| | |
|---|---|
| **Municipality/Organization:** | **City of Northampton, MA** |
| **EPA NPDES Permit Number:** | **MA041016** |
| **MassDEP Transmittal Number:** | **W-035904** |
| **Annual Report Number & Reporting Period:** | **Year 13 April 1, 2015 – March 31, 2016** |

# NPDES PII Small MS4 General Permit Annual Report (Due: May 1, 2016)

**Part I. General Information**

Contact Person: James R. Laurila Title: Acting Director of Public Works

Telephone #: 413-587-1570 Email: jlaurila@northamptonma.gov

Mailing Address: 125 Locust Street, Northampton, MA 01060

Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature:

Printed Name: David J. Narkewicz

Title: Mayor

Date: 4/28/16

## Part II. Self-Assessment

**The City of Northampton has completed the required self-assessment and has determined that our municipality is in compliance with all permit conditions.**

# Part III. Summary of Minimum Control Measures

## 1. Public Education and Outreach

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 1.1 | Stormwater Educational Brochure | DPW | General educational brochure developed and distributed by Fall 2004. | General educational brochure distributed to 15,090 households, businesses and other mail recipients in Northampton in 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016<br>Stormwater information also distributed at the DPW office and other public events. | Implement public education activities through the Soak Up the Rain and Pioneer Valley Soak Up the Rain initiatives as a member community in the Connecticut River Stormwater Committee. |
| Revised | | | General educational brochure developed by Spring 2004 and distributed by Fall 2007. | | |
| 1.2 | Stormwater Educational Information on DPW Website | DPW | Information on the Stormwater Management Program and other public educational material on DPW website. | New information and links to resources continually put on the City's web site. | New information will continue to be put on the City's web site. |
| Revised | | | | | |
| 1.3 | Stormwater Educational Outreach to Community School Groups | DPW | Educational Materials Available for use in schools and community groups by Fall 2004 | Ongoing curriculum at the Northampton High School on water and watersheds that includes stormwater. Students have conducted limited sampling in past years. | Continue to work stormwater information into curriculums of schools. |
| Revised | | | Stormwater information used in classrooms as determined by interest. | | |
| 1.4 | Tributary Signage | DPW | Tributary signage on five bridges in 2005 and 2007 | | |
| Revised | | | Eliminated tributary signage in favor an expanded catch basin labeling program due to cost constraints and greater effectiveness of the catch basin labels for public education (see 2.3 below) | | |

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 1.5 | Targeted Educational Material | DPW | Additional Educational Outreach as necessary. | Continued program to sell rain barrels to residents. 40 rain barrels were sold in 2015-2016.<br><br>Continued individual outreach to property owners, engineers, and developers on green infrastructure and Low Impact Development (LID) techniques.<br><br>Worked with the Connecticut River Stormwater Committee and implemented public education activities through the Pioneer Valley Soak Up the Rain initiative. Distributed informational signs for rain gardens and porous paving projects. Researched effective messaging for public outreach on bacteria/ pet waste management and nutrient management.<br><br>Implemented a credit program for rain gardens, porous pavement/pavers and dry wells for residential properties as part of the Northampton Stormwater and Flood Control Utility. | Continue to increase awareness and use of LID and Green Infrastructure practices for new developments and small scale improvements on residential properties (i.e. rain gardens, rain barrels, porous pavement/pavers, and drywell systems) |
| Revised | | | | | |

## 2. Public Involvement and Participation

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 2.1 | Public Advisory Committee | DPW | Regular Advisory Committee meetings. | The Board of Public Works (BPW) has served as the public advisory committee for the Stormwater Management Program. The Board of Public Works was eliminated in 2014 and the Public Works Commission continues the role as advisory committee for the Stormwater Management Program. | Continue to utilize the Public Works Commission as a means for public participation. |
| Revised | | | | | |
| 2.2 | Volunteer Water Quality Monitoring | DPW | Water quality monitoring and inspections throughout the City by volunteers. | Visual inspections of priority outfalls completed by DPW staff. Volunteers and staff with the Connecticut River Watershed Council conducted Connecticut and Mill River water quality monitoring. | Continue water quality visual assessments at priority outfalls throughout the City working with volunteers as possible. (see also 3.3 below) |
| Revised | | | Water quality visual inspections by DPW employees and volunteers. | | |
| 2.3 | Storm Drain Labels | DPW | Storm Drain labels on 20% of Catch Basins by Spring 2008 | Volunteers labeled 150 (5%) catch basins throughout the City in 2004. 500 additional labels (15%) were installed by the Fall of 2009. Purchased 1,700 metal catch basin labels in February 2014. Installed approximately 100 catch basin labels in 2015 in the downtown Northampton area. | Continue to install new metal catch basin labels throughout Northampton. |
| Revised | | | | | |
| 2.4 | Community Clean-Ups | DPW | Community Clean-Ups publicized and completed by Spring 2009. | Multiple clean-ups completed in the downtown area, specific city neighborhoods, rail trails, Mill River, and the "Meadows" section of the City near the Connecticut River. | Continue river and neighborhood cleanups throughout the City. |
| Revised | | | | | |

## 3. Illicit Discharge Detection and Elimination

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 3.1 | Storm Sewer System Map | DPW | Complete storm sewer map and field verify by Spring 2005. | GIS storm sewer map completed. Updates and revisions to the storm sewer map added as necessary. | Continue to make updates and revisions to the storm sewer map. |
| Revised | | | | | |
| 3.2 | Legal Prohibition and Enforcement | DPW | Illicit Connections and Discharges to the Municipal Storm Drain System Ordinance adopted by City Council. | Previously completed. (Illicit Connections and Discharge to the Municipal Storm Drain System Ordinance adopted by the City Council and signed by the Mayor June 17, 2004.) | Continue to enforce the Illicit Connections and Discharge to the Municipal Storm Drain System Ordinance. |
| Revised | | | | | |

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 3.3 | Illicit Discharge Detection and Elimination | DPW | Priority screening areas identified and targeted for inspections. Investigation and enforcement of illicit discharges and connections. | Continued visual inspections of priority outfalls. Investigated various public complaints.<br><br>Follow up to dry weather sampling results and recommendations conducted in 2011 and 2013 including manhole inspections and CCTV inspections. As part of IDDE investigations in the watershed area to outfall #146, a failing sanitary sewer system in Warner Street was reconstructed. Additional IDDE investigation located 5 locations where sewer mains were leaking to the drain system or to waterways. Repairs were completed in all 5 locations to correct the problems. | The City will continue IDDE investigation in all drainage areas where previous investigations have shown positive indicators of contamination and where further action and IDDE investigation was recommended. Additional manhole inspections and sampling, CCTV inspections, dye tests, and smoke tests will be used as necessary to locate the sources of contamination and work to correct the problems. Continue to conduct visual inspections at priority outfalls including limited bacteria sampling. Investigation and enforcement of illicit discharges and connections as they are discovered. |
| 3.4 | Targeted Educational Outreach | DPW | Conduct annual household hazardous waste collection. Conduct outreach to the public to encourage reporting of illicit discharges. | The annual household hazardous waste collection was publicized and completed in May 16, 2015. 192 Northampton residents or businesses participated and a total of 13,400 lbs of hazardous waste was collected. Information about reporting illicit discharges was in the Stormwater Brochure distributed to residents of the City. | Continue annual household hazardous waste collection. Continue educational outreach to the public for reporting illicit discharge to the storm drain system to the DPW. |
| | | | | | |

