



# *Developing an Effective Stormwater Education and Outreach Program for Your Community*

*Restoring the Merrimack River through Stormwater Education  
Urban Waters Small Grant Program*

June 2014

Prepared by:

Northern Middlesex Council of Governments

and

Merrimack River Watershed Council

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## *A How-to Manual and Train-the Trainer Guide*

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Mill City Grows  
Lowell National Historical Park  
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Lowell Parks and Conservation Trust  
Greater Lowell Chamber of Commerce  
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## Partnership Agreement Entities

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# PART A: HOW-TO MANUAL

## Introduction

Stormwater connects us all in some way, whether it is as simple as floating paper boats during a rain storm or dealing with the aftermath of a flood. The connection between stormwater, drinking water, and the quality of our lives, needs to be conveyed effectively, in a way that will inspire action and empower our residents and local officials with the knowledge they need to improve and protect our waterways. This manual is designed as a guide for stormwater educators, including municipal staff, boards and officials, residents, and non-governmental organizations interested in implementing an effective local messaging campaign relative to stormwater. We hope that you are able to create a program that meets your needs by building upon what we have learned as a result of this project. Part A of this manual guides you through the process of developing an effective messaging program. Part 2 includes a Train-the-Trainer Guide for those conducting public education.

Effective community education about the problems of, and solutions to, polluted stormwater can make a difference in both the quantity and quality of stormwater that reaches a river or other receiving water body. By targeting both community members and municipal decision-makers, stormwater education and outreach can change individual behavior. This project was undertaken to create and implement stormwater education that includes tailored strategies to reduce known pollutants from individual and community sources to the Merrimack River, ultimately restoring water quality.

The Northern Middlesex Council of Governments (NMCOG), a regional planning agency in Massachusetts, and the Merrimack River Watershed Council, (MRWC) a regional nonprofit, were awarded a two-year EPA Urban Waters Small Grant in 2012. The grant served nine communities in the Northern Middlesex Region of Massachusetts, ranging from the City of Lowell to the rural town of Dunstable. These communities all fall within the Merrimack River watershed, the fourth largest in New England.

## About the Region and Its People

The project study area encompasses the Greater Lowell region of Massachusetts, which includes the following communities: Billerica, Chelmsford, Dracut, Dunstable, Lowell, Pepperell, Tewksbury, Tyngsborough and Westford. The region has a population of 286,901 with a density of approximately 1,500 people per square mile.<sup>1</sup> Lowell, the center city in the region, is the fourth largest community in the Commonwealth, with 106,519 residents and a

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<sup>1</sup> 2010 U.S. Census

population density of 7,500 persons per square mile, according to the 2010 U.S. Census.

The region has been intricately connected to the Merrimack River since the late 1700s, and has depended on the River for agriculture, transportation, and as a major source of power to support the Industrial Revolution. It remains historically and culturally significant as reflected by the Lowell National Historical Park in Lowell. Many people still swim and fish in the Merrimack River and it serves as the drinking water supply for the City of Lowell and other communities.

Lowell is an immigrant city, and in recent years has become home to the second largest Cambodian community in the country, with an estimated population of 30,000 people. Beginning in the 1980s, Cambodian and Laotian refugees fled their native land to escape the ravages of war and political persecution. Cambodians have a history deeply tied to the river, be it the Mekong in their home nation or the Merrimack, and many have an agrarian background. The City also has a large Hispanic population of 18,000 residents (17%). More recent immigrant populations in Lowell include Burmese, African, and Iraqi refugees who have fled war-torn areas. A primary focus of this project was to determine how to most effectively communicate stormwater issues in a way that pays special attention to low-income, non-English speaking Environmental Justice communities. The research performed through this project underscored the importance of understanding and considering the cultural, social, political and economic issues impacting recent immigrants and the environmental justice community when developing an educational and messaging program.



Kayaking on Merrimack River in Lowell, MA

## About the Merrimack River

The Merrimack River, which flows through the heart of Lowell as well as through four other communities in the region, begins at the confluence of the Pemigewasset and Winnepesaukee Rivers in Franklin, New Hampshire, and flows one hundred sixteen (116) miles, where it then empties into the Atlantic Ocean at Newburyport, Massachusetts. By the time it reaches Lowell, the Merrimack has passed through three major cities and some of the most densely populated and polluted areas of New Hampshire. As it passes through Lowell, the river receives additional pollutants from stormwater run-off, combined sewer overflows, and both intentional and unintentional dumping. In the Greater Lowell region, the Merrimack River is listed as impaired for pathogens, nutrients, priority organics and metals.

The Merrimack River is classified primarily as Class B waters, meaning that the water is intended to be fishable, swimmable, and acceptable for boating, but the portion of the River within the Northern Middlesex region is still considered non-supporting for Class B waters (EOEA, 2001). The Merrimack River and the Concord River, one of its major tributaries, are the only major New England rivers used as a municipal drinking water supply. The City of Lowell and Town of Tewksbury are two of the five communities that rely on the Merrimack River for drinking water, while the Town of Billerica draws its drinking water from the Concord River. The U.S. Forest Service considers the Merrimack to be the most threatened watershed in the country due to the loss of private forested lands (Stein et al., 2009). The main environmental problems impacting the River's water quality within the Northern Middlesex region are:

- Pathogens;
- Nutrients (primarily phosphorus);
- Impervious surfaces;
- Flooding;
- Loss of private forested lands; and
- Climate change.



The Pawtucket Dam in Lowell; photo by Jennifer Myers

## Connecting Communities Through Stormwater Education

Through this project, *Restoring the Merrimack River by Connecting Communities through Stormwater Education*, the Northern Middlesex Council of Governments and the Merrimack River Watershed Council strengthened existing partnerships and developed new partnerships with organizations that represented the diversity and unique character of the Greater Lowell region. The development of these new partnerships allowed us to successfully reach out to Lowell's environmental justice communities, in order to better understand how they relate to stormwater and to craft messages that were effective and embraced by that community. Overall, the goals were to:

- Develop new partnerships, with special attention to low-income, non-English speaking Environmental Justice communities;
- Develop and test stormwater messaging for effectiveness and applicability with diverse populations and age groups;
- Develop a stormwater education program that works for all;
- Create a Train-the-Trainer Guide; and
- Create a How-To-Manual.

The project combined the efforts of local, regional, and federal partners to restore the Merrimack River by developing educational materials that highlight the importance of day-to-day connection to stormwater and how it impacts the environmental, economic, and social health of our community. During our research, we found that many materials and education programs are designed for a middle-class suburban audience. Such messages are not effective for low-income, non-English speaking city dwellers. Understanding the priorities of various stakeholder groups in the Greater Lowell region has allowed us to tailor messages so that they reach a variety of audiences and effectively communicate how we can restore water quality through stormwater management techniques.

This document provides guidance on how to best tailor a stormwater education for your community, building upon the research that was conducted under our Urban Water Small Grant. The manual contains guidance on how to create an effective stormwater messaging campaign for your community using a step-by-step process, examples, and trouble-shooting information outlined in the following pages. Additional information about this project can be found on the NMCOG stormwater website: <http://www.nmstormwater.org/urban-waters>.

## Explaining Stormwater and Polluted Runoff

In developing effective stormwater messaging, it is important to recognize that many people do not understand the term “stormwater” or the connection between stormwater and the quality of their drinking water. Using the term “polluted runoff” often makes it easier for the audience to understand the concept of how runoff impacts water quality. The following is a

simple narrative describing stormwater and polluted runoff which you may find helpful in your work.

### About Polluted Runoff

Water from rain and melting snow either seeps into the ground or “runs off” to lower areas, making its way into streams, rivers, lakes and other water bodies. On its way, runoff water can pick up and carry many substances that pollute water. Some substances, such as pesticides, fertilizers, oil and soap are harmful in any quantity. Others, like sediment from construction, bare soil, pet waste, grass clippings and leaves, can, in sufficient quantities, harm rivers and lakes. In addition to rain and snowmelt, various human activities like lawn watering, car washing, and malfunctioning septic tanks can create runoff that carries pollutants to streams, rivers and lakes.

Polluted runoff generally happens anywhere people use or alter the land. For example, in developed areas, none of the water that falls on hard surfaces like roofs, driveways, parking lots or roads can seep into the ground. These impervious surfaces create large amounts of runoff that pick up pollutants. The runoff flows from gutters and storm drains to streams. Runoff not only pollutes the water, but erodes stream banks when the velocity of the water increases during heavy rain events.

Polluted runoff can:

- [AFFECT YOUR HEALTH](#). High levels of pollution (toxic metals, excess nutrients, and high levels of bacteria) can cause water to become unsafe for drinking, swimming, or boating.
- [HARM WILDLIFE](#). Excess pollutants, such as chemical fertilizers, may cause high levels of algae growth that can lead to fish kills and ruin the beauty of our ponds and lakes. In addition, when runoff travels across impervious surfaces, the water temperature can increase due to the transfer of heat from impervious pavement. Warmer water can hold less oxygen, decreasing the oxygen level in streams and rivers. This can cause stress to the fish living in the river, and in extreme situations can lead to fish kills.
- [CAUSE OR WORSEN FLOODING](#). During significant storm events, pavement and other impervious surfaces increase the amount and speed at which runoff enters the river, which can cause or worsen flooding. The rush of water can cause erosion, washing everything from sediment to trees into the river, and changing the normal flow pattern of the river.
- [COST YOU MONEY](#). Cleaning water due to polluted runoff costs taxpayers money. If we can prevent the pollutants from getting into the water in the first place, everyone wins!



## Other Activities Impacting Water Quality

Pollutants found in runoff water can include oil, pesticides, fertilizers, soil from construction sites, pet waste, and trash. In addition to the pollutants described above, sewer overflow and construction projects can harm the health of a river.

COMBINED SEWER OVERFLOW (CSO) SYSTEMS: Combined sewer systems are found in many older cities, such as Lowell. When it rains, the sewer system can't handle the large volume of sewage and storm water. This is called a combined sewer system because both sewage and storm water flow into one pipe. Instead of allowing water to back up into people's basements during a rainstorm, the combined sewer system allows the polluted water to be discharged directly into the Merrimack River. This discharge into the river is known as a combined sewer overflow or CSO. Lowell has initiated a stormwater separation program to address this issue. However, the program will take several years to implement due to the high cost.

In the interim, communities can implement low impact development techniques to help reduce the flows of stormwater into the collection system. These techniques include using permeable or porous pavement, installing green roofs on buildings, and planting rain gardens.

CONSTRUCTION IMPACTS: Construction can disturb the ground, allowing sediment to be washed into the river and possibly carrying construction debris as well. The sediment carries phosphorus, which adds to the nutrient problem. Loose sediment clouds the water, impacting fish and other animals that depend on clear water to see their prey; and it also affects fish breathing. The National Research Council (2009) has noted that construction is the second highest contributor to phosphorus nationwide. Construction also contributes over one third of the sediment load to rivers.

# Developing Effective Messaging

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Developing educational strategies for stormwater requires creative partnerships and public involvement to meet federal stormwater management requirements, and more importantly to ensure that stormwater programs are effective in reducing pollution and improving water quality. Stormwater pollution control is most effectively implemented when people and organizations understand the impact of stormwater pollution, its sources, and the actions they can take to control it.

There are some people who feel that regulation and enforcement should be the main tools to accomplish clean water goals, instead of education. However, past programs that relied solely on enforcement or monetary incentives have not been successful. You want an effective stormwater program that makes a difference, right?

