

The TMDL Program Results Analysis Project: New 2008-2009 Products

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What is *TMDL Program Results Analysis?

-- A five-year project assessing
program progress,
environmental outcomes,
and probable causes

to generate the insights needed to improve our
programs' protection of the environment and public
health.

* The full scope of this results analysis approach includes Clean Water Act section 303(d) listing and delisting, total maximum daily load (TMDL) development and implementation, TMDL alternatives (Category 4b), and post-project effectiveness monitoring.

Why Analyze TMDL Program Results?

To learn how well we are meeting program expectations, below:

Environmental Outcomes

1. more recovered waters
2. more incremental progress on recoveries
3. more protection and maintenance
4. optimized timing to maintain resources

Programmatic Features

5. adequate program milestones and tracking
6. documented condition of impairments & recoveries
7. efficient program resource use
8. restoration partners

Causal Linkages

9. scientific explanations of recoveries
10. plausible links of outcomes to Clean Water Act (CWA)/TMDLs

Three Approaches to Assessing Results Information:

1. Empirical: analyze evidence, outcomes from case studies and program tracking

- VA Tech Case Studies (TMDL successes)
- “Evaluating Options for Documenting Incremental Improvement” (Interim measures)
- Region 5 TMDL Implementation rates study

2. Survey: compile practitioners’ insights on key performance/results issues

- “Implementing TMDLs: Understanding and Fostering Successful Results” (Kent State Grant)
- “TMDL Implementation Tracking Needs Assessment”

3. Literature synthesis: review technical publications for results-relevant findings

- Restorability screening tools (Driving factors)

Impaired Waters Program Pipeline



[303(d)] [TMDLs] [Permits/BMPs] [Monitoring/Tracking]

Listing | Planning | Implementing | Improving | Recovery

Impaired waters

Restored waters

Listing results analysis outputs

- ▶ *Overview of 303(d) Listing* (est. 2009 fact sheet)
- ▶ *Progress on Impaired Waters Listing and Reporting* (est. 2008 fact sheet)
- ▶ *Report of the Working Group on TMDL/Permit Data Systems Linkages* (2008 report)
- ▶ *National TMDL Tracking System Data Check Spreadsheet* (quarterly)
- ▶ National map of watersheds of the 2002 baseline impaired waters list (2007 national GIS dataset)

Planning results analysis outputs

- ▶ *Developing Effective Nonpoint TMDLs: An Evaluation of the TMDL Process* (2007 report)
- ▶ National map of waters with TMDLs (2007 national GIS dataset)
- ▶ *The 100 TMDLs Study* (2006 analysis and fact sheet)

Implementation results analysis outputs

- ▶ Statistical analysis of TMDL Implementation rates in EPA Region 5 (est. 2009 analysis)
- ▶ *TMDL Implementation Tracking Needs Assessment* (2008 EPA regional report)
- ▶ *Implementing TMDLs: Understanding and Fostering Successful Results* (2008 report)
- ▶ *TMDL Implementation: Lessons Learned* (2007 published paper)
- ▶ TMDL and Watershed Planning Technical Support Clearinghouse and Website (2006-08 grant)
- ▶ *TMDL Implementation: Characteristics of Successful Projects* (2006 report)

Recovery results analysis outputs

- ▶ *A Comparative Method for Setting Restoration Priorities Among Impaired Waters* (est. 2009 published paper)
- ▶ States Working Group on Environmental Results and Innovation (2007-2009 grant)
- ▶ *Restoration and Recovery Literature Database* (2008 database)
- ▶ *Recovery Potential Project* (2008 fact sheet)
- ▶ Recovery potential indicators and reference sheets (2008 support data)
- ▶ Recovery potential assessments (2005-2008 analyses)
- ▶ *Applying Results Findings: the Recovery Potential Project* (2007 published paper)

Incremental improvement results analysis outputs

- ▶ *Evaluating options for documenting incremental improvement of impaired waters under the TMDL program* (2008 report)
- ▶ *Summary of 2007 TMDL/Monitoring National Workshop Session on Program Effectiveness* (2007 report)