## 4. Construction Site Stormwater Runoff Control

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 4.1 | Erosion and Sediment Control Ordinance | DPW | Erosion & Sediment Control and Post Construction Stormwater Management Ordinance adopted by City Council. | Completed. (Erosion & Sediment Control and Post-Construction Stormwater Management Ordinance adopted by the City Council and signed by the Mayor June 17, 2004.) | Implement the Erosion & Sediment Control and Post-Construction Stormwater Management Ordinance as necessary. |
| Revised | | | | | |
| 4.2 | Stormwater Site Plan Reviews | DPW | Procedures for site plan review implemented following adoption of Ordinance. | Reviewed all proposed development projects disturbing over 1 acre for compliance with the Erosion & Sediment Control and Post Construction Stormwater Management Ordinance. Issued stormwater management permits for 5 projects and reviewed all smaller projects applying for planning board permits. | Continue to review all development projects for compliance with the Erosion & Sediment Control and Post Construction Stormwater Management Ordinance. |
| Revised | | | | | |
| 4.3 | Stormwater Site Inspections | DPW | Procedures for site inspections implemented following adoption of Ordinance. | Conducted site inspections and responded to public complaints regarding construction sites. | Continue inspections as required for compliance with the Erosion & Sediment Control and Post Construction Stormwater Management Ordinance. |
| Revised | | | | | |
| 4.4 | Construction Site Public Participation | DPW | Procedures for receiving information submitted by the public in place following adoption of Ordinance. | Stormwater Management Permit application process is concurrent with Planning Board and/or Conservation Commission review so the public hearings during review by these entities serve as the public hearing for each project. | Conduct further outreach to the public on how to identify and report stormwater runoff problems at construction sites. |
| Revised | | | | | |

## 5. Post-Construction Stormwater Management in New Development and Redevelopment

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 5.1 | BMP Strategies | DPW | Adopt or change City regulations to create a consistent post-construction runoff control strategy. | Completed. Post-construction runoff control strategy defined and adopted as part of Erosion and Sediment Control and Post-Construction Stormwater Management Ordinance adopted June 2004. The DPW continued to work with the Office of Planning and Sustainability and the Pioneer Valley Planning Commission to consistently revise all relevant municipal ordinances to add specific LID and green infrastructure guidance and requirements. A Green Streets and Infrastructure Policy was drafted and is under review. | The DPW will continue working with the Northampton Office of Planning and Sustainability and the Pioneer Valley Planning Commission to consistently revise requirements for stormwater management in all relevant municipal ordinances. Continue to maintain a consistent post-construction runoff control strategy. Conduct outreach to developers to educate about LID and preferred runoff control BMPs. Possible adoption of a final Green Streets and Infrastructure Policy as an Executive Order. |
| Revised | | | | | |
| 5.2 | Runoff Control Performance Standards | DPW | Post-Construction runoff control performance standards incorporated into an Ordinance. | Completed. Performance standards developed and incorporated into the Erosion and Sediment Control and Post-Construction Stormwater Management Ordinance, which was adopted in June 2004. | Enforce compliance with post-construction runoff control performance standards through site plan review and site inspections. Continue to define the preferred structural and non-structural BMPs. |
| Revised | | | | | |

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 5.3 | Structural BMP Inspection and Maintenance | DPW | Develop inspection schedules and a maintenance enforcement mechanism for structural stormwater controls throughout the city. | All development projects over 1 acre since 2004 with approved Stormwater Management Permits have been required to complete a legally binding Stormwater Operation, Maintenance, and Inspection Agreement as a condition of the permit. Inspections of the BMPs are conducted on an on-going basis. As part of the new Stormwater and Flood Control Utility, a Credit and Incentive Policy has been implemented starting July 1, 2014 to provide credits for stormwater BMPs that have been operated and maintained in good working condition. Property owners will be required to provide documentation of the condition and maintenance status of BMPs for the proposed credits. | Continue inspections of the stormwater BMPs throughout the City. |
| Revised | | | | | |

## 6. Pollution Prevention and Good Housekeeping in Municipal Operations

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| 6.1 | Drainage System Operation & Maintenance Program | DPW | Operation and maintenance (O&M) program implemented. | Implemented stormwater O&M activities including street sweeping, catch basin cleaning, water quality unit cleaning, limited drain line cleaning, and drain system repairs. | Continue to implement O&M activities and identify ways to further reduce the discharge of pollutants through the storm drain system. |
| Revised | | | | | |
| 6.2 | Employee Training | DPW | Employee training completed | Ongoing training. | |
| Revised | | | | | |
| 6.3 | Pollution Prevention BMPs | DPW | Pollution prevention BMPs identified and prioritized. | Design of improvements to the Hinckley Street drainage system and outfall. Construction of stormwater green infrastructure improvements as part of the renovation of Pulaski Park in downtown Northampton. | Identify and implement additional pollution prevention BMPs for DPW properties, road projects, and activities as well as other Municipal properties and parking lots. |
| Revised | | | | | |

## 7. BMPs for Meeting Total Maximum Daily Load (TMDL) Waste Load Allocations (WLA) *Not Applicable*

| BMP ID # | BMP Description | Responsible Dept./Person Name | Measurable Goal(s) | Progress on Goal(s) – Permit Year 13 (Reliance on non-municipal partners indicated, if any) | Planned Activities – |
|---|---|---|---|---|---|
| | | | | | |
| Revised | | | | | |
| | | | | | |
| Revised | | | | | |
| | | | | | |
| Revised | | | | | |
| | | | | | |
| Revised | | | | | |
| | | | | | |
| Revised | | | | | |
| | | | | | |
| Revised | | | | | |

## 7a. Additions

| | | | | | |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |

## 7b. WLA Assessment

**Part IV. Summary of Information Collected and Analyzed**
n/a

**Part V. Program Outputs & Accomplishments**
(Since beginning of permit coverage unless specified otherwise by a **, which indicates response is for period covering April 1, 2015 through March 31, 2016)

**Programmatic**

| | (Preferred Units) | Response |
|---|---|---|
| Stormwater management position created/staffed | (y/n) | Y |
| Annual program budget/expenditures ** | ($) | $164,000 |
| Total program expenditures since beginning of permit coverage | ($) | $1,338,000+ |
| Funding mechanism(s) (General Fund, Enterprise, Utility, etc) | | Utility |
| | | |

**Education, Involvement, and Training**

| | | |
|---|---|---|
| Estimated number of property owners reached by education program(s) | (# or %) | 85% |
| Stormwater management committee established | (y/n) | Y |
| Stream teams established or supported | (# or y/n) | N |
| Shoreline clean-up participation or quantity of shoreline miles cleaned ** | (y/n or mi.) | Y |
| Shoreline cleaned since beginning of permit coverage | (mi.) | - |
| Household Hazardous Waste Collection Days | | |
| ▪ days sponsored ** | (#) | 1 |
| ▪ community participation ** | (# or %) | 192 |
| ▪ material collected ** | (tons or gal) | 6.7 tons |
| School curricula implemented | (y/n) | Y |
| | | |

**Legal/Regulatory**

| | In Place Prior to Phase II | Reviewing Existing Authorities | Drafted | Draft in Review | Adopted |
|---|---|---|---|---|---|
| Regulatory Mechanism Status (indicate with "**X**") | | | | | |
| ▪ Illicit Discharge Detection & Elimination | | | | | X |
| ▪ Erosion & Sediment Control | | | | | X |
| ▪ Post-Development Stormwater Management | | | | | X |
| Accompanying Regulation Status (indicate with "**X**") | | | | | |
| ▪ Illicit Discharge Detection & Elimination | | | | | X |
| ▪ Erosion & Sediment Control | | | | | X |
| ▪ Post-Development Stormwater Management | | | | | X |

| **Mapping and Illicit Discharges** | **(Preferred Units)** | **Response** |
|---|---|---|
| Outfall mapping complete | (%) | 100% |
| Estimated or actual number of outfalls | (#) | 326 |
| System-Wide mapping complete (complete storm sewer infrastructure) | (%) | 95% |
| Mapping method(s) | | |
| ▪ Paper/Mylar | (%) | - |
| ▪ CADD | (%) | - |
| ▪ GIS | (%) | 100% |
| Outfalls inspected/screened ** | (# or %) | 5% |
| Outfalls inspected/screened (Since beginning of permit coverage) | (# or %) | 85% |
| Illicit discharges identified ** | (#) | 5 |
| Illicit discharges identified (Since beginning of permit coverage) | (#) | 16 |
| Illicit connections removed ** | (# ); and (est. gpd) | 0 |
| Illicit connections removed (Since beginning of permit coverage) | (#); and (est. gpd) | 7 |
| % of population on sewer | (%) | 80% |
| % of population on septic systems | (%) | 20% |