The more you plan and set the stage at this point, the easier your job will be later. The definition of success will vary from program to program, but generally speaking, a successful education program is one that correctly targets its audience and achieves the desired outcomes and behavior changes.

Likewise, success also includes elements of efficiency and sustainability. By following the steps outlined below you will be well on your way to getting results.

## Step 1: Identify Goals and Objectives

### DETERMINE GOALS AND OBJECTIVES

A goal describes what you hope to accomplish over the long term, and an objective describes the shorter-range action steps you will take to achieve your goal. Objectives are quantifiable, and time-bound. Think about your goals and objectives and write them down. Make sure they realistically fit within your timeframe.

Examples of goals include:

- Increase community awareness of stormwater problems;
- Increase participation in a particular behavior; and
- Create a local ordinance or by-law to reduce impervious cover.

Examples of objectives include:

- Conduct five focus groups to identify local connections to the river within the next six months.

### Quick Tips

- ✓ Develop goals, objectives and establish a timeframe.
- ✓ Identify a target audience.
- ✓ Make a list of potential project partners.

- Develop and conduct two workshops for the public on stormwater solutions within the next year.

To identify the issues that you want to target, focus on specific local pollution problems. For example, if a waterway in your community has a bacteria problem, you may want to focus on encouraging pet owners to clean up pet waste. For commercial areas with large paved parking lots, you might focus on reducing vehicle fluid leaks or encouraging the use of permeable pavement for parking lot resurfacing or retrofit projects. In residential areas your educational messages could promote natural lawn care techniques.

### [IDENTIFY YOUR TARGET AUDIENCE](#)

Programs that effectively address stormwater pollution must consider individual, household, and business related behaviors and activities. For example, polluted runoff is generated by residents and community members undertaking the following activities:

- Littering;
- Disposing of trash and recyclables;
- Disposing of pet waste;
- Applying lawn chemicals and fertilizers;
- Washing cars on a paved surface;
- Changing motor oil improperly; and
- Improperly disposing of paint, pesticides, cleaners and other household chemicals.

Since a number of pollutants come from an uninformed public, education is a critical component of any successful stormwater management effort. The best public education programs are those that direct their messages at the population that can affect the needed change in behavior. In addition, the composition of the community that you serve should help determine the types of messages that you develop and their format. Get to know your community well by examining demographic data (age, income, educational attainment, race, ethnicity and languages spoken) and talking with residents and community groups. Messages are designed to raise general awareness, educate, or motivate action. If people aren't familiar with an issue or problem, awareness and education will have to precede any calls for action.

## Step 2: Identify Stakeholder Concerns and Form Partnerships

To developing effective messaging, it is critical to carefully listen to what people have to say in your area. Messages can appeal to the audience's hopes, fears, sense of responsibility, or personal benefits. Exploring the attitudes, perceptions, and beliefs of the audience regarding the subject of your message will help ensure that the message resonates with the target audience.

Reach out to local groups with an interest in rivers or the environment, including recreational groups and businesses. When you talk with these individuals or groups, draw out their top environmental or community concerns before discussing stormwater specifically. This ensures they feel free to convey the problems they care about the most. Discussions can become biased if an interviewer sets the stage ahead of time or provides leading questions. It is best to ask about their main environmental concerns, and then discuss how these relate to stormwater.

To set up the meeting, it is recommended that you reach out to different members of your community in a variety of ways, including the following:

- Create flyers and brochures and distribute these at local events;
- Communicate to minority and non-English speaking audiences through bilingual newspapers and radio programming, and through community organizations that serve minority or non-English speaking communities;
- Reach out to youth through local institutions, such as the YMCA/YWCA and Boys & Girls Clubs;
- Conduct interactive workshops in schools
  - Contact local English As a Second Language (ESL) instructors at community colleges; and
  - Search out appropriate departments at your local universities and colleges who may be able to help you make connections;
- Attend local ethnic festivals and events to engage community members;
- Reach out through local foundations and non-profits that can help identify and contact community leaders;

### Quick Tips

- ✓ Reach out to youth, teenagers, young adults, and professionals.
- ✓ Set up face-to-face meetings, attend community events, and hold group meetings.
- ✓ Listen to stakeholder concerns, and try and understand how they connect to the local river.
- ✓ Establish partnerships.

- Attend local neighborhood association meetings to understand residents' concerns;
- Reach out to faith-based organizations with good connections to the community;
- Reach out to recreational users through boating, rowing and fishing associations;
- Meet with the Chamber of Commerce to reach developers and business leaders; and
- Reach out to Municipal Elected Officials, Planners, Engineers, Conservation Agents and Water Departments to determine their needs for stormwater education.

Interview a broad range of groups and individuals, and identify the best way to talk with the person or group you are trying to meet. Some people may not feel comfortable sharing their opinions, thoughts and feelings in a group setting, and may prefer to meet one-on-one. Remember that meeting with stakeholders can take some time, and in many instances, you may need to think creatively.

### **Setting up face-to-face meetings**

Face-to-face meetings are useful for initial contact, for creating possible partnerships, and for talking with individuals who may desire anonymity or feel more comfortable presenting their opinions one-on-one rather than in a group. We conducted twenty face-to-face meetings with municipal staff, neighborhood groups, and non-profits to understand their connection to stormwater. It is best to set up these meetings at a time that is most convenient for the person you are meeting with. In addition, it is best to meet the person at their office or home, as they will generally feel most comfortable and speak more freely.

### **Attend Community Meetings and Events**

Think broadly about where you can meet the community. Most cities and towns have a calendar of events. Determine which groups will allow you to present your project. Getting on the agenda of a local neighborhood association or community group can take time. These groups usually meet monthly, and your issue may not be on their list of priorities. Be patient, and request to be placed on the agenda for a brief presentation.

### **Group Meetings**

Group meetings that combine like-minded individuals can allow stakeholders to feel comfortable discussing their concerns. Bringing people together who have conflicting opinions for a group meeting is generally not recommended. The purpose is to listen to what people have to say, and if people feel their opinions are not validated, they may not provide open and honest feedback.

## Develop Partnerships

While reaching out to stakeholders, consider creating partnerships with those groups who share overlapping concerns. Create a list of organizations or individuals which can provide insight into the concerns and attitudes of the target audience. Partnerships create relationships and open doors to new audiences. In addition, they lend credibility to your efforts and can lead to long-lasting relationships. Consider forming partnerships with:

- Cities and towns;
- Regional planning agencies;
- Federal or state agencies;
- Non-profits;
- Faith-based organizations;
- Neighborhood groups;
- Local schools;
- Cultural and historic groups;
- Ethnic associations;
- Business organizations, such as the Chamber of Commerce;
- Recreational organizations (rowers, kayakers, fishing organizations);
- Colleges and universities; and professional organizations.

When a group agrees to partner, send a formal request for the partnership and provide the specifics on how you agree to work together. Below an excerpt from a letter provided to the City of Lowell following an initial meeting for this project.

Thank you for meeting with us earlier this fall regarding our EPA Urban Waters grant. We would like to confirm the proposed outreach steps for the project, which are largely based on your advice and recommendations. It is our intent to utilize an approach that best addresses your community's stormwater issues. We would also like to update you on our progress to date, and suggest ways to move forward in implementing the program. You suggested that the best groups to educate in the City are residents and developers. The following summarizes the approach that we will utilize in our outreach efforts to those particular stakeholders.

Our EPA Urban Waters grant targeted a portion of the Merrimack River watershed region. The table on the following page lists our prospective partners and their potential roles, which were identified early in the process. After meeting with all the identified community stakeholders, we ultimately established a formal partnership with thirteen (13) entities including: the City of Lowell, the Towns of Tewksbury, Tyngsborough, Chelmsford and Dracut, the Cambodian Mutual Assistance Association, RUMBO (the Hispanic Bilingual newspaper), Mill City Grows (a community-gardening nonprofit), Lowell National Historical Park, Lowell Parks and Conservation Trust (a nonprofit urban land trust), the Greater Lowell Chamber of Commerce, American Public Works Association, and the Tsongas Industrial History Center.



Category of Partner	Name of Partner	Role of Partner
<b>Business Community</b>	<ul style="list-style-type: none"> <li>• Merrimack Valley Economic Development Council</li> <li>• Greater Lowell Chamber of Commerce</li> </ul>	<ul style="list-style-type: none"> <li>• Identify economic benefits &amp; importance of the Merrimack River</li> <li>• Participate in focus groups</li> <li>• Promote &amp; attend workshops/trainings</li> </ul>
<b>Cultural and Historical</b>	<ul style="list-style-type: none"> <li>• Southeast Asian Environmental Justice Partnership</li> <li>• Cultural Organization of Lowell (COOL)</li> <li>• Coalition for a Better Acre</li> <li>• Cambodian Mutual Assistance Assoc.</li> <li>• Tsongas Industrial History Center</li> </ul>	<ul style="list-style-type: none"> <li>• Provide historical &amp; cultural information on past &amp; present connections to River</li> <li>• Participate in focus groups</li> <li>• Translation capabilities</li> <li>• Promote &amp; attend workshops/trainings</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• Merrimack River Watershed Council</li> <li>• Lowell Parks and Conservation Trust</li> <li>• SuAsCo Watershed Community Council</li> <li>• Nashua River Watershed Association</li> <li>• Clean River Project</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in focus groups</li> <li>• Identify community connections to River</li> <li>• Provide examples of existing stormwater management trainings and materials</li> <li>• Promote workshops /trainings to their constituencies</li> </ul>
<b>Municipal</b>	Town of Billerica, Town of Chelmsford, Town of Dracut, City of Lowell, Town of Pepperell, Town of Tewksbury, Town of Tyngsborough, Town of Westford	<ul style="list-style-type: none"> <li>• Participate in focus groups</li> <li>• Identify community connections to the Merrimack River and water resources</li> <li>• Provide examples of existing stormwater trainings &amp; materials</li> <li>• Promote &amp; attend workshops/trainings</li> </ul>
<b>Recreational</b>	<ul style="list-style-type: none"> <li>• Essex Rowing Club</li> <li>• Merrimack River Rowing Association</li> <li>• UMass Lowell Rowing Program</li> </ul>	<ul style="list-style-type: none"> <li>• Participate in focus groups</li> <li>• Identify community connections to River</li> <li>• Promote &amp; attend workshops/trainings</li> </ul>

## Step 3: Research Stormwater Problems in Your Area

It is important to determine the most important stormwater problems in your area in order develop the most effective campaign possible. Begin by compiling local resources. Determine if a watershed plan exists for your area. Review existing studies from the Environmental Protection Agency (EPA) or the US Army Corps of Engineers. Touch base with local watershed associations, regional planning agencies, environmental nonprofits, municipal staff, and local universities or colleges in your area.

### Quick Tips

- ✓ Determine the most important stormwater problems in your area.
- ✓ Make a list of how this overlaps with stakeholder

For example, in the Merrimack River Watershed, 60% of the phosphorus comes from wastewater treatment plants and another 21% comes from land development (Gulf of Maine Council, 2011). To address the phosphorus issue, the target audience could be wastewater treatment plant operators, or municipal officials who deal with the land development policies.

