correlate DO impairment with BOD and ammonia).	
Are site-specific discharge data required?	TD14-a	It is not required but is preferable. Loadings can be estimated through watershed modeling assessments.	The need for site-specific data (flow and concentration) varies, but is preferable. This is particularly important for WWTP where typical loading is used to create an overall WLA that is split among WWTPs (it may not be representative for all sources).	The proportional allocation method is based on permitted flow and effluent limits (for point sources). Therefore, site-specific information is preferable.	It is not required but is preferable.	FDEP uses statewide compiled Event Mean Concentration by land use to estimate load from various sources. BMP toolboxes developed by state to estimate load reduction for various BMP activities.	If available, site-specific data can be used but not necessary.	· Fund effectiveness monitoring · Adopt AI guidelines (Shabman et al,. 2007)
Is the statistical rollback method used?	TD16	Yes, but not always. Because both parts of the bacteria criteria must be met (geometric mean and 10th percentile) alternative methods are usually equivalent to the statistical rollback method.	Yes, but uses a reference beach approach for pathogens to account for natural sources.	*Question not responded to.*	No.	No.	No.	
Are load/WLAs ever reassessed after TMDL issuance?	TD15	No policies or methods are currently in place. To date, no approved TMDL has been reopened to revise analysis or allocations. If a change in WQ standards (e.g., via UAA) resulted in a decision to reopen, the process would be described in the Implementation Plan.	No policies or methods currently in place. May occur on a case-by-case basis.	WLAs may be adjusted during the WPDES permitting process so long as the total WLA expressed in the TMDL remains the same or is lower. Recent proposed guidance (2013) updated protocols: http://dnr.wi.gov/news/input/documents/guidance/TMDLGuidance.pdf	No.	FDEP develops the BMAP over a multi-year period, using its EMC values and toolboxes. Activities are documented in BMAP by source and responsible party.	No.	· Fund effectiveness monitoring · Adopt AI guidelines (Shabman et al,. 2007)
TMDL implementation								
General								
Is implementation addressed in the TMDL itself?	TD17, TD19	All TMDLs include adaptive implementation as a strategy in the TMDL itself or as a subsequent TMDL implementation plan.	If TMDL developed by RWCB as a Basin Plan amendment and a supporting staff report, implementation is addressed. If EPA develops the TMDL, implementation is not typically addressed. 20-year time frame for WLA achievement is assumed.	If TMDL is developed by states and is adopted as part of the Area-wide Water Quality Management Plan, it contains implementation requirements. 20-year time frame for WLA achievement is assumed.	All TMDLs include an implementation plan that is submitted with the TMDL report.	Implementation of Watershed Management Approach to Water Quality includes development of BMAPs (Phase 4) and Implementation (Phase 5). Pollutant reduction strategies defined in BMAP. Additional studies can also be conducted during the implementation phase (Phase V) that can refine the initial TMDL reduction goals. If subsequent monitoring indicates water quality standards are consistently	No, EPA does not approve implementation actions for TMDLs so implementation plans/ components are not provided. TMDLs do assume MS4s meet the MEP standard (progressive implementation). TMDLs have adaptive implementation language allowing for revisions based on new data as available.	Adopt AI guidelines (Shabman et al,. 2007)