**Construction**

| | (Preferred Units) | Response |
|---|---|---|
| Number of construction starts (>1-acre) ** | (#) | 5 |
| Estimated percentage of construction starts adequately regulated for erosion and sediment control ** | (%) | 100% |
| Site inspections completed ** | (# or %) | 5 |
| Tickets/Stop work orders issued ** | (# or %) | 0 |
| Fines collected ** | (# and $) | $0 |
| Complaints/concerns received from public ** | (#) | 0 |
| | | |
| | | |

**Post-Development Stormwater Management**

| | | |
|---|---|---|
| Estimated percentage of development/redevelopment projects adequately regulated for post-construction stormwater control | (%) | 60% |
| Site inspections (for proper BMP installation & operation) completed ** | (# or %) | 70% |
| BMP maintenance required through covenants, escrow, deed restrictions, etc. | (y/n) | Y |
| Low-impact development (LID) practices permitted and encouraged | (y/n) | Y |
| | | |
| | | |

**Operations and Maintenance**

| | | |
|---|---|---|
| Average frequency of catch basin cleaning (non-commercial/non-arterial streets) ** | (times/yr) | <1 |
| Average frequency of catch basin cleaning (commercial/arterial or other critical streets) ** | (times/yr) | <1 |
| Qty of structures cleaned ** | (#) | 1,000 |
| Qty. of storm drain cleaned ** | (%, LF or mi.) | 0% |
| Qty. of screenings/debris removed from storm sewer infrastructure ** | (lbs. or tons) | n/a |
| Disposal or use of screenings (landfill, POTW, compost, beneficial use, etc.) ** | (location) | Landfill |

| | | |
|---|---|---|
| Basin Cleaning Costs | | |
| • Annual budget/expenditure (labor & equipment)** | ($) | n/a |
| • Hourly or per basin contract rate ** | ($/hr or $ per basin) | - |
| • Disposal cost** | ($) | 0 |
| Cleaning Equipment | | |
| • Clam shell truck(s) owned/leased | (#) | 1 |
| • Vacuum truck(s) owned/leased | (#) | 1 |
| • Vacuum trucks specified in contracts | (y/n) | N |
| • % Structures cleaned with clam shells ** | (%) | 100% |
| • % Structures cleaned with vactor ** | (%) | 0% |

| | (Preferred Units) | Response |
|---|---|---|
| Average frequency of street sweeping (non-commercial/non-arterial streets) ** | (times/yr) | 1 |
| Average frequency of street sweeping (commercial/arterial or other critical streets) ** | (times/yr) | 2 |
| Qty. of sand/debris collected by sweeping ** | (lbs. or tons) | 60 tons |
| Disposal of sweepings (landfill, POTW, compost, beneficial use, etc.) ** | (location) | Compost & Landfill |
| Annual Sweeping Costs | | |
| • Annual budget/expenditure (labor & equipment)** | ($) | $35,000 |
| • Hourly or lane mile contract rate ** | ($/hr. or ln mi.) | - |
| • Disposal cost** | ($) | $1,847 |
| Sweeping Equipment | | |
| • Rotary brush street sweepers owned/leased | (#) | 2 |
| • Vacuum street sweepers owned/leased | (#) | 0 |
| • Vacuum street sweepers specified in contracts | (y/n) | 0 |
| • % Roads swept with rotary brush sweepers ** | % | 100% |
| • % Roads swept with vacuum sweepers ** | % | 0 |

| | | |
|---|---|---|
| Reduction (since beginning of permit coverage) in application on public land of:<br>("N/A" = never used; "100%" = elimination) | | |
| ▪ Fertilizers | (lbs. or %) | |
| ▪ Herbicides | (lbs. or %) | |
| ▪ Pesticides | (lbs. or %) | |
| Integrated Pest Management (IPM) Practices Implemented | (y/n) | Y |
| | | |

| | (Preferred Units) | Response |
|---|---|---|
| Average Ratio of Anti-/De-Icing products used **<br><br>(also identify chemicals and ratios used in specific areas, e.g., water supply protection areas)<br><br>--Granular Sodium Chloride (NaCl) treated with liquid magnesium chloride/organic based performance enhancer (Caliber-M2000—24% $MgCl_2$, 12% proprietary ingredients, 0.5% IMP-AP) | % NaCl<br>% $CaCl_2$<br>% $MgCl_2$<br>% CMA<br>% Kac<br>% KCl<br>% Sand | Y-(% not known)<br><br>Y-(% not known) |
| Pre-wetting techniques utilized ** | (y/n or %) | Y |
| Manual control spreaders used ** | (y/n or %) | Y |
| Zero-velocity spreaders used ** | (y/n or %) | N |
| Estimated net reduction or increase in typical year salt/chemical application rate | (±lbs/ln mi. or %) | 0 |
| Estimated net reduction or increase in typical year sand application rate ** | (±lbs/ln mi. or %) | -100% (reduction) |
| % of salt/chemical pile(s) covered in storage shed(s) | (%) | 100% |
| Storage shed(s) in design or under construction | (y/n or #) | N |
| 100% of salt/chemical pile(s) covered in storage shed(s) by May 2008 | (y/n) | Y |
| | | |
| | | |

**Water Supply Protection**

| | | |
|---|---|---|
| Storm water outfalls to public water supplies eliminated or relocated | # or y/n | N |
| Installed or planned treatment BMPs for public drinking water supplies and their protection areas | # or y/n | N |
| • Treatment units induce infiltration within 500-feet of a wellhead protection area | # or y/n | 0 |

# Connecticut River Stormwater Committee
# Annual Report
# April 1, 2015 to March 31, 2016

## The Connecticut River Stormwater Committee

The Connecticut River Stormwater Committee is an intergovernmental compact of 13 municipalities organized to collaborate on education and outreach about stormwater impacts on the Connecticut River. Facilitated and staffed by the Pioneer Valley Planning Commission, committee work helps NPDES MS4 regulated member communities meet stormwater education and outreach permit requirements. Based on the Memorandum of Agreement under which the committee was formed in 2008, work also helps member communities with related bylaws/ordinances and other compliance measures. Member communities are shown in Table 1 below.

**Table 1: Connecticut River Stormwater Committee Member Communities**

| Member Community | Committee Representatives and Departments |
|---|---|
| Agawam | Tracey DeMaio, Department of Public Works |
| Chicopee | Quinn Lonczak, Department of Public Works |
| Easthampton | Jim Gracia, Department of Public Works |
| Granby | Dave Derosiers, Highway Department |
| Holyoke | Yem Lip, Department of Public Works |
| Longmeadow | Mario Mazza, Department of Public Works |
| Ludlow | JT Gaucher, Department of Public Works |
| Northampton | Doug McDonald, Department of Public Works |
| Southwick | Randall Brown and Richard Grannells, Department of Public Works |
| South Hadley | Melissa LaBonte, Department of Public Works |
| Springfield | Kevin Chaffee, Planning/Conservation |
| West Springfield | Jim Lyons and Amanda Santaniello, Department of Public Works |
| Westfield | Casey Berube, Department of Public Works |

## Education and Outreach over the Past Year

The Stormwater Committee has been in a transition phase over the past year, continuing education and outreach under the requirements of the 2003 permit, but taking important steps in preparing for the forthcoming 2016 permit. In some cases the work of preparing for the forthcoming permit has served to provide education and outreach under the 2003 permit. This is especially the case with the pet waste practices survey that went to dog owners throughout Stormwater Committee communities (described in greater detail below).