## Step 4: Focus Your Campaign

List the top concerns and identify the confluence between stakeholder concerns and key environmental concern. Focus your campaign on these issues. Our research revealed that the top environmental concerns were impervious areas, pathogens, nutrients (including phosphorus) and flooding. Conversations with residents revealed that the most pressing concerns included flooding, lack of green space, animal waste and trash. Many neighborhood groups were also interested in neighborhood beautification and fresh, local food from community gardens. We also learned that many Latinos in our region do not drink their tap water. While this may reduce the effectiveness of any messages to this group tailored around drinking water, we felt it was important to incorporate drinking water into our stormwater messaging campaign. We also focused our campaign on land protection and the connection between stormwater and drinking water.

## Step 5: Create Draft Messages

### Don't reinvent the wheel

See if messages others have prepared can be modified to work in your community. Check out the Think Blue campaign ([www.thinkblue.org](http://www.thinkblue.org)), and the Long Island Sound Study's Step-by-Step posters, ([www.longislandsoundstudy.net](http://www.longislandsoundstudy.net)) and U.S. EPA website ([www.epa.gov](http://www.epa.gov)). You can also access any of the messages we created at [www.nmstormwater.org/for-municipalities](http://www.nmstormwater.org/for-municipalities). The following guides may also be helpful:

- Getting in Step: A Guide for Conducting Watershed Outreach Campaigns (EPA 2010);
- Community Outreach Toolkit: Supporting the Reduction of Nutrient Pollution in the Mississippi-Atchafalaya River Basin (EPA 2012);
- Source Protection Handbook: Using Land Conservation to Protect Drinking Water Supplies (Trust for Public Land 2005).

### Quick Tips for Drafting Your Messages

- ✓ Don't reinvent the wheel.
- ✓ Use simple language.
- ✓ Use a variety of approaches.
- ✓ Link everything to an action.

## Use Simple Language and Graphics

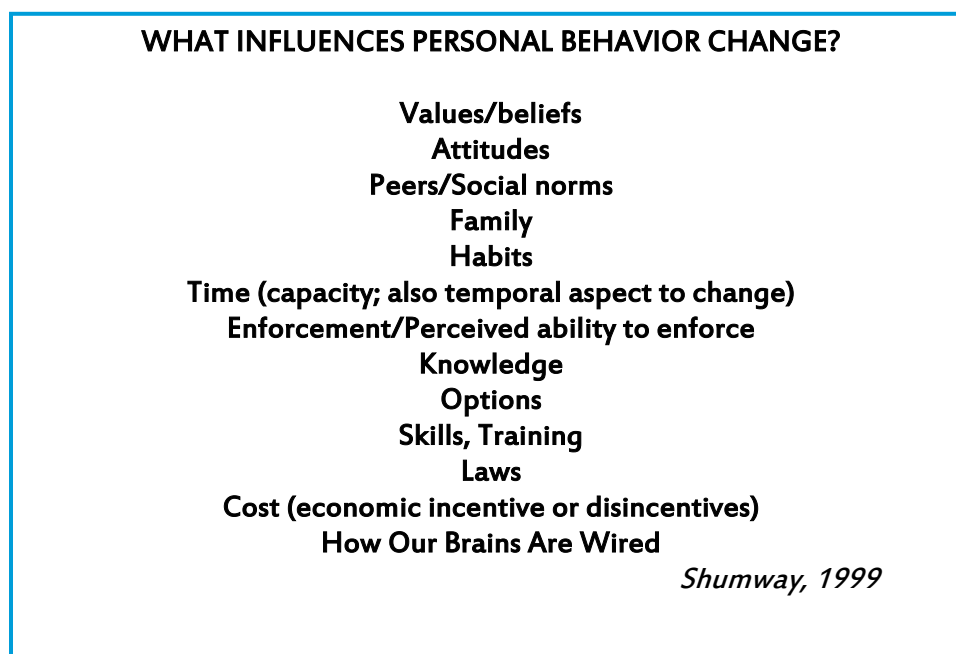
When you begin, remember that the public doesn't understand terms such as "stormwater," "watershed," or "water quality." Use "polluted runoff," "our rivers" or "clean water" instead (Water Words That Work). The language and style of the message should match those of the target audience. If you're unsure about the reading level of the target audience, pre-test the message with representatives of the audience to determine its appropriateness. Consider displaying the message graphically if the target audience is not fully literate.

When designing the layout of your brochure, flyer, or how-to guide, use restraint, consistency, and quality materials. Restraint should be used in choosing typefaces or fonts; the kinds of graphics or artwork selected should be consistent; and quality materials should be used for photographs and artwork. Invite readers into your material with appealing, user-friendly layouts.

Use photographs to reinforce your message. Taking effective photographs takes practice and patience. Photos of people, especially children, appeal to many audiences. Show action, such as water quality sampling, tree planting, or festival events, in your photographs. If you borrow photographs, the photographer might require a photo credit.

## Use a Variety of Approaches

People change their behavior for a variety of reasons. Consider which attribute you are most likely to influence, and develop your messages and solutions accordingly. For example, college students and teenagers are more likely to change their behavior through social norms (peer pressure), while parents may be more responsive to solutions linked with stewardship. We learned that while the "Stewardship" approach seemed to resonate the most with participants in all groups, no one single message appealed to all, and a diverse set of messages is best.



The effectiveness of a particular message can vary greatly, depending on age and cultural differences. When asked why they care about protecting the environment, 62% of the respondents in our project identified *Stewardship*. Stewardship means different things to different people. To some, this means "I have a responsibility to future generations" (39%); to others, "Nature is God's work."

### **Link Your Visuals and Taglines with a Solution**

It's not enough to provide education regarding the problem within the message. If you want people to act, you need to identify the solution and tell them what action to take. Add visuals showing other people taking the action that you recommend. Brainstorm possible solutions for your community's top concerns. The best solutions help address multiple problems simultaneously. For example, planting trees and mixed shrubs can help reduce pollution while also reducing the risk of flooding. Similarly, addressing construction violations helps reduce both sediment and nutrients to our streams and rivers.

The box below shows the priority environmental issues identified in the Merrimack River watershed, as well as solutions that address residents' main concerns, based on the research conducted through our project.

#### **PROBLEM: SOLUTION**

Animal Waste: Scoop the Poop  
Nutrients: Reduce Lawn Fertilizer  
Nutrients: Don't Wash Your Car in the Driveway  
Nutrients: Don't Dump in Our Storm Drains  
Nutrients; Report Construction Problems  
Flooding: Plant Trees  
Flooding: Plant Combined Rain Garden/Community Garden  
Flooding: Install a Hollywood Driveway  
Impervious Surfaces: Support Local Land Protection  
Impervious Surfaces: Plant a Tree

Make a list of the approaches and tag lines you plan to use. Match each approach and tag line with a solution, as shown below, and then begin creating posters and images with these ideas. Draft ten (10) to fifteen (15) test messages to share with stakeholders, using a variety of approaches including humor, stewardship, shock, cost, social norms (i.e., peer pressure), beautification (of a neighborhood), and patriotism. The following table outlines the approaches and tag lines used for the messages that we developed through our Urban Water Small Grant. The right hand column also identifies the specific image we created to

visually convey the problem and solution to various audiences. You can find these images in Appendix A and or on our stormwater website at: [www.nmstormwater.org/for-municipalities](http://www.nmstormwater.org/for-municipalities).

### Example Approaches and Tag Lines

Problem	Approach and Tag Line	Solutions	Image(s) Developed
Lack of Open Space and loss of forested land	Stewardship – “You only give your babies the purest water”	<ul style="list-style-type: none"> <li>• Support local land protection</li> <li>• Plant trees</li> </ul>	Mother and baby
Polluted runoff from homeowners	Stewardship- “We all deserve clean water and together WE can make it happen”	<ul style="list-style-type: none"> <li>• Scoop the Poop</li> <li>• Don’t Dump in Storm Drains</li> </ul>	Children Playing
Construction generated pollution	Stewardship/ Patriotism- “Be a River Hero and Protect More Than Just the River”	<ul style="list-style-type: none"> <li>• Report construction problems</li> <li>• Don’t dump in storm drains</li> </ul>	Image of Children (NRDC)
Health Impacts of Polluted Water	Health- “Keep Your Family Healthy”	<ul style="list-style-type: none"> <li>• Don’t dump in storm drains</li> <li>• Plant a combined rain garden/ community garden</li> </ul>	Child drinking while standing in the Merrimack River
Cost of pollution	Cost- “Save Money. Reduce Your Water Bill. It’s a No-Brainer!”	<ul style="list-style-type: none"> <li>• Support local land protection</li> <li>• Plant a tree</li> </ul>	Side by side photos of clean and polluted water
Pollution from Pet Waste	Humor- “Scoop the Poop”	<ul style="list-style-type: none"> <li>• Pick up pet waste</li> </ul>	Dog scooping poop
Pollution from washing cars on the driveway	Humor- “If you wash your car in the driveway you might as well stand in the River”	<ul style="list-style-type: none"> <li>• Wash your car on the lawn or go to the car wash</li> </ul>	Man standing in the River while washing his car
Pollution from Lawn Chemicals	Humor- “Think more is better? Tell that to the fish”	<ul style="list-style-type: none"> <li>• Use less fertilizer</li> </ul>	Man using lawn spreader with distressed fish
Litter	Shock- “Enjoying the water? Help clean up the Merrimack!”	<ul style="list-style-type: none"> <li>• Don’t dump</li> </ul>	Fish and litter
Multiple pollution sources	Patriotic- “Be a River hero”	<ul style="list-style-type: none"> <li>• Plant a tree</li> <li>• Report construction problems</li> <li>• Volunteer</li> </ul>	Child saluting
Homeowner behavior	Stewardship – “When you don’t clean up, we all suffer”	<ul style="list-style-type: none"> <li>• Scoop the poop</li> <li>• Don’t dump in storm drains</li> </ul>	Children

## Step 6: Conduct Focus Groups to Test Messages

Focus groups provide an opportunity for in-depth discussion and feedback on your stormwater messages. The feedback received at a focus group can make a difference in successful messaging. If you've never conducted a focus group before EPA's *Getting in Step Guidebook* provides information and details on how to run a focus group (EPA, 2010). Additional information can also be found in the Train-the-trainer section of this document.



Focus group discussion

Set up five (5) or six (6) focus groups at different times of the day and on different days of the week to accommodate various schedules. Invite leaders of neighborhood associations and local non-profits to join small groups of 5-10 people to review your messages. Send out an agenda in advance and offer light refreshments.

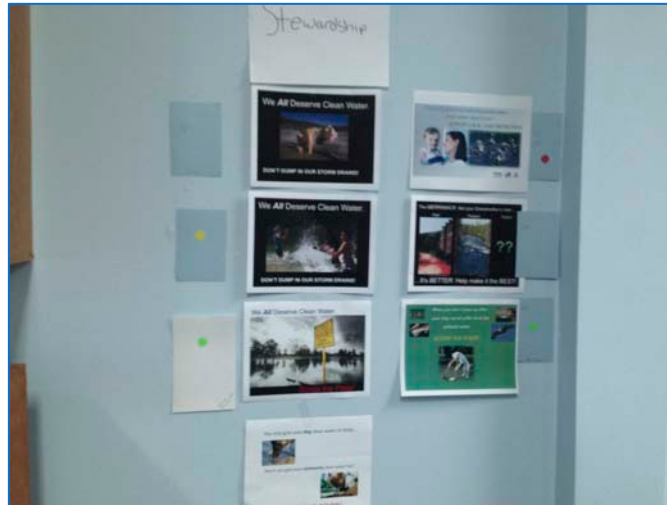
At the meeting, have all participants introduce themselves, and provide a project overview. Display your draft stormwater messages and have participants identify their favorite images. This can be done by hanging the stormwater messages on the walls, and providing stakeholders with colored dots. This interactive activity gets people up and moving, and keeps people engaged. It is also a great way to encourage less vocal stakeholders to participate. Messages can be ranked by assigning a numerical value to each color used. For example, red dots can represent three points, while each blue dot represents two points, and green dots represent one point. The total points for each image can then be added together to identify the most popular messages.

