Integration of NY’s Monitoring Program into NY’s Vision Approach

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Outline

- NY’s Monitoring Approach
- Integration of monitoring into NY’s Vision approach
- NY’s priority concerns and approach to implement
- Tools developed as a result of this process
Statewide Waters Monitoring Program

Monitoring by waterbody type

- Rivers/Streams
- Lakes/Ponds/Reservoirs
- Groundwater
Five Year Monitoring Cycle

Year 0 - WAVE

Year 1 - Screening

Year 2 - Intensives

Years 3 - 5 - Assessments, Update WI/PWL, Develop Protection/Restoration Strategies
Lake Monitoring Programs

- Citizen Statewide Lake Assessment Program (CSLAP)
- Lake Classification and Inventory
2016 CSLAP Lakes

• Statewide ~ 130 Lakes
Monitoring Parameters

- Depth profile (depth, temp, DO, pH, conductivity, ORP)
- Surface water samples for trophic and standard limnological indicators
- Nutrients, algae, clarity, carbon, color, metals
- Bottom water samples if lake stratified
- Macrophyte (aquatic plant) identifications
- Invasive exotic plants
- Protected species (with Natural Heritage Program)
River and Stream Monitoring Programs

• Biological Monitoring Program
• Water Chemistry Sampling Program
• Water Assessment by Volunteer Evaluators (WAVE)
Screening Site Selection

Un-assessed Waters 20%
• Relies on Waterbody Inventory

Department/Outside Interest 30%
• TMDL Vision / Compliance Issues etc…

Regional Reference 10%
• > 75% Natural Cover, Background chemistries, good biology

Long-Term Trend 20%
• Longest historical sampling record…..many from 70’s

Random Probabilistic 20%
• Statistical, unbiased sampling design
Screening Network Parameters

- Macroinvertebrate Community Analysis
- Habitat Assessment
- Sediment Toxicity
- Recreational Assessment
- Periphyton at suspected invasive sites
Intensive Network Parameters

Screening Network Parameters +

- Water Column Chemistry
- Periphyton Community Analysis
- Sediment Chemistry
- Macroinvertebrate Tissue Chemistry
- Pebble Count
- Fish Community Analysis
Macroinvertebrate Community Analysis

- Non-impacted: BAP > 7.5
- Slightly impacted: BAP 5.0 - 7.5
- Moderately impacted: BAP 2.5 – 5.0
- Severely impacted: BAP < 2.5
Biological Monitoring in NYS
Monitoring to Document Support of Uses

Uses Supported
- Water Supply: Class A
- Shellfishing: Class SA
- Public Bathing: Class B, SB
- Recreation: All Waters
- Aquatic Life: All Waters
- Fish Consumption: All Waters

Other Conditions
- Habitat/Hydrology: All Waters
- Aesthetics: All Waters
Reporting on Use Attainment/Degradation

NYS’s Water Body Inventory and Priority Waterbodies List

- (WI) Waterbody Inventory - All Waters of the State
- (PWL) Priority Waterbodies List - Troubled Waters

Provides supporting information for:

- Section 305(b) Water Quality Reports
- Section 303(d) List of Impaired TMDL/Waters
- NYSDEC WQIP Scoring
- NYSEFC CWSRF Scoring
- Other Funding Programs
- Responding to Public Inquiries
- Storing Institutional Memory
NY’s Strategy to implement EPA’s Vision

• Build on and improve the existing 303(d) program,
• Use monitoring data collected by DEC,
• Integrate information from other Division of Water (DOW) programs,
• Incorporate alternative plans when applicable
• Foster new partnerships and enhance existing partnerships.

http://www.dec.ny.gov/chemical/23835.html
Monitoring data important part of process

- Evaluate level of impairment
- Help to organize waterbodies
- Track progress toward improvement
- Used to assess recovery potential
Priority concerns

Pollutants of Concern
- Nutrients
- Pathogens
- Dissolved oxygen

Priority Uses—Public
- Drinking water supply
- Primary contact recreation
- Shellfishing
Select & evaluate waterbodies

- Identify criteria for scoring to prioritize/rank waterbodies
- Evaluate top ranked waterbodies
Scoring criteria developed for each metric