The narrative below summarizes the work of the Connecticut River Stormwater Committee during the 2016 reporting year, which includes the following:

- Promoted Soak up the Rain stormwater education campaign
- Designed and constructed 3 demonstration rain gardens with 2 hands-on training events

- Defined program of effective messaging on bacteria/pet waste management
- Began to define program of effective messaging on nutrients
- Discontinued collaboration with Greenscapes Program
- Began retooling website education and outreach for the Pioneer Valley
- Led first phase of urban tree planting project in Chicopee, Holyoke, and Springfield
- Collaborated with Massachusetts state-wide coalition of stormwater coalitions

## 1. Promoted "Soak up the Rain" stormwater education campaign

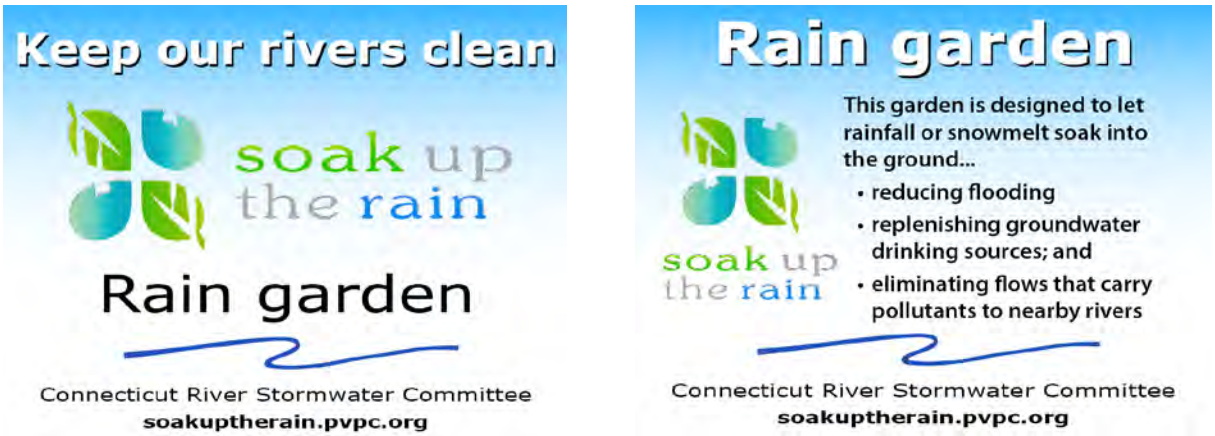
The Connecticut River Stormwater Committee continued to develop and promote the "Pioneer Valley Soak up the Rain" education campaign (a local version of the EPA's New England campaign). The campaign, a call to action for property owners to reduce stormwater runoff through strategies that soak up the rain, involved two outreach efforts for the Connecticut River this year:

***Pioneer Valley Soak up the Rain Website www.pvpc.org/soakuptherain/***

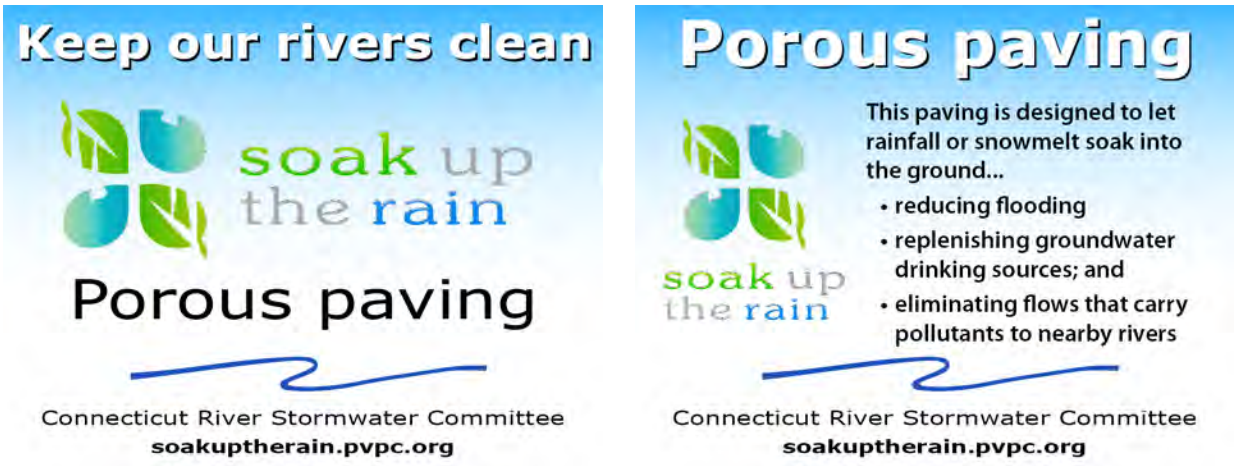
The Stormwater Committee continues to maintain the Pioneer Valley Soak up the Rain website, which promotes a range of practices, including tree plantings, rain gardens, permeable pavements, dry wells, and green roofs. An occasional blog that includes photos and video provides examples from the region. Property owners throughout the Pioneer Valley are also invited to submit projects that they know of to feature on the website. A "Cool resources" heading provides connection to the latest information and a "resources" menu item links to a library of informational resources. In the past year, the website had 33,997 hits with 12,095 of these hits resulting in information requests being sent to the user. Links to this website are on all member community stormwater web pages.

***Soak up the Rain Signs for rain gardens and porous paving projects***

The Stormwater Committee produced 150 Soak up the Rain signs, including 100 for rain gardens and 50 for porous paving. Each of the signs has two different sides to them, giving property owners the option to display a message that connotes pride in having such a facility or a more involved message that describes what the system does. Signs have been distributed to Stormwater Committee communities for use at green infrastructure stormwater management projects in their jurisdictions and distributed also to residential and business property owners with high profile projects. The Committee will continue to distribute and display signs to further the message about soaking up the rain. *See sign design below.*




***Rain garden signs – both sides***




***Porous paving signs – both sides***

## 2. Designed and constructed 3 demonstration rain gardens with 2 hands-on training events

PVPC continued work with the Regenerative Design Group to design and construct demonstration rain gardens in Springfield. Two of the three projects to date have also included hands-on trainings to build regional know-how in the design and installation of rain gardens. Trainees then helped by volunteering to install plants in each of the rain gardens. Though rain garden facilities are located in Springfield, trainings have been advertised throughout the region to include all Stormwater Committee communities. The three rain garden projects to date have included:

| ***Rain garden address*** | ***Description of facility*** | ***Training details*** |
|---|---|---|
| Birchland Avenue - residential demonstration project | 370 square foot facility that has capacity to capture and soak up 1,384 gallons of rainfall from portion of rooftop. | NA |
| Springfield Museums - institutional demonstration project | 2,900 square foot facility near Chestnut Street that has capacity to capture and soak up 11,800 gallons from half of large rooftop on Kilroy House | Training on May 16 drew 21 participants from several stormwater committee communities. Program began with overview on the nature of stormwater impacts on the Connecticut River and the advantages of capture and infiltration of flows using rain gardens to avert flooding and pollution, and promote improved aesthetics. The training then provided detail on site evaluation, design strategy, site preparation, and installation. |
| Gardening the Community - community demonstration project | 1,000 square foot facility along Walnut and James Streets that has capacity to capture and soak | Training on October 3 drew 22 participants from various stormwater committee communities. Program |

| | | |
|---|---|---|
| | up 3,740 gallons from paved parking lot - this is a new community garden site and the rain garden is part of the 1st phase of construction | began with overview on the nature of stormwater impacts on the Connecticut River and the advantages of capture and infiltration of flows using rain gardens to avert flooding and pollution, and promote improved aesthetics. The training then provided detail on site evaluation, design strategy, site preparation, and installation. |

Promoting these trainings entailed reaching out to: Western Massachusetts Master Gardener Association, Ecological Landscape Alliance, local public libraries, and notice placements with area newspapers and social media resources. The rain garden work is made possible through a settlement agreement reached by Clean Water Action. Based on the materials, contracts, and know-how developed through this work in Springfield, this project can be easily duplicated in other stormwater committee member communities for the future. PVPC has talked with both Clean Water Action and MassDEP about additional funding to replicate this program in other communities.

*Residential demonstration rain garden in Springfield*

*Institutional demonstration rain garden at Springfield Museums*

*Community demonstration rain garden at Gardening the Community's new site at Walnut and James Streets in Springfield*

## 3. Defined program of effective messaging on bacteria/pet waste management

Based on the 2014 draft Massachusetts Municipal Separate Storm Sewer Systems (MS4) permit, the 2016 final permit to be issued by the U.S. Environmental Protection Agency will require urbanized areas draining to the Connecticut River to provide an annual message to encourage proper management of pet waste. Specifically, communities with systems that discharge to bacteria or pathogen impaired waters without an EPA approved TMDL must supplement education and outreach programming,

> …with an annual message encouraging the proper management of pet waste, including noting any existing ordinances where appropriate. The permittee or its agents shall disseminate educational materials to dog owners at the time of issuance or renewal of a dog license, or other appropriate time. Education materials shall describe the detrimental impacts of improper management of pet waste, requirements for waste collection and disposal, and penalties for noncompliance."[1]

Messaging on proper management of pet waste is also required in the June/July time frame for communities where there are nitrogen and phosphorous impaired waters.