### Quick Tips Test Your Messages

- ✓ Hold focus groups to test your messages.
- ✓ Revise messages based on feedback.
- ✓ Analyze results.
- ✓ Test perceptions.



Consider varying the presentation of materials because people can change their responsiveness to questions depending on the order in which questions are presented.



Participants place dots on the preferred images

After completing this activity, open a discussion to solicit comments on why they chose certain images. We held six focus groups with 56 participants that were organized as follows:

- Youth focus group;
- Community gardener focus group;
- Recreational users/city planners/ environmental nonprofits focus group;
- Green Building Council, news media group;
- Business focus group (Chamber of Commerce, developers); and
- Academic, city residents, environmental nonprofits focus group.

Each focus group can help refine messages and visuals. After a focus group, retain the top ranked messages in each category, and based on suggestions received, make revisions and additions as needed.

### Determine How Your Message Is Perceived

Educating the public and succeeding in changing individual behaviors is hard work because people perceive a message differently depending on their experiences. Determining how your message is being perceived is particularly important for culturally diverse groups. Understand and respect cultural differences. Test your message out on different individuals or groups.

For example, we wanted to create a visual on cost because studies have shown that every dollar spent on land protection saves twenty-seven dollars (\$27) in water treatment costs. It took several attempts to perfect this image and text. We first tried an image of burning money. However, many stakeholders did not understand the image, and did not like the picture of burning money. In addition, we found that burning money had an entirely different meaning for the Cambodian community. We then tried a flow diagram showing cause and effect. While the focus groups liked the idea, they felt that our visuals were too confusing. Our third and successful image provides a comparison of two river images—one is picturesque, while the other shows an area where pollution and dumping are problematic.



## Step 7: Short on Time? Use Messages Based on Values or Humor

If you don't have the time or ability to run focus groups, then use what is known to work. Prior research, as well as our focus group research, showed that most people respond favorably to value-based messages, particularly stewardship and humor. Stewardship was a highly effective messaging style for all. The desire to make this world a better place for our children and grandchildren is universal, and appeals to all age groups,

### Quick Tips

- ✓ Use humor-based messages for children.
- ✓ Use value-based messages for adults.

cultures, and ethnicities. Our stewardship messages are shown below.



Humor was the most effective messaging style for the younger audience. We created an image adapted from ThinkBlue.MA, and added a humorous photo and an actionable step. Keeping your message lighthearted makes people feel more comfortable with the topic and helps them feel less intimidated. When conducting stormwater education at a Farmer's Market, we found children's participation to increase when we used the tagline: Where does your dog's poop go?



## Step 8: Refine Your Messages

Take a hard look at your visuals. Ensure that they reflect the members of your community and racial and ethnic diversity of the people used within your image. Ensure the landscape images make sense. If you are targeting an urban audience, don't use a rural river landscape - swap that out with an urban image instead. If you use images from the internet or from others, don't forget to credit the source, and check to ensure that the image you are using is not copyrighted. If so, you will need to get permission to use it.

Ask friends and colleagues to review the messages to see if the average person will understand the message and the solution. A critical eye here is invaluable. For example, we created one solution, "Plant river buffers", but found that most people have no idea what a river buffer is. Instead we changed the solution instead to "Plant trees" and provided a simple explanation as to why tree planting along our rivers is beneficial: "Trees and shrubs along our river banks absorb pollutants and clean our river water". In another example, we wanted to convey a message to "Report construction violations." However, we soon realized that the public doesn't know what a construction violation is. As a result, we showed pictures of a construction violation, and a photo of someone calling to report the violation. A participant then suggested we enlarge the image of the construction violation, which we did in the next draft.

### Quick Tips

- ✓ Ensure racial and ethnic diversity in images.
- ✓ Cite photos and obtain permission for use, if needed.
- ✓ Have friends and colleagues review your messages.
- ✓ Translate messages.
- ✓ Distribute messages to project partners and stakeholders.

## Step 9: Translate Your Messages

We translated six of our messages into Khmer and Spanish. Identify the most common languages spoken in your area and have a professional translate them.



## **Step 10: Distribute Your Messages**

Distribute your messages to your local stakeholders, project partners, municipal officials and local non-profits. Post them on your website to share with others. In addition, share your messages using social media on Facebook and Twitter. Part B of this document provides extensive guidance on message distribution.

## **Future Program Evaluation**

As outlined above, proactive planning, collaboration and research establishes the foundation of a solid and effective messaging program. Once your messaging campaign has been developed and implemented, it is best to periodically evaluate the results and adjust the messages, if necessary. Surveys and focus groups can be expensive, but are an effective means of assessing the program's effectiveness. Less formal follow-up evaluation strategies can include observations at community meetings, anecdotal information and improved water quality monitoring results. When selecting the best evaluation strategy consider how you will use the information and the resources you have available, and identify the types of information that will be most valuable in assessing the impact of your program.



# PART B: TRAIN-THE-TRAINER GUIDE

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## Introduction

This Train-the-Trainer Guide provides recommendations on how to educate your community about stormwater based on the research performed during the conduct of our Urban Waters project. The Guide can help you work more closely and effectively with community members to develop outreach goals, and to most efficiently reach out to a broad cross section of your community with messages that resonate. One advantage of this particular approach is that it is low cost and easily implemented. Another is that the program can be repeated as needed to train stakeholders, municipal staff and public officials about stormwater management needs and benefits.

The earlier section of this document provided a step-by-step method for creating effective stormwater messages, while this section will provide instruction on how to engage the parties who will receive your message and carry it forward to the overall community. When educating the public, it is important to connect individual and community interests with the health of the watershed. Be sure to do the following:

- Speak in words that people understand.
- Provide solutions that people can understand and accomplish in their day-to-day lives.
- Create multiple messages that target different segments of the community.
- Reinforce the message of the connection between water, land, health and quality of life.
- Acknowledge that changing the public's behavior is hard. Encourage your target population to try a certain action or measure for a month, in the hopes that it will eventually become a habit.

Outreach is conducted to raise awareness of stormwater and environmental issues, to educate the community on relevant issues of concern, and to motivate people to take action to address such issues and problems. The following steps have been formulated to assist you with your stormwater education activities. We hope that you find these tips and ideas useful for effectively engaging your community and promoting stewardship of our environmental resources.

## Step 1: Establish Objectives and Develop a Plan

To raise public awareness and change behavior is a significant challenge. Identifying the motivating factors contained within your campaign will help to define your objectives and establish the framework for building your program. An effective public education program



should be based on established objectives. You should begin by developing an outline of the important concepts you are trying to convey. Keep the desired outcome in mind when forming your objectives. Are you looking to heighten awareness, provide information, or encourage action? It is important to make your objectives as specific as possible and to include a timeframe or schedule. As you progress through the phases of developing and implementing an outreach campaign, your objectives and activities will change. As the target audience becomes aware of the issues, you'll focus your efforts toward action. It is important that you periodically review your objectives and adjust them when necessary.

Developing clear objectives and a plan for delivering your message to the appropriate parties will help your program in the following ways:

- Ensures continuity across multiple events;
- Creates interest and motivation for participants;
- Assures that all important points are made and that information isn't inadvertently omitted; and
- Serves as an outline for use by additional or future trainers.

You can effectively shape the elements of your program by determining if your public outreach materials provide solid justification and sound rationale as to why someone should change their behavior. Your information and presentation needs to be compelling and convincing.

## **Step 2: Consider Your Target Audience**

The following groups should be part of your public education strategy:

- Local government and community leaders;
- Homeowners and tenants;
- Civic, environmental and other public and private organizations;
- Developers and business and industry leaders; and
- Elementary and secondary school students, college students and faculty.

Break down your target audience into the smallest components possible while still retaining the characteristics of the population you are trying to reach. If your audience is too broad you may not be able to deliver your message in a way that resonates with all those you are trying to reach. In reality, there is rarely just one audience. The messages you develop need to be tailored to the different segments of the community that you wish to reach.

The composition of your target audience will determine the best approach for delivering your message. You cannot teach children in the same way that you can educate an adult. Adults want to know why the topic at hand is important, how they make a difference, and they need to feel that the information being provided has value. Adults are active learners and your

approach should be interactive, engaging them in conversation and asking for their input and feedback. Adults are able to retain knowledge when provided an opportunity to apply what they have learned. It is important to structure your stormwater message so that they understand that their newly acquired knowledge can be applied in everyday life. Research has shown that most people need to hear a message three times before they retain it. Handouts, visuals, discussions, games, slide shows and videos can be used as a way of delivering the same information in more than one format.

Children need active involvement in order to learn and retain information. Avoid an approach where children must be passive listeners for long periods of time. Provide them with hands-on activities that involve art, music, games or group activities. Encourage participation in discussions. Field trips and outdoor activities can be the most rewarding forms of education for children. A walk through the neighborhood might be one of the most effective ways to teach children about impervious surface and stormwater infrastructure. When developing an outreach message for children, choose messages that are age appropriate by considering whether your audience will be students in preschool, grammar school, middle school, or high school.

Build a strong relationship with the school district in your area. Find out if there are any stormwater education programs already in place, or if the school district would be willing to implement a program if resources were available. The school district's needs and the municipal resources available will determine how effectively you will be able to partner with the schools.

Finally, keep in mind that there are systematic differences in the practices, social roles and traditional culture in minority and ethnically diverse communities that influence learning. For this reason, it is important to understand the community that you are working with. Explore what your target audience thinks about an issue and become familiar with their values and beliefs. Knowledge about racial, ethnic, religious and cultural heritage can help you understand behavior and what motivates change and acceptance. Reaching out to an educator or social worker within a particular community will help you better understand what works and what is not possible or practical. More importantly, it will prevent you from using an approach that is ineffective or perhaps even offensive to a specific cultural group.

Below is list of issues and topics that you will want to research relative to the community before beginning your messaging campaign:

- Demographic profile;
- Community interaction and information flow;
- Community capacity and activism;
- Economic and social issues and problems;

- Infrastructure and public services;
- Education levels;
- Public safety and health issues; and
- Environmental awareness and values.

### **Step 3: Work with Your Local Government**

Since there is no county government in Massachusetts, you will need to work with your local government. Development and regulatory approvals are managed at the local level through the Planning Board, Zoning Board of Appeals, Conservation Commission, and Building Department. The Planning Boards oversee the communities' Master Plan, prepare zoning regulations and administer the Subdivision Control Law. The Zoning Boards of Appeals review appeals to the communities' zoning regulations, and the Conservation Commission is responsible for enforcing the Massachusetts Wetlands Protection Act and local Wetland Bylaws. Almost all changes to local regulations must be voted into effect by town meeting vote or must be approved by the City Council. Municipal staff that address stormwater management issues include the community planner or community development director, conservation agent, the engineering department and the public works department.