Generally, greater negative impact → higher score

Examples of metrics:

- Number of related pollutants
- Number of uses impaired
- Phosphorous & Chl a concentrations
- Active public water supply
- Population served by public water supply
- Public access to waterbody
- Ecological importance
- Incidence of blue-green algae blooms
Examples of criteria

**Class A**
- Active public water supply
- Population served by public water supply
- Multiple impairments
- Number of blue-green algae blooms

**Streams/Rivers**
- Trout/trout spawning
- Public access
- Biological impairment
- Multiple impairments
- Multiple uses impaired
- Proximity to other impaired streams/rivers
## Prioritization process

<table>
<thead>
<tr>
<th>Step 1: Rank by priorities</th>
<th>Step 2: Evaluate impairment level</th>
<th>Step 3: Select Waterbodies</th>
<th>Step 4: Determine feasibility of TMDL</th>
<th>Step 5: Analysis selected waterbodies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active public water supply (PWS)</td>
<td>Harmful algal blooms (HAB)</td>
<td>Rank list and select priority waterbodies</td>
<td>Connectivity</td>
<td>Pollutant source analysis</td>
</tr>
<tr>
<td>Population served by PWS</td>
<td>Multiple use impairment</td>
<td>Identify &amp; document limitations</td>
<td>Watershed size</td>
<td>Data assessment to determine schedule</td>
</tr>
<tr>
<td>Ecological importance</td>
<td>Multiple pollutant impairments</td>
<td>Consult with staff</td>
<td>Public interest</td>
<td>Existing watershed plan or similar plan</td>
</tr>
<tr>
<td>Class</td>
<td>Beach closures</td>
<td></td>
<td></td>
<td>Identify financial benefits</td>
</tr>
<tr>
<td>Public access</td>
<td>BAP Score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Response</td>
<td>Points</td>
<td>Qualitative</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------</td>
<td>--------</td>
<td>-------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Public water supply</td>
<td>Y</td>
<td>1</td>
<td></td>
<td>Waterbodies with active PWS</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Population served</td>
<td>0</td>
<td>0</td>
<td></td>
<td>The greater the population served the greater the public impact and potential for implementation. Range is based on the PWS waterbodies listed on the 303(d) list; scoring range may need be adjusted for future analysis.</td>
</tr>
<tr>
<td></td>
<td>1-10000</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10001-50000</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50001-150000</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;150000</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harmful Algae Bloom</td>
<td>0/0</td>
<td>0</td>
<td></td>
<td>No reports</td>
</tr>
<tr>
<td></td>
<td>1/1</td>
<td>0.25</td>
<td></td>
<td>One report, one year only</td>
</tr>
<tr>
<td></td>
<td>&gt;1/1</td>
<td>0.5</td>
<td></td>
<td>More than one report, one year only</td>
</tr>
<tr>
<td></td>
<td>&gt;1/&gt;1</td>
<td>1.5</td>
<td></td>
<td>At least one report for multiple years</td>
</tr>
<tr>
<td>Number of related impairments</td>
<td>1</td>
<td>0.25</td>
<td>Less connected</td>
<td>How many individual impairments can likely be addressed by a single TMDL (e.g. nutrients, DO, pathogens, silt/sediment). Max of 4 related impairments in this list set point range.</td>
</tr>
<tr>
<td>Number of related impairments</td>
<td>2</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of related impairments</td>
<td>3</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>1</td>
<td>More connected</td>
<td></td>
</tr>
<tr>
<td>Number of uses impaired</td>
<td>0</td>
<td>0</td>
<td>No uses impairments</td>
<td>Up to 6 uses are evaluated in waterbody assessment, but in most cases no more than 4 are likely to be related. Most waters have 2 or less related uses impaired. (water supply, recreation, fishing, aquatic life, aesthetics, habitat)</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>1</td>
<td>Multiple related uses impaired</td>
<td></td>
</tr>
<tr>
<td>Chl-a concentration</td>
<td>&lt;6</td>
<td>0</td>
<td>Good</td>
<td>June through September average concentration of chlorophyll-a. &gt;30 was used because it is the upper bound of the blue-green algae criteria</td>
</tr>
<tr>
<td>Health impacts</td>
<td>Yes</td>
<td>1</td>
<td></td>
<td>When data from DOH is available; e.g., DBPs, drinking water advisories</td>
</tr>
<tr>
<td>Health impacts</td>
<td>No</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Criteria</td>
<td>Response</td>
<td>Points</td>
<td>Qualitative</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>----------</td>
<td>--------</td>
<td>-------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Class</td>
<td>A</td>
<td>1</td>
<td>Higher priority</td>
<td>Waterbody classification</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>0.25</td>
<td>Lower priority</td>
<td></td>
</tr>
<tr>
<td>T/TS</td>
<td>TS</td>
<td>2</td>
<td>More protection</td>
<td>Trout (T) or trout spawning (TS) designated stream?</td>
</tr>
<tr>
<td></td>
<td>T</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>None</td>
<td>0</td>
<td>Less protection</td>
<td></td>
</tr>
<tr>
<td>Related Pollutants Impairments</td>
<td>1</td>
<td>0.25</td>
<td>Less</td>
<td>How many related impairments could be addressed by a single TMDL?</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>1</td>
<td>More</td>
<td>How many additional contiguous HUC12s are also listed as impaired? Limited to those HUC12s in the same stream network with multiple segments that impaired all for same reasons in same area</td>
</tr>
<tr>
<td>Proximity (connectivity)</td>
<td>0</td>
<td>0</td>
<td>Fewer</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-5</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;10</td>
<td>1</td>
<td>More</td>
<td></td>
</tr>
<tr>
<td>Multiple Use Impairments</td>
<td>0</td>
<td>0</td>
<td>Fewer</td>
<td>How many use impairments will be improved/removed by a single TMDL?</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>0.25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&gt;3</td>
<td>1</td>
<td>More</td>
<td></td>
</tr>
<tr>
<td>Public Access</td>
<td>None</td>
<td>0</td>
<td>Limited access</td>
<td>No readily apparent means of access for general public</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjacent</td>
<td>0.5</td>
<td></td>
<td>Access encourages: boat ramps, municipal parks, recommended fishing</td>
</tr>
<tr>
<td></td>
<td>Public</td>
<td>1</td>
<td>Easy access</td>
<td></td>
</tr>
<tr>
<td>Ecological Importance</td>
<td>To be determined</td>
<td></td>
<td></td>
<td>As data from NYS DOH becomes available, information about DBPs, beach closures &amp; what closed for.</td>
</tr>
<tr>
<td>Biological Assessment Profile (BAP score)</td>
<td>&lt;1.25</td>
<td>1</td>
<td>Worse</td>
<td>Biotic assessment profile data based on macroinvertebrate data</td>
</tr>
<tr>
<td></td>
<td>1.26-2.5</td>
<td>0.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.6-3.75</td>
<td>0.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Flowing waters

