

*Proceedings of the 4<sup>th</sup> National Conference*

# **Nonpoint Source and Stormwater Pollution Education Programs**

Holiday Inn Chicago Mart Plaza ♦ Chicago, Illinois  
October 17-20, 2005

*Cosponsored by*

Chicago Botanic Garden  
U.S. Environmental Protection Agency

December 2005

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*Proceedings prepared by*  
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## FOREWORD

Those of us fortunate enough to take part in the conference documented in these proceedings reflect on it with pride and joy. It was that rare event that proved to surpass expectations all around. The agencies and organizations that invested in sending us to Chicago stand to be richly rewarded as we begin to apply the tools and lessons presented there. Post-conference evaluations proved the point: for many of us, it was quite simply the most worthwhile conference we had ever attended.

There is plenty to be gleaned from these proceedings. They chronicle much of the information and insights imparted by the conference presenters. What is missing from this narrative is the *adventure* of the conference experience. Along the journey, many of us learned from the most qualified and engaging experts in the business across four outstanding pre-conference workshops. We were captivated by the keynote address delivered by Nancy Lee, who proved to be second to none. We delighted in the elegant and wonderfully offbeat debut of The People's Choice Awards, where we saw, heard, and voted on the best television and radio ads with nonpoint source and stormwater messages. Whether it was enjoying the camaraderie of far-flung colleagues and new acquaintances during the hospitality reception, the wonder-filled evening at the Notebaert Nature Museum, or the discovery of learning from the many superb presentations described in these pages, we benefited invaluablely from the adventure itself.

And yet, the conference laid down a serious challenge. We heard loud and clear: we *must* do a better job linking outreach to measurable and meaningful results, and ultimately to real-world water quality improvements. As this conference series has evolved, social marketing approaches have taken center stage. And as we learned from Nancy Lee, the "products" that we sell are improved behaviors and new habits. If the challenge of obtaining and measuring "results that matter" through our outreach wasn't made plain enough during the pre-conference workshops, then we surely got the message by the conference's first morning. A new standard has arrived. Thirty-three years into the Clean Water Act and 33,000 known impaired water bodies later, authenticated nonpoint source success stories are rare. The days of "outreach as usual" are over. Yes, the goal is behavior change, but not merely; it's about establishing new social norms widely enough to restore impaired waters or to deliver other meaningful water quality goals.

The bar has been raised. Our nonpoint source outreach goals, tools, and experiences are growing to meet the challenge. The U.S. EPA is proud to continue sponsoring this groundbreaking conference series. On behalf of the U.S. EPA-States nonpoint source partnership and the federal-state-local conference planning committee, we hope you will join us at our 5<sup>th</sup> national conference.



Don Waye  
Nonpoint Source Control Branch  
U.S. Environmental Protection Agency  
Washington, DC

# AGENDA

*4<sup>th</sup> National Conference*  
***Nonpoint Source and Stormwater  
Pollution Education Programs***

October 17-20, 2005 \* Holiday Inn Chicago Mart Plaza \* Chicago, Illinois

## Conference Agenda

### Monday, October 17

- 8:30 a.m.-4:30 p.m.     **PRE-CONFERENCE WORKSHOP #1** ..... *Sauganash West*  
**Fostering Sustainable Behaviour: Beyond Brochures** ..... *(14<sup>th</sup> floor)*  
Doug McKenzie-Mohr; McKenzie-Mohr Associates, Fredericton,  
New Brunswick, Canada
- 8:30 a.m.-4:30 p.m.     **PRE-CONFERENCE WORKSHOP #2** ..... *Sauganash East*  
**Getting in Step: Conducting Effective Stormwater/NPS Outreach Campaigns** ..... *(14<sup>th</sup> floor)*  
Charlie MacPherson and Melissa DeSantis; Tetra Tech, Inc., Fairfax, Va.
- 8:30 a.m.-noon     **PRE-CONFERENCE WORKSHOP #3** ..... *Western Stage House*  
**Engaging Communities Through Social Mapping** ..... *(14<sup>th</sup> floor)*  
Theresa Trainor; U.S. Environmental Protection Agency, Washington, D.C.
- 1:00-4:30 p.m.     **PRE-CONFERENCE WORKSHOP #4** ..... *Western Stage House*  
**A “How To” for New Stormwater and NPS Education Managers** ..... *(14<sup>th</sup> floor)*  
Brian A. Day; Environmental Communication & Training, LLC, Charlottesville, Va.
- 7:30-9:30 p.m.     **The People's Choice Awards for Nonpoint Source and  
Stormwater Pollution Outreach** ..... *Wolf Point Ballroom*  
*Join your fellow conference attendees at this fun-filled evening session to* ..... *(15<sup>th</sup> floor)*  
*view the finalists and cast your ballot for your favorite outreach products.*  
*(complimentary popcorn, cotton candy and snacks along with a cash bar)*

### Tuesday, October 18

- 7:00 a.m.-5:15 p.m.     **Conference Registration** ..... *14th Floor Foyer*  
  
*(throughout*     **POSTERS and DISPLAY MATERIALS:** View Posters and other display materials  
*conference)*     presented by NPS and stormwater outreach specialists from across the country ..... *14th Floor Foyer*
- 8:30-9:15 a.m.     **WELCOMES AND OPENING REMARKS** (*page 1*) ..... *Sauganash East*  
Barbara Whitney Carr; President and Chief Executive Officer, ..... *(14<sup>th</sup> floor)*  
Chicago Botanic Garden, Glencoe, Ill.  
Thomas V. Skinner; Regional Administrator, U.S. Environmental Protection Agency -  
Region 5, Chicago, Ill.  
Diane C. Regas; Director, Office of Wetlands, Oceans and Watersheds,  
U.S. Environmental Protection Agency, Washington, D.C.

# AGENDA

## **Tuesday, October 18** *(continued)*

- 9:15-10:00 a.m.      **KEYNOTE ADDRESS** *(page 1)* ..... *Sauganash East*  
**Using Social Marketing to Influence Public Behavior: Why It's 1,000 Times Harder—and 7 Ways to Make it Easier**  
Nancy R. Lee; President, Social Marketing Services, Inc., and Adjunct Faculty at the University of Washington and Seattle University  
Mercer Island, Wash.
- 10:00-10:30 a.m.      **Break**; Poster and Display Viewing ..... *14<sup>th</sup> Floor Foyer*
- 10:30 a.m.-noon      **OPENING PLENARY SESSION** ..... *Sauganash East*  
MODERATOR: Donald F. Waye; U.S. EPA - Headquarters, Washington, D.C.  
**Measuring Results from Outreach and Education Programs: Can We See Improvements Downstream?** *(page 2)*  
David Galvin; King County Department of Natural Resources and Parks, Seattle, Wash.  
**Using the Unified Subwatershed and Site Reconnaissance to Develop Education and Outreach Strategies** *(page 3)*  
*Jennifer A. Zielinski; Center for Watershed Protection, Ellicott City, Md.*
- noon-1:20 p.m.      **LUNCHEON and ADDRESS** ..... *Wolf Point Ballroom (15<sup>th</sup> floor)*  
**The Adopt-A-Waterway Program: Where Business and the Environment Meet** *(page 4)*  
Paul Polizzotto; President and CEO, Environmental Communication and the Adopt-A-Waterway Program, New York, N.Y.
- 1:45-3:15 p.m.      **SESSION A1: DEVELOPING EFFECTIVE NPS AND STORMWATER EDUCATION PROGRAMS** ..... *Sauganash East*  
MODERATOR: Walton C. Poole; America's Clean Water Foundation, Boise, Idaho  
**Developing a Social Component for the NPS Evaluation Framework** *(page 5)*  
Ken Genskow; University of Wisconsin, Madison, Wis.  
**Best Practices for Field Days: Raise the Impact of Your Nonpoint Source and Stormwater Education Programs** *(page 6)*  
John Bilotta; University of Minnesota Extension Service, Chaska, Minn.  
**Assessment of Maine's Stormwater Phase II and NPS Outreach Campaign for 2003-2005** *(page 7)*  
Kathy M. Hoppe; Maine Department of Environmental Protection, Presque Isle, Maine
- 1:45-3:15 p.m.      **SESSION B1: TOOLS AND TECHNIQUES FOR NPS AND STORMWATER EDUCATION** ..... *Sauganash West*  
MODERATOR: Nikos D. Singelis; U.S. EPA - Headquarters, Washington, D.C.  
**U.S. EPA's NPS Outreach Digital Toolbox: Your One-Stop Shop** *(page 8)*  
Ansu John; Tetra Tech, Inc., Fairfax, Va., and  
Donald F. Waye; U.S. EPA - Headquarters, Washington, D.C.  
**Selling Low Impact Development: Audiences, Messages, and Media** *(page 9)*  
Katherine K. Mull; Northern Virginia Regional Commission, Annandale, Va.  
**Stormwater, Secret Agents, Soil, and Sumo Wrestlers: Exploring the Secret Agent Worm Interactive Website** *(page 10)*  
Doug Peterson; University of Illinois Extension, Urbana, Ill.