Federal and state regulations require that municipalities with storm drain systems manage and control stormwater discharges. Working with local governments is critical to influencing how stormwater systems are planned, built, and maintained. Local regulations dictate impervious cover allowances and Conservation Commissions are often engaged in actions that protect land along rivers and streams. Local communities are also charged with ensuring enforcement of stormwater pollution prevention plans.

If you are trying to educate your local government on the importance of stormwater, consider presentations to the Conservation Commission, Planning Board, and Zoning Board of Appeals. All of these entities play an important role at different stages of a proposed project. However, each presentation should be tailored according to role of the commission or board. For Conservation Commissions, highlight the ecological connections between the water and land, and why stormwater management is so important. Briefly offer a few examples of practices, policies or regulation changes that could improve the health of local rivers, streams, and land. Such options might include the following:

- Fertilizer reduction programs;
- De-icing policies;
- Encouraging the use of native and drought-tolerant plants;
- Highlighting the need to control invasive species;
- Integrated pest management plans to minimize use of pesticides;
- Encouraging best management practices (BMPs) for agriculture;

- Enforcing erosion and sediment control on construction projects; and
- Establishing incentive programs for developers to reduce impervious surface;

Engage in a discussion with the Conservation Agent before meeting with the Conservation Commission, so that you approach the meeting with a clear understanding of local issues and concerns. The appendix to this document contains a PowerPoint presentation that we prepared for a local Conservation Commission.

There are several effective strategies for reaching out to local officials, either individually or as a group. Emailing or having conversations with individual members can be effective in tailoring your message for each person based on their role, be it fiscal or regulatory. Presentations at a public meeting can reach a broad audience that includes local officials and the public. Your message must be shaped so that it is well understood and your presentation should be brief and to the point. Presentations could include a one-page fact sheet where you could provide the following information, depending on the issue you are trying to address:

- The need for stormwater improvements, including a summary of water quality data.
- Community benefits of stormwater management and low impact development.
- Examples of model regulations or strategies that worked in other communities.
- Documentation of the number of communities in your state that have similar policies, programs or regulations. Providing such information for surrounding communities is particularly helpful.
- The cost effectiveness and the environmental benefits of the action you are proposing.
- A cost comparison of action versus inaction.
- Potential funding sources, both public and private.
- Social and economic impacts of poor water quality to drinking water, recreation, tourism, and quality of life.
- Documented public health impacts of poor water quality.

#### Quick Tips

- ✓ Be succinct.
- ✓ Make a compelling argument.
- ✓ Use data-driven information.
- ✓ Discuss economic and legal ramifications.
- ✓ Include a 1-page fact sheet.

The information you present will depend on the outcome you are trying to achieve. Environmental education is most effective when it speaks to local issues, problems, and priorities. Communities are more likely to participate in and benefit from environmental education if they see a direct link to personal and community well-being. Limit the number of concepts or messages that you plan to present at any one time so that your audience will

retain and use what they have learned. Keep the information as simple as possible so that it is easily understood.

Under EPA's stormwater regulations, communities are encouraged to form partnerships and distribute educational materials to diverse local audiences as part of a formal public education program. If you are a non-profit organization, take advantage of the work already being done by most municipalities by creating a partnership. Most municipalities will welcome the collaboration. Not only will you be able to build upon work already completed by others and develop a more in depth understanding of the community, the municipality will also benefit from having a stronger, more effective public education program. In addition, the collaboration will minimize duplication of effort and utilize the limited resources as efficiently as possible.

## Step 4: Determine Your Outreach Options

Determine how the target audience gets its information so that you have an understanding of how to best format and distribute information. Find out which newspapers, magazines or newsletters they read. Do they watch local news or cable television? Identify the organizations that they belong to and find out if they have computer access and utilize social media. Using the communication channels that the target audience is familiar with and trusts will add credibility to your program. Be sure the options you choose allow you to deliver your message effectively in clear, nontechnical terms that can be understood by your audience. Limit the number of concepts or messages that you plan to present at any one time so that your audience will retain and use what they have learned.

There are many outreach options available for delivering your message, depending on your budget. For example, using the visuals that you created by following the first section of this document will be helpful, but interactive workshops, neighborhood meetings, videos and public service announcements may also be valuable. Other options include website messages, social media, brochures, posters, newspaper inserts, radio or television ads, T-shirts, and bumper stickers. You can encourage local businesses to support your efforts by sponsoring events, festivals and popular community activities. You can also conduct walking, canoe, or kayak tours.

The outreach method should vary based on the target audience. For example, if you are trying to reach homeowners, consider asking your local water treatment plant to include your printed message as a brochure or printed insert sheet in the next water bill or water report. If you are trying to reach young adults, consider social media (Facebook, Twitter, or YouTube video). If you are trying to

### Quick Tips

- ✓ Identify your target audience.
- ✓ List your outreach options.
- ✓ List community events where you can provide information.

reach the general public you might use billboards, postcards, Social Media, websites, radio ads, advertising on public transit, and public service announcements. Brochures are an effective way to present and explain your message. Unlike other communication vehicles, brochures can be distributed in many places. Racks can be set up at libraries, events and fairs. You can pass out brochures at meetings. You can even organize a direct mail campaign. Posters can be displayed for months or even years, and are an effective option for message delivery. Text, photos, slogans—even graphs—can be presented effectively on posters. Generally, posters are used to build awareness (“Save the River”) or deliver a simple message (“Plant a Tree”).

In communicating with municipal boards and officials, consider PowerPoint presentations, fact sheets and brochures. Town Meeting is a good venue for providing a short presentation to get the message out to voters and town residents.

Once you release your message, repeat it over and over again. In marketing, the formula for success is: “Reach X Frequency = Results”. The more your target audience hears or sees your message, the more likely they will understand, comprehend and retain the information you are providing.

### **Face-to-Face Meetings**

For our Urban Waters project, face-to-face meetings and presentations were our most effective outreach strategies. In fact, one of the best ways to get your message across is through direct engagement that allows the listener to be an active participant in the conversation. Emails can be ignored, but the person in front of you is likely to be attentive. Concerns and questions can be answered and your message can be tailored appropriately as the discussion evolves. This provides the best chance of making a positive impression and of ensuring that the message is understood and passed on. Consider working face-to-face meetings into as many initiatives as possible.

One way to get your meetings off on the right foot is to provide adequate advance notice, which shows respect for participant’s time and increase the chances of strong attendance. Set the agenda and stick to it, so that participants feel their time is valued and that they can count on you to keep the discussion focused. Mail any agenda materials and supporting information well ahead of the meeting to give participants time to review them. Email and website postings are important assets for circulating pre-meeting information.

Participants can play various roles in a meeting: active participation, information management, process management and decision-making. Outline the expected role of the participants at the start of the meeting.

Small group meetings enhance the democratic process of community decision-making by creating a more intimate environment than public meetings. They are useful for working on

complex issues and concerns and more voices can be heard with less competition for speaking time. Small group meetings encourage attendees to participate, get involved and informed, and contribute to a sense of community.

We utilized neighborhood meetings and found them to be effective during our Urban Waters project. In-person meetings are a great way to provide information directly to the target audience. A community discussion might involve citizens that have volunteered for the discussion or are in attendance because of a prior commitment. We met with existing neighborhood organizations as part of their monthly meeting agenda and found that there was a high level of interest in stormwater due to recent flooding along the Merrimack River. Because of their experiences, residents understood the clear connection between stormwater management and flooding, and had a high level of interest in addressing the problem.

During the process of meeting there may be conflict. Conflict is a natural phenomenon and occurs in almost all human interactions and relationships. There are basic human needs that come into play when addressing conflict and conflict resolution: recognition, fulfillment, security and identity. Conflicts arise when people feel that their interests or values are challenged and that their needs are not being met. In some cases, no matter how hard you try, you may not be able to resolve a conflict. In such situations, it is better to simply acknowledge that differences of opinion or perspective exist and that this is normal. Encourage the conflicted parties to respect the view points of everyone and reaffirm the fact that such differences are expected. It is best to build on small agreements, than to focus your energy on trying to resolve a deep and difficult conflict.

Following the meeting, provide participants with a meeting summary, regardless of the format of the meeting. This will allow you to confirm that you accurately understood the opinions and ideas contributed by the participants. In addition, the participants will be grateful that you have seriously considered with they had to say, and will feel that their time was well spent.

### **Community Events**

Be present at community events to get your word out. Make a display board and a brochure to distribute with the main messages you are trying to convey. State-wide environmental conferences, stormwater and environmental events, environment clubs at universities and colleges, river festivals and farmers markets are all great places to get your message out. We presented at the Massachusetts Association of Conservation Commissions Annual Conference and reached over 800 conservation officials. We also had stormwater education and outreach booths at local events, including the Lowell Southeast Asian Water Festival, and the Lowell RiverFest.



## Focus Groups

Focus groups provide an opportunity to meet with a small group from your target audience so that they may exchange information and articulate their ideas. Focus groups may be selected through surveys, be chosen through the recommendation of community leaders, or selected at random. Focus groups can also be comprised of a certain demographic based on age, place of residence or occupation. You should invite no more than ten members of your target audience, and limit participation to one or two hours. Schedule the focus group session at a location and time convenient for participants. During the focus groups session questions are posed to the group and responses are recorded on a flip chart. In addition to the valuable input provided by participants, focus groups allow you to build a network of stakeholders who can help spread your message.

The person responsible for managing the focus group is usually a facilitator. The facilitator should be perceived as a neutral party and should not contribute his or her own ideas. The facilitator should also challenge assumptions, act as a catalyst and make sure that participants feel comfortable that their ideas and concerns are being heard and respected.

Some of the questions to ask during the focus group that could help you better understand how best to address stormwater education in your area include the following:

- What are three things that you value about your community?
- How do you spend your leisure time?
- Do you know where your drinking water comes from?
- Where do you get information about your drinking water?
- Do you think that water quality in your community is improving or declining?
- What are the major community events in your community?
- From what sources do you get your news or other information?

## Working with the Media

If your message needs to be conveyed and understood by the public, it must be covered by the mass media. The media are the most cost-effective and efficient way to get your message delivered. Nearly every study conducted in the United States over the past decade has concluded that most people—even those involved in scientific or water resource issues—get their environmental information from the news media.<sup>2</sup> Surveys repeatedly show high public interest in environmental issues and in water quality, particularly as it relates to drinking water, public health, and recreational uses. Packaging your messages as news stories can help distribute your information to mass audiences at virtually no cost.

Develop a list of media contacts and assemble a media kit. A media kit can include maps, a fact sheet, contact information and quotes from subject experts and community leaders

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<sup>2</sup> Getting in Step: A Pathway to Effective Outreach in Your Watershed, U.S. EPA, 2003

relative to your project or program. Submit press releases to those on your media contact list. You can also create a newsletter which can be shared with the media and the public, and invite the media to your events.

There are many ways to get your message into the media through informational news stories, personal interest stories, issues analyses, public service announcements, interview programs, call-in shows, letters to the editor, and featured articles relative to the environment, recreation and outdoor living.

Good news stories have at least one of the following attributes:

- Involve local people or issues/documented statistics;
- Relate to significant issues or events;
- Quote well-known or respected members of the community;
- Affect many people throughout a community or region;
- Involve controversial issues; or
- Include a celebrity.

Structuring your press release to include one or more of these attributes increases the likelihood that it will be published.

