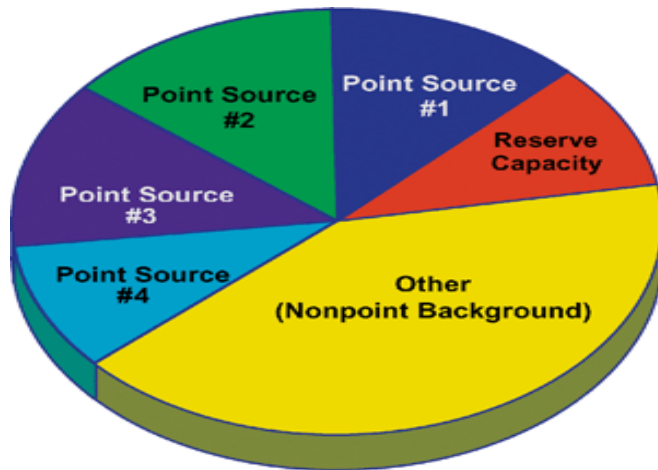


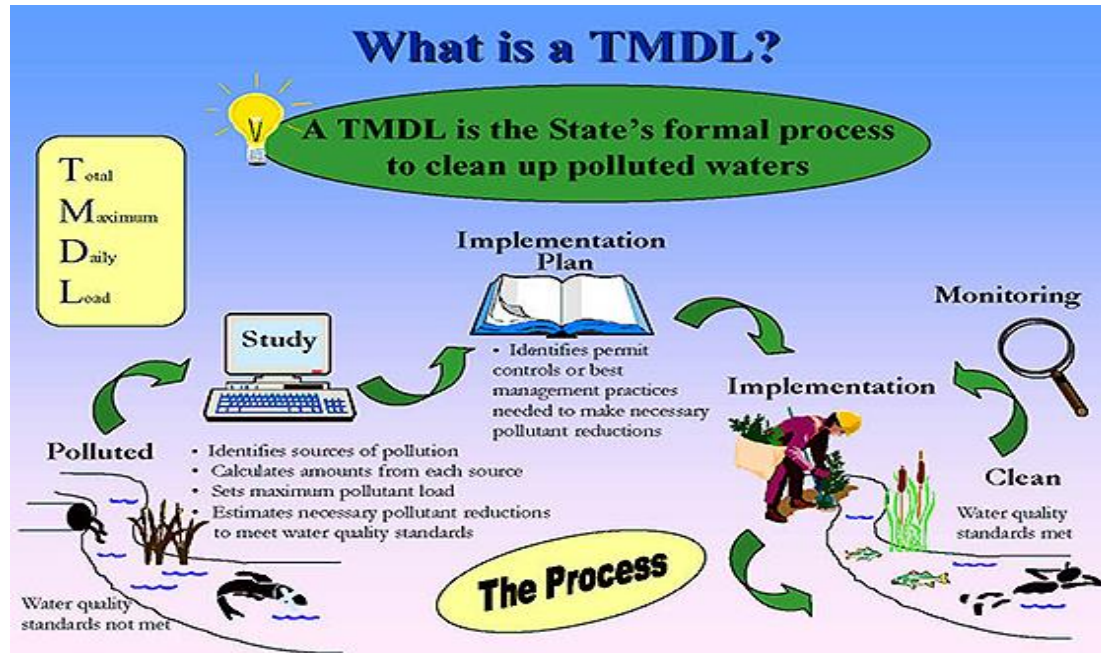
TOTAL MAXIMUM DAILY LOADS

“A Means To An End, Or An Endless Means?”

Issues and Perspectives on the Development and Implementation of TMDLs Under the Clean Water Act



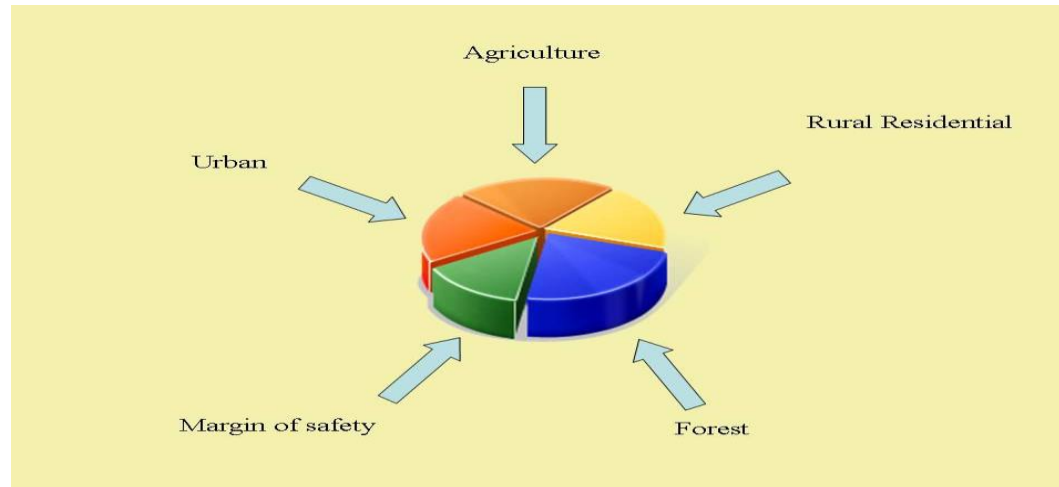
Stephen N. Haughey
Great Lakes Water Conference
University of Toledo School of Law
November 6, 2015



The development of a TMDL is a significant, time-consuming, and scientifically-rigorous undertaking. The average TMDL takes 3 years to develop. For larger watersheds and rivers, it takes an average of 5 years.