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						maintained, no further reductions are required, even if TMDL target has yet to be attained.		
Are policies in place to identify implementation actions?	TD17	Implementation actions for NPDES dischargers must meet requirements outlined in the Water Quality Program policies and guidance such as the Stormwater Management Manual for Washington. No specific policies exist for nonpoint source. Nonpoint source implementation actions must demonstrate they will result in nonpoint discharges that do not violate water quality standards. Ecology has authority under RCW 90.48 to take enforcement actions to correct documented pollution problems that violate water quality standards. Ecology uses effectiveness monitoring and cataloging of implementation measures to verify success.	If compliance cannot be achieved with a change to WQS or a single action by the RWCB (permit or certification that a certain action will achieve allocations), then a Basin Plan amendment is issued that contains implementation actions. No explicit procedures other than the TMDL Guidance (Section 7), which requires evaluation of the environmental impact for means of compliance. A BMP toolbox is used to select implementation activities to achieve pollutant reduction. Adaptive implementation is commonly used and allows phased implementation and planning studies (example: mercury TMDL).	WAC, Chapter NR 151, contains nonpoint source performance standards: http://docs.legis.wisconsin.gov/code/admin_code/nr/100/151.pdf WAC, Chapter NR 217, contains procedures for point sources (specific for phosphorus): http://docs.legis.wisconsin.gov/code/admin_code/nr/200/217.pdf	There are no explicit procedures.	Florida uses statewide BMP toolbox in development of TMDLs and BMAPs. Florida Department of Agriculture and Consumer Services (FDAC)'s Agriculture Water Policy required development and adoption of BMP activities proposed by FDEP for nonpoint sources. Florida was the first state in the country to require treatment of stormwater from all new development (statewide Stormwater Rule established design criteria and technology based effluent limits for use in defining LA/WLA).	There are no explicit procedures. South Carolina actively encourages use of the South Carolina Simplified Guide to Developing Watershed Based Plans (for nonpoint sources). South Carolina recently published a guidance memo "Evaluating the Progress of MS4 Programs" to assist NPDES permit writers.	· Develop guidance documentation or policies to determine TMDL implementation actions (should be referenced in the TMDL development process). · Utilize NPDES-collected monitoring data to evaluate TMDL effectiveness. · Develop BMP toolbox to aid in the identification of source control and treatment measures targeted at pollution reduction. In conjunction with TMDL effectiveness monitoring, refine assumptions as needed.
How are load allocations (associated with nonpoint sources) enforced?	TD18	Per RCW 90.48, Ecology may take enforcement actions to correct documented pollution problems that violate surface water quality standards.	California Water Code requires permits or conditional waivers for all dischargers. Nonpoint Source Policy: http://www.waterboards.ca.gov/water_issues/programs/nps/docs/oalfinalcopy052604.pdf	Per WAC, Chapter NR 151, DNR has statutory authority for addressing impacts from smaller livestock operations and crop production and provides local governments authority to enforce agriculture performance standards. If the TMDL requires additional reductions, rulemaking is needed. http://dnr.wi.gov/topic/nonpoint/documents/npsprogrammgmtplan6282011.pdf	Limited enforcement authority for nonpoint sources.	Florida Department of Agriculture and Consumer Services (FDAC) have regulations in place to develop and adopt BMPs proposed by FDEP by rule and measure effectiveness (based on load reduction in pounds). FDEP employs a general verification process with monitoring program targeted at before and after implementation.	Limited enforcement authority for nonpoint sources. Implementation of the Section 319 program provides grant funding based on pollutant reduction goals and provides incentives for nonpoint sources.	
How are WLAs (associated with point sources) enforced?	TD18	Through issuance of NPDES permits and effluent limits (as applicable)	Through issuance of NPDES permits and effluent limits (as applicable)	Through issuance of NPDES permits and effluent limits (as applicable)	Through issuance of NPDES permits and effluent limits (as applicable)	Through issuance of NPDES permits and effluent limits (as applicable)	Through issuance of NPDES permits and effluent limits (as applicable)	
Point sources (municipal stormwater)								
How many MS4 stormwater permits are subject to TMDL requirements?	Not a specific question	State has eight Phase I permittees regulated under a general Phase I MS4 NPDES permit, and one agency (WSDOT) regulated under an individual MS4 NPDES permit. State has approximately 100 Phase II permittees. Phase I permittees include Clark, King, Pierce, and Snohomish Counties; the cities of Seattle and Tacoma; and the Ports of Seattle and Tacoma.	State has 22 area-wide Phase I permits, affecting 100+ permittees. http://www.swrcb.ca.gov/water_issues/programs/stormwater/phase_i_municipal.shtml	State has 220 municipalities regulated under general MS4 permits (requirements do not vary by Phase I/II).	Ohio has 4 individual Phase I MS4 permits (Dayton, Akron, Toledo, and Columbus), and 294 general MS4 permits (affecting 542 communities).	State has 20+ individual Phase I permits (with multiple co-permittees listed on each).	State has one large individual Phase I (SCDOT) and four medium individual Phase I NPDES MS4 permits (SCDOT, Greenville County, Richland County, and City of Columbia). City of Columbia was one of the last Phase I permits issued.	
How are TMDL requirements incorporated into MS4 permits?	P1, P1-a, P1-b	Permit generally requires programmatic activities to address TMDL parameters. Appendix 2 of the MS4 permits and	Varies by region and permit. State trying to develop consistent approaches. An internal technical memorandum: TMDL	State has developed an MS4 Urban Stormwater Technical Team to develop guidance for determining MS4	In recent years, NPDES permit renewals are integrated with the TMDL process. During permit renewals, Ohio EPA staff	Permit requires programmatic activities to address TMDL parameters and adherence with	Generally as programmatic activities to address TMDL parameters. Recently issued permits include monitoring	· Develop BMP toolbox to aid in the identification of source control and treatment measures