The internet and social media now play a pivotal role in delivering information across the globe. Develop a web page, Twitter account and a Facebook page to deliver your message and keep people informed about your project or issue. Printed media is fading in popularity, and many people now receive their news and information principally through the internet and social media.

### Workshops or Issues Forums

Workshops and issue forums are good techniques for soliciting feedback on a narrow selection of issues. Workshops and forums generally seek input on a series of predetermined questions or topics. Use workshops and forums to bring together technical experts, carefully selected stakeholders, or the public. Consider workshops or forums for municipal staff and officials, youth, teenagers and college students, nonprofits, environmental groups and concerned citizens. As part of our Urban Waters project, we participated in a municipal stormwater workshop for local officials and presented information on how their work and activities can benefit stormwater management.

#### Quick Tips for Workshops

- ✓ Have a sign in sheet.
- ✓ Conduct introductions.
- ✓ Offer refreshments.
- ✓ Allow plenty of time for questions.
- ✓ Tailor the information the audience.

## Step 5: Establish Partnerships with Public Entities, Cultural Organizations and Non-profits

Stormwater education issues are complex for one organization to tackle on its own. Influencing behavior is hard. Getting broad participation for non-governmental organizations greatly enhances your chance of success. In times of shrinking budgets and increased needs, partnerships can create a team that collectively focuses on identifying audiences, developing and refining messages, and sharing resources. Key partnerships can also provide staff, membership support, and financial resources.

State or local environmental organizations are the first place to start looking for partners. Identify local organizations likely to be interested in watershed issues, such as the local Farm Bureau, the Boy Scouts or Girl Scouts, local water utilities, or watershed and other environmental organizations. Then reach out to local agencies and organizations charged with protecting water resources, such as sanitation districts, planning commissions, and other government agencies. Federal, state, regional, or local agencies may also have programs with goals and objectives similar to yours. Federal agencies like the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the National Park Service, and others are often looking for ways to partner with local governments and the private sector, and view local agencies, nonprofits, and private organizations as credible sources of local environmental expertise.

Engage cultural organizations. Culture is expressed through the social structure (e.g., social organizations, and social roles and norms) that links people together. Social organizations are created to meet community needs formally and informally. It is important to understand the social organizations of a community because they are the cultural mechanisms within which community life grows and community decisions are made.

Community cultural assessment can provide insight into the complexity of community life, an essential element in developing carefully crafted and well-designed messages and strategies that meet the needs and interests of the community. Understanding the formal and informal networks used for communicating is the key to identifying local leaders who can assist in getting your message out.

Sociologists have found that when a new idea or behavior is adopted by roughly 15 to 20 percent of the audience, it will then have the critical mass it needs to permeate the rest of the audience, by word of mouth and observation.<sup>3</sup> This social diffusion can be achieved by identifying the innovators and early adopters in the community, who are the most likely to try something different. Identify these individuals and seek their assistance in setting new trends.

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<sup>3</sup> Getting in Step: A Pathway to Effective Outreach in Your Watershed, U.S. EPA, 2003

## **Step 6: Reach Out to Minority and Non-English Speaking Populations**

Many communities are ethnically and culturally diverse, and a portion of the population speaks languages other than English. The messages contained in signs, brochures, advertisements, newsletters, and other outreach materials that are printed only in English are mostly lost on these groups. Understanding cultural issues, language barriers, and specific needs of minority and non-English speaking populations is vital, in order to respond to questions and concerns with sensitivity and to focus your outreach efforts most effectively.

Make a particular effort to identify organizations that represent the minority and non-English speaking populations in your area. These organizations can provide valuable insight and support to your project, and there are often translation services available through these organizations. Working with such organizations will allow you to better understand the following:

- The social, political, cultural and economic factors in the community;
- The problems affecting the watershed, from the community's perspective; and
- The influential leaders in the community (religious, civic and business) and how they might be able to help protect the watershed and the environment.

Historically, many minority groups, immigrants and refugees have been treated badly by the leaders in the countries from which they came. This often results in the mistrust and fear of public officials. Some individuals may have recently immigrated from a war torn, impoverished nation and may lack language skills, fear authority figures due to their immigration status, and may have suffered severe emotional distress as a result of the loss of loved ones. When conducting your outreach program, you must keep these factors in mind.

The City of Lowell has the second largest Cambodian population in the country, estimated at 30,000 people. These immigrants moved to the City to flee the Khmer Rouge and experienced great hardship and trauma. In undertaking our Urban Waters project, we found that working with the Cambodian Mutual Assistance Association (CMAA) was the most effective way of reaching this population. Empathy and understanding is essential and one must accept that it will take time to gain trust, given their past experiences and the fears that many individuals possess. We were able to develop messages that were embraced and accepted by the Cambodian community, given their agricultural roots and their connection to the river. Many Cambodians fish in the Merrimack, not just for recreation, but also to feed their families. Copies of the messages we developed are included in the appendix in English, Spanish and Khmer formats.

Although Lowell's Latino population is not as large as the Cambodian population, Latinos comprise a significant non-English speaking group within the community. We partnered with Rumbo, the largest Spanish newspaper in the Merrimack Valley, to most effectively

communicate with our Spanish-speaking residents. In addition, we met with Latino students at Middlesex Community College, and with Latino youth who were participating in a local boating program on the Merrimack River. Utilizing existing groups within our target audience proved highly effective in our situation.

Working with minority groups is rewarding. It is important to identify their needs and understand their perspective. However, the information gathering process may be much slower than when working with other groups. This is to be expected and you should not get discouraged if the pace seems slow. Establishing rapport and building relationships with trusted and respected members of the community takes time. Meet in locations where minority groups are comfortable. Encourage minorities to identify their needs in their own language and avoid using slang terms or jargon.

There are many benefits to targeting specific minority or ethnic audiences, especially if they constitute a large proportion of the population. If the outreach program is tailored to a specific audience, the participants are more likely to feel that they are an important part of the effort. They can learn more specifically about the ways they might cause stormwater pollution and how it affects their neighborhood environment and quality of life. They also learn what they can do to help curb stormwater pollution, improve conditions in their neighborhood, and be aware of and prevent environmental injustices.

## **Step 7: Reach Out to Businesses and Related Organizations**

Outreach messages targeting businesses are better received and more powerful if a member of the business community delivers them. In addition, using selected businesses to deliver your message can increase the likelihood of reaching the target audience and save money on postage. For example, if you develop a brochure on oil recycling, ask to display the brochure at auto parts supply outlets. Keep in mind that businesses will be more likely to distribute your materials if there is an added benefit to them. You could provide an opportunity for the businesses to sponsor your campaign, which provides some advertising exposure acknowledging their good will and support of the community. We worked through the Greater Lowell Chamber of Commerce to reach the business community in our area.

There are many ways to provide education and outreach for commercial activities. Materials designed for businesses can include posters, magnets, calendars, flyers, brochures, and best management practices (BMPs) fact sheets. For example, if the target audience includes restaurants you could distribute educational brochures that outline BMPs that reduce urban runoff volume and pollutant concentration that result from their operations.

We worked through the City of Lowell Engineering Department and the Chamber of Commerce to understand the perspective of local developers and found that their concerns were largely focused on a perception the best management practices add significant cost to

development projects. We were then able to provide documentation and studies that showed that their concerns were largely unfounded. In addition, we provided the participating developers with an existing tool that can be used to estimate the cost of certain BMPs, including environmentally friendly parking lot retrofits.

Businesses tend to look for projects that help the communities where their employees live or where their customers purchase and use their products and services. Businesses can be persuaded to take part in a partnership to improve their public standing and eventually increase their profits. One of the benefits of outreach programs for businesses, as with all outreach programs, is an increase in public awareness about water quality issues. Additionally, because some business practices use materials and chemicals that are harmful to the environment, it is important for municipalities to inform owners, operators, and employees about practices that should be avoided to maintain and improve water quality.

## **Step 8: Troubleshoot**

Outlined below are several barriers which we encountered in our project. These types of issues can keep your outreach plan from being successful. As your campaign progresses look for areas of concern and respond quickly. Modifying your program during implementation to adjust to changing conditions is highly recommended.

### **I am having trouble connecting with a particular community.**

**Find someone who can help introduce you.** We had difficulty connecting with the Asian community, but finally made progress. We broke this impasse through a common funder for both the MRWC and the Cambodian Mutual Assistance Association, who helped make the connection. If you don't have all of the correct stakeholders involved from the beginning, you can't be sure that your campaign will address all the social, economic, political, and ecological conditions that must be considered in developing an effective plan. In addition, involving the key players at the outset builds trust and support for the project, assigns responsibility, creates more innovative solutions, and is more cost-effective.

### **Leader did not RSVP to emailed invitations.**

We found that leaders had to be individually contacted, and often did not respond to multiple email invitations. We had to reschedule one focus group due to the initial lack of response. We tried to increase attendance by offering focus group meetings, both during the day and at night. Despite publicity from the Greater Lowell Chamber of Commerce, we had low attendance from developers. Try using multiple avenues of communication. When someone does not respond to email place a direct phone and send a letter.



**Some people may be more comfortable talking about issues one-on one.**

Schedule face-to-face meetings and attend local events. As described earlier in this section of the document, many people are not comfortable in a group setting but will speak freely if you meet with them personally.

**It is difficult to get on the agenda for municipal board meetings.**

Town and city officials and the volunteers who make up municipal boards are very busy. It took much longer for us to get on their agendas than we had anticipated. Build two months lead time into your plan, when it includes meetings with local boards and commissions.

**People don't understand what to do.**

Stormwater is complicated. Try simplifying the message and show a picture of what you are asking your targeted audience to do. Conduct a survey to see which proposed solutions people seem receptive to implementing. Through our survey we found that people did not understand why we were asking them to plant trees. Interestingly, they also stated that because they have such a positive opinion regarding trees, they would be most inclined to do adopt this solution anyway!

## **Step 9: Evaluate Your Efforts**

Building an evaluation component into the plan from the beginning will ensure that feedback on outreach program impact is generated. Ideally, feedback generated during the early stages of the project will help to make a preliminary determination about program effectiveness. Adapting elements of the outreach effort continually as new information is received ensures that ineffective components are adjusted or scrapped, while the components that are working are supported and enhanced.

The success of outreach programs depends on how well they're conceived, planned, implemented, and adapted. Evaluating success is not difficult if you initially develop concrete, measurable objectives against which your achievements can be compared. In addition, focusing the outreach effort on discrete target audiences provides a manageable approach for both implementing the outreach program and measuring its success. Assessing how the project functions within the economic, social, and political environment of the community helps to uncover aspects of the objective, message, audience, format, or distribution mechanism that might be affecting results.

Evaluation is an important tool for determining your outreach program's progress and success. Impact evaluations assess the outcome or impacts produced by the outreach program and are directly tied to the original objectives. This type of evaluation measures the effect of an outreach program on the target audience by asking, "To what extent did we achieve our objective?" Typical performance measures



include increased awareness, knowledge of an issue, changes in perceptions or behavior, repeat participation in a targeted activity, and goal-oriented measures of water quality improvements. Be aware that sometimes unintended outcomes can result from an outreach program, and if there is evidence that such outcomes are prevalent, the evaluation can attempt to capture and define them so the program can be revised. There is a very helpful free global tool called IRIS that lists globally accepted metrics for social, environmental, and even financial success. A guide for exploring the full IRIS catalog can be found at [www.iris.thegiin.org](http://www.iris.thegiin.org).