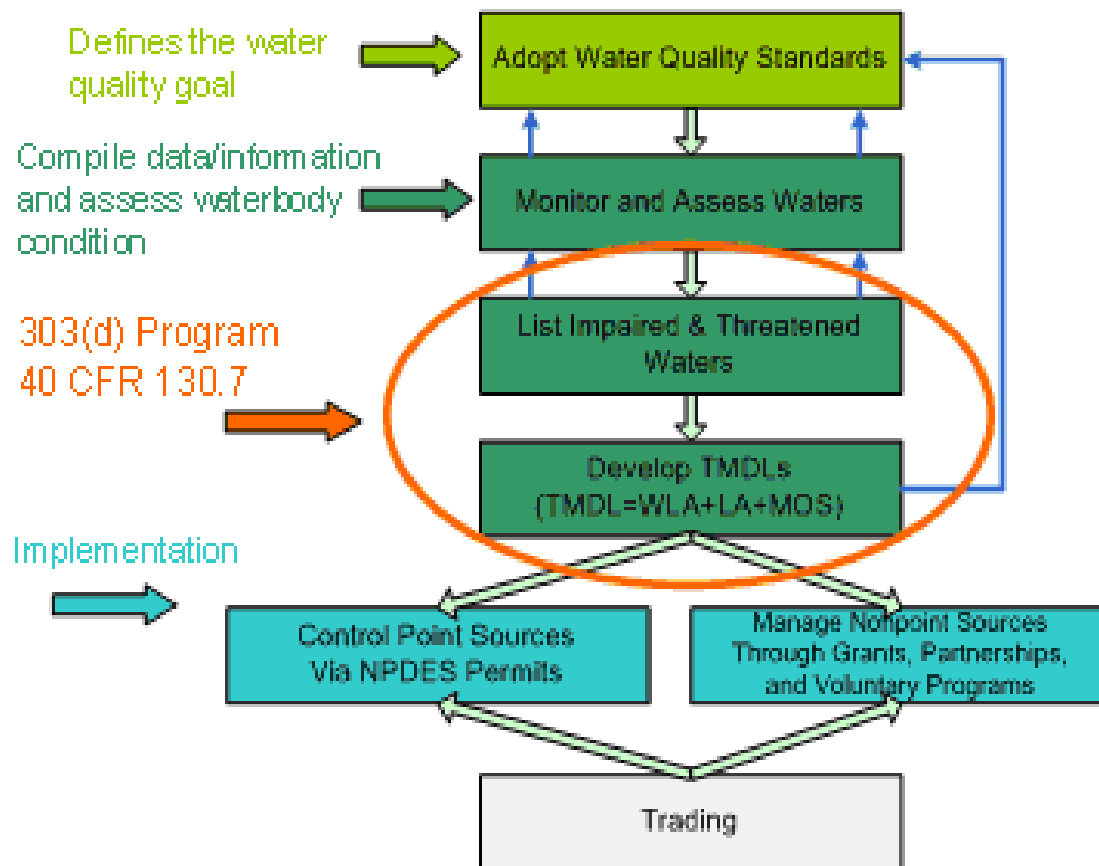
OUTCOME OF THE TMDL PROCESS

The end product of the TMDL development process is a “pollution diet” or “allocation pie.”



The “pie” is the assimilative capacity of the waterbody for the applicable pollutant. The “slices” are the loadings reductions allocated to the point sources (PS) and non-point (NP) sources of the pollutant, a margin of safety (MOS) for uncertainty, and sometimes a reserve capacity for future growth.

HOW THE TMDL PROCESS FITS IN THE CWA WATER QUALITY STANDARDS PROGRAM



WHY ARE TMDLs IMPORTANT?

- **Only a handful of states have adopted numeric nutrient water quality standards (WQS) for rivers and streams. Consequently, TMDLs are the predominant means by which states translate generic narrative “free from” WQS into binding numeric phosphorus and nitrogen effluent limits.**
- **TMDLs require states to assess and quantify non-point (NP) source contributions of pollutants to stream impairment, and then develop load allocations (LAs) for the NP sources.**
- **Because TMDLs must achieve applicable WQS, non-discharge-related causes of impairment, such as poor riparian habitat, degraded streams, and flow augmentation issues, are frequently addressed in the TMDL, and programs developed to address them. TMDL-driven NP source stream improvement projects are the single greatest source of CWA Section 319 grant funding applications.**
- **Arguably, TMDL are the only CWA-based program that forces states to undertake a comprehensive view of water quality and causes of impairment.**

WHY ARE TMDLs IMPORTANT? (cont.)