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		Washington	California	Wisconsin	Ohio	Florida	South Carolina	
		Appendix 3 of the WSDOT permit identifies actions to address specific TMDL parameters (per TMDL development recommendations). Actions include targeted outreach efforts, increased monitoring, targeted IDDE screening, and submission of CIP plans. A standard recipe book is not available to translate loading back to achievement of the WLA, although some implementation activities require permittees to estimate change in pollutant loading, either directly or indirectly.	Requirements in Stormwater Permits (by Tom Mumley) provides some interim guidance. Permit requires standard programmatic activities. Specific TMDL requirements incorporated as numeric effluent requirements (Los Angeles-area permit), pollutant load reduction benchmarks, and/or BMP requirements. Permits adopted prior to TMDL issuance require reporting on efforts to demonstrate adequate progress.	compliance with TMDL allocations. State is still finalizing approaches and guidelines. Allocations are required to be expressed in the permit. Current permit requires standard programmatic activities and requirement to address developed urbanized areas.	review 303(d) list and applicable TMDLs in crafting permit language and BMP expectations. Permit requires standard programmatic activities and BMPs. MS4 permits do not require development of pollutant load assessments or benchmarks. Monitoring is required but not to actively determine TMDL compliance to date.	conditions of the BMAP. State requires a TMDL Monitoring and Assessment Plan, which includes evaluation of pollutant load discharge and updated SWMP to ensure load reduction. State provides tools available (per BMP toolbox) to assist in calculating load reductions. Example: http://dep.state.fl.us/water/stormwater/npdes/docs/methodology-calculating-reduction-credits.pdf If discharging into bacteria TMDL water-body without established BMAP, bacteria source tracking may be required.	requirement. Development of TMDL implementation plans included as a requirement in the permits. Recent (City of Columbia) permit issued with a provision that a permit modification may be necessary if the need for effluent limits arises.	targeted at pollution reduction. In conjunction with TMDL effectiveness monitoring, refine assumptions as needed. · Standardization of programmatic BMPs for achievement towards pollutant load reduction.
What are typical actions/activities to comply with TMDL requirements?	P1-a	Control measures per the SWMP (and permit) include structural controls, post-construction standards, IDDE, monitoring, ESC, and source control (municipal facility runoff control). Per Appendix 2, permittee-specific requirements are listed for each applicable TMDL. Activities include preparation of an Early Action BMP Plan (details provided in permit); preparation of a QAPP for sampling of priority areas (prepared following Ecology's Guidelines for Preparing QAPPs for Environmental Studies [Publication 01-03-003]); ordinance adjustments, etc.	Control measures per the SWMP (and permit) include structural controls, post-construction standards, IDDE, monitoring, ESC, and source control (municipal facility runoff control). Permits are written with specific, prescriptive elements (BMPs, etc.) to address TMDL impairment as developed for the Basin Plan Amendments. Requirements (WLAs) are directly referenced in the permit. Strategies include IPM (for pesticides), trash management plans and receptacle operation (for trash), etc. Internal discussions have introduced concept of permittee-developed, BMP-based compliance plan (with source identification, schedule, BMPs, and assessment to demonstrate activities will achieve WLA).	