All 13 member communities of the Connecticut River Stormwater Committee will be subject to these requirements. As such, the Connecticut River Stormwater Committee has been interested in

[1] Note that where appropriate municipalities must also provide messaging around septic system maintenance to help address bacteria impairments.

understanding the effectiveness of past pet waste messaging and how to move forward with messaging under the new permit.

With funding from the Massachusetts Direct Local Technical Assistance Program and match from the Connecticut River Stormwater Committee budget, the Pioneer Valley Planning Commission worked with member communities to devise and distribute a survey to help provide direction on bacteria messaging.

With members of the Connecticut River Stormwater Committee, the Pioneer Valley Planning Commission (PVPC) developed a three-page survey containing 20 questions for dog owners. Survey design was informed by the principles of community based social marketing. As defined by McKenzie-Mohr and Smith, community based social marketing seeks to foster sustainable behavior by first identifying barriers and benefits to a sustainable behavior. They note that barriers may be "internal" to the individual, such as lack of knowledge regarding how to carry out an activity, or external, as in structural changes that need to be made in order for the behavior to be more convenient.[2] As such, understanding current practices, barriers, and perceptions were integral to the six overarching questions the Stormwater Committee sought to answer through the survey:

1. Has the most recent dog waste messaging through the distribution of posters under the Think Blue Connecticut River campaign reached pet owners and got them to think about their practices?
2. Do people understand the connection between pet waste and stormwater?
3. What are current practices in yards at home, while walking in neighborhood, and walking in public parks?
4. What are the barriers to best practices?
5. What would make best practices easier for dog owners?
6. What are important considerations for messaging about pet waste practices going forward?

PVPC distributed the *paper survey* through animal hospital waiting rooms (see image at right) in Stormwater Committee municipalities and through direct distribution of surveys at two dog parks in the region. A link to the *electronic version of the survey* went by e-mail to clients of Dave's Soda and Pet City and the Northampton Veterinary Clinic. Both survey distribution methods included an incentive – a $5 coupon to Dave's Soda and Pet City, a local pet store, with franchises throughout the region, which kindly donated the coupons.

*Box with surveys left in animal hospitals in stormwater committee municipalities.*

A total of 1,279 people completed the survey – 100 paper surveys were collected and 1,179 people completed the online survey. Of the completed surveys, 641 were completed by people who live in Connecticut River Stormwater Committee member communities. The messaging analysis and report focuses on the results from those specific communities.

[2] From: *Fostering Sustainable Behavior: An Introduction to Community Based Social Marketing*, by Doug McKenzie-Mohr and William Smith, New Society Publishers, 1999.

***Major Findings from Survey***

Effectiveness of most recent messaging

The past poster message about dog waste in the Connecticut River Think Blue campaign reached 8.7% of survey respondents (59 people) in Connecticut River Stormwater Committee communities. What is interesting is that fully 134 people responded to the follow up question about whether the message got them to change their practices. This may indicate that by virtue of showing the message on the survey page itself, people took in the message and were prompted to consider their practices. Comments seem to reinforce this, with many writing, "I already pick up my pet's waste." Of those 134 survey respondents, nearly 40% indicated that the ad moved them to make "a major change" or "somewhat of a change in their practices." The remaining 60% indicated either "not much of a change," "no change at all," or "not sure." Based on written comments, it is likely that those in this later category are already picking up their dog's waste.

Connection between pet waste and stormwater

The survey indicates widespread awareness that pet waste can affect streams and rivers, with 74.5% recognizing that it contributes either "a great deal," "a moderate amount," or "a little." At the same time, 25.6% of respondents are "not sure" or "do not think" that pet waste is a contributing factor to water pollution.

Current practices (in yards at home, while walking in neighborhood, and walking in public parks or forests)

Regardless of whether they are in their yard with their dog, walking around the neighborhood, or walking at a public park or forest, the majority of respondents report picking up waste. In t*heir own yard or around the neighborhood*, 88% and 97% of respondents respectively report picking up after their dog, and put the waste in the trash (or for a few, flush it down the toilet).

When asked why they pick up after their dog *in their own yard*, the most common response is "hygiene/health reasons", followed by "courtesy to neighbors," "concern for environment," and "it's the law." When walking a dog *around the neighborhood* or at a *public park of forest*, "courtesy to neighbors" is the most common response, followed by "hygiene/health reasons."

For dog owners who do not pick up after their dog in their yard, a follow-up question on the survey asks to identify the reason why. Of the 125 people who answered this question, 63% stated that they think dog waste is a "natural fertilizer." A smaller number of people felt that it "makes little difference" (15.0%) or it is "too much trouble" (7.2%). From the comments made as part of this question, it is clear that many people who live in more rural locations feel it is not necessary to pick up waste, or that it is not going to contaminate a water supply.

When asked a similar question in regard to w*alking their dog in the neighborhood*, 12 people indicated that they don't pick up their dog's waste. In a follow up question, however, 26 people gave reasons for not picking up the dog's waste. Of those, the most popular response was that "it is a natural fertilizer." For a few, "it is too much trouble," or they simply forgot a bag or some other means of picking it up. Lastly, w*hen at a public park or forest*, 51 people stated they don't pick up after their dog. Of these, the most common reason was that "it is a natural fertilizer," followed by "makes little difference." Some of the comments suggest that if people are far in the woods, they don't see the need to pick it up. Similarly, if they have forgotten a bag, or do not have a way to dispose of the waste (short of bringing it home with them), they are likely to leave it.

There are several themes that emerge from among those who do not pick up after their dog. First, a sizeable number of respondents think of pet waste as a "natural fertilizer" and that it doesn't have a significant effect on water quality. Second, many respondents commented that they live in a rural area, and infer that the waste will decompose along with other wild animals wastes. These results suggest that there is an opportunity to raise awareness about pet waste in the environment and help to change behavior. If dog owners better understand the potential water quality impacts of leaving feces on the ground, they may be more likely not leave it where it falls. As several respondents who do pick up waste referred to the law as a reason, regulations and fines may be another useful strategy for behavior change as well.

**Why you <u>do not</u> pick up your dog's waste?**

| | In yard | | In neighborhood | | In public park/forest | |
|---|---|---|---|---|---|---|
| Not concerned | 12.0% | 15 | 3.9% | 1 | 7.8% | 4 |
| Makes little difference | 15.0% | 19 | 0% | 0 | 17.7% | 9 |
| Too much trouble | 7.2% | 9 | 23.0% | 6 | 13.7% | 7 |
| My neighbors don't; so why should I? | 1.0% | 1 | 7.7% | 2 | 5.9% | 3 |
| It is a natural fertilizer | 63.2% | 79 | 50.0% | 13 | 52.9% | 27 |
| It is not sanitary to pick up | 1.6% | 2 | 15.4% | 4 | 2.0% | 1 |
| *Total* | *100.00%* | *125* | *100.00%* | *26* | *100.00%* | *51* |

Generally, people are more likely to pick up after their dog if they are not on their own property. They are also more concerned about "courtesy toward their neighbors" when they are walking in the neighborhood or in a park, and this prompts them to pick up after their dog.

**Why do you pick up your dog's waste?**

| | In yard | | In neighborhood | | In public park/forest | |
|---|---|---|---|---|---|---|
| Courtesy to neighbors | 28.1% | 232 | 37.4% | 367 | 32.0% | 315 |
| Hygiene/health reasons | 39.8% | 329 | 30.3% | 297 | 30.0% | 294 |
| Concern for the environment | 22.3% | 184 | 20.0% | 197 | 24.0% | 236 |
| It's the law | 9.8% | 81 | 12.3% | 121 | 14.0% | 139 |
| *Total* | *100.00%* | *826* | *100.00%* | *982* | *100.00%* | *984* |

<u>Barriers to best practices</u>

Within this survey, responses indicate widespread understanding that pet waste should not be left on the ground, and that there is a responsibility as a pet owner to pick up after dogs. Some comments, however, indicate that despite good behavior reported by the survey respondents, there is a problem with "others" not picking up dog waste.