# AGENDA

## **Tuesday, October 18** *(continued)*

- 3:15-3:45 p.m.      **Break**; Poster and Display Viewing.....14<sup>th</sup> Floor Foyer
- 3:45-5:15 p.m.      **SESSION A2: WATER OUTREACH EDUCATION TOOLS**.....Sauganash East  
MODERATOR: Denise Hosler; U.S. Bureau of Reclamation, Denver, Colo.  
**Water Outreach Education Tools for NPS Programming: The Best in Education Practices, Target Audience Research, Programs, and Materials**  
*(page 11; 90-minute presentation)*  
Elaine L. Andrews and Kate Reilly; University of Wisconsin, Madison, Wis.
- 3:45-5:15 p.m.      **SESSION B2: APPROACHES FOR STORMWATER EDUCATION AT THE LOCAL LEVEL**.....Sauganash West  
MODERATOR: Patti Sanzone; Florida Department of Environmental Protection, Tallahassee, Fla.  
**If You Wouldn't Drink It, Don't Dump It: The Stormwater Public Education Campaign for the City of Orem, Utah** *(page 12)*  
Steve R. Johnson; City of Orem, Utah  
**Public Education and Community Outreach Supporting the City of Toronto's Water Pollution Solution** *(page 13)*  
Nicole Dufort; City of Toronto, Ontario  
**A Federal Facility's Resource-Efficient and Proactive Approach to Phase II MS4 Permit Requirements for Public Education** *(page 14)*  
Corie L. Rockett; CH2M Hill, Atlanta, Ga.
- 5:15-7:00 p.m.      **HOSPITALITY RECEPTION**..... Wolf Point Ballroom  
*Join your colleagues for a terrific selection of hors d'oeuvres and refreshments—and spirited discussion! (cash bar)* *(15<sup>th</sup> floor)*

## **Wednesday, October 19**

- 7:00 a.m.-5:00 p.m.      **Conference Registration**.....14<sup>th</sup> Floor Foyer
- 7:00-8:15 a.m.      **Buffet Breakfast**..... Wolf Point Ballroom (15<sup>th</sup> floor)
- 8:30-10:00 a.m.      **SESSION A3: NPS EDUCATION PROGRAMS AT THE COMMUNITY LEVEL**.....Sauganash East  
MODERATOR: Kathy M. Hoppe; Maine Department of Environmental Protection, Presque Isle, Maine  
**Clean Water — Who Cares? Translating Public Understanding Into Successful Communication Programs** *(page 15)*  
Karen M. DeBaker; Clean Water Services, Hillsboro, Ore.  
**The Neighborhood Water Stewardship Program: An Innovative Approach to Behavior Change in Northern Virginia** *(page 16)*  
Aileen Winquist; Arlington County Department of Environmental Services, Arlington, Va.  
**Clean Water is Just Good Business: Outcomes From the Cocoa Beach Green Business Program** *(page 17)*  
Leesa Souto; University of Central Florida - Stormwater Management Academy, Melbourne, Fla.

# AGENDA

## **Wednesday, October 19** *(continued)*

- 8:30-10:00 a.m.      **SESSION B3: EDUCATION STRATEGIES FOR MINIMIZING DEVELOPMENT IMPACTS ON STORMWATER** ..... *Sauganash West*  
MODERATOR: Ron Struss; University of Minnesota Extension Service, Farmington, Minn.  
**A Tale of Two Programs: Lessons Learned From Two Education Program Structures** *(page 18)*  
John Chapman; University of Minnesota, St. Paul, Minn.  
**Hold on to Your Dirt!** *(page 19)*  
Hossain Kazemi; Stormwater Compliance Specialists, Inc., Benicia, Calif.  
**Marketing a Successful Stormwater Bylaw: Lessons Learned From Three Massachusetts Communities** *(page 20)*  
Christine E. Wallace; Horsley Witten Group, Sandwich, Mass.
- 10:00-10:30 a.m.      **Break**; Poster and Display Viewing ..... *14<sup>th</sup> Floor Foyer*
- 10:30 a.m.-noon      **SESSION A4: HOME AND YARD CARE EDUCATION PROGRAMS** ..... *Sauganash East*  
MODERATOR: Barbara Liukkonen; University of Minnesota, St. Paul, Minn.  
**The University of Minnesota Shoreland Education Program** *(page 21)*  
Eleanor R. Burkett; University of Minnesota Extension, Brainerd, Minn.  
**Texas SmartScape Program: Smart Gardening for North Central Texas and Beyond** *(page 22)*  
Leslie C. Rauscher; North Central Texas Council of Governments, Arlington, Texas  
**Lessons Learned: Moving LakeSmart From Pilot to Statewide Program** *(page 23)*  
Barbara Welch; Maine Department of Environmental Protection, Augusta, Maine
- 10:30 a.m.-noon      **SESSION B4: SOCIAL MARKETING APPROACHES** ..... *Sauganash West*  
MODERATOR: Sarah Lehmann; U.S. EPA - Region 5, Chicago, Ill.  
**WaterWorks! in the Mainstream: Social Marketing** *(page 24; 30-minute presentation)*  
Karen L. Hargrove; Middle Tennessee State University, Murfreesboro, Tennessee  
**Adapting and Scaling Social Marketing Techniques to Regional, Municipal, and Neighborhood Stormwater Issues: A Case Study from South Burlington and Chittenden County, Vermont** *(page 25; 60-minute presentation)*  
Juli Beth Hinds; City of South Burlington, Vt.
- noon-1:15 p.m.      **LUNCHEON and ADDRESS** ..... *Wolf Point Ballroom (15<sup>th</sup> floor)*  
**Eyes on the Environment: Environmental Education and Tools for Broadcast Meteorologists** *(page 26)*  
Deborah A. Sliter; Vice President for Programs, The National Environmental Education and Training Foundation, Washington, D.C.
- 1:20-1:30 p.m.      **GROUP PHOTO!** ..... *Hotel's Main Lobby (15<sup>th</sup> floor)*