## **Step 10: Train Others**

Once you understand how to conduct effective outreach in your community, share the knowledge! Provide information and materials to key people and organizations, so as to create a network of knowledgeable and impassioned educators who understand the range of issues involved and who are able and willing to leverage their own networks. The educational materials provided here can be given to community leaders, including local cultural groups, municipal staff and officials, local and regional planners, public officials, business leaders, non-profit leaders and other stakeholders. Their participation in your program will help spread your message and increase awareness of stormwater at the local level.

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# APPENDIX

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## **STORMWATER MESSAGES**



When you wash your car  
in the driveway...

*It's like washing  
it in the river!*

**YOU can make the difference.**

Wash your car on the grass instead of the street.  
Or take it to the car wash.

All the soap and oil runs down your driveway  
to a storm drain and pollutes the  
Merrimack River.

Photo Credits: river photo: MRWC; car wash photo:  
[www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-to-curb-stormwater-pollution/](http://www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-to-curb-stormwater-pollution/)



នៅពេលអ្នកលាងឡានក្នុងកន្លែងចំណាត់ឡាន...  
វាក៏ដូចជាលាងឡាននៅក្នុងទន្លេនោះដែរ!

អ្នកអាចជួយកែប្រែបាន។

លាងចរន្តរបស់អ្នកនៅលើវាលស្មៅជំនួសលើផ្លូវ  
ថ្នល់។ ឬ យកវាទៅកន្លែងលាងឡាន។

ទាំងសាប៊ូ និងប្រេងហូរចុះចំណាត់ឡានរបស់អ្នកហូរ  
ចូលបំពង់បង្ហូរទឹកហើយបំពុលទឹកទន្លេ Merrimack

រូបភាពពីកិត្តិយសពី: រូបថតទន្លេ: MRWC; រូបថតលាងឡាន:  
[www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-to-curb-stormwater-pollution/](http://www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-to-curb-stormwater-pollution/)



Cuando lava su auto en  
la entrada...

*¡es como lavarlo  
en el río!*

**USTED puede hacer la diferencia.**

Lave su auto en el césped en lugar de hacerlo en la calle. O llévelo a un lavadero de autos.

El jabón y el aceite caen por el desagüe y contaminan el río Merrimack.

Fotos: río: MRWC; lavadero de autos:  
[www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-curbing-stormwater-pollution/](http://www.longislandsoundstudy.net/2010/03/step-by-step-a-citizen's-guide-to-curbing-stormwater-pollution/)



# Worried about flooding?



**Plant trees  
in your  
neighborhood!**



**Trees soak up water and reduce flooding.**

Photo Credits: Flood- [http://galogato.com/images/2006/lowell\\_flood\\_2006.html](http://galogato.com/images/2006/lowell_flood_2006.html); Tree planting: American Spirit, Dreamstime.com

តើអ្នកព្រួយបារម្ភអំពីទឹកជំនន់ឬទេ?



ដាំដើមឈើនៅដំបង  
របស់អ្នក!



ដើមឈើស្របយកទឹក ហើយកាត់បន្ថយទឹកជំនន់

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# ¿Le preocupan las inundaciones?



## ¡Plante árboles en su vecindario!



### Los árboles absorben al agua y reducen las inundaciones.

Fotos: inundación: [http://gatogato.com/images/2006/lowell\\_flood\\_2006.html](http://gatogato.com/images/2006/lowell_flood_2006.html); plantación de árboles: American Spirit, Dreamstime.com



# Keep Your Family Healthy

Your drinking water comes  
from the Merrimack River...



***Don't dump  
anything into the  
storm drains!***

Photo Credits: drinking water: Hughstoneian, Dreamstime.com; river: MRWC

រក្សាគ្រួសាររបស់អ្នកឱ្យមានសុខភាពល្អ

ទឹកផឹករបស់អ្នកមកមកពីទីនេះ

Merrimack...

ហាមចោលសម្រាមចូលកង

បំពង់បង្ហូរទឹក!

រូបភាពគំរូក្នុងសៀវភៅ: ទឹកផឹក: Hughstoneian, Dreamstime.com; river: MRWC



# Mantenga a su familia saludable

Su agua potable proviene del río  
**Merrimack...**



***¡No arroje  
desechos a los  
desagües!***

Fotos: agua potable: Hughstoneian, Dreamstime.com; río: MRWC

*You only give your baby  
the purest water...*



The plants along the river absorb and capture sediment from polluted runoff, helping to ensure that the water is safe and clean for people and wildlife.

When you protect the land,  
you protect your drinking water.

*Their babies need it too!*

***SUPPORT LOCAL LAND PROTECTION***

Photo Credits: baby: pashedmag.com; ducks: copyright <http://www.anewenglandwildlife.com>



អ្នកឲ្យទឹកដ៏បរិសុទ្ធបំផុតដល់កូនរបស់អ្នក...



រក្ខជាតិដែលនៅតាមបណ្តោយទន្លេនេះ  
ស្រូបយកនិង  
ចាប់យកកាកសំណល់ដ៏ជាតិពល,  
ជួយធានាឲ្យទឹកញ៉ាំមានសុវត្ថិភាព  
និងស្អាតសម្រាប់មនុស្ស និងសត្វព្រៃ។  
ពេលណាអ្នកការពារដីធ្លី, អ្នកក៏ការពារ  
ទឹកដ៏គ្រប់លំដាប់ដែរ។

កូនទាំងឡាយរបស់ពួកគេក៏ត្រូវការដែរ!

ជួយការពារដីធ្លីមូលដ្ឋាន

រូបភាពគីក្ខុយស្តីពី: ទារក:poachedmag.com; សត្វទា: រក្សាលិខិតដោយ <http://www.anewenglandwildlife.com>

*Quiere que su bebé solo  
tome el agua más pura...*



Las plantas del río absorben y capturan el sedimento de los vertidos contaminados, lo que ayuda a asegurar que el agua que beben las personas y la vida silvestre sea segura y limpia. Cuando protege la tierra, protege su agua potable.

*¡Sus bebés también lo necesitan!*

**APOYE LA PROTECCIÓN DE LA TIERRA LOCAL**

Fotos: bebé: poachedmag.com; patos: derechos de autor <http://www.anewenglandwildlife.com>



# Mantenga a su familia saludable

**Su agua potable proviene del  
río Merrimack...**

## ***¡Plante un jardín de lluvia!***

**Los jardines de lluvia purifican las sustancias  
contaminantes y mantienen limpia nuestra agua.**



Foto: niña bebiendo agua: [inspiredhealthandhappinessblog.com/2012/01/8-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/](http://inspiredhealthandhappinessblog.com/2012/01/8-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/); río: MRWC; plantación de jardín de lluvia: [www.joe.org](http://www.joe.org); jardín de lluvia: [www.bolincreek.org](http://www.bolincreek.org)



# ***Keep Your Family Healthy...***

***Your drinking water comes  
from the Merrimack River...***

## ***Plant a Rain Garden!***

***Rain gardens purify pollutants,  
and keep our water clean.***



photo credits: girl drinking water: [inspiredhealthandhappinessblog.com/2012/01/5-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/](http://inspiredhealthandhappinessblog.com/2012/01/5-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/); river: MRWC  
; rain garden planting: [www.joe.org](http://www.joe.org); rain garden: [www.bolincreek.org](http://www.bolincreek.org)



រក្សាគ្រួសាររបស់អ្នកឱ្យមានសុខភាពល្អ

ទឹកជីករបស់អ្នកគឺមកពីទន្លេ Merrimack...

ដាំស្ពានច្បារទឹកភៀង!

ស្ពានច្បារទឹកភៀងបន្ថែមធាតុពល  
និងរក្សាទុករចនាសម្ព័ន្ធស្នាក់



ប្រភពគំនិតដើម្បី: គេហទំព័រ: [inspiredhealthandhappinessblog.com/2012/01/5-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/](http://inspiredhealthandhappinessblog.com/2012/01/5-tips-for-children-increase-mental-focus-attention-energy-capacity-part-ii/) ; river: MRWC; rain



A young boy in a yellow shirt and khaki shorts is fishing in a river. He is holding a fishing rod and looking down at the water. The river is surrounded by lush green trees and rocks. The water is clear and blue.

**We All Deserve Clean Water...  
Together, We Can Make It Happen**

***Keep trash out of  
our storm drains!***

Photo credits: boy fishing: Palangsi: Dreamstime.com; River: MRWC





យើងទាំងអស់គ្នាគួរទទួលបាននូវទឹកស្អាត ...

រួមដៃគ្នា, យើងអាចធ្វើទៅបាន

ទឹកសម្រាប់ឱ្យគ្នាជីវិតប្រចាំថ្ងៃ!

រូបភាពពីកម្ពុជា: កុមារស្រី: Palangsi: Dreamstime.com; River: MRWC



**Todos merecemos agua limpia...  
*juntos podemos lograrlo***

***¡No arroje basura  
en los desagües!***

Fotos: niño pescando: Palangsi: Dreamstime.com; río: MRWC

**POWERPOINT PRESENTATION FOR  
LOCAL CONSERVATION COMMISSIONS**

## Polluted Runoff and Land Conservation: What's the Connection?



Carolyn Shumway, Ph.D.  
Executive Director, Merrimack River Watershed Council  
In partnership with NMCOC



# Overview

- Purpose: Convey links between stormwater and conservation.
- Project: Restoring the Merrimack River through Education, a USEPA-funded Urban Waters grant.
- Presenter: Dr. Caroly Shumway
  - Executive Director of the Merrimack River Watershed Council.
  - 22 years conservation experience in U.S., Africa, and Asia.
  - Experience reviewing SWPPPs, wetland permits (RI), developing stormwater bylaws and ordinances.

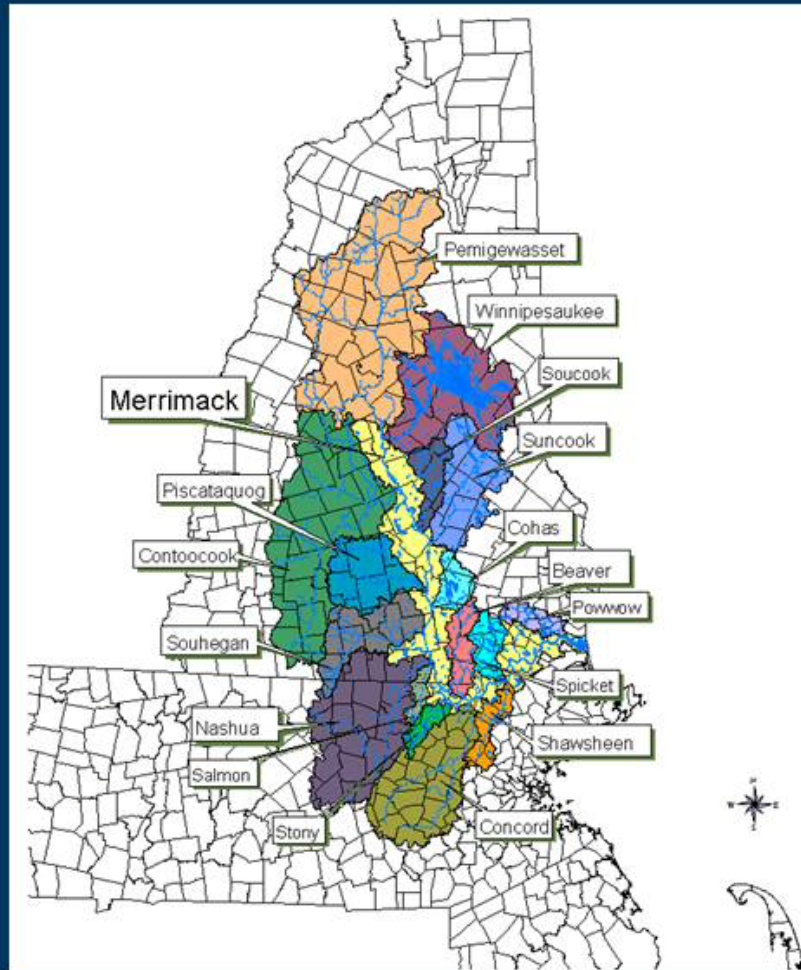


# Take-home Messages

- Land and rivers are connected. Polluted runoff, wildlife, and plants connect them.
- Water quality and river health are degraded when impervious cover is above 5-7%.
- The cheapest and easiest way to address water pollution, flooding, and wildlife loss is with buffers, not engineered structures.
- Conservation Commissions have important roles to play in tackling polluted runoff. This includes:
  - Reviewing wetland permits
  - Providing the support and justification for bylaws
  - Acting as watchdogs to ensure enforcement
- NMCOG and MRWC can help you!