TMDL Results Analysis: Earlier products we have discussed

1. 100 TMDL Document Review – 2005
2. Assessment Methodology Study – 2005
3. VA Tech TMDL Success Stories – 2006
4. “Developing Effective Nonpoint Source TMDLs: An Evaluation of the TMDL Development Process” – 2006
5. “TMDL Program Results Analysis Measures and Methods Report” -- 2006
6. Office of the Inspector General TMDL Program Evaluation – 2007

TMDL Results Analysis: New highlights from 2008-2009

1. **“Evaluating Options for Documenting Incremental Improvement” – 2008**
2. **“Implementing TMDLs: Understanding and Fostering Successful Results” – 2008**
3. **Statistical survey of TMDL implementation rates (Region 5)**
4. **Restorability screening tools**
5. **Results Analysis Web site**
6. ASIWPCA TMDL Working Group for Environmental Results and Innovation
7. Implementation tracking pilot project (Region 5)
8. Working Group on TMDL/Permits Data System Linkages

1. “Evaluating Options for Documenting Incremental Improvement” (November 2008)

- Need for this report
 - Incremental improvements may outnumber full recoveries for a long time, recovery is often slow
 - Documenting partial recoveries essential to demonstrate interim program success
 - Documentation must be credible
- Technical approach of report addresses the following:
 - What constitutes bona fide incremental improvement?
 - What scientifically valid methods/data needed?
 - How are states currently documenting incremental improvement?
 - What capacity do state programs need?

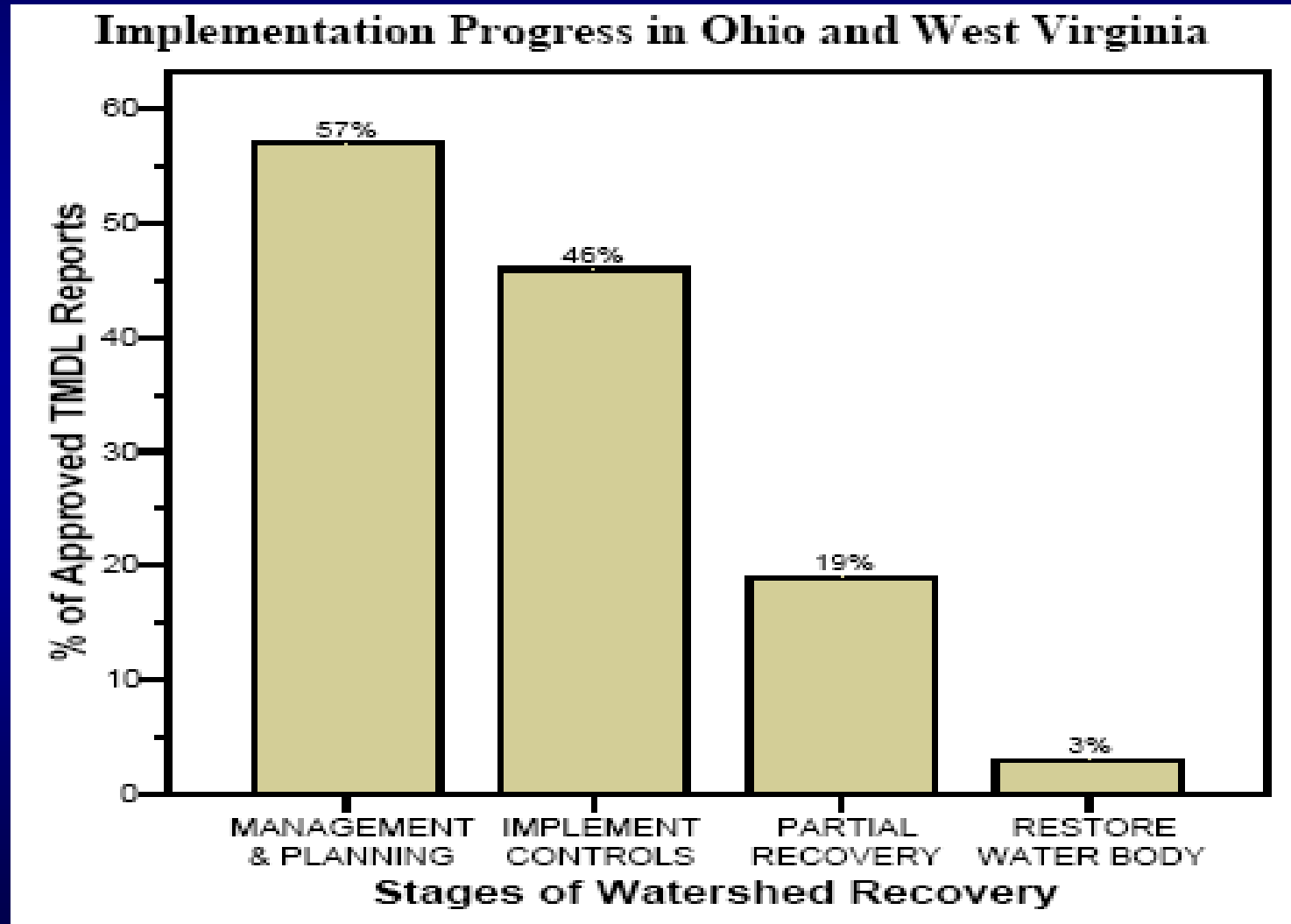
1. “Evaluating Options for Documenting Incremental Improvement”, cont.