- **Costs to pollutant sources to implement the TMDL program are between \$1 billion and \$3.4 billion each year. (USEPA “Fact Sheet on The National Costs of the Total Maximum Daily Load Program” (Draft) EPA 841-F-01-004, August 1, 2001)**
- **The TMDL program is particularly burdensome for small (< 10,000) cities, towns, and villages:**
 - **50% of POTWs serve <10,000 customers;**
 - **Average cost to meet TMDL-driven limits is \$6.9 million, with a range of \$50,000 to \$15 million;**
 - **Average estimated TMDL-driven rate increase is 263%, with a range from 114% to 625%; and**
 - **Average rate increase exceeds USEPA 2% affordability benchmark, based on the 2009 national median rural household income of \$41,000.**



Source: National Rural Water Association: “Assessing the Impact of Current and Future TMDL Designations on Small Wastewater Systems,” Kramer Env. Mgt., Inc. (2009)

ORIGIN OF TMDLs



- **Section 303(d) of the CWA:**

- **Each state must identify waters for which the application of (i) technology-based effluent guidelines for non-POTWs and (ii) secondary treatment standards for POTWs is insufficient to achieve applicable water quality standards.**
- **Each state's list and priority ranking of "impaired" waters must be submitted to USEPA for approval, and thereafter periodically reviewed, updated and re-submitted.**
- **In accordance with its priority rankings, each state must establish a TMDL for all pollutants contributing to the impairment, taking into account seasonal variation and a margin of safety.**

HISTORY OF THE TMDL PROGRAM

- **Dates back to the 1972 Federal Water Pollution Control Act Amendments. But largely ignored until Congress created a NP source funding program in the Water Quality Act of 1987.**
- **States slow to act, resulting in dozens of citizen suits against states and USEPA in the 1990s, culminating in enforceable schedules to develop lists of impaired waters and begin development of TMDLs.**
- **In some states where no delegated NPDES program exists or the state failed to act, USEPA forced to develop lists of impaired waters and TMDLs.**

(source: <http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/lawsuit.cfm>)

CURRENT STATUS OF THE TMDL PROGRAM

- **52,431 TMDLs approved so far. By a wide margin, the majority of TMDLs that have been developed are for 5 pollutants:**
 - **Pathogens – 10,951;**
 - **Nutrients (P&N) – 7,697;**
 - **Metals (other than Hg) – 7,143;**
 - **Organic Enrichment/Oxygen Depletion – 6,713; and**
 - **Sediment – 6,626.**
- **Because organic enrichment and oxygen depletion are almost always linked to excessive nutrients, nutrient-related TMDLs are arguably at the top of the list.**

(source: http://iaspub.epa.gov/waters10/attains_nation_cy.control?p_report_type)

USEPA'S ROLE IN STATE-SUBMITTED TMDLS

- **Each state-developed TMDL must be submitted to USEPA, which must approve or disapprove it within 30 days of submission. USEPA's review is a procedural checklist, confirming the presence of:**
 - **Identification of waterbody, pollutants of concern, pollutant sources, and priority ranking;**
 - **Description of the applicable water quality standards and numeric water quality targets;**
 - **Loading capacity – linking water quality and pollutant sources;**
 - **NP source load allocations (LAs);**
 - **PS wasteload allocations (WLAs);**
 - **Margin of safety (MOS);**
 - **Seasonal variation;**
 - **Reasonable assurances;**
 - **Monitoring plan to track TMDL effectiveness;**
 - **Implementation plan;**
 - **Public participation;**
 - **Submittal letter; and**
 - **Administrative record.**



(source: <http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/final52002.cfm>)