# The Merrimack River Watershed



- Fourth largest in NE (5010m<sup>2</sup>)
- Two million people and 203 communities in two states depend on this watershed
- The only major river and tributaries in NE serving as direct source of drinking water (river: Lawrence, Lowell, Methuen, Tewksbury)





# What is Polluted Runoff (a.k.a. Stormwater)?

- Polluted runoff is the polluted water from rain or melted snow that 'runs off' hard surfaces such as parking lots into storm drains.
- As the water moves, it picks up pollutants and flows to streams and the Merrimack River directly or indirectly through storm drains.
- This water is not treated before it reaches the river
- Stormwater is more than pollutants.
  - Causes thermal stress, flashiness, reduction in groundwater recharge.
- Polluted runoff can affect health, harm wildlife, cause flooding, and cost towns money.



# Top Watershed Issues

- Loss of private forested lands due to sprawl.
  - Most threatened in the U.S. (USFS, 2009)
  - Impacts to water quality (4<sup>th</sup> most threatened)
  - Impacts to terrestrial species at risk (7<sup>th</sup> most threatened)
- Increasing impervious surfaces.
- Pathogens.
- Phosphates (21% from developed lands, with construction biggest source; 60% from municipal wastewater) .
- Flooding.
- Decline of wetland-associated birds.
- Climate change will increase flooding and stormwater impacts in NE (NOAA, 2011).



# Why should you care?

Land and water are connected.

- What's in the water affects forest birds.





# Land and Water are Connected

- What's in the water affects trees and crops
- What's on the land affects what's in the water

FISH

TREES



Merz et al., Ecol. Applications 2006





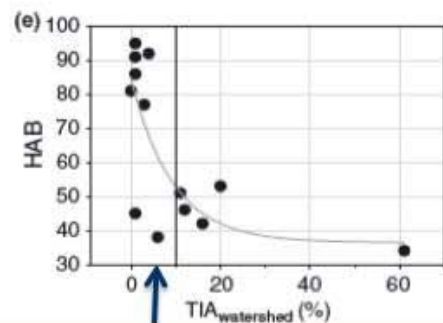
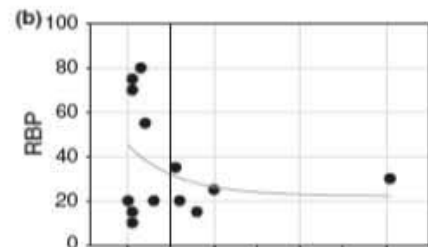
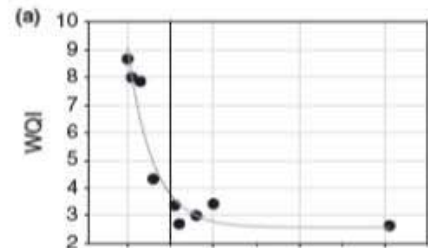
# Stormwater affects both LAND and WATER, including groundwater

Water  
Quality

River  
Insects



Fish  
Habitat  
Quality



5%

Schiff and Benoit (2007) JAWRA 43(3)

- Both water quality and ecology are degraded when impervious cover is above 5-7%.
- River buffers are most significantly impacted by impervious cover.
- Once degraded, river water quality and species diversity are difficult to restore.



# The Science Is Clear

- Construction violations are significant contributors to sediment and phosphate.
- Once rivers are degraded, water quality and species diversity are difficult to restore.
- It is cheaper and more effective to address stormwater through wise land use and land protection than downstream (engineered) technologies.
- Land can be protected via conservation or bylaws.



# How Is Stormwater Managed?



- Stormwater Management Plan (SWMP): required for town MS4 permits and freshwater wetland permit
- Low Impact Development (LIDs) and Best Management Practices (BMPs): Examples
  - Rain gardens
  - Infiltration basins; other infiltration practices
  - Conservation by Design
  - Vortex units
  - Permeable pavement
  - River buffers

# Public Education

- 6 focus groups
- Two workshops
- Most popular approaches, messages, and visuals:
  - Stewardship
  - Humor
  - Cost



# What Can Towns Do?

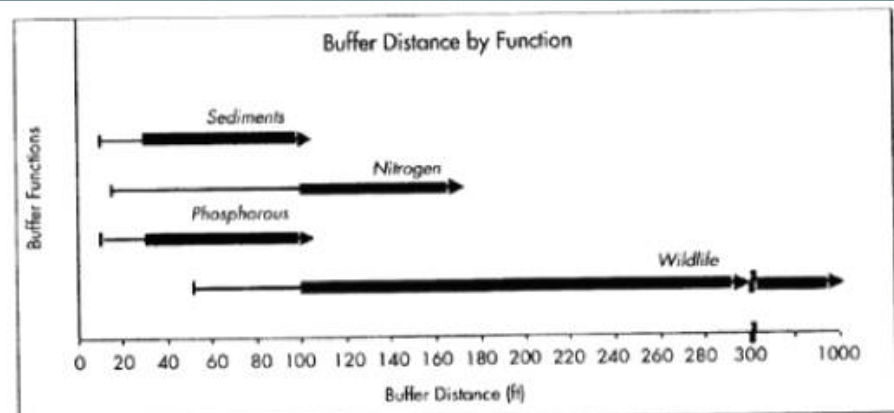




# Conserve land to protect water sources

- Create No-build 100 foot buffers for rivers/wetlands to benefit:
  - Wildlife: habitat enhanced for amphibians, reptiles, stream insects, forest interior wetland birds
  - Wetlands: more likely to stay viable.
  - Water quality: enhanced. Flooding reduced.
    - Nitrogen can be cut by 80-90%, compared to 50% at 50ft.
    - Sediments are most efficiently reduced.
    - Stream temperatures are lower, benefiting fish.

Source: EPA, 2006; Wenger, 1999;  
Vt. Agency of Natural Resources, 2005



## Create local bylaws to reduce impervious cover and polluted runoff

- Stormwater bylaw – update sediment/soil erosion control
- LID bylaw
- Local wetlands bylaw
- Aquifer or Surface Water Protection Overlay District
- Reduce parking space requirements
- Consideration of stormwater impacts when revising local zoning bylaw and subdivision regulations
  - Building footprint size
  - Stormwater management plan
- Setback bylaw for septic systems (OWTS)
- Tool: Assess impervious cover percentage build-out by zone.
  - Set overall goal for % impervious watershed.



# Enact Policies to Prevent Pollution

- Fertilizer reduction programs.
- Deicing policies.
- Integrated pest management plans.
- Sound agricultural practices.
- Encourage the use of native and drought tolerant species.
- Ensure good erosion and sediment control when developing orders of conditions for construction projects.
- Control of invasive species.

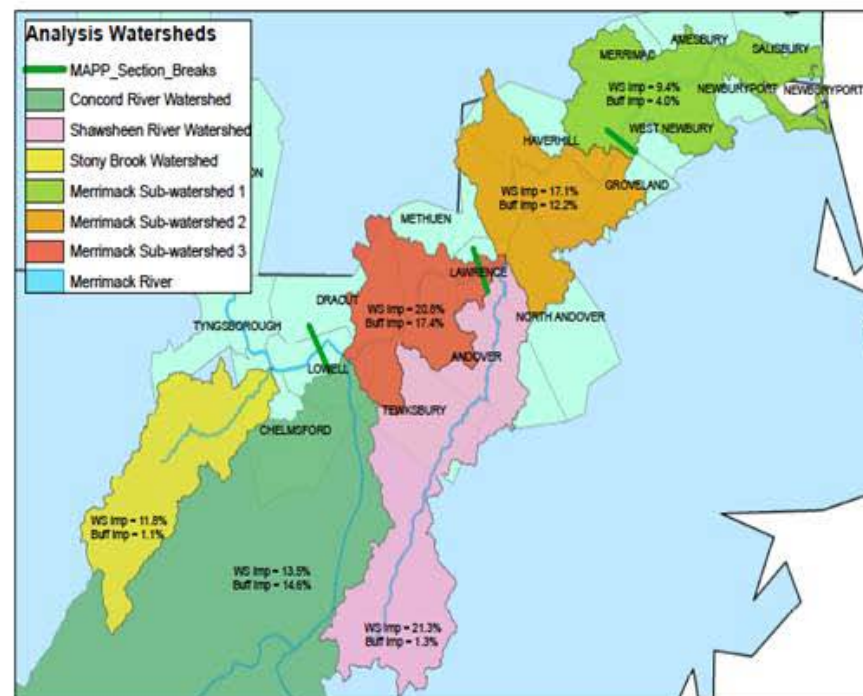




# Prioritize Actions At A Watershed Scale

- Protect and/or maintain subwatersheds with less than 5-7% impervious cover.
- Restore subwatersheds with 7-9% impervious cover.

Tributaries and HUC 12 Watersheds and Impervious Layers



MRWC, 2013





**Tool: Ask: What is total % impervious cover under different scenarios?**  
**Scenario: Set 35% Imperv business zones, reduce elsewhere.**

ZONE	Impervious acres	Zone Impervious ENTER % for ZONE	Impervious % over entire subwatershed
Roads	50.7	72.8	0.7
BH	2.8	35	0.0
BN	3.1	35	0.0
LC	42.4	35	0.0
M	0.0	12	5.0
PS	0.8	10	0.0
PS	18.7	15	0.5
RA	5.1	25	0.0
REA	24.9	7.3	6.7
RS	0.0	0	Total for Study area
RU	148.4		6.7
Total	1879.1		Total for Study area

## NMCOG and MRWC can Help

- Provide references and fact sheets for bylaws.
- Draft bylaws.
- Draft stormwater management plans.
- Facilitate discussion with town residents or Town Boards.
- Provide support at public meetings, and local events.
- Present to local boards and the public.
- Provide information on stormwater regulations and best practices.
- Provide support for meeting MS4 permit guidelines through the Northern Middlesex Stormwater Collaborative.
  - Mark Hamel (Town Engineer) and Mike Buxton (DPW Director) serve as Dracut representatives.