- Case studies used to illustrate viable options
 - 3 OH watersheds -- subjects of acid mine drainage abatement and treatment projects
 - Varying amounts of incremental change across these 5 restoration project examples, each showing varying degrees of biological and chemical/physical change
- Messages
 - Combination of technical capacity and overarching impetus/incentive for incremental improvements reporting is needed to make incremental assessment a routine output of state programs
 - By providing a supporting infrastructure of indicators and WQS, state programs can fulfill their custodial role for monitoring and assessment and WQS in a more integrated fashion.
 - Tiered Aquatic Life Use-based programs could give current measures (i.e., SP-11, SP-12) wider application and exposure

2. “Implementing TMDLs: Understanding and Fostering Successful Results” (December 2008)

- Kent State grant product
- 63 TMDL reports (63 watersheds) studied
- TMDLs approved 1998-2006
- 174 pollutants addressed
- Questions:
 - To what extent are TMDLs being implemented in OH and WV?
 - What factors facilitate progress in implementation?
 - What steps can facilitate further progress in implementation?

2. “Implementing TMDLs: Understanding and Fostering Successful Results”, cont.



2. “Implementing TMDLs: Understanding and Fostering Successful Results”, cont.

Steps states can take to help accelerate progress in implementation:

1. Engage local and regional groups in TMDL development,
2. Provide funding to implement projects to reduce pollutant loads and improve water quality,
3. Engage state officials in implementation processes,
4. Create standardized formats for TMDL implementation recommendations and procedures for incorporating TMDL recommendations into subsequent implementation efforts,
5. Develop indicators of implementation progress and tracking progress against them, and
6. Educate and engage key audiences in TMDL implementation, and its tracking and management.

3. Statistical Study of TMDL Implementation Rates in Region 5 (est. March 2009)

Data gathering is complete, analysis is ongoing

- Excellent collaboration by Region 5 and states (IL, IN, MI, MN, OH, WI)
- Studied implementation rates of nonpoint source (NPS)-only vs. point source (PS)/mixed, older vs. newer TMDLs
- Studied frequency of Implementation Plans, watershed or multi-TMDL approaches
- Statistically valid results describe Region 5 patterns only, and do not compare/contrast states

3. Statistical Study of TMDL Implementation Rates in Region 5, cont.

Some 'draft, highly generalized' results:

- Region 5 TMDLs with some implementation appear to be much more common than TMDLs with none (true for all subpopulations assessed)
- Region 5 PS/mixed TMDLs are implemented more often than NPS-only TMDLs
- A significant majority of Region 5 TMDLs have implementation plans but these don't guarantee implementation occurs
- Watershed or multi-TMDLs have increased and include almost all of the newer Region 5 TMDLs

4. Restorability screening tools (multiple ongoing activities)

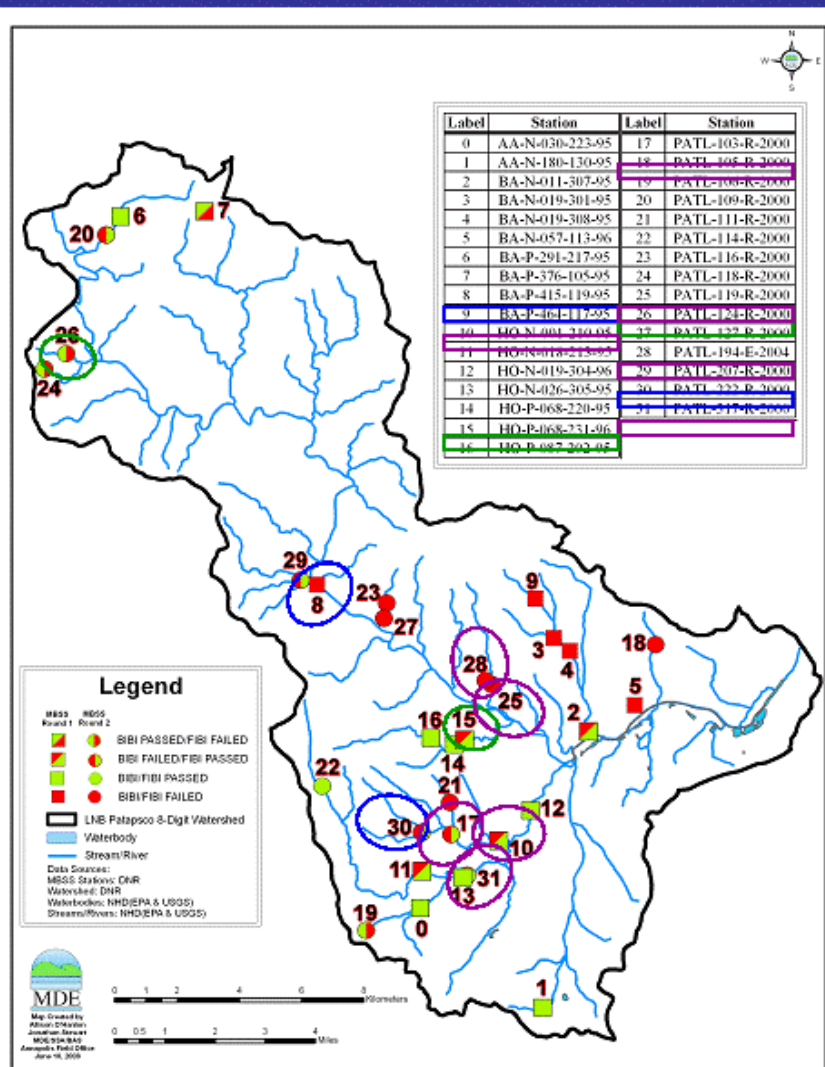
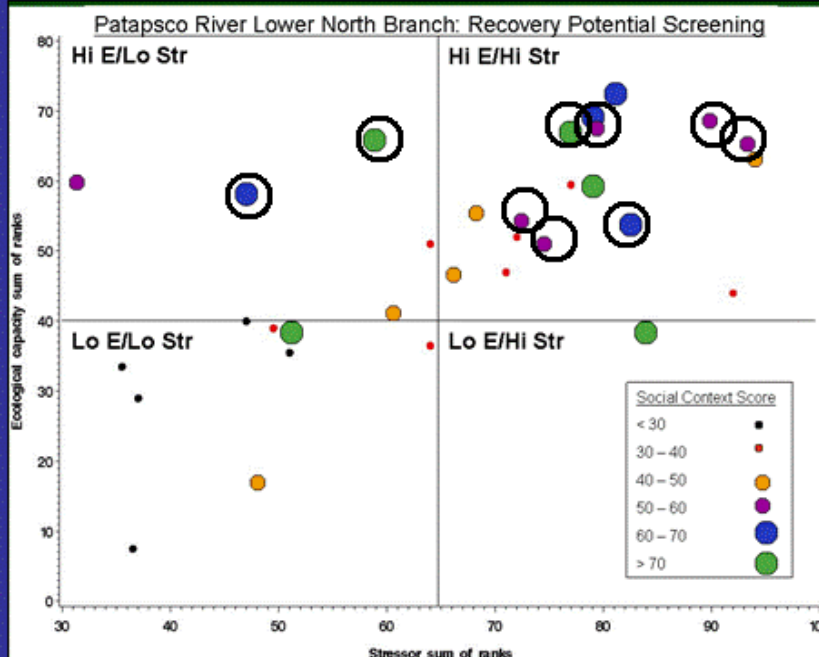
Recovery potential indicators