> "It's already quite easy. Wish more people thought this way. It's my worst pet peeve to see dog waste on the ground."
>
> "It's very easy to pick up my dog's poop. There should be no reason why people don't do this. Those that don't are just plain LAZY."

Public works and highway officials on the Connecticut River Stormwater Committee confirm that improper pet waste disposal practices are still a big problem in their communities.

Barriers to best practices evident in comments from survey respondents are:

- the need for greater understanding that pet waste doesn't stay where it falls – that water can carry it (or pieces of it) quite a distance so that it contaminates nearby waterbodies
- the need for greater understanding that pet waste is not a "natural fertilizer"
- lack of receptacles for easy disposal of waste
- winter months when fewer receptacles are out or it is just more difficult to access feces to pick them up
- forgetting bags at home

Making it easier for dog owners to do the right thing

To the question "What would it take to make picking up your dog's waste easier for you?" many respondents gave more than one response and also provided comments. Responses were as follows:

| | |
|---|---|
| More receptacles | 422 responses |
| Easier access to bags | 286 responses |
| Monetary fine | 17 responses |

Seventy six of the respondents also provided comments under "other," indicating that they already pick up after their dog, or that it's the right and responsible things to do. A few commented that knowing it's a potential pollutant is a motivator. One mentioned more posted signs and making it an enforceable law and another said a compost facility so that the waste does not end up at a landfill.

***Messaging Going Forward***

For behavior change, community based social marketing practitioners have identified some important tools. These include gaining commitments from individuals to develop community norms that encourage people to behave more sustainably. Direct personal contact is a key technique as the research indicates that people are most likely to change some behaviors in response to direct appeals or social support from others. (McKenzie-Mohr and Smith) These are important guidelines in thinking about messaging going forward.

Discussion and key considerations

Most survey respondents report that they pick up their dog's waste. Strong motivators cited by respondents to picking up dog waste—including health/hygiene reasons and courtesy to neighbors—indicate that campaigns over the years, whether people acknowledge their impact or not, seem to have "normalized" the practice of carrying waste disposal bags, and picking up and disposing of dog waste. The availability of products, including dog waste scoops and the waste bag totes that clip to leashes, have likely also factored into this normalization of practice. From survey responses at least, the "yuck" factor of picking up waste is almost non existent. [Less than 2% of respondents (1 and 2 people depending on setting: yard, neighborhood, park/forest) indicate they do not pick up waste due to it not being sanitary to pick it up.]

The question remains whether this survey involves a self selected group most of whom "do the right thing" or whether the self reporting within the survey is overly optimistic (at least one past study has noted that people are inclined to want to report that they are "doing the right thing"). Some of the survey comments and certainly the experience of public works and local highway officials on the

Stormwater Committee indicate there remains a problem with people not picking up dog waste or picking it up and disposing of it improperly, either leaving bagged waste on the ground or putting it down the storm drain. As such, effective messaging about dog waste will continue to be important. Following are key considerations in messaging based on survey results:

- Disabuse dog owners of the idea that pet waste is a "natural fertilizer" and inform them about the contamination issues associated with this waste, broadening the understanding of stormwater runoff concepts.
- Encourage homeowners (in both rural and urban areas) to pick up after their dog. Inform homeowners that even though the waste may not initially be located near a storm drain, stream or river, the leachate may travel toward them when carried by rainfall or snowmelt.
- Capitalize on existing motivators to pick up dog waste, particularly health/hygiene reasons and courtesy to neighbors.
- While not as strong a motivator, reminding people of the law and possible consequences of not picking up dog waste could promote best practices
- Undertake a campaign to install more waste disposal facilities, making these facilities more highly visible in public parks, forests, and particularly locations where municipal officials observe persistent problems with proper waste disposal.

***Next Steps***

Based on survey results, PVPC has developed a draft program of messaging for Stormwater Committee communities on pet waste that includes metrics required under the forthcoming permit. This include proposed formats and venues. The Stormwater Committee will review and refine this program in the coming months to include in the Notice of Intent and Stormwater Management Program Plan that they must each complete.

## 4. Began to define program of effective messaging on nutrients

Based on the 2014 draft Massachusetts Municipal Separate Storm Sewer Systems (MS4) permit, the 2016 final permit to be issued by the U.S. Environmental Protection Agency will have various education and outreach requirements for nutrients, specifically nitrogen and phosphorous. While there are four audiences noted under the permit, nutrient outreach and education is largely aimed at the residential, and business and institutional audiences. Note that the business and institutional audience includes private colleges, private schools, hospitals, and commercial facilities. Education and outreach topics relative to nutrients involve: lawn care activities, proper management of pet waste, and maintenance of septic systems.

There are additional education and outreach requirements depending on water quality issues:

A. All Pioneer Valley stormwater regulated communities are subject to the *Long Island Sound Total Maximum Daily Load (TMDL) requirements for nitrogen* and must therefore supplement Residential and Business/Commercial/Institution programs with annual timed messages on specific topics:

- an annual message in the spring (April/May) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release fertilizers;

- an annual message in the summer (June/July) timeframe encouraging the proper management of pet waste, including noting any existing ordinances where appropriate;[3]
- an annual message in the Fall (August/September/October) timeframe encouraging the proper disposal of leaf litter

"The permittee shall deliver an annual message on each of these topics, unless the permittee determines that one or more of these issues is not a significant contributor of nitrogen to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP."

B. Where water quality limited waterbodies are *impaired by phosphorus* (Belchertown, Easthampton, Granby, Southampton, Springfield, and Westfield), a municipality must supplement its Residential and Business/Commercial/Institution program with annual timed messages on specific topics:

- an annual message in the spring (March/April) timeframe that encourages the proper use and disposal of grass clippings and encourages the proper use of slow-release and phosphorous-free fertilizers
- an annual message in the summer (June/July) timeframe encouraging the proper management of pet waste, including noting any existing ordinances where appropriate
- an annual message in the fall (August/September/October) timeframe encouraging the proper disposal of leaf litter

"The permittee shall deliver an annual message on each of these topics, unless the permittee determines that one or more of these issues is not a significant contributor of phosphorous to discharges from the MS4 and the permittee retains documentation of this finding in the SWMP."

Note that communities that are subject to a *lake or pond Total Maximum Daily Load (TMDL) requirements for phosphorus* (Granby, Hadley, Ludlow, Springfield, and Wilbraham) must develop a Lake Phosphorus Control Plan and within it describe both planned structural as well as non-structural controls. These non structural controls could include education and outreach, but based on the 2014 draft MS4 permit there does not seem to be anything specifically required on education and outreach within the permit term.

***Education and outreach on nutrients***

All 13 member communities of the Connecticut River Stormwater Committee will be subject to education and outreach requirements on nutrients. As such, the Connecticut River Stormwater Committee has been interested in understanding how to move forward with messaging under the new permit.

With funding from the Massachusetts Direct Local Technical Assistance Program and match from the Connecticut River Stormwater Committee budget, the Pioneer Valley Planning Commission worked to examine useful research and understand new regulations to provide direction for messaging on nutrients by the Committee.

<u>New fertilizer use regulations in Massachusetts</u>

Massachusetts has two sets of new regulations related to fertilizer use: one for non-agricultural turf and lawns and another for agricultural land. The new regulations for turf and lawns became effective June 5, 2015, and stipulate that phosphorous containing fertilizers may only be applied to turf and lawns when:

[3] Annual messaging for pet waste is covered under the Bacteria section of this report.

1. a soil test indicates that it is needed; or
2. a lawn is being established, patched, or renovated.

This restriction mirrors laws already in place in Connecticut, Vermont, and New Jersey. Other highlights from the Massachusetts regulation prohibit nutrient applications between December1 to March 1 or to saturated soil or soils that are frequently flooded. Professionals must keep records of nutrient applications. Retailers must display phosphorous containing fertilizer products separate from non-phosphorous fertilizer products and post a sign displaying language informing the consumer about phosphorous containing fertilizer restrictions for turf and lawns. For more detail, see language of regulation in Appendix E, and Massachusetts Department of Agricultural Resources (MDAR) Fact Sheet in Appendix F.