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>T or TS</th>
<th>Access</th>
<th>Multiple Pollutants</th>
<th>Multiple Use Impairments</th>
<th>Proximity</th>
<th>BAP Score</th>
<th>Ecological Importance</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw Mill River</td>
<td>A</td>
<td>-</td>
<td>Public</td>
<td>DO, Path, Nut</td>
<td>Bath, Rec, Aquatic Life</td>
<td>5</td>
<td>3.57</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td>Steele Creek</td>
<td>A</td>
<td>TS</td>
<td>None/Private</td>
<td>Nut, Slit, Algae</td>
<td>Water supply</td>
<td>1</td>
<td>Need Data</td>
<td>TBD</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name</th>
<th>Class</th>
<th>T or TS</th>
<th>Access</th>
<th>Multiple Pollutants</th>
<th>Multiple Use Impairments</th>
<th>Proximity</th>
<th>BAP Score</th>
<th>Ecological Importance</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saw Mill River</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0.75</td>
<td>0.75</td>
<td>0.5</td>
<td>0.5</td>
<td>0</td>
<td>4.5</td>
</tr>
<tr>
<td>Steel Creek</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0.75</td>
<td>0.25</td>
<td>0.25</td>
<td>0</td>
<td>0</td>
<td>4.25</td>
</tr>
</tbody>
</table>
Each step in the prioritization process helps to refine & focus the impaired waterbodies list to the most effective water quality improvement.
Evaluate waterbodies