Control measures per the SWMP (and permit) include structural controls, post-construction standards, IDDE, monitoring, ESC, and pollution prevention. MS4s also have to address the developed urbanized area standard. Per WAC, Sections NR 151 and 216, all municipalities subject to stormwater permit requirements must implement a 20% and 40% reduction in TSS in runoff as compared to no controls by 2008 and 2013, respectively. Municipalities must use modeling methods (SLAMM, etc.) to indicate progress. Guidance document: http://dnr.wi.gov/topic/stormwater/documents/Guidance_TSS.pdf	Control measures per the SWMP include structural controls, post-construction standards, construction standards, IDDE, retrofits, industrial runoff control, and monitoring. Programmatic activities may vary among permits. Example: two TMDLs resulted in development of alternative construction stormwater permits that contained additional requirements (riparian setback, use of infiltration for post-construction treatment) from statewide permit No separate requirements associated with TMDLs are specifically outlined.	Control measures per the SWMP include structural controls, post-construction standards, IDDE, retrofits, industrial runoff control, and municipal facility runoff control. Permit language requires adherence with conditions outlined in applicable BMAPs. Specific activities may include targeted retrofits, septic tank replacements, and ordinance and code adjustments. http://dep.state.fl.us/water/stormwater/npdes/ms4_1.htm	Control measures per the SWMP include structural controls, post-construction standards, IDDE, retrofits, industrial runoff control, and municipal facility runoff control. Monitoring (per City of Columbia permit) is to be used to show progress towards WLA. State has proposed guidelines for MS4 jurisdictions related to how to evaluate the progress of MS4 programs (August 2008), using a pollutant load reduction methodology. Such guidance is incorporated into the implementation section of TMDLs, but is not referenced in MS4 permits.	Fund effectiveness monitoring. Adopt AI guidelines (Shabman et al,. 2007)
Do implementation actions/activities vary by TMDL parameter? How?	P1-c	Yes. See discussion above.	Yes. See discussion above.	Yes, specific for TSS and total phosphorus.	Minimal. Stormwater staff conducts TMDL/303(d) audits to draft permit language, but there is not a lot of variability or range of options for implementation activities outlined in the TMDLs. Much discretion is left to the permit writers.	Yes, in accordance with activities specified in the BMAP.	Minimal. Future permits may include more targeted measures. MS4 communities are generally the most vocal commenters on TMDL so SCDHEC is determining how to address this.	
If applicable, have MS4 permits been issued requiring compliance with TMDL surrogates?	P1-d	Current permits do not have requirements to comply with TMDL surrogates.	Looking at numeric surrogates, but so far not using them.	No.	No.	Not applicable.	No, although hydromodification is an issue that may warrant this connection (if legally feasible).	Reconsider use of surrogates.