On December 5, 2015, regulations for the application of plant nutrients on agricultural lands became effective.

Existing Studies and Reports

In researching messaging around lawn care and nutrients, PVPC found critical guidance for the Connecticut River Stormwater Committee in a multi-year study (2006 to 2010) by the Land Grant Universities/Cooperative Extensions in New Hampshire, Vermont, Maine, Rhode Island, and Connecticut. Unfortunately, the cooperative extension at the University of Massachusetts did not participate in this study.

Focused on residential property owners, the study explores current understanding and behavior and messaging to change homeowner lawn care behavior to reduce nutrient loss in New England. PVPC could not find any studies focused on other types of property owners with lawns or even lawn care businesses or any specific explanation why the focus in this study on residential property owners.

Funded by the U.S. Department of Agriculture Cooperative State Research, Education, and Extension Service (USDA CSREES), the multi-year study had three major components:

Part 1: Extensive social science survey on lawn care behavior in 5 New England communities (Hampden, ME; East Lyme, CT; Milton, NH; Brandon, VT; East Kingstown, RI) conducted to inform outreach design, development and implementation

Part 2: Development and distribution of education and outreach materials guided by the social science survey findings

Part 3: Follow up survey to understand effectiveness of project messaging in changing lawn care behavior

The program of this project was informed by the principles of community based social marketing. As defined by McKenzie-Mohr and Smith and mentioned above in the Bacteria section of this report, community based social marketing seeks to foster sustainable behavior by: identifying barriers and benefits to a sustainable behavior, designing a strategy that utilizes behavior change tools, piloting the strategy with a small segment of a community, and evaluating the impact of the program once it has been implemented across a community.

The central question to the USDA CSREES study is: What motivates environmentally responsible behavior in lawn care? Understanding the large answer to this question helped to inform design of a

specific outreach program aimed at measurable change in the practices of small-scale landowners in caring for their landscapes. Other objectives of the study included:

- Explore primary drivers of Do it Yourselfers (DIYers) lawn care choices and practices, especially with regard to fertilizer applications
- Investigate perceived barriers and benefits to adoption of more water quality friendly nutrient application practices
- Examine relative measures of trust and frequency of contact for various sources of yard care information by neighborhood residents
- Determine effectiveness of trained opinion leaders (such as Master Gardeneres, local garden center staff, alpha neighbors, Extension staff, etc) to invluence residential nutrient management behavior in neighborhoods

Results for part 1 of the program are included in a document entitled, “Changing Homeowner Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds, Social Science Results Summary,” 2008. This work entailed 52 in depth interviews in 5 communities with turf care opinion leaders from 4 categories:

- industry/business group
- outreach/educators group
- community/alpha neighbor group
- research/scientist group

In addition self-administered questionnaires were sent to residents in each of the 5 communities with the return of 754 completed questionnaires. See a summary of the key findings in Appendix G.

Note that for parts 2 and 3 of the program (the outreach phase), Maine, conducted and reported the work separately from the other project partners. As a result there are two different reports under part 3 of the program, one that covers Maine and another report that covers the communities in Maine, as well as Connecticut, New Hampshire, Vermont, and Rhode Island. Respectively, these reports are entitled as follows: “Changing Bangor Area Lawn Care Behavior: Results from the Evaluation Survey,” 2008, and “Changing Homeowner Lawn Care Behavior to Reduce Nutrient Losses in New England's Urbanizing Watersheds, Final Social Science Project Evaluation Report,” July 2010.

The 2010 study acknowledges, “…the study site in Maine was able to leverage the research from this project into a larger campaign than in other study communities…” In Maine, project partners followed up on the survey by testing messaging in six “…high amenity suburban communities with heavily managed lawns.” They distributed messaging as follows: two neighborhoods received no messaging, serving as the control group; two neighborhoods received standard messaging about stormwater; and two neighborhoods received “normative” messaging (which aims to redefine the norm). Normative messaging picked up on indications from the USDA CSREES survey as well as previous studies that people feel it very important that their lawn fit in with their community and that community members adhere to community standards of lawn care (one researcher on the project referred to this as the "peer pressure" approach). So messages under this category were along the lines of, "Most of your neighbors don't apply chemicals to their lawns because they know that there is a better way to go in getting a healthy lawn."

***Major Findings***

While study findings within the USDA CEERES funded project agree that homeowners feel it very important that their lawn fit in with their community and that community members adhere to community standards of lawn care, study results also demonstrate that the standards of care and amount of fertilizers applied to lawns vary from neighborhood to neighborhood. In the first USDA CSREES survey of 5 communities across New England, the norm was not to apply fertilizers while in the Maine survey of the 6 "high amenity suburban neighborhoods," the norm is to apply fertilizers.

Also, while the project's first survey results indicate that there is a high level of awareness that lawn care practices may impact water quality, the Maine survey indicates that despite this understanding and concern, the perceived prevalence of chemicals used to maintain lawns in neighborhoods leads respondents to continue to apply chemicals to care for their lawns. Despite these issues, the Maine study did find that those who received normative messaging demonstrate a greater intention to reduce or eliminate fertilizer and pesticide use over those people who received standard messaging or no messaging at all.

What motivates lawn care choices and practices

The major driver for people seems to be a need to "fit in" by following the standards of lawn care they see in their neighborhood. At least one of the studies notes that this ideal of a desirable/healthy lawn is driven in large part by marketing, resulting in a type of lawn that demands high levels of input and intensive management strategies.

Most effective messaging

Based on the results coming out of the five-state New England study, it seems homeowners are aware that lawn chemicals can run off into waterways and negatively impact water quality. Homeowners also seem to understand the harmful impacts that lawn chemicals can have on children and pets. These connections between environment and health are important or very important to 77% of the respondents in the five-state USDA CEREES funded survey. Along these lines, making connections to specific, local bodies of water draws on people's a sense of place as a motivator in environmentally responsible behaviors.

While health and water quality information should continue to be part of messaging, the Maine study indicates that messaging focused on shifting norms in lawn care will be most effective in facilitating behavior change. This norm-based appeal to environmental behavior change is far more effective than other framings.

Normative messaging aims to redefine what is a desirable lawn/healthy lawn and provides a means for DIYers to achieve a desirable and healthy lawn while adhering to environmentally sensitive strategy. According to the surveys from the study, what constitutes a "healthy lawn" is interpreted on a highly variable basis-not driven by research, but marketing. These influences seem to be resulting in lawns that demand high levels of input and intensive management strategies that could easily be interpreted as being unhealthy.

Other important approaches to effective messaging from or derived from the USDA CEREES funded studies include:

- A component related to, "Don't' use it all" or "Use only what needed" to address the tendency for people to use an entire package of fertilizer to avoid storage and thus overfertilize. New Hampshire Cooperative Extension is already considering development and distribution of a bag

clip that not only helps to make storage of leftover fertilizer a bit more convenient, but reminds people not to use it all.

- Messaging that plays up what appears to be common regard for lawns as providing recreational space (a functional, rather than appearance defined standard). Messaging from Paul Tukey's Safe Lawns campaign and his two books related to this campaign could be effective in this regard. It appears that the campaign organization itself is no longer operational, though the website is still up and running with tremendous information. See: Safelawns.org

Barriers to best practices

As mentioned above, the norms for lawn care within a given neighborhood and the desire for property owners to adhere to that standard present the biggest challenge in getting adoption of better practices.

Directions for more environmentally friendly practices of care must be more easily and readily available. The USDA CEREES funded surveys found that people rely heavily on product packaging for application information. And the five-state survey found that University Extension and Master Gardeners are considered to be the most trustworthy sources of information.

It is important to note too that while people did not attach high importance to having a dark green lawn, clover free lawn, or golf-course quality lawn, they did feel that having a pest free lawn, having thick grass, and having a weed-free lawn are important.

While people in the 5-state survey do not seem averse to spending a little more time on their lawn (two-thirds of respondents indicated "no" or "no preference" to the question of whether they would prefer to spend less time managing their lawn than they currently do), they do feel that environmentally friendly lawn care practices will cost them more money. Good information on costs should be developed and distributed to help people understand the actual measure of this cost.