# AGENDA

## **Wednesday, October 19** *(continued)*

- 1:45-3:15 p.m.      **SESSION A5: EVALUATION TECHNIQUES**..... *Sauganash East*  
MODERATOR: Sarah Lehmann; U.S. EPA - Region 5, Chicago, Ill.  
**Practical Evaluation of Outreach and Public Relations Strategies**  
*(page 27; 90-minute presentation)*  
Shelli Bischoff-Turner; Conservation Impact, Denver, Colo.
- 1:45-3:15 p.m.      **SESSION B5: USING WEATHER AS AN EDUCATIONAL MARKETING**  
**TOOL**..... *Sauganash West*  
MODERATOR: Leesa Souto; University of Central Florida, Melbourne, Fla.  
**A Follow-Up to the “Eyes on the Environment” Luncheon Presentation**  
*(page 28)*  
Sara Espinoza; The National Environmental Education and Training Foundation,  
Washington, D.C.  
**Weather Matters Month: Bring on the Barrels—The “Art” of Social Marketing**  
*(page 29)*  
Angela Poe Dossett; Bluegrass PRIDE, Lexington, Ky.  
**Boost Your Outreach With the “After the Storm” Television Broadcast**  
*(page 30)*  
Donald F. Waye; U.S. EPA - Headquarters, Washington, D.C.
- 3:15-3:45 p.m.      **Break**; Poster and Display Viewing..... *14th Floor Foyer*
- 3:45-5:15 p.m.      **SESSION A6: REACHING OUT TO STUDENTS AND TEACHERS**..... *Sauganash East*  
MODERATOR: Thomas E. Davenport; U.S. EPA - Region 5, Chicago, Ill.  
**Stream Side Science: Tailoring Watershed Education to Meet the Needs of**  
**Teachers** *(page 31; 45-minute presentation)*  
Nancy Mesner; Utah State University, Logan, Utah  
**Clean Ways for Waterways: Washington County High Schools’ Stormwater and**  
**Nonpoint Source Pollution Lesson** *(page 32; 45-minute presentation)*  
Amy Workman; University of Wisconsin-Extension, West Allis, Wis.
- 3:45-5:15 p.m.      **SESSION B6: EDUCATION PROGRAM EVALUATION AND REFINEMENT** ..... *Sauganash West*  
MODERATOR: Rosetta Fackler; Kentucky Division of Water, Frankfort, Ky.  
**Is Your Public Education, Outreach, and Participation Program Working?** *(page*  
*33; 45-minute presentation)*  
Lisa Knerr; Tetra Tech, Inc., Lakewood, Colo.; *and*  
Curry Rosato; City of Boulder Public Works, Boulder, Colo.  
**Testing Education Methods Before Districtwide Launch Pays Off**  
*(page 34; 45-minute presentation)*  
Melissa DeSantis; Tetra Tech, Inc., Fairfax, Va.
- 5:35 p.m.            Museum Tour Registrants Assemble at the Holiday Inn’s building entrance  
**on the first floor** *(don’t forget your name badge and tour ticket,*  
*and wear a coat appropriate for the weather)*
- 5:45 p.m. **sharp!!**      Buses depart for Notebaert Nature Museum..... *Hotel’s Entrance on first floor*
- 6:00-10:00 p.m.      **ENJOY THE NOTEBAERT NATURE MUSEUM!**  
*(please refer to the special Nature Museum sheet in your conference packet)*

# AGENDA

## Thursday, October 20

- 7:00-8:15 a.m.      **Buffet Breakfast**..... *Wolf Point Ballroom (15<sup>th</sup> floor)*
- 8:30-10:00 a.m.      **SESSION A7: EVALUATING THE IMPACTS OF PUBLIC EDUCATION PROGRAMS** ..... *Sauganash East*  
MODERATOR: Michael Mitchell; U.S. EPA - Region 4, Atlanta, Ga.  
**Teaming Up to Tackle Program Evaluation for Stormwater Education Programs**  
*(page 35)*  
Megan M. Hanson; City of Portland Environmental Services, Portland, Ore.  
**Evaluating Landscape Education Programs: Examples From Florida, Texas, and Pennsylvania** *(page 36)*  
Barbra C. Larson; University of Florida, Gainesville, Fla.  
**Tracking California’s Nonpoint Source Education Programs for Marinas and Recreational Boating** *(page 37)*  
Martina Keefe; Tetra Tech, Inc., Fairfax, Va.
- 8:30-10:00 a.m.      **SESSION B7: COLLABORATIVE APPROACHES TO STORMWATER EDUCATION (Part 1)** ..... *Sauganash West*  
MODERATOR: Curry Rosato; City of Boulder Public Works, Boulder, Colo.  
**Meeting the Challenge: A Protection Message in a Restoration World**  
*(page 38)*  
Marion K. Lonsdale; City of Duluth, Minnesota  
**Minnesota Water—Let’s Keep it Clean: A Regional Stormwater Education Collaboration for the Twin Cities Metro, Minnesota** *(page 39)*  
Ron Struss; University of Minnesota Extension Service, Farmington, Minn.  
**Collaborative Approaches to Stormwater Education: “Ours to Protect” Regional Partnership** *(page 40)*  
Amy Mangus; Southeast Michigan Council of Governments, Detroit, Mich.
- 10:00-10:30 a.m.      **Break**; Last Chance for Poster and Display Viewing! ..... *14<sup>th</sup> Floor Foyer*
- 10:30 a.m.-noon      **SESSION A8: USING RESEARCH TO IMPROVE THE EFFECTIVENESS OF COMMUNICATIONS** ..... *Sauganash East*  
MODERATOR: Barbara Welch; Maine Department of Environmental Protection, Augusta, Maine  
**Using Research to Improve Targeting and Content of Communications**  
*(page 41; 90-minute presentation)*  
Curtis A. Mildner; Market Decisions, South Portland, Maine
- 10:30 a.m.-noon      **SESSION B8: COLLABORATIVE APPROACHES TO STORMWATER EDUCATION (Part 2)** ..... *Sauganash West*  
MODERATOR: Thomas E. Davenport; U.S. EPA - Region 5, Chicago, Ill.  
**Participatory Planning Tools for Achieving Nonpoint Source and Stormwater Pollution Goals** *(page 42)*  
Theresa Trainor; U.S. EPA - Headquarters, Washington, D.C.  
**Implementation of Private Parcel Best Mgm’t Practices at Lake Tahoe** *(page 43)*  
Jessica A. Schwing; Tahoe Regional Planning Agency, Stateline, Nev.  
**Street Smarts: City, County, and Watershed District Staff Learn Together Through Public Works Forum** *(page 44)*  
Louise Watson; Ramsey-Washington Metro Watershed Dist., North St. Paul, Minn.



# CONFERENCE PRESENTERS

4<sup>th</sup> National Conference

## Nonpoint Source and Stormwater Pollution Education Programs

October 17-20, 2005 \* Holiday Inn Chicago Mart Plaza \* Chicago, Illinois

### Conference Presenters

**Elaine L. Andrews**

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# Measuring Results from Outreach and Education Programs: Can We See Improvements Downstream?

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## Abstract

I did a quick and unscientific review of nonpoint source education and outreach programs – my own and others around the country – asking (naively), “What can we show, in the water, as a result?” The answer is “We don’t know,” or “Not much.” This is likely a reflection of the complexity of watersheds, multiple inputs, cost and challenge to monitor changes, and related, valid reasons. Nevertheless, it is troubling that we have so little to show, in terms of direct, documented impacts in the environment, for the educational and outreach programs we have done. There are a few good and interesting examples, which I highlight. Generally, education and outreach programs do not do a good job of outcome thinking, or of using current theory, logic models or social marketing expertise to craft carefully thought out strategies. Nor do we do well at measuring results, outcomes and impacts. We should consider the relationship between education and outreach programs and other watershed-protection strategies, and think more broadly of the value of increased understanding, support and constituency-building that we get through our efforts. I am convinced of the fundamental value of outreach and social marketing programs, and encourage us all to think more critically, measure more rigorously, and help build a body of evidence to document the results of our work.

## Introduction

As part of natural resource protection and related programs, King County, local cities (Seattle, Bellevue, etc.), other agencies, and NGOs have conducted public education and outreach for years – decades – to promote stewardship, water quality, salmon protection, recycling, waste reduction, and general sustainability. We have received national awards for our creative advertising campaigns, our promotional materials, our Web sites, our hands-on restoration projects, our school programs, and on and on. We are considered national leaders in this area, and have much to be proud of. We have a “green” citizenry. But are Seattle-area residents green because of our environmental outreach and education efforts, or are they just moldy or moss-covered from our famous rains? What do we have to show, in hard data, for all of the outreach effort we have expended over many decades? What do the salmon notice as they return to spawn?

Squeezed by budgets and prodded by performance measurement, we have been asking critical questions across all of our programs. As part of this exercise, I naively volunteered a year ago to search for good examples from across the country related to watershed stewardship, education, and outreach. I went into this “quick” project thinking that with relative ease I would find good case studies, documentation of effects of various outreach strategies, and other results that we could learn from, cite, and use back home to refine our local programs. I began asking basic questions locally, such as, “What exactly are we trying to accomplish?” “How are we going about it (what strategies are we employing)?” “What can we show for the effort and money expended?” And nationally, “Have other programs documented any tangible environmental results from education/outreach efforts?” “What works best?” As I got into it I started to ask more desperately, “Has anyone, anywhere, documented on-the-ground or in-the-water improvements from outreach or education programs?” “Can we show anything, anywhere, for the past thirty or more years of such work?”