Appendix D: Ecology Comments on Draft Recommendations and Future Coordination

Ecology comments on the report Recommendations for Improving Water Quality Assessment and Total Maximum Daily Load Programs in Washington State

Recommendation 1: Establish a multi-stakeholder Standing Committee to improve coordination and engagement with the regulated community.

This recommendation is confusing and worth talking about some more. We think we are meeting this recommendation with the multi-stakeholder committee, the WQ Partnership, which we have worked with on issues for many years. Ecology's work with this group is consistent with EPA's *CWA 303(d) Vision and Goal Statement* (2013). When we engage in revisions to Policy 1-11 and before submitting WQ Assessments to EPA, we routinely come to this group for feedback, suggestions, and concerns. We also work with this group on many other water quality related issues. What is it about this existing group that does not meet the intent of this recommendation? Your ideas and feedback wuld be helpful since a number of your members sit on this group and since the new Water Quality Program Manager is reaching out for ideas on how to improve this group.

Recommendation 2: Implement existing regulatory authority related to unpermitted and nonpoint sources.

We could really use your help and assistance on moving this recommendation and similar recommendations you have on this issue of regulating nonpoint.

Ecology routinely uses its authority to regulate nonpoint sources of pollution, especially in situations in which we believe that an enforcement action will address an agregious situation or will spur others to implement BMPs. In fact, one of our agricultural enforcement cases was appealed to the state supreme court, where our enforcement action was upheld. However, there are often significant political costs to the agency when we use this authority. It would be useful to us if regulated point sources would visibly support our efforts to regulate nonpoint sources of pollution. We agree that more funding for nonpoint staff and more monitoring of nonpoint sources would be useful. Right now, support by point source dischargers on this work would be the most helpful in making this recommendation real.

It is important to note that we are required to use technical assistance before taking a nonpoint enforcement action, and we would prefer to get voluntary compliance because it is faster and less costly.

Recommendation 3: Refine water quality standards and water quality assessment methodologies.

a) **Use *E. coli* as the indicator bacteria.**
Because EPA has made new national recommendations for bacteria, The Water Quality Program has a schedule that it has developed to consider revising bacteria indicators in Washington in Fiscal Year 15 & 16 (scheduled as part of the last Triennial Review). So this is a priority we have identified.

We should note that Ecology attempted to revise fresh water bacteria standards to E. coli in 2003. There was strong pushback from tribes and the public not to move from fecal coliform. The continuation of the use of fecal coliform was determined appropriate for numerous reasons prominent among them being: 1) fecal coliform has a very strong correlation with E.Coli (90-95%) and therefore is believed to be at least as effective an indicator as E.Coli in Washington, 2) fecal coliform in shellfish marine waters will continue to provide stringent protection for shellfish as well as primary contact 3) many comments were received on fecal coliform monitoring and how past monitoring would now be compared to the new indicators, and 4) because of close correlation with E. Coli, staying with fecal coliform would avoid the higher costs associated with the monitoring and analysis for E. coli and enterococci without their being superior indicators for our state.

b) **Revise statewide listings to reflect current water quality conditions.**

Ecology acknowledges that the Water Quality Assessment process takes time and resources, and it is difficult to keep the Assessment current with new data because of the resources and time needed to collect and analyze data. If we did not cut off data collection to begin the assessment, we would never get done with a listing cycle. We are in the process of working to automate the technical data assessment piece of the Assessment and are hopeful that this new process will allow more timely assessment of the data.

c) **Improve transparency and completeness of methodology for water body delisting.**

We think we have already implemented this recommendation so it would be helpful to better understand this recommendation. . We have added delisting decision documentation to Policy 1-11. Specific suggestions on where further documentation is needed would be helpful.

d) **Define a critical condition or period of application for the water quality assessment (WQA) of each water body-parameter combination.**

We think we have already implemented this recommendation so it would be helpful to better understand this recommendation. The specific parameter sections in the Water Quality Assessment Policy include this kind of information, as well as the associated QAPPs. If there are specific areas where this seems to be deficient, it would be helpful to know what they are.

Criteria are already based on worst-case conditions (e.g. temperature in summer). In many cases there is insufficient information to determine the critical season with only the data available from the 303d listing. For example, bacteria may be a problem in the fall and winter from runoff, but sometimes also in the summer from direct access or discharge. Or DO may be a problem in summer, but also in the fall “shoulder season” when flows are still low but

criteria more stringent. It would not be protective to assume the season without a scientific study of the problem, since a given pollution problem may occur in more seasons than the original listing data suggest.

e) **Re-evaluate the potential benefits of the binomial probability distribution function in WQAs.**

This was discussed in the response to comments for the last revisions to Policy 1-11. Especially see comments from Snohomish County: http://www.ecy.wa.gov/programs/wq/303d/WQPolicy1-11ResptoComments.pdf.