IMPORTANT TMDL ISSUES GOVERNED BY STATE LAW

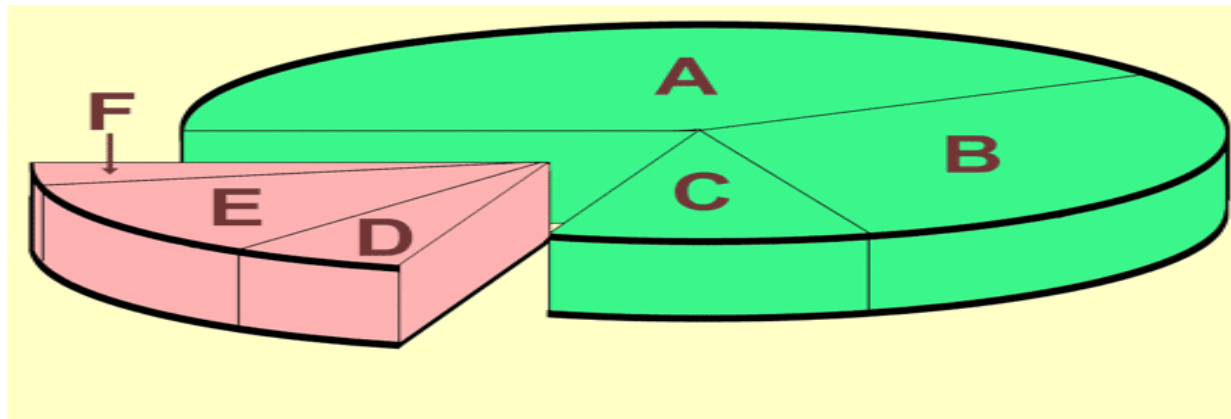
- Because USEPA's checklist for TMDLs is procedural, not substantive, for everything other than the MOS and seasonal variation, critical issues in the development of TMDLs are governed by state law, including the required level of public participation, the adequacy and thoroughness of the reasonable assurances and the implementation plan, and the reasonableness of the NP source LAs and PS WLAs.
- Efforts to assert substantive challenges to USEPA's approval of state-issued TMDLs have been dismissed as premature. *City of Arcadia v. U.S. EPA*, 265 F. Supp. 2d 1142, 1144-1145 (ND Cal. 2003); *Sierra Club v. Meiburg*, 296 F. 3d 1021, 1025 (11th Cir. 2002).

IMPORTANT TMDL QUESTIONS GOVERNED BY STATE LAW (cont.)

- **What level of public participation is required in the development of each TMDL?**
- **How should the allocations between and among the NP sources and PS be developed?**
- **Is the load capacity of the stream correct?**
- **Can a TMDL have adequate reasonable assurances of achieving WQS if it relies on voluntary NP source loading reductions and NP source riparian habitat improvements?**
- **Is the state required to develop an implementation plan to apply the TMDL?**
- **Is the length of time provided to meet TMDL-driven permit limits adequate and reasonable?**
- **Are the TMDL-based limits technically achievable and affordable?**

IMPLEMENTATION OF TMDLs

- Once USEPA approves a TMDL, the state must incorporate it in its EPA-approved continuous planning process (“CPP”) for water quality management. 33 USC 1313 and 40 CFR 130.7
- States with delegated NPDES programs must issue permits with limits “consistent with the assumptions and requirements” set forth in the approved TMDL. 40 CFR 122.44(d)(1)(vii)(B)
- What does “consistent with the assumptions and requirements” of an approved TMDL mean? Can states alter the allocations of pollutant loadings among the NP sources and PS, giving a bigger piece of the allocation pie to, for example, a POTW?



IMPLEMENTATION OF TMDLs (cont.)

- **According to USEPA, loading allocations between NP sources and PS cannot be altered once the TMDL is approved. However, the allocations among the PS can be reallocated or re-mixed without resubmitting the TMDL for approval.**
- **The CWA does not impose deadlines for WQS attainment through TMDLs. So TMDLs can be developed in phases, implemented in stages, staggered over multiple permit terms, and subject to adaptive management principles, if USEPA find the state’s “reasonable assurances” and implementation plan adequate.**

(source: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/tmdl_clarification_)

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT

- **Are TMDLs rules that must undergo formal notice and comment rulemaking procedures?**
 - **Each TMDL establishes at least 3 new binding, uniform standards that did not previously exist:**
 - **A maximum allowable capacity for all applicable pollutants for each waterbody, which operates as a new ceiling for pollutant loadings for the foreseeable future;**
 - **A margin of safety;**
 - **An allocation of pollutant loadings between NP sources and PS; and**
 - **An optional reserve capacity to allow for future growth.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Some state courts have stated that TMDLs are rules that require proper notice and comment rulemaking procedures:**
 - **Idaho - *Asarco Incorporated v. State of Idaho*, 69 P. 3d, 139, 141 (Id. 2003);**
 - **South Carolina - *South Carolina Commissioners of Public Works v. S.C. Dep't of Health & Environmental Control*, S.C. ALC No. 03-ALJ-07-0126-CC, 2003 SC ENV LEXIS 92, **20-26 (Sept. 22, 2003) *aff'd in part on other grounds*, *Commissioners of Public Works v. South Carolina Dep't of Health & Environmental Control*, 372 S.C. 351, 363-364 (2007);**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Maryland - *Sierra Club v. U.S. EPA*, 162 F. Supp. 2d 406, 419-420 (D. Md. 2001);**
- **Delaware - *City of Rehoboth v. McKenzie*, Del. Super. Ct. No. 98C-12-023, 2000 WL 303634, *1 (Feb. 29, 2000);**
- **Missouri - *Missouri Soybean Association v. Missouri Clean Water Commission*, 102 S.W. 3d 10, 24 (Mo. 2003);**
- **New Jersey - *In re Adoption of Amendments to Ne., Upper Raritan, Sussex County & Upper Delaware Water Quality Mgmt. Plans*, N.J. Super. Ct. No. A-5266-07T3, 2009 WL 2148169 *5 n. 3 (July 21, 2009); and**
- **Ohio? – *Fairfield County Board of Commissioners v. Scott Nally, Director of Environmental Protection*, Case No. 2013-1085, March 24, 2015 (143 Ohio St. 3d 93 2015).**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Several states promulgate TMDLs as rules without a court mandate:**
 - **California – E.g. 23 C.C.R. 3904 (TMDL for the Garcia River);**
 - **Colorado – E.g. 5 CCR 1002-35:35.2 *et seq.* (TMDLs for the Gunnison and Lower Dolores River Basins);**
 - **Florida – E.g. Fla. Admin. Code R. 62-304.315 (TMDL for the Chipola River Basin);**
 - **Oregon – E.g. Admin. R. 340-041-0154 (TMDL for the Upper Grande Ronde Basin); and**
 - **Virginia – E.g. 9 VAC 25-720-90 (TMDL for the Tennessee-Big Sandy River Basin).**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Are states using TMDLs to develop uniform, binding numeric WQS for nutrients for waterbodies and watersheds under the guise of enforcing narrative “free from” WQS? Despite only a handful or so of states having adopted numeric WQS for nutrients, at least 10,000 or more nutrient TMDLs have been developed.**
 - **Key differences between narrative “free from” WQS and numeric WQS:**
 - **Basically all states’ have the same generic “free from” narrative WQS that has subjective language broad enough to be applied to address nutrient impacts:**