## *Summary of Key Findings*

The punchline is: NOT VERY MUCH and WE DO NOT KNOW, or in many cases, NO. But let me qualify that conclusion right from the get-go: Outreach and education efforts around the country might be very effective at making the environment better, but we have very little to no data that can show any direct link between these “soft” interventions in a watershed and improvements in the water. Even specific strategies – let’s take stenciling storm drains to pick one widely employed technique – have no studies showing that they make any difference from the perspective of the fish downstream. These findings do not necessarily mean that the programs are ineffective. The connection between education/outreach and ultimate effects in the environment is so diffuse, obscured by other complex factors, and difficult to measure directly that we have essentially no proof one way or the other. Maybe the real value of these efforts is in linkage with other strategies, hard changes to the landscape, regulations and ordinances, which, combined, will result in improvements downstream. Yet the result of my search is troubling, and causes me to wonder how we might shift our thinking as well as our strategies in order to be as effective as possible and to be able to document that effectiveness in the future. That is the challenge.

## *Methods and Caveats*

Mine was a quick and, thus, overly-simple study. A few colleagues and I skimmed our existing stock of references (reports, papers, example brochures) for useful information. We followed up by contacting authors or programs that looked like they were doing useful work. We searched the Internet for example programs, and contacted individuals connected to these sites in order to glean more details. We called or emailed colleagues and contacts. We used the references cited by others to further expand the search. We sent email queries out over existing non-point source and related listservs. We kept asking everyone for critical studies, examples where results-oriented documentation had occurred. Within the limited time allotted (a few months), I then compiled our findings.

I am not an educator, nor do I have any background in educational theory. In a sense I am an outsider sticking his nose into other people’s business. But I have been involved in education and outreach programs in the King County area for 25 years, so am as guilty as anyone else of the sins I discuss in this paper. Please bear with me as a result. Feel free to push back, especially if you have a study that I missed, or can set your work into a logical/theoretical framework that makes sense and is evidence-based (to use a current health care term). My intent is certainly not to skewer anyone or nonpoint-source outreach in general, but to challenge us all to use more critical thinking, and to employ better measurement, as we proceed.

## *Theory*

At the risk of inciting tangential debate over the politics of testing, competing educational models, the meaning of learning, and the oversimplification of complex systems, let me begin with my layman’s view of a few theoretical frameworks.

The basic, yet widely disproved, theory of linear behavior change is variously referred to as **the “rational” theory or the “knowledge-deficit model”**: once given the right information, people will logically follow through with whatever changes are needed or requested. Awareness begets knowledge, which begets action. If we simply educate people, they will change their behaviors. If we simply provide the right information in enough quantity, behavior change is sure to follow. We the experts know best; all we have to do is tell the masses what to do, the right way to behave, and they will follow through.

From my naïve perspective (and this is where I am likely to offend most of you in this conference), it appears that environmental education in general and nonpoint source outreach in particular still subscribe, consciously or unconsciously, to this approach.

Hold that unsettling thought for a minute while I describe a few theoretical frameworks and then return to the debate.

**Bennett's hierarchy** (the classic reference is Bennett, 1975; see also Bennett, 1977) has been a very influential model not only in Cooperative Extension but in many applications of education and outreach. He proposed a "chain of events," a sequential logic, that not only could provide a theoretical basis for program planning, but also offered steps along the chain that could each be called out for evaluation. His more recent evolution of this model, with Kay Rockwell, is called **Targeting Outcomes of Programs or "TOP"** (Rockwell and Bennett, 2005).

In both cases, however, the rational theory of information seems to underlie the steps between "KASAs" (knowledge, attitudes, skills, aspirations) and any resulting changes in behaviors. Even in the most recent TOP literature, it is stated that, "*Practices change as people increase their knowledge, modify their attitudes, improve their skills, and raise their aspirations, and then apply these KASAs changes in their own living and working situations....As participants apply new KASAs to their working and living behaviors, they adopt the targeted practices. As participants use these practices, they help change the SEE [social, economic or environmental] conditions which were targeted.*"

At the Chicago conference two years ago, Amy Bodwell and Carol Saunders (2003) presented an overview of a fundamental outcome-based framework known as the **Logic Model**. In addition, Susan Gorman and John LaRocca (2003) presented a case study emphasizing outcome focus in grant-funded projects. The logic model is nothing more than a basic, simplistic diagram that encourages programs at any level to connect, in a conceptually logical way, inputs, activities, outputs, outcomes and impacts. There are lots of variations on this theme ("intermediate outcomes," "results," "results based accountability," "balanced score card," etc.), but the basic idea is to create an organized, conceptual model linking the ultimate desired results of an organization's efforts with programmatic activities and potentially measurable steps along the way. (See also Penna and Phillips, 2004, for more overview of the logic model, TOP, and other outcome frameworks.)

Of course, this too can promote a dangerous degree of linear thinking that does not reflect complex reality. But at least diagrammatically the logic model encourages program planners to think about outcomes and impacts and the theoretical relationship of activities and outputs to these desired results. As Stephen Covey (1989) admonishes, "Begin with the end in mind."

The devil is in the details, either tripping over Bennett's steps or assuming a direct "if...then" sequence between providing information and getting the desired end behavior. It turns out that maybe this step from the information, knowledge and skills level to the actual follow-through to desired behaviors is more challenging than originally thought.

Into this void fits an important, relatively new development based on social psychology and marketing theory rather than on traditional education models. It is generally referred to as "behavior change" or as "**social marketing**," and hardly uses the "e" word (education) at all. Andreasen (1995) produced an early textbook on the subject. The best basic, very accessible textbook is by our very own Nancy Lee (Kohler, Roberto and Lee, 2002), which provides an amazing amount of well-researched examples of social marketing approaches from a wide variety of public causes. Douglas McKenzie-Mohr from New Brunswick, Canada, focuses more specifically on environmental issues; Doug's book, "Fostering Sustainable Behavior" (McKenzie-Mohr and Smith, 1999), is one of the classic references. Doug also maintains a useful Web site, <<http://www.cbsm.com>>, which includes case studies in environmental and related fields.

Social marketing makes the point loud and clear that information alone will not change behavior. This fundamental point is key. One must first understand the world from the perspective of the target audience, including what their barriers are to the desired change(s). Only when one is able to address the barriers, and use simple, proven tools such as commitment, prompts, norms, and incentives, will real behavior change happen.

Kevin Mercer (2003), describing a social marketing-based project in Toronto at the last Chicago conference, made the comment that, “Education alone is not going to get us anything other than a literate community,” suggesting that programs cannot be successful if they focus simply on getting a message out or providing information. Instead, programs need to be based on social marketing principles, including addressing audience-stated barriers and involving commitment and one-on-one, repeated contacts. He notes that, “The goal of effective social marketing is not to achieve a ‘one-time sale,’ but to build a relationship with the householder so that they feel engaged and appreciated as a source of clean-water programming.”

It seems, however, that even the social marketing programs often have a very shaky connection to ultimate improvements in the environment. Most programs still appear to stop at measurement of behavior change, without following through to see if the fish notice any improvement downstream.

Betty Elzufon (in her 2000 report for the Water Environment Research Foundation (WERF)) sets up a very worthwhile “**framework**” for outreach and related source control projects. It is a clear, logical process that requires upfront thinking and estimating, before any outreach is implemented. Steps include:

Identify the issue or problem – clearly I.D. the pollutant of concern, collect baseline data on levels and loadings.

Identify sources – estimate contributions that will add up to the total, and estimate each source’s controllability.

Determine possible control strategies.

Evaluate the control strategies – which ones are most likely to achieve measurable results?

Determine an estimated load reduction from an estimate of the participation rates and loadings for each strategy. Evaluate cost also.

Establish a goal – set a measurable target or desired outcome based on the above calculations.

Then, implement the program – including pilots and designed evaluation steps.

Evaluate effectiveness – during as well as after.

Modify the program – based on what is being learned.