Ecology plans to prepare a companion document to the WQ Assessment policy that will discuss the Type I and Type II error analysis. This will be available before submitting the current fresh water assessment to EPA.

Recommendation 4: Improve and employ consistent processes for collecting, assessing, and utilizing credible data in WQA and TMDL development.

We think we have already implemented this recommendation so it would be helpful to better understand this recommendation. Ecology follows state statutory requirements for credible data, contained in Policy 1-11, Chapter 1: Assessment of Water Quality for the Clean Water Act Sections 303(d) and 305(b) Integrated Report and Chapter 2: Ensuring Credible Data for Water Quality Management. Third party data collected using an Ecology-approved QAPP can be used for WQA and TMDL development. This recommendation needs some specific suggestions so that we can understand where the authors feel this is lacking.

The statement "minimum QA/QC requirements for data used in WQAs and TMDLs remain undocumented in policy, State statutes, or code" is inaccurate. There is an extensive body of QA/QC policy and guidance provided to Ecology for WQA and TMDL work. When the Credible Data Policy was developed there was a conscious decision to not specify QA/QC procedures since those policy and guidance documents already existed separately.

a) **Standardize and improve transparency of WQA and TMDL development methodologies tobe consistent with current and applicable EPA quality related regulations, policy, and guidance.**

This recommendation suggests that Ecology's methodologies are inconsistent with EPA policies, guidance, and rules. However, no examples of this inconsistency are provided.

b) **Clearly define and apply appropriate quality assurance/quality control (QA/QC) levels forWQAs and TMDL development.**

This recommendation suggests that Ecology's QA/QC requirements are inadequate. Again, no examples are provided of how those requirements are failing to ensure the quality of information used in our TMDL studies. This also appears to contradict that statement in Appendix C that staff view the quality of data as a strength of Ecology's TMDL program. It would be helpful to better understand this recommendation or the specific issues you are referring to.

Recommendation 5: Refine water quality assessment categories to improve clarity and aid in defining priority water bodies.

It is not clear what benefits this recommendation would provide. The statement, "Expand existing classification categories for water bodies, which would prevent the development of TMDLs…" is not the objective anticipated in EPA's *CWA 303(d) Vision and Goal Statement* (2013). Rather EPA is proposing that states use the correct tool to get to clean water. Although other states have added categories, we do not believe it is necessary to do so in order to design studies or nonpoint strategies with the appropriate scope and objectives as alternatives to the immediate development of TMDLs.

Recommendation 6: Update the current biological assessment and listing methodology.

This would be helpful to understand so we clearly know and can understand your thoughts/ideas.

a) **Employ a public process to help define the methodology and quality assurance/quality control (QA/QC) protocols utilized for biologic monitoring efforts.**

   QA/QC protocols to be used by Ecology are technical decisions that must meet state credible data requirements. It would not be appropriate to use different protocols in every watershed.

b) **Require stressor identification before listing determinations are made for biological data.** The purpose of the TMDL study may be to identify the stressor causing the listing, and the outcome may not necessarily be a TMDL. One example is the TMDL study of Total Dissolved Gas in the Spokane River, where the study found the source of non-attainment to be dams under a single FERC license, and instead of a TMDL, recommended a 4A listing based on the 401 certification in the license.

   Perhaps these concerns could be addressed by clarifying in agency policy that a TMDL technical study may result in various outcomes, of which a TMDL is but one. Studies could be renamed and their scope clarified to identify the variety of outcomes possible in addition or instead of a TMDL. Otherwise, if a stressor has to be identified before a Category 5 listing can be established, a resource-intensive study may be required just to achieve the listing, followed by another study to set the TMDL. It would be a more efficient use of public resources to conduct one study with the flexibility to select from a variety of endpoints and implementation methods.