<u>Ecological Capacity Metrics</u>	<u>Stressor Exposure Metrics</u>	<u>Social Context Metrics</u>
natural channel form	invasive species risk	watershed % protected land
connectivity	channelization	applicable regulation
Strahler stream order	hydrologic alteration	funding eligibility
rare taxa presence	aquatic barriers	303(d) schedule priority
historical species occurrence	corridor road crossings	estimated restoration cost
species range factor	corridor road density	certainty of causal linkages
elevation	corridor % U-index	TMDL or other plan existence
corridor % forest	corridor % agriculture	university proximity
corridor % woody vegetation	corridor % urban	certainty of restoration practices
corridor slope	corridor % impervious surface	watershed organizational leadership
bank stability/soils	watershed % U index	watershed collaboration
bank stability/woody vegetation	watershed road density	large watershed management potential
watershed shape	watershed % agriculture	government agency involvement
watershed size	watershed % tile-drained cropland	local socio-economic distress
watershed % forest	watershed % urban	landownership complexity
proximity to green infrastructure hub	watershed % impervious surface	jurisdictional complexity
contiguity w/green infrastructure corridor	severity of 303(d) listed causes	iconic significance
biotic community integrity	severity of loading	human health and safety
soil resilience properties	past land use change trajectory	recreational resource

4. Restorability screening tools, cont.

Patapsco L. N. Br. – Which MBSS catchments rank as highly restorable while also more likely to influence the Patapsco's condition?

Selection criteria:
All MBSS with high E, high Social, and failed BIBI or FIBI (9 of 31)



5. Results Analysis Web Site

Coming soon to the <http://www.epa.gov/owow/tmdl/> Web site!

Goal: Communicate information about TMDL Program results to technically specialized audiences mainly outside US Environmental Protection Agency (USEPA).

Varied audience will include:

- TMDL practitioners
- State water programs
- Other federal agency programs
- Folks in academia
- USEPA HQ, Regional, and other water quality staff

Draft layout:

- Overview
- Impaired waters 303(d) listings
- TMDL planning and completion
- TMDL implementation and tracking
- Water quality improvements
- Waterbody recovery
- Fact sheet series

What Picture of TMDL Program Results is Emerging?

- TMDLs are being implemented (e.g., implementation projects underway in 65% of watersheds of Kent State study)
- Restoration priority-setting needed more than ever (e.g., where to develop TMDLs, implement, restore first - given limited funding)
- Evidence continues to build about driving factors for environmental results (e.g., funding, watershed organizations, data for TMDL development/reassessment, stakeholder involvement)
- Emerging interest in dynamics of protection and restoration
- State forums crucial to understanding issues (e.g., ASIWPCA questionnaire on states' implementation tracking)