This seems logical enough, but very few nonpoint source programs go through this logical process. Even if completely based on estimates, such a process will help to focus attention on expected outcomes from outreach strategies, plus offer clear avenues to measure whether these results can be seen in the watershed.

Elzufon (in her 2001 WERF report) also offers a **hierarchy for measurement of nonpoint source control projects**. She notes that measurement can happen, and is important, at each stage, from program activity through to ultimate desired outcome:

Design and implementation of a source control program;

Increased awareness of pollution-related issues;

Changes in behavior to address the pollution-related issues;

Reduced input of targeted pollutants from the targeted source(s);

Improved quality of discharges (such as stormwater runoff or wastewater);

Improvements in environmental conditions.

She notes that it is increasingly difficult and expensive the farther along this continuum one moves, so that in fact most source control programs focus measurements in the first two areas, sometimes at the third, but rarely beyond that.

All of the above background sets the stage for my primary concern; few of us have applied sufficient attention to what results we hope to get out of our education and outreach efforts, nor have we attempted to measure whether these results are actually happening on the ground. More rigor is needed.

### *Useful, interesting case studies*

The one-and-only project that hit my national query squarely on the head is the neat study conducted by **the University of Connecticut in the Town of Branford**. Michael Dietz et al. (2002, 2004) chose two tiny, side-by-side, suburban neighborhoods for a **“paired watershed” study**, one to serve as a control and one for treatment. After two years of calibration of runoff from both watersheds, treatment consisted of trained volunteers offering site assessments, soil testing, and recommendations for best management practices to the 34 homeowners in one watershed. Results were mixed and, overall, inconclusive. Although nitrate-nitrite nitrogen went down in the treatment neighborhood’s runoff, total nitrogen did not, nor did phosphorus or many other parameters. However, this is THE classic study to meet my expectations. Studies following this approach need to be conducted in many places, testing many more specific intervention approaches, possibly for longer time periods. Yes, they will be expensive and challenging to do, but once we have a body of work along these lines, we can all extrapolate from the results and know that our practices are actually based on some evidence. But I jump ahead.

Interestingly, when I contacted Mike Dietz to inquire about the study, he remarked that, “Although our study was somewhat promising, we are finding better results with our LID [Low Impact Development] subdivision (Jordan Cove, Waterford, CT -- a 319 national monitoring project). Larry Coffman described LID as ‘taking the people’s actions out of the equation.’ The residents of the study subdivision are not doing anything differently, despite our education efforts. However, pollutant export is greatly reduced over predevelopment conditions” (Dietz, 2004).

A second small case study that I wish to highlight is still a work in progress, but definitely worth noting. This is the **“Stillhouse Spring Cleaning”** project in **Austin, Texas**, that Kathy Shay spoke briefly about at the last Chicago conference (Shay, 2003). Nitrate levels are too high in the Stillhouse Hollow Spring (around 7 mg/L, where the state level of concern is 3.5). The project goal is to get the nitrate down to 3.5 within five years. The city has been working with the 250 residents in the springshed, using targeted education about landscaping practices from its “Grow Green” program, as well as free organic, slow-release fertilizer give-aways. Research on fertilizers and local soils has been a key part of the project, as well as ongoing monitoring of the spring for nitrate levels. Early give-aways of a fertilizer too high in leachable nitrogen resulted in a spike of nitrates up to 10 mg/l. A switch to a different product has brought those levels back to the 7 mg/L average, but has not yet shown a reduction below that level, even after five+ years of effort. Survey results show that 54% of springshed residents said that they have changed some aspects of their lawn care practices to reduce pollution. Learn more at: <<http://www.ci.austin.tx.us/growgreen/stillhouse.htm>>. Kathy notes, “We sometimes joke that we are the ones being educated by the Stillhouse Spring Cleaning program” (Shay, 2003). We should all be so humble, and make sure we plow what we learn back into future program design, as they are doing in Austin.

In the twin cities area of **Minnesota**, some very interesting work has been going on related to **nutrient loadings into local lakes**. (See: <<http://www.lakeaccess.org/lakedata/lawnfertilizer/mainlawn.htm>>.) After years of outreach efforts to convince homeowners to use low- or non-phosphorus fertilizers on their lawns, little change could be seen in local lakes. But in a study pairing watersheds in a municipality that had passed an ordinance prohibiting the use of phosphorus-containing fertilizers with nearby watersheds in an area without such a regulation, total-phosphorus levels in runoff were documented to be significantly less in the area with the phosphorus-free regulation. Now a statewide restriction on phosphorus has gone into effect in Minnesota, so it will be very interesting to see if this regulation

results in corresponding reductions in nutrient levels in the environment. This example illustrates a regulatory effect rather than education/outreach; I will come back to that theme later. As John Barten, one of the principal investigators in the above project, notes, “Education was [however]... necessary to get local and state elected officials to adopt the fertilizer restrictions, and that effort was very successful” (Barton, 2004).

In Washington state, the **Whatcom Watersheds Pledge project** has been involving residents and businesses since 1998, using a social marketing commitment technique as its cornerstone. The project also includes environmental monitoring that determines specific pollutants of concern, and ongoing evaluation to measure both awareness and behavior changes (using surveys) and changes in environmental conditions. The “pledge” involves checking off specific actions that a resident or business is willing to commit to from a long list of strategies that relate to watershed concerns. Almost 10% of the targeted households (1000+ out of 12,000) have taken the pledge either by sending in an official pledge card or, now, by pledging on-line. David Laws of the Washington State Department of Ecology reports that, “respondents who had taken the pledge engaged in significantly fewer watershed-harming behaviors than those who had not taken the pledge.... Behavior change is more likely to occur when individuals take the watershed pledge” (Laws, 2004). Pesticides have been monitored in Padden Creek, one of the watersheds in the Whatcom program. Recent follow-up studies have shown fewer pesticides detected, but the variability in the environmental data is too great to assess trends or attributions. Still, it is one of the few cases I found where such monitoring was taking place tied into a long-term watershed outreach program. Learn more at: <<http://www.watershedpledge.org>>.

Kudos also to our neighbors in **Snohomish County, Washington**, who have been conducting some interesting projects using **social marketing approaches and detailed studies of target populations**. Lynda Ransley (2003) reported on their test of an “outreach continuum” model at the last Chicago conference (see also Ward and Ransley, 2004, for more details). While no environmental measurements were part of this pilot, the detailed tracking of participation rates in context to the whole watershed population, coupled with their detailed analyses of sub-population characteristics, stand out as unusual and worth replicating in other projects. Time will tell if they can detect improvements in the subject watersheds.

In **King County**, we spent years trying to get local homeowners to stop using **diazinon**. We could show increases in awareness, and self-reported reductions in use, yet the levels of this organophosphate pesticide in local streams did not decrease significantly, and in fact remained at levels which could directly impact fish. It was not until the federal restriction on consumer sales of diazinon that we started to see a reduction in local waters (Dickey and Wilson, in press). It appears that it took a regulatory change, in other words, to see actual impacts in the environment.

Also in **King County** we are trying a norms re-alignment/social diffusion approach through our **Natural Yard Care Neighborhoods project**. Residents in selected neighborhoods are given concentrated help to change certain yard-care behaviors, and are encouraged to share experiences not only with each other within the immediate neighborhood, but also through social and other networks to spread the word. The following behavioral results are encouraging to date: huge increases in knowledge and skills; positive changes in every one of 24 specific behaviors tracked—holding even after two years; as well as diffusion to an average of five other people. Unfortunately, project design and budgets have not included any monitoring for environmental improvements in the target neighborhoods. For more details on this ongoing program, see:

<<http://dnr.metrokc.gov/dnrp/weekly/2003/wk12-yard.htm>>.

I would also like to mention our experience with **dental offices in King County**. (While a wastewater rather than watershed example, it reinforces an emerging theme.) We spent years working with dentists and their professional association to encourage them to install a “black-box” treatment unit in their waste pipes, known as an **amalgam separator unit**, in order to capture the fine particles from

new or replacement filling work and thus cut down on mercury loading. They fought us at first, when a regulation was proposed. After more than five years of very intensive education and outreach, including face-to-face site visits, only 25 of 1,000 dental offices had voluntarily installed this relatively inexpensive device. Once we made it mandatory through local sewer regulation, compliance was swift: within a year, 94% have installed this equipment, and we have seen the mercury in our wastewater biosolids cut in half (Chamberlain et al., 2005). We believe that our years of educational work with local dentists paved the way for the fast shift, but it is interesting that it required the regulation before the behavior change tipped so dramatically.