Recommendation 7: Define TMDL prioritization methodology, timelines, and process for public involvement.

Ecology will be updating its TMDL prioritization process to be consistent with EPA's *CWA 303(d) Vision and Goal Statement* (2013) by 2016.

Recommendation 8: Define TMDL development methodology.

The statement "Currently, Washington State does not prescribe TMDL development methods in policy, State statutes, or code. TMDL development procedures lack clarity and consistency" is not entirely accurate. There are a variety of policy and guidance documents and procedures that describe TMDL development methods and procedures. It would be helpful to understand the specific issue or guidance that you woud like to see after looking at what we already have in place.

a) **Require a project definition report or project plan at the beginning of the TMDL development effort.**
This is currently done in the Quality Assurance Project Plan (QAPP). Suggestions for a broader project plan are already being discussed and could be a useful improvement.

b) **Confirm designated use and applicability of WQS early in the TMDL development process.**
Water quality standards that apply to a TMDL are defined in a QAPP. A TMDL is designed to address the standards that currently exist in rule. An outcome of a TMDL study could be a recommendation to review the standards, and such a process is already described in the standards.

c) **Develop specific guidelines for determination of the margin of safety (MOS).**
Prescribing specific processes for MOS may be counterproductive. MOS is publically reviewed during the TMDL development process, and the flexibility to explore alternative approaches helps ensure a TMDL that is fair and can be implemented efficiently.

d) **Assign load allocations (LAs) by specific known nonpoint sources, in conjunction with Recommendation 2.**
Most TMDL studies are designed to attempt to identify nonpoint pollution sources. However, the complexity of NPS pollution makes it challenging to ensure that all possible sources are quantified and identified within the limited scope and resources of any given project. Typically, part of implementation is to further identify sources and focus implementation efforts.

e) **Reject the use of non-pollutants as surrogates.**

EPA's regulations state that TMDLs can be expressed in several ways, including in terms of toxicity (often an aggregate measure of more than one pollutant), or by some "other appropriate
measure" [40 C.F.R. §130.2(i)]. They also state that TMDLs may be established using a biomonitoring approach as an alternative to the pollutant-by-pollutant approach [40 C.F.R. § 130.7(c)(1)]. This flexibility in the expression of TMDLs supports reliance on a surrogate when there is a reasonable rationale and the TMDL is designed to achieve compliance with water quality standards.

The matrix in Appendix C notes that Ecology requires surrogate measures to be linked with pollutants and their criteria. This should be noted in this section.

Recommendation 9: Develop consistent TMDL implementation expectations.

a) **Develop standardized best management practice (BMP) performance measures (programmatic and structural) to use in defining wasteload allocations and implementation efforts.**
It is unclear what is meant by a standardized programmatic BMP performance measure. Examples around this would be helpful so we can determine if we have already done this or might need more of your help in being successful at doing this.

We have tried to establish suites of BMPs that will address nonpoint pollution from specific land uses (such as livestock keeping), and those efforts were met with significant political resistance. We agree that the best way to address nonpoint pollution would be to establish suites of BMPs for different land uses that could be used for TMDL implementation as well as for our routine nonpoint work and for straight to implementation projects. However, BMPs cannot be used to express TMDL load allocations, which are required to be numeric.

b) **Develop TMDLs that allow flexibility via adaptive management where the wasteload allocations (WLAs) or LAs do not appear attainable with current tools or BMPs.**
Phased TMDLs are only one possible tool to address this issue, and is perhaps not the most cost effective, since it requires the TMDL to be revisited at least once, and perhaps multiple times. Other tools are compliance schedules and variances.

c) **Implement TMDLs in a manner that ensures proportional distribution of WLAs or LAs to all major contributing sources.**
Ecology's TMDLs divide the pollutant load between point and nonpoint sources as accurately as possible. However, federal regulations require that, unless we can provide reasonable assurance that the nonpoint portion of a pollutant load will actually be reduced as part of TMDL implementation, all of the load must be assigned to the point sources. As noted in the response to Recommendation #2, when we attempt to implement TMDL load allocations, we often face significant pushback from industry groups and there are political costs to the agency when we use this authority. It would be useful to us if regulated point sources would visibly support our efforts to regulate nonpoint sources of pollution.