Making it easier for people to "do the right thing"

Points of purchase, where people are buying lawn care products and presumably looking for information on how to get desired results, presents great opportunity to help people do the right thing. Messaging and information could be provided in these locations through lawn care kiosks and workshops hosted by the local garden centers and hardware stores selling products in collaboration with some of the most trusted sources of information (as indicated by the New England survey): Cooperative Extension and Master Gardeners.

It is also critical to provide one reliable place to go for good information on homeowner lawn care practices. In Massachusetts, the new regulations refer people to the UMass Cooperative Extension for guidance. Guidelines for homeowners, however, are not immediately identifiable on the UMass website. Perhaps a great photo with a heading that says, "Your Lawn: What You Need to Know (click here)." While the new Massachusetts regulations focus on phosphorous, it will be important for people to also obtain information on nitrogen application, especially given that the Connecticut River basin contributes to water quality problems in Long Island Sound.

The USDA CEERES funded project noted that recommendations from each the University of Connecticut and University Massachusetts Cooperative Extensions are somewhat contradictory from one another. Other cooperative extensions in New England appear to be using the recommendations coming from UConn, which might create some inconsistency with professionals who travel to other states to do lawn care.

At the same time, the New England Interstate Water Pollution Control Commission has devised a set of fertilizer guidelines for what it defines as “nonperformance turf”/“urban turf” based on four stakeholder meetings between 2012 and 2013. Stakeholders included turf fertilizer manufacturers, lawn care professionals, sports turf managers, turf industry trade groups and professional associations, researchers, university extension specialists, municipal and private groundskeepers, state and federal environmental agencies, and watershed groups. These are published in a report entitled, “Regional Clean Water Guidelines for Fertilization of Urban Turf.”

Since UMass Cooperative Extension is cited as the source for information in complying with new Massachusetts regulations, supporting UMass Cooperative Extension in developing and widely distributing concise and specific recommendations for best practices will be critical. Reconciling what may appear to be different recommendations coming from the NEIWPCC and UConn's Cooperative Extension could be helpful too.

With the new requirements that soils be tested before applying phosphorous to a lawn, it will be important to sponsor soil test days. Interpreting results will be another important component of enabling people to comply with the new regulations as results may be confusing.

***Messaging Going Forward***

Discussion and key considerations

While the New England USDA CESREES project focused on homeowners, there are three additional audiences to which messaging about fertilizer use is important and required under the MS4 permit. These are: lawn care companies and commercial and institutional property owners with large lawns. Working with these other audiences to understand barriers and motivations to better practices will be important going forward in communities with such property owners. (Note that under the MS4 permit, reduced fertilizer use by cities and towns on landscapes at municipal parks, schools, and other properties is part of the municipal Minimum Control Measure on Good Housekeeping.) At the same time, UMass Extension has been working already with several of these audiences. It will be important to coordinate and integrate with the work UMass is already doing.

It is also critically important to get consistent fertilizer application recommendations together for both phosphorous and nitrogen. Though the new Massachusetts fertilizer regulations only explicitly curtail phosphorous use, nitrogen is a concern in the entire Connecticut River watershed based on water quality problems in Long Island Sound. For now, the MS4 permit has no specific restrictions on nitrogen in stormwater, but this may change going forward.

To be most effective, it will be useful to focus energy toward behavior change in neighborhoods where it is clear the standard of lawn care requires high inputs of fertilizers. Door hangers, a lawn sign campaign, and workshops at nearby garden centers or hardware stores are all ways to provide focus on a specific neighborhood. Target audiences might include condominium or neighborhood associations as well. It may also make sense to identify those neighborhoods with high inputs where there are existing water quality issues in nearby lakes or rivers.

Following are key considerations in nutrient messaging for homeowners based on the MS4 permit requirements, the new Massachusetts fertilizer use regulations, and findings from the USDA CESREES project:

- Use normative messaging wherever possible making group standards more apparent (e.g., 70% of your neighbors do not apply chemical fertilizers because they understand there are better ways to get the great lawn they want). People often decide what attitudes and actions are appropriate from those around them. This will take additional research in many cases in order to understand the norm in a given area.
- Redefine what is a desirable lawn and connect this to public health and water impacts/improvements. Also, be sure to name the Connecticut River or a local lake with which people identify.
- Provide good, clear instructions on best fertilizer practices and application rates when needed. Include distinction between slow release fertilizers and information on proper use of composts.
- Provide good, clear instructions on proper use/disposal of grass clippings in April/May and proper disposal of leaf litter in August/September/October
- Draw on sense of lawns as recreational space, a functional space to keep safe for people and pets
- Promote ways to not use all the fertilizer in a bag if not needed
- Partner with UMass Cooperative Extension and Western Massachusetts Master Gardeners wherever possible as the USDA survey indicates that residents caring for lawns seem to most trust cooperative extensions and master gardener organizations on lawn care issues

***Next Steps***

Based on survey results, PVPC has developed a draft program of messaging for Stormwater Committee communities on nutrients that includes metrics required under the forthcoming permit. This includes proposed formats and venues. The Stormwater Committee will review and refine this program in the coming months to include in the Notice of Intent and Stormwater Management Program Plan that they must each complete.

## 5. Discontinued collaboration with the Greenscapes Program *www.Greenscapes.org*

On behalf of Stormwater Committee members, PVPC has had lengthy conversations with Greenscapes partners to encourage the coalition to stay with a program of building understanding about the connection between better lawn and garden care practices and reduced impacts on water resources and human and environmental health. It seems especially important to stay with this specialized program given the new fertilizer regulations just enacted by Massachusetts. Despite PVPC's urging, however, coordinators of the Greenscapes program decided to leave this program of messaging and expand Greenscapes to address a broader program of stormwater information to more fully serve member communities in eastern Massachusetts.

## 6. Began retooling website education and outreach for the Pioneer Valley

Given the various websites/pages the Stormwater Committee communities have been using to promote work under the 2003 permit, including Think Blue and Greenscapes, and the expanded education and requirements of the forthcoming permit, PVPC has begun working to retool and update web materials. This has started with a newly proposed website framework under "Think Blue: Clean Water Begins with You," that attends to the various stormwater issues and audiences under the new permit. It will bring together education and outreach materials together with metrics for understanding the effectiveness of

messages and movement away from behavior and practices that negatively impact the health of the Connecticut River.

## 7. Led first phase of urban tree planting project in Chicopee, Holyoke, and Springfield

PVPC is leading an effort to promote urban tree planting in the region's 3 major cities in partnership with the US Forest Service, Massachusetts Executive Office of Energy and Environmental Affairs, the Valley Opportunity Council, Nuestras Raices, ReGreen Springfield, Conway School of Design, Mass DCR, and the Cities of Chicopee, Holyoke, Springfield. Aimed at reducing stormwater flows to combined sewer areas and promoting greater climate reslience, the project involves an integrated community outreach process involving multiple neighborhood workshops and workshops for public works officials. The workshop for public works officials, held in November and conducted by engineering consultants TetraTech, drew 12 officials from 6 stormwater committee communities. The two neighborhood workshops held to date have each drawn some 40 participants. Once completed, the project will provide the following major deliverables:

- installation of 2,200 trees on local streets and yards
- final engineering design for a green streets in each municipality
- model stormwater tree rebate ordinance

The project is made possible thanks to a $239,000 grant award to PVPC from the US Forest Service under the State and Private Forestry FY15 Northeastern Area Landscape Scale Restoration Program.

## 8. Collaborated with Massachusetts state-wide coalition of stormwater coalitions

On behalf of the Connecticut River Stormwater Committee, PVPC has been participating in a state wide conversation with other stormwater coalitions to determine how best to build efficiencies through collaboration for the forthcoming MS4 stormwater permit. The group, called together by a consultant and leader of the Central Mass coalition, has had two meetings to date in an effort to identify existing resources and explore possible collaborations on education and outreach. PVPC's hope is that the group can better identify all possible activities for collaboration under the permit by:

- clarifying who has produced tools and resources that can help in meeting permit requirements, perhaps with some updating
- where the gaps are in possible joint state-wide materials, and
- who would like to take responsibility for specific work going forward