“Waters shall be free from substances that adversely affect aquatic life, cause nuisance conditions, or promote nuisance growth of aquatic weeds or algae”

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Narrative WQS are meant only to be gap fillers: “States should...establish narrative criteria...where numerical criteria cannot be established or to supplement numerical criteria.” 40 CFR 131.11(b).**
- **Narrative “free from” WQS are meant to be applied on a case by case basis to establish numeric WQBELs for individual dischargers, designed to eliminate a water quality condition caused by that discharger.**
- **Numeric WQS are uniform standards meant to be applied to protect designated uses for whole waterbodies, classes of waterbodies, or watersheds or ecoregions.**
- **Source: USEPA’s Water Quality Standards Handbook, Chapter 3**
(<http://water.epa.gov/scitech/swguidance/standards/handbook/chapter03.cfm#section5>)

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- Applying an existing narrative WQS to set WQBELs for an individual discharger to eliminate a specific waterbody impact caused by that discharger is an adjudication of rights, subject to the state's permit appeal process.
- Developing binding, uniform numeric WQS for nutrients for classes of streams, watersheds or ecoregions is rulemaking, subject to the state's administrative procedures act (APA) requirements.
- States that develop new WQS or revise existing WQS must submit them to USEPA for review and approval. 40 CFR 131.20-.21.

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Using existing narrative “free from” WQS to develop binding, uniform numeric WQS in the context of developing TMDLs denies the protections afforded by rulemaking, applies narrative WQS in a manner not intended by USEPA, and violates the requirement to submit new and revised WQS to USEPA for approval.**
- **Using nutrient “guidance documents” and then applying “target values” from them to set *de facto* numeric WQS that drive the development of nutrient TMDLs and establishment of binding loading allocations for PS is at the crux of the issue.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

■ Examples:

- **Ohio - Association Between Nutrients, Habitat, and the Aquatic Biota in Ohio Rivers and Streams, Ohio EPA Tech. Bull. MAS/1999-1-1**

(source: http://www.epa.ohio.gov/portals/35/guidance/assoc_load.pdf)

- **NH - Numeric Nutrient Criteria for the Great Bay Estuary, June 2009**

(http://des.nh.gov/organization/divisions/water/wmb/wqs/documents/20090610_estuary_criteria)

City of Dover v. USEPA, 2013 WL 3893379 (D. DC 2013)