**Coyote Creek in the South San Francisco Bay area** is probably one of the most studied streams in the U.S. and an area with many watershed-related programs, including intensive and varied public education and outreach. A major project by the Santa Clara Valley Urban Runoff Pollution Prevention Program (2001), however, failed to measure any actual changes/improvements in the creek. “Extensive studies (including this one) have generally been unable to show that widespread and systematic implementation of BMPs significantly reduces the quantity of pollutants discharged from an urban watershed.” Maybe my quest is unrealistic given the extreme challenges of measuring actual changes in the environment.

### *Findings/Observations/Generalizations/Analysis*

Most case studies that we located covered the same familiar territory – they are 98% description of what was done, with measurements usually limited to a) tracking participation (for example, numbers of participants at workshops, numbers of brochures distributed), and sometimes b) results of surveys that sought to assess awareness levels and self-reported behaviors. Almost no studies report numbers of participation as rates relative to the total number of households or landowners in the watershed, or to a targeted number. Almost no studies follow up on self-reported behavior changes to assess how many such changes are actually happening on-the-ground.

- **Most nonpoint outreach programs do outreach without a clear plan in mind**, including definition of the problem to be addressed, quantified estimates of loadings and sources, quantified estimates of the likelihood of reductions, or measurements beyond counting process, activities, or outputs.
- **Most outreach programs appear to follow the “rational” model** that information will somehow cause people to change behavior. Media campaigns, printing of brochures, emphasis on workshops all appear to lean heavily on the assumption that information alone will work.
- **Increased awareness does not necessarily translate into behavior change.** Many projects use surveys to measure changes in awareness, and stop there.
- **Self-reported behavior change often does not translate on-the-ground.** Many projects ask respondents if they do certain behaviors, then make judgments about behavior change using before and after comparisons. Almost no projects truth-test a subsample to see if actual behavior change occurred. Our local experience purchasing sales data for pesticides finds a large discrepancy between what people tell us they buy and what they actually buy!
- **It is a long way from awareness or self-reported change to results downstream.** In many cases, we do not know if our suggested best management practices (BMPs) work – there are no good studies. We do not know, for example, if runoff would improve with one, two, or three changes in a homeowner’s yard – there are no good studies. We do not know how many yards it would take within a watershed to make a difference – there are no good studies. (Tom Schueler’s Center for Watershed Protection is doing some of the best, yeoperson’s work in the country to collate studies and disseminate useful results; even they acknowledge the dearth of studies as reported here. Still, check out the very useful papers such as Schueler, 2000a; Schueler, 2000b; Swann, 1999; and the parent compendium, Schueler and Holland, 2000; as well as their Web site at <http://www.cwp.org>.)

- **Very few education/outreach programs focus on a single issue in a defined area.** We all tend to be broad-brush, multi-issue, too general, and non-targeted. Energy conservation studies proved decades ago that there is a big difference in actual results between a campaign message, “To preserve our environment, we must conserve energy” and, “Now that you’re almost ready to go to bed, please turn your thermostat back to 55 degrees” (Winett and Ester, 1983). Most successful projects stick to one subject, focus small, follow-up repeatedly, and stay as specific as possible.
- **Our messages are not only too general, they are also disconnected from results.** The majority of people in the U.S. do not understand the concept of “watershed” (EPA, 2003). Even those who do, do not connect what they do in or on their yard with negative results somewhere else. We do not – or cannot – provide direct feedback.
- **Most education/outreach projects do not start with a defined problem, at the end/in the stream, and work backward.** Instead, we tend to want to do everything at once, to cause people to behave properly in the watershed, with a long list of “shoulds and don’ts.” Successful projects stay focused on one issue and work backward from the defined problem.
- **Few education/outreach projects develop a logical framework,** such as that suggested by Elzufon (2000). Start with a specific problem, including baseline levels and loading estimates; identify sources, even if they are based on best estimates; consider the controllability of the sources, even if simply by estimate; develop possible control strategies; estimate the potential load reduction from each strategy; set measurable targets; only then implement the chosen strategies, and evaluate success using specific measurements; adjust future program delivery according to what the data report. It all sounds so logical, so simple. Yet few of us follow this approach in our work.
- **Few education/outreach projects ask the audience first.** We tend to go right to what we think should be done, and jump right to the customary strategies (workshops, brochures, whatever), without ever asking any sample of the real audience what its (their) perspective is. We “‘should’ on people,” says the grandmother of one of my co-workers. We tend not to listen. We know best. Successful projects interview non-bureaucrats, hold focus groups, and collect population data to fully understand the audience’s perspective, needs, barriers, and ideas.
- **Few education/outreach projects set defined targets.** Most of us do broad-brush outreach, hoping it will somehow be effective. Yet we rarely state what “effective” means in terms of specific targets. As a result, we do not measure, we cannot define or claim success, and our efforts are more-or-less wasted.
- **Even the term “education” implies that we know best and that rational informing works.** We come across as, “The government knows what is right and we will educate you to change your bad behavior.” After more humbly gaining a good understanding of the audience’s view, we might be more effective if we used a marketing framework, to persuade, to convince, to use all of the tools in the CBSM toolbox to prompt real action. (See Williams, 1991, for more on this concept.) We should acknowledge, and internalize, that what we call public education is really an attempt at persuasion. Maybe it would not sound so good to have a “Dept. of Persuasion” in a local government agency. Yet we need to shift our approaches in that direction, even if forced to retain the “e” word on our business cards.
- **Experiential programs appear to be more powerful than information campaigns,** more likely to connect people with their watershed. Activities such as citizen volunteer monitoring, hands-on restoration, storm-drain-stenciling projects, and other ways to get an experiential element incorporated into the program have a greater likelihood of success. Get peoples’ feet wet and their hands dirty. Once they have invested in the watershed, even in a tiny part of it, they will have more ownership. There are many examples of such “activity-based learning” programs; see the Izaak Walton League’s Save Our Stream and Stream Doctor projects <<http://www.iwla.org>>, and our local EarthCorps <<http://www.earthcorps.org/>>, as two among many worthy programs.

Many interesting examples appear which seem to show that, **where education and outreach programs were not successful alone, they were essential to set the stage for regulations** that resulted in measurable impacts. (See the examples I highlighted earlier; also Kassirer and Wolnik, 2004.) Is this just coincidental, or is this a significant finding? It might be worth serious contemplation; **rather than look to education and outreach efforts as ends in themselves, maybe we should see them in a broader context, as raising awareness and building constituencies for the environment.** Even if the target audience fails to modify its own behaviors, support might be gained for more programming, increased budgets, and local or state ordinances that will tip the balance toward the desired environmental gain.

Let me close my litany of findings with where I began: **I could find almost no case studies that document a direct, measurable environmental effect from an outreach program.** Let me also reiterate the flip-side: **This does not mean, necessarily, that outreach or social marketing programs are ineffective, but rather that measurement of the ultimate goal of environmental improvement is complex, highly variable, expensive to conduct, and thus rarely pursued. I also conclude that programs all too often are not based in a solid theoretical framework that would allow us to focus more on results, outcomes, and ultimate impacts. But I am convinced of the fundamental value of outreach/social marketing efforts, to increase essential environmental understanding, build watershed constituencies, and provide key support for an array of other environmental protection strategies.**

## *Recommendations*

Every program should use the **Logic Model** or equivalent to develop a coherent, big-picture view connecting its specific activities and outputs to ultimate desired results. Clearly articulate goals and objectives, outcomes, results, and impacts for outreach programs. If broad in scale (e.g., seeking to raise general awareness of, and support for, watersheds), be clear about measurements, targets, and objectives. If focused on a specific problem or geographic area, use the **WERF framework** to hone strategies to achieve measurable results.

