Tracking and Communicating Vermont’s Clean Water Progress

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Vermont Department of Environmental Conservation

29th Annual Nonpoint Source Pollution Conference

April 25, 2018
Vermonters care about clean water
Vermont’s Clean Water Priorities

Nonpoint source pollution is the cause of impairment for:

93% of impaired river and stream miles
99.6% of impaired lake and pond acres
Nutrient Pollution Control Plans (i.e., TMDLs)

- Phosphorus TMDLs for Vermont Segments of Lake Champlain
- Nitrogen TMDL for Dissolved Oxygen in Long Island Sound
- Lake Memphremagog Phosphorus TMDL
Vermont Clean Water Act (Act 64 of 2015)
“All-in for Clean Water”

Reasonable assurance to meet nonpoint source targets

New water quality regulations

New Clean Water Fund

New tracking, accounting, and reporting requirements
Tracking TMDL Implementation

**Funding Programs**
Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

**Regulatory Programs**
Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater
Lake Champlain TMDL Accountability Framework

1. TMDL establishes phosphorus targets
2. TBP I.D. five-year interim phosphorus planning targets
3. TBP I.D. priority actions to meet five-year planning targets
4. Track actions implemented via regulatory/funding programs
5. Estimate annual average phosphorus load reductions
6. Measure progress against TMDL base load and targets

EPA issues report cards by planning basin on five year rotation
Funding Programs
Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

Regulatory Programs
Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater
Outreach and technical assistance measures to evaluate the level of clean water outreach and technical assistance provided by state agencies to support implementation of clean water funding and projects;

Investment measures on dollars invested in clean water restoration projects, addressing planning, design, and implementation of water quality improvement practices;

Measures of project outputs, quantifying the results of clean water restoration projects completed by project type; and

Measures of environmental outcomes, quantifying nutrient reductions achieved through State-funded clean water restoration projects.

http://dec.vermont.gov/watershed/cwi/cwf#report
**Investment Measures**

114% Increase in funds invested in clean water projects from 2016 to 2017

Total state funds invested in clean water projects in SFY 2017: $22,976,188

Funds awarded for clean water projects in the Lake Champlain Basin: $14,303,667

Funds awarded for clean water projects in the Lake Memphremagog Basin: $607,164

Funds awarded for clean water projects in the Connecticut River Basin: $7,734,114

Funds awarded for clean water projects in the Hudson River Basin: $331,249
# Results of Agricultural Projects

Results of agricultural pollution prevention projects implemented in SFY 2017, statewide.

<table>
<thead>
<tr>
<th>PROJECT RESULTS</th>
<th>Performance Measures</th>
<th>2016</th>
<th>2017</th>
<th>TMDL¹ Implementation</th>
<th>Act 64 (2015) Implementation</th>
<th>RAP¹ Compliance</th>
<th>Flood Resiliency</th>
<th>Working Landscape</th>
<th>Habitat Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acres of cropland and pasture treated by annual conservation practices</td>
<td>3,865</td>
<td>2,486*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Acres of cropland and pasture treated by crop rotation and associated practices</td>
<td>572</td>
<td>0*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acres of cropland and pasture treated by forested buffers</td>
<td>366</td>
<td>178*</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Number of barnyard/production area practices installed</td>
<td>39</td>
<td>87</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acres of water quality protections within conserved agricultural lands</td>
<td>New in 2017</td>
<td>89</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
</tbody>
</table>

*USDA NRCS prioritized federal funding for field-based practices in SFY 2017, therefore, state-funded field practices decreased relative to SFY 2016, while state-funded barnyard/production area practices increased by more than 50 percent relative to SFY 2016. Federally funded projects are outside the scope of this report.

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**Lesson Learned:**
Public relates to project outputs and cobenefits; helpful where pollutant reductions cannot be quantified.
Results of Agricultural Projects

Results of agricultural pollution prevention projects implemented in SFY 2017, statewide.

<table>
<thead>
<tr>
<th>POLLUTANT REDUCTION</th>
<th>2016</th>
<th>2017</th>
<th>Cumulative</th>
<th>Extent of Load Reduction Quantified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual agricultural conservation practices (active for at least 1 year)</td>
<td>443</td>
<td>283</td>
<td>283</td>
<td>53 percent of acres quantified in 2017 (projects in the Lake Champlain basin)</td>
</tr>
<tr>
<td>Agricultural crop rotation and associated practices (active for at least 5 years)</td>
<td>271</td>
<td>0</td>
<td>271</td>
<td>100 percent of acres quantified (cumulative) (projects in the Lake Champlain basin)</td>
</tr>
<tr>
<td>Forested riparian buffer restoration on agricultural lands (active for at least 15 years)</td>
<td>199</td>
<td>34</td>
<td>234</td>
<td>69 percent of acres quantified (cumulative) (projects in the Lake Champlain basin)</td>
</tr>
</tbody>
</table>

Figure 21. Before (left) and after (right) installation of livestock exclusion fencing and improved laneway and water crossing, completed by Poultney Mettowe Conservation District with ANR funding.