Includes discussion with regional DEC staff, other state agencies to:

- Identify existing plans or models
- Learn about water quality activities
- Identify opportunities for collaboration

Detailed analysis of top ranked waterbodies to:

- Evaluate feasibility of TMDL or interim alternative plan
- Assess recovery potential
TMDL-lite Screening tool

• Simple model covers major aspects of a TMDL analysis
• Assesses loads for stormwater, septic, and point sources
TMDL-lite Screening tool

• Understand relative load contribution by source (e.g., developed, agriculture, septic)

• Simple analysis to determine waterbody potential recovery response (e.g., estimated reductions needed)

• Help identify most appropriate watershed management approach (e.g., TMDL or watershed plan)
TMDL-lite Stormwater Loads

• Estimate stormwater loads using simple method
• Based on land use, precipitation, and simple hydrology

\[
\text{stormwater load} = \text{pollutant concentration} \times \text{export factor}
\]
TMDL-lite Septic Loads

- Estimates the septic nutrient load.
- Based on population served by septic, and proximity to surface waters

$$\text{septic load} = \text{septic loading factor} \times \text{number of septic's}$$
TMDL-lite Point Source Loads

• Quick approximations can be made using GIS-Layer
• More reliable estimates can be determined through Discharge Monitoring Report (DMR) data
TMDL-lite: Lake Champlain

TMDL
- Cultivated Crops: 32%
- Forest: 34%
- Pasture/Hay: 21%
- Developed, Low Intensity: 5%
- Developed, Medium Intensity: 2%
- Developed, High Intensity: 1%

TMDL-lite
- Cultivated Crops: 31%
- Forest: 35%
- Pasture/Hay: 23%
- Developed, Open Space: 4%
- Developed, Low Intensity: 4%
- Developed, Medium Intensity: 2%
-Developed, High Intensity: 1%
TMDL-lite: Onondaga Lake

TMDL

- Developed: 19%
- Cultivated Crops: 16%
- Pasture/Hay: 8%
- Forest: 8%
- Metro Outfall 001: 28%
- Metro Outfall 002: 7%
- CSO: 8%
- Rural: 0.2%
- Open Water: 3%
- Small SPDES Discharges: 1%

TMDL-lite

- Developed: 28%
- Cultivated Crops: 14%
- Pasture/Hay: 9%
- Marcellus WPCP: 2%
- Small SPDES Discharges: 1%
- Metro Outfall 002: 6%
- Metro Outfall 001: 23%
- Forest: 7%
TMDL-lite Waterbody Budget

• Ability to estimate reductions needed
• Load to waterbody based on source analysis
• Load to waterbody based on monitoring data – will include all sources/sinks
• Total maximum load determined from WQ standard/goal (e.g., max load that will produce 20 ug/l of P in lake)
Planning & tracking

- Where to develop TMDLs, watershed plans, or other alternative plans, and
- Where to prioritize monitoring work for planning and recovery tracking.
# Example tracking

Database to track water quality management plans

1. TMDLs and watershed plans
2. Other plans (e.g., LTCPs, consent orders, etc.)

<table>
<thead>
<tr>
<th>SEG ID</th>
<th>Waterbody</th>
<th>Class</th>
<th>Waterbody Category</th>
<th>Management Action</th>
<th>Pollutant</th>
<th>Date Issued</th>
<th>Recommended actions</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1302-0004</td>
<td>Peach Lake</td>
<td>B</td>
<td>Impaired</td>
<td>TMDL</td>
<td>Phosphorus</td>
<td>2009</td>
<td>Sewering</td>
<td>Sewered - 2013</td>
</tr>
<tr>
<td>0101-0023</td>
<td>Scajaquada Creek</td>
<td>B</td>
<td>Impaired</td>
<td>LTCP/Consent Order</td>
<td>Odors Floatables Pathogens</td>
<td>2004</td>
<td>LTCP BSA Bird Island WWTP</td>
<td>PCM plan to be submitted 3/2015</td>
</tr>
</tbody>
</table>
More work to be done…

• Improve integration with DOW programs
  • Monitoring
  • Permits
  • Flood & Dam Safety
  • Funding
  • Compliance
Thank You

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