- **Wash. – *Simpson Tacoma Kraft Company v. Department of Ecology*, 119 Wn. 2d 640; 1992 Wash. LEXIS 221 (Wash. Sup. Ct. 1992)**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **The requirement to demonstrate “reasonable potential” and establish a “cause-effect relationship” between: (1) pollutant discharges and the impairment, and (2) imposition of TMDL-based loading reductions and achievement of applicable WQS and elimination of the impairment.**
 - **If the impairment is directly caused by conventional pollutants like, for example, metals, demonstrating “reasonable potential” to support loading reductions, and “reasonable assurances” that applicable WQS will be achieved once reductions are imposed, is relatively straightforward.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **If the impairment is indirectly caused by pollutant discharges in combination with habitat factors, NP sources, and/or stormwater runoff (as is the case with nutrient and sediment TMDLs), establishing “reasonable potential” and “reasonable assurances” when developing and implementing the TMDL is complex and controversial.**
 - **Can significant PS loading reductions be imposed if the predominant causes of impairment are habitat factors, NP sources, or stormwater runoff?**
 - **When habitat factors are significant, nutrient-based impairments can exist even if PS nutrient discharges are at extremely low levels.**
 - **NP source agricultural discharges can have impacts long after spring fertilizer application is finished due to drainage tiles.**
 - **Are the TMDL’s “reasonable assurances” defensible if the elimination of impairment requires voluntary loading reductions by significant NP source contributions or voluntary habitat improvements?**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Development of TMDLs for “non-conventional pollutants.”**
 - **Sediment – Total suspended solids (TSS) is the “conventional” pollutant, but regulation of sediment loadings in the context of developing TMDLs has increased to where sediment TMDLs are the fourth most developed TMDL behind pathogen, nutrients and metals.**
 - **Flow – Not at this time! Flow is not a “pollutant” under the CWA, and thus mandatory flow reductions developed as part of a TMDL are unenforceable. *Virginia Dep't of Transp. v. U.S. E.P.A.*, Case No. 1:12-CV-775, 2013 WL 53741 (E.D. Va. 2013).**
 - **States can develop WQBELs using surrogate or indicator parameters (40 CFR 122.44(d)(1)(vi)), but, in the context of developing TMDLs, the surrogates must themselves be pollutants.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **When, in what form and forum, and to what level, must states provide due process to affected stakeholders when developing TMDLs?**



- **Is an opportunity for notice and comment before submittal to USEPA sufficient? What about after submittal and receipt of federal approval?**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

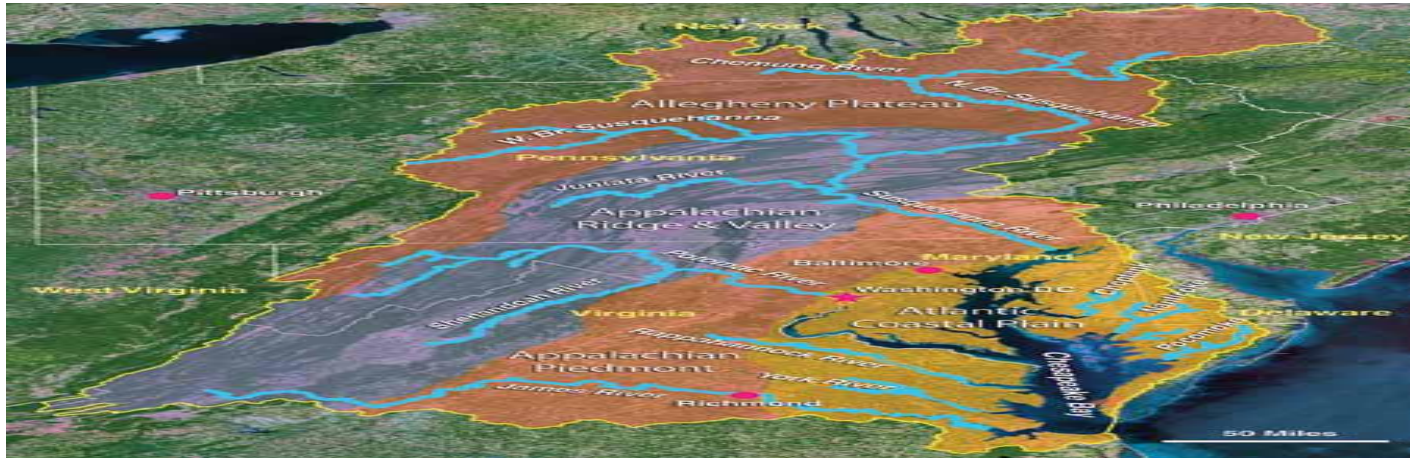
- **Is a state’s issuance of a final TMDL an appealable action under state law? Several federal courts have held that loading reductions in state-issued TMDLs are nonbinding recommendations or “informational tools.” *Anacostia Riverkeeper, Inc. v. Jackson*, 798 F. Supp. 2d 210, 216 (D. DC 2011); *Pronsolino v. Nastri*, 201 F. 3d 1123, 1129 (9th Cir. 2002); *Sierra Club v. Meiburg*, 296 F. 3d 1021, 1025 (11th Cir. 2002); *American Canoe Association v. U.S. EPA*, 289 F. 3d 509, 512 (8th Cir. 2002); *City of Arcadia v. U.S. EPA*, 265 F. Supp. 2d 1142, 1144-1145 (ND Cal. 2003).**
- **If state law makes final TMDLs binding on subsequent state-issued permits, the issuance of a final TMDL is an appealable action independent of USEPA’s approval process.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **If TMDLs are not binding, but only tools or recommendations, due process only requires an opportunity for review once the recommendations are applied in enforceable NPDES permits.**
- **If USEPA approves state-issued TMDLs before they are applied in NPDES permits, can permit holders challenge all aspects of the TMDL in the context of appealing the permit? Harmonizing 40 C.F.R. 122.44(d)(1)(vii)(B) with the state's appeal process.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Regional TMDL development by USEPA.**