Lesson Learned:
Report extent to which pollutant reductions are quantified; gaps will exist in project data and performance.
Watershed Summaries – New this Year

Lamoille River Watershed Summary

State funding awarded in the Lamoille River watershed in SFY 2017, by sector
Total: $1,589,446
Clean Water Initiative Projects Dashboard

Phase 1 (Complete)

Stormwater Implementation
Northfield Village Green Bioretention Installation

Town: Northfield
County: Washington
Watershed: Winooski
Funding Amount: $110,695
Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2016)
Description: This project was identified and designed as part of a previous grant to that sought to mitigate stormwater runoff within the Village of Northfield. The site that has been selected is located behind the Village Green in Northfield. This project constructs a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.
Partners: Central Vermont Regional Planning Commission

Results:
- 0.8 kg/year phosphorus reduction
- 5 acres of impervious area treated

For more information visit: http://dec.vermont.gov/watershed/cwi/projects

http://dec.vermont.gov/watershed/cwi/projects

Phases 2-3 (2018)
Interagency data and data visualization

[Diagram showing ANR, VTrans, AAFM, ACCD, VHCB connections]

[Graph showing data visualization]
Vermont Clean Water Tracking Systems

Facilitates project prioritization

Tracks work completed via funding and regulatory programs

Contains BMP Accounting and Tracking Tool (BATT)

Lesson Learned:
Interagency coordination is key, especially for sharing agricultural data
Tracking & Accounting TMDL Implementation: BMP Accounting & Tracking Tool (BATT)

- Practice Reporting
- Practice location
- Acres treated, land use
- Practice characteristics

BATT

Estimates annual average pollutant reduction
Stormwater Treatment Practice Example

### BMP System

<table>
<thead>
<tr>
<th>Name</th>
<th>St. Albans Gravel Wetland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latitude</td>
<td>44.80522</td>
</tr>
<tr>
<td>Longitude</td>
<td>-73.06988</td>
</tr>
<tr>
<td>Drainage Area</td>
<td>11: St. Albans Bay Direct Drainage</td>
</tr>
<tr>
<td>HUC12</td>
<td></td>
</tr>
<tr>
<td>Local ID</td>
<td></td>
</tr>
<tr>
<td>Notes</td>
<td></td>
</tr>
</tbody>
</table>

#### Land Use

<table>
<thead>
<tr>
<th>ID</th>
<th>Land Use</th>
<th>Acres</th>
<th>Soil</th>
<th>Slope</th>
<th>P Load</th>
</tr>
</thead>
<tbody>
<tr>
<td>974</td>
<td>Developed Impervious with Paved Roads (WA)</td>
<td>1.8</td>
<td>NA</td>
<td>NA</td>
<td>1.90574</td>
</tr>
<tr>
<td>975</td>
<td>Developed Pervious (WA)</td>
<td>1.01</td>
<td>NA</td>
<td>NA</td>
<td>0.179376</td>
</tr>
</tbody>
</table>

#### BMP's

<table>
<thead>
<tr>
<th>ID</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1692</td>
<td>Gravel Wetland</td>
</tr>
</tbody>
</table>

#### O&M

<table>
<thead>
<tr>
<th>ID</th>
<th>Inspection Date</th>
<th>Start Date</th>
<th>End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>273</td>
<td>7/1/2010</td>
<td>7/1/2030</td>
<td></td>
</tr>
</tbody>
</table>

#### Loads and Reductions

- Total Phosphorus Load: 2.086116 kg/year
- Computed Phosphorus Reduction: 1.243201 kg/year
- Override Phosphorus Reduction: 0
- Phosphorus Reduction: 1.243201 kg/year

[Update] [Cancel]
Reporting Pollutant Reductions

Communications Lessons Learned

Modeled estimates of pollutant reductions
Project-level accountability
Interim measure of progress
Relative magnitude of reduction over time

Complement with monitoring data
Land use and climate change affect progress
Report extent pollutant reductions quantified
Reported pollutant reductions may change as methods are updated

Sticker shock: it will require many, many practices across the landscape
Next Steps: EPA Report Cards

Phase 2 Implementation Plans
- EPA issues interim report card
- EPA issues final report card
## Next Steps: Additional Projects

Table 14: Summary of Vermont's ability in SFY 2017 to account for nutrient pollution reductions by project type, basin, and nutrient of concern

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Lake Champlain</th>
<th>Lake Memphremagog</th>
<th>Connecticut River</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agricultural cropland and pasture conservation practices</td>
<td>Phosphorus</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Agricultural forested riparian buffers</td>
<td>Phosphorus</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Barnyard and production area management practices</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Agricultural easements for water quality</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>River and floodplain restoration</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Riparian buffer restoration</td>
<td>Phosphorus</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Wetland restoration</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Forest erosion control</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Stormwater treatment practices</td>
<td>Phosphorus</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Road erosion control linear practices</td>
<td>Phosphorus*</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Road erosion control culvert replacements</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Wastewater treatment upgrades</td>
<td>Phosphorus</td>
<td>Phosphorus*</td>
<td>Nitrogen</td>
</tr>
<tr>
<td>Combined sewer overflow abatement</td>
<td>Phosphorus</td>
<td>Phosphorus</td>
<td>Nitrogen</td>
</tr>
</tbody>
</table>

Expand ability to quantify pollutant reductions for projects in Connecticut River, and to cover additional project types.
Next Steps: Additional Programs

Expand tracking to federal funding programs, such as USDA-NRCS and Lake Champlain Basin Program

Expand tracking to new regulatory programs as they are rolled out (new stormwater permits and Required Agricultural Practices)
Lesson Learned:
Developing consistent, transparent tracking procedures for data gathering is key, especially when multiple partners are involved.
Next Steps: Verification

Lesson Learned: Verification is key to credit practices over time

Bioretention is a practice that treats runoff by passing it through a vegetated filter bed, with a filter mixture of sand, soil, and organic matter. Filtered stormwater is either returned to a conveyance system or infiltrated into the native soil.
For more information:

Website  cleanwater.vermont.gov
Reports   http://dec.vermont.gov/watershed/cwi/cwf#reports
Projects http://dec.vermont.gov/watershed/cwi/projects

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