- We need to look at the whole target audience and **quantify targets in terms of percentages of the whole.** If it is intended or expected that we will only reach 1% of the target audience, say so, but also quantify the expected benefit of reaching that number. If we need to reach 15% to make a noticeable impact based on our theoretical framework, figure out a way to make that happen and do not be satisfied with 1%. It will be helpful for all outreach projects to tally numbers in context of the whole targeted population (in a watershed, or a neighborhood, or whatever the whole is), in order to better grasp potential effectiveness of the intervention.
- We need to **know our audiences.** We need to really understand who is out there and what they are thinking, what their values are, what makes them grin or grimace, what their barriers are to our issues and desired behaviors, what might get them over or around such barriers. We need to base all of our education and outreach projects on a clear understanding of our audiences, gained from population data, surveys, focus groups, marketing analyses and whatever other information is available. We need to segment our audiences and fine-tune the segmentation just the way the commercial marketers do. Much more attention needs to be spent here, rather than jumping right to assumed strategies.
- We need to **focus our outreach on specific problems or desired results,** even if it means doing so in smaller geographic areas. We need to try Elzufon's (2000) WERF strategy in order to articulate the desired outcome, set specific targets, and conduct enough measurement to know if we are successful. The more we start to do this, the more we will learn.
- We need to **incorporate the social diffusion model** consciously into program planning. For example, target the "greens" in the population (do not waste time at first on the "browns"). Use

innovators and early adopters. Once a critical mass (say, 15 to 20%) of the audience has made a behavioral change, expect to see it catch fire and permeate much of the rest of the population, becoming the new norm. Test this out. Build it into program design.

- We need to **incorporate commitment** consciously into program design. Social psychology tells us that this is a powerful tool to bridge the follow-through gap. Borrow liberally from the Whatcom Watersheds Pledge project (with appropriate credit, of course) as one interesting current example.
- We need to do **pilot studies, test models, collect data; measure, measure, measure**. Follow the example of the spring project in Austin, Texas. Be data-based. We need many more studies along the lines of the Dietz et al. paired watershed work. We need to invest in specific data collection so that we can document what works and what doesn't. Here is a clear opportunity for EPA and USDA to target grant funds and, over the next decade, begin to build the evidence that will tell us what really works. Once this has been done, the results can be applied broadly without having to invest in the details each time. But until this is done, we simply do not know whether our strategies are effective.
- We need to **acknowledge the power as well as the limits of education and outreach**. Maybe many of our current strategies will never result in actual, long-term behavior change or in actual, measurable environmental outcomes, at least not directly or by themselves. We should **focus on what they can do for us**, such as in building awareness, building community support, creating the critical mass of people in the watershed who demand action and political will, who are willing to pay for programs or to have regulations tightened. We should pay much more attention to this concept: maybe after all we should be changing our view of our work, from "education" programs to "support-building" programs. Worth careful consideration, I think. It might change the way we approach our business.

## ***Conclusion***

I do feel like the skunk at your garden party. I hope that my comments are provocative, yet received in the good faith that they are presented in. Out of the resulting arguments, I hope useful ideas will emerge. If nothing else, you will set me straight. I do believe that we need to stop and examine what it is exactly that we are hoping to achieve through our nonpoint education and outreach programs. We need to test and better document outcomes and impacts. We need to broaden our understanding of the role of education/outreach/persuasion in the overall context of watershed protection. We need to think from the perspective of the fish downstream. Doing so over the next few years will help all of us to refine our efforts and be more effective. I look forward to the healthy discussion ahead. Let the tomatoes fly!

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# Using the Unified Subwatershed and Site Reconnaissance to Develop Education and Outreach Strategies

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## **Abstract**

Urban subwatershed restoration has traditionally focused on the stream corridor, with less attention paid to upland areas where neighborhoods and businesses are located. However, these upland areas are important in subwatershed restoration, since they contribute stormwater pollutants to the stream corridor. The Center for Watershed Protection (CWP) has developed the Unified Subwatershed and Site Reconnaissance (USSR), a field assessment method designed to assess these upland areas for behaviors that can influence water quality and to identify specific audiences for education and outreach efforts. This paper introduces the USSR and reviews the utility of two of its four assessments – the Neighborhood Source Assessment (NSA) and the Hotspot Site Investigation (HSI) – in formulating source control plans and education and outreach programs.

Neighborhoods have a large number of potential pollution sources, but also offer many opportunities to educate residents about stewardship activities that can improve receiving stream quality. The nature and distribution of pollution sources normally differ in each neighborhood since each has a unique age, lot size, turf cover, tree canopy, conveyance system, street condition and degree of resident awareness. Consequently, pollution sources need to be assessed within individual neighborhoods to customize an effective and targeted education and source control plan for the subwatershed as a whole. The NSA profiles pollution source areas, stewardship behaviors, and residential restoration opportunities within individual neighborhoods.

Stormwater hotspots generate pollution during common operations and activities that occur at certain commercial, industrial, institutional, municipal or transport-related sites. Each hotspot site has its own unique operations, drainage system, and potential pollution risk. As a result, each hotspot should be individually inspected to identify current practices, spill risks, and stormwater management problems. The HSI provides a way to quantify the impacts of hotspot activities on subwatersheds and to identify possible education, source control, and restoration practices that may be needed.

Over the last two years, the USSR has been tested and refined in several watershed plans developed by CWP. An introduction to the USSR and its utility in developing education and outreach strategies will be discussed in this paper.

## ***Introduction***

Urban subwatershed restoration has traditionally focused on the stream corridor, with less attention paid to upland areas where neighborhoods and businesses are located. However, these upland areas are important in subwatershed restoration, since they contribute stormwater pollutants to the stream corridor. The Unified Subwatershed and Site Reconnaissance (USSR), developed by the Center for Watershed Protection (CWP), is designed to assess these upland areas for behaviors that can potentially influence water quality and to identify promising education, pollution prevention, and restoration project opportunities (Wright et al., 2004).

The USSR is a rapid field survey to evaluate potential pollution sources and restoration opportunities within urban subwatersheds. It was developed to help watershed groups, municipal staff, and consultants quickly assess subwatershed restoration potential. In addition, it has proven

to be especially useful in formulating source control plans and watershed education and outreach programs. The USSR is quick and inexpensive, applies over a wide range of urban conditions, and has four major assessment components:

- *Neighborhood Source Assessment (NSA)* that profiles pollution source areas, stewardship behaviors, and residential restoration opportunities within individual neighborhoods.
- *Hotspot Site Investigation (HSI)* that ranks the potential severity of each commercial, institutional, industrial, municipal, or transport-related hotspot found within a subwatershed.
- *Pervious Area Assessment (PAA)* that evaluates the potential to reforest turf areas or restore natural area remnants at all open parcels within a subwatershed.
- *Streets and Storm Drains (SSD)* that measures the average pollutant accumulation in the streets, curbs, and catch basins of a subwatershed, and investigates the on-site retrofit potential for parking lots.

The concept behind the USSR is to provide a quick, but thorough characterization of all upland areas to identify major source areas that are contributing pollutants to the stream and control them through education, source controls, pervious area management, and improved municipal maintenance.

The USSR is a “windshield survey” that requires you to drive down every street in a subwatershed to locate and assess possible restoration sites and determine specific pollution sources and hotspots. Together, the four USSR assessments produce a wealth of useful data to identify and locate potential restoration practices in a subwatershed, including the following:

- Lawn Care Education
- Pet Waste Management
- Natural Landscaping and Reforestation
- Stormwater Pond Maintenance
- Bufferscaping
- Potential for Rooftop Disconnection
- On-site Residential Retrofits
- Hotspot Permit Enforcement
- Targets for Hotspot Pollution Prevention
- Parking Lot Retrofits
- Illicit Discharge Investigations
- Upland Soil Reclamation
- Upland Reforestation
- Natural Area Restoration
- Storm Drain Stenciling
- Street Sweeping
- Catch Basin Clean-outs

### ***How the USSR Helps Identify Education and Outreach Opportunities***

The USSR identifies potential pollution sources in the upland areas of the subwatershed that may adversely affect water quality, and assembles a comprehensive initial inventory of promising pollution prevention and restoration projects. The USSR also identifies additional stakeholders in each subwatershed that can be invited to join the restoration planning process.