- **The Chesapeake Bay traverses 6 states and the District of Columbia.**
- **Section 303(d) of the CWA places primary responsibility for TMDL development on the states.**
- **33 U.S.C. 1370 and 33 U.S.C. 1251(b) emphasize states' primary authority over their own waters and over pollution control.**
- **Because waterbodies do not stop at state boundaries, and water quality-based loading reductions recommended in a state-issued TMDL can impact downstream states' ability to achieve WQS, TMDLs can have regional implications involving multiple states.**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Section 117 of the CWA establishes federal authority over water quality in the Chesapeake Bay. But so does Sections 118 for the Great Lakes (8 states and Canada), and Sections 119-121 for the Long Island Sound, the Lake Champlain Basin, and the Lake Pontchartrain Basin, respectively (2 states each).**
- **How much “regional” impact or express federal authority is sufficient to support USEPA stepping in to develop the TMDL and enforce its loading allocations in the affected states?**
- ***American Farm Bureau Federation v. EPA*, 792 F.3d 281 (3d Cir. 2015) (July 6, 2015), cert. deadline November 6, 2015. USEPA’s TMDL for the Chesapeake Bay upheld in full. Arguments included that USEPA lacked authority to step in to do the regional TMDL.**
- **USEPA’s draft “Considerations for the Development of Multijurisdictional TMDLs” (March 22, 2012)**
(http://water.epa.gov/lawsregs/lawguidance/cwa/tmdl/upload/Draft-MJTMDL_032212.pdf)
- **Are federal TMDLs for the Ohio River basin, the Great Lakes, or the Mississippi River basin next?**

CURRENT ISSUES AFFECTING TMDL DEVELOPMENT (cont.)

- **Daily versus monthly, seasonal, or annual TMDL limits.**
 - ***Friends of the Earth, Inc. v. EPA*, 446 F.3d 140 (D.C. Cir. 2006).** If EPA deems a pollutant “suitable” for development of a total maximum daily load, TMDLs developed for the pollutant must be based on daily loadings.
 - ***NRDC v. Muszynski*, 268 F.3d 91 (2nd Cir. 2001).** TMDLs can be based on loadings other than daily, as long as the TMDL adequately supports the alternative loadings.
 - **Despite *Friends of the Earth*, USEPA maintains that existing NPDES rules and guidelines allow TMDLs based on daily loadings to be translated into monthly, seasonal, or annual WQBELs when sufficiently supported.**
http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/2006_11_21_tmdl_anacostia_memo111506.pdf
 - **USEPA’s draft “Options for the Expression of Daily Loads in TMDLs” (June 22, 2007)**
http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/upload/2007_06_26_tmdl_draft_daily_loads_tech-2.pdf

CURRENT ISSUES IMPACTING THE SUCCESS OF TMDLs

- **Enforceability of NP source loading allocations in TMDLs.**



- NP source pollution is the single greatest remaining cause of stream impairment.
(source: <http://water.epa.gov/polwaste/nps/outreach/point1.cfm>)
- The CWA does not regulate NP source pollution.
- Section 319 of the CWA provides only funding for voluntary NP source pollution reduction projects.
- Without amendment of the CWA to authorize NP source regulation, the CWA goals for fishable, swimmable waters will not be achieved. GAO: “Clean Water Act: Changes Needed if Key EPA Program is to Help Fulfill the Nation’s Water Quality Goals” (December 2013)

(source: <http://www.gao.gov/assets/660/659496.pdf>)

CURRENT ISSUES IMPACTING THE SUCCESS OF TMDLs (cont.)

- **Development-caused degradation of water quality.**
 - **In the absence of stricter controls over development and post-development runoff, in terms of water quality and quantity, degradation of stream attributes and destruction of riparian habitat is sufficient to mask the positive impact of PS pollutant loading reductions for nutrient and sediment-based TMDLs.**

This



turns this



into this.



CURRENT ISSUES IMPACTING THE SUCCESS OF TMDLs (cont.)