We should work with your group to explore options on how to get a more equitable delination of real responsibility between nonpoint and point sources of pollution. We could use point source stakeholders' help in this effort—so far it has bee a challenge to do alone.

d) **Finalize framework for water quality trading and offsets.**
Ecology has developed a draft trading policy, which enables trading in the state. However, at this time, there are no interested purchasers, although we have heard about many groups that believe they have something to sell.

We do not agree that encouraging water quality trading is an appropriate action for Ecology to take, since trading is voluntary. We also do not agree that trading would necessarily help to achieve nonpoint pollution reductions. Unless trading programs are carefully crafted to set appropriate baselines for nonpoint dischargers to achieve prior to generating credits, trading programs can be just another way to shift costs for all of the pollutant reduction responsibility in a watershed onto point sources.

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Sent: Friday, July 11, 2014 10:03 AM
To: Britsch, Steve; Moore, Bill (ECY); Ratcliff, Jana; Carla Vincent; Coyle, Jill; Jeff Schnabel; John Collins; Keune, Jennifer; Mindy Fohn; Schaffner, Larry; Bresler, Helen (ECY); Braley, Susan (ECY); Brown, Chad (ECY); Archer, Jessica (ECY)
Subject: RE: Draft WQ Assessment and TMDL Report - Review and Discussion

All—Here are my notes on ideas and potential next steps that I briefly mentioned at the end of our meeting last week. —Thanks for the discussion and look forward to hearing from you on your next steps-

Follow up on Key Issues
We should decide how to follow up on some of the items discussed— as they relate to recommendation number 1 and your desire for smaller workgroups. One of my thoughts was a longer day to discuss some of these issues in more detail (e.g. – UAA for bacteria, BIBI, Credible data requirements for Ecology with the Agency's QA/QC officer, modeling A/QC discussion.....).

Addressing Nonpoint-
Meet with Helen Bresler to talk through some ideas on how to get more attention on nonpoint.
Ecology will be updating the Nonpoint Plan and many of the issues discussed on Friday should be included and discussed in that plan update. Work on the nonpoint plan is starting now and we could schedule time to meet and talk about this in more depth.
Time for this is now—Helen and her staff are contact for this.

303(d) Policy
Many of the items in the recommendation are items associated with the update of the 303(d) listing policy. There should be more discussion when the time gets closer for updating the 303(d) policy. The soonest that might happen will be in Spring 2015. Susan Braley is the contact for that and can provide wou with the most current schedule for that work.

TMDLs—
You all want to see clear schedule for when we will be developing TMDLS. You do not want to be surprised by us and would like to plan for this work.
As you noted we are required to update our prioritization process to meet new federal requirements—as part of that effort we will talk and share our ideas with you. In the mean time I encourage you to work directly with my counterparts on this issue. Rich Doenges at (360)407-6271 is responsible for the SW region and Kevin Fitzpatrick at (425)649-7033 is responsible for the NW region.

Credible Data
I suggest a follow up meeting with our agency's Quality Assurance Officer to talk in more detail. Here is a list of our SOPs http://www.ecy.wa.gov/programs/eap/quality.html and more information on the quality assurance requirements for the data we use.
If you want to set up further discussion on this as well as modeling protocols please work with Jessica Archer.

Let us know if you would like to follow up on these as well as your next steps for the report. Thanks--Melissa

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