- **Missing, inadequate, and/or poorly-supported NP source trading programs.**



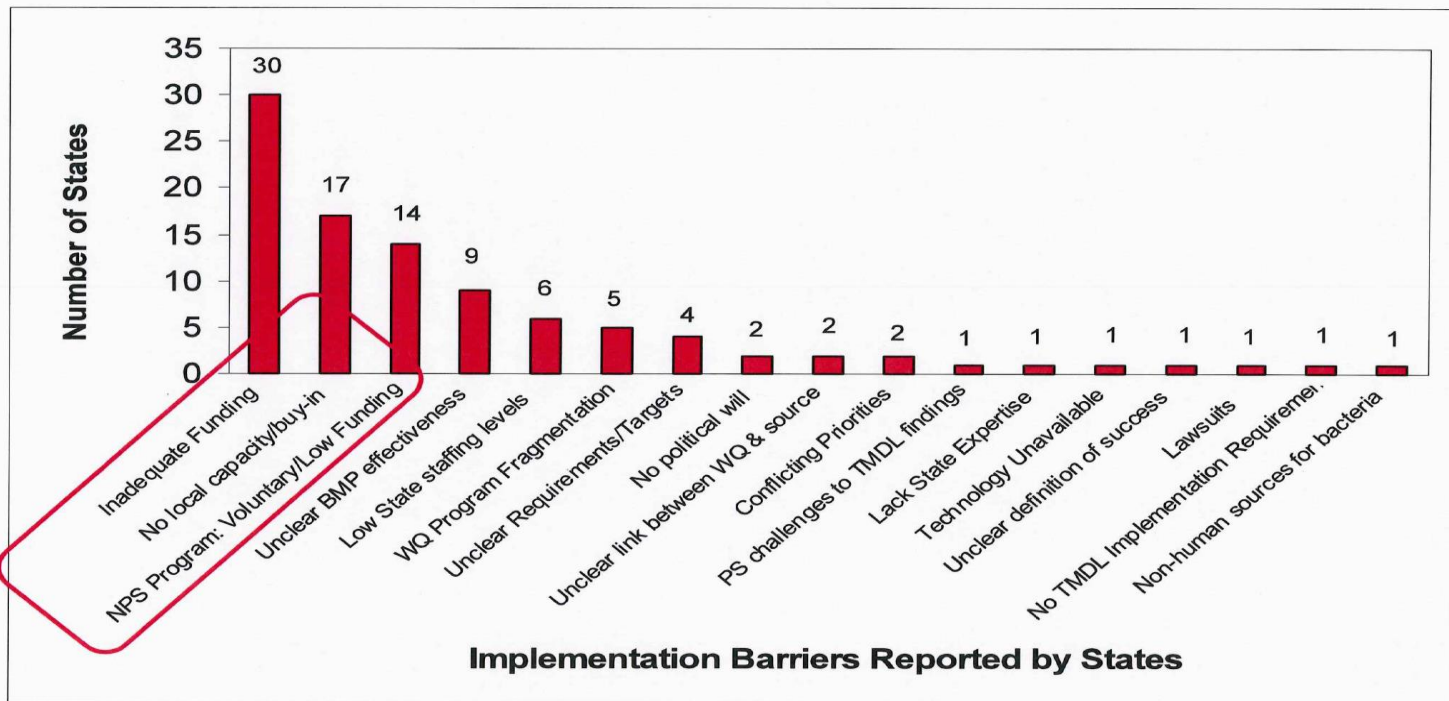
- **Lack of support by state agencies for trading programs, or establishment of unrealistic expectations and deadlines for measuring/achieving success;**
- **Lack of regional organizations to manage/oversee trading programs;**
- **Lack of understanding of trading principles and funding options for trading programs; and**
- **Fear that financial participation by PS in trading programs will not avoid future imposition of costly numeric WQBELs.**

CURRENT ISSUES IMPACTING THE SUCCESS OF TMDLs (cont.)

- **Improper or unattainable use designations.**
 - **Biological WQS for fish and macroinvertebrates are set at levels deemed appropriate to support and maintain designated uses (e.g. cold water fisheries).**
 - **Attainment of designated uses and meeting biological WQS are directly impacted by degradation of the stream's attributes and riparian corridor.**
 - **Using TMDLs to support PS loading reductions will never achieve biological WQS and designated uses if the stream and riparian corridor have been degraded beyond a certain point.**



TMDL IMPLEMENTATION BARRIERS



Source: June 2008 National Workshop to Advance State TMDL Programs.
States identified their top three barriers to TMDL Implementation.

PROACTIVE STEPS TO INFLUENCE TMDL DEVELOPMENT

**Get
Involved
and Make a
Difference!**

- **Form a river or watershed TMDL coalition of impacted stakeholders. An association with its own name and letterhead that seeks to partner with the state agency for TMDL development sends a powerful message.**
- **Begin collecting effluent and ambient chemical water quality data to monitor pollutant loadings and stream conditions – Are applicable WQS or target values already being achieved, or trending upward toward achievement, without a TMDL?**
- **Begin documenting NP sources and monitoring their loadings and seasonality;**

PROACTIVE STEPS TO INFLUENCE TMDL DEVELOPMENT (cont.)

- **Assess the stream's physical characteristics and properties, and riparian corridor attributes, and develop potential restoration projects to propose in lieu of TMDL-driven loading reductions;**
- **If the impairment is biological, begin monitoring biological water quality – How are the fish and macroinvertebrates doing? Attainment of biocriteria can trump expensive TMDL-driven loading reductions.**
- **Begin exchanging data and information with the state agency now, not after the draft TMDL is issued for comment.**
- **An ounce of prevention is worth a pound of cure. It is much easier to influence the preparation of regulatory documents than it is to convince an agency to alter them once drafted!**
- **Proactivity works - Stillwater River basin TMDL.**
- **Lower Great Miami River Nutrient Water Quality Model**



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