Two of the four assessments – the NSA and the HSI – have proven to be especially useful in developing watershed education and outreach plans, developing pollution source control plans, and identifying sites for on-site, small-scale stormwater retrofit and restoration projects. The NSA focuses on assessing residential neighborhoods, whereas the HSI focuses on assessing stormwater “hotspots.”

## ***Basics of Neighborhoods***

Neighborhoods have a large number of potential pollution sources, but also offer many opportunities to educate residents about stewardship activities that can improve stream quality; therefore, they are an important focus for subwatershed restoration. Each residential neighborhood has a distinctive character in terms of age, lot size, tree cover, drainage, lawn size, general upkeep, and resident awareness. In addition, neighborhoods are rather homogenous when it comes to resident behaviors, stewardship, and involvement in restoration efforts. These unique characteristics directly influence the ability to widely implement restoration practices, such as on-site retrofits, neighborhood source controls, and better stewardship. While some neighborhood characteristics can be discerned from maps and aerial photographs, field assessments are needed to get quantitative data on pollutant source areas and their restoration potential.

## ***Introduction to the NSA***

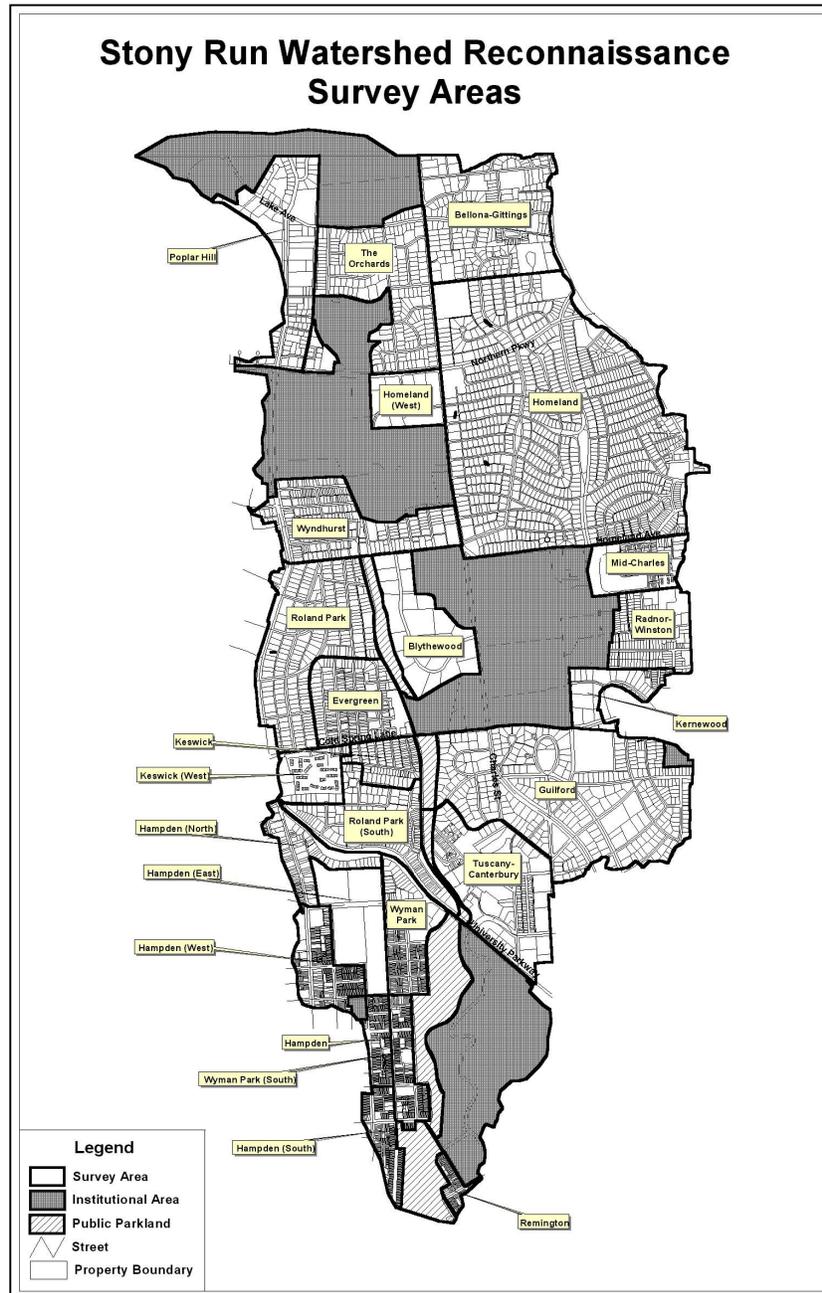
The neighborhood is the fundamental unit for residential source control. Residential pollution sources can only be assessed neighborhood-by-neighborhood within a subwatershed (Figure 1). The residential behaviors that contribute to stormwater quality problems can be systematically assessed by the Neighborhood Source Assessment (NSA), which looks at four specific source areas of the “average” neighborhood: yards and lawns; driveways, sidewalks, and curbs; rooftops; and common areas.

The NSA is a rapid field survey that quantifies potential pollution sources within neighborhoods, and identifies potential stewardship and restoration practices. Conducting the NSA involves driving every street in the neighborhood to systematically assess the residential behaviors that contribute to stormwater problems by subsampling individual lots, curbs, catch basins, and common areas. The NSA field form evaluates five parts of the average neighborhood:

- Neighborhood Characterization – Compiles basic information about the neighborhood.
- Yard and Lawn Conditions – Assesses vegetative cover and management practices on the typical lawn.
- Driveways, Sidewalks, and Curbs – Estimates pollutant accumulation and evaluates housekeeping on these impervious areas.
- Rooftops – Quantifies how rooftop runoff is managed on the average residential lot.
- Common Areas – Evaluates practices in common neighborhood areas, such as stormwater ponds, buffers, and floodplains.

The NSA collects data on more than 30 neighborhood factors linked either to pollution sources or potential stewardship practices, as summarized in Table 1. The last part of the NSA form identifies key residential behaviors causing pollution in the neighborhood, and computes an index that rates the overall severity of non-point source pollution for the neighborhood as a whole. NSA data from individual neighborhoods is then used to generate counts, maps, lists of projects, and metrics that may be used to prioritize neighborhood and subwatershed education and outreach activities.

Figure 1: Sample Subwatershed Residential Reconnaissance Map



**Table 1: NSA Factors Assessed and Corresponding Stewardship Techniques**

Source Area	Neighborhood Factor Assessed	Corresponding Stewardship Technique
Yards and Lawns	High management turf	Reduced fertilizer use
	Potential pesticide use	Reduced pesticide use
	Non-target irrigation	Xeriscaping
	Extensive turf cover	Natural landscaping
	Low forest canopy	Tree planting
	Improper yard waste disposal	Yard waste composting
	Soil erosion	Erosion repair
	Construction activity	Single lot control
	Presence of septic systems	Septic system clean-outs
	Presence of swimming pools	Safe pool discharge
Driveways, Sidewalks, and Curbs	Driveway/curb flows	Safe car washing
	Driveway conditions	Driveway sweeping
	Outdoor car maintenance	Car fluid recycling
	Sidewalk zone conditions	Pet waste pick-up, streetscaping
Rooftops	Downspout connection	Downspout disconnection or treatment
Common Areas	Evidence of pet waste	Pet waste education/enforcement
	Presence of stormwater ponds	Stormwater maintenance
	Turf cover in open space	Bufferscaping, reforestation
	Condition of storm drain inlets	Storm drain stenciling
	Sidewalk zone	Streetscaping
	Evidence of dumping	Prevention/removal of dumping

### ***Basics of Hotspots***

Stormwater “hotspots” are defined as commercial, industrial, institutional, municipal, or transport-related operations that produce higher levels of stormwater pollutants, and/or present a higher potential risk for spills, leaks, or illicit discharges.

There are two basic types of hotspots. Regulated hotspots are known sources of pollution and are subject to federal or state regulations. Unregulated hotspots are operations suspected to be potential pollution sources, but which are not currently regulated. Stormwater hotspots can be found in a variety of land uses, including commercial, industrial, institutional, municipal, and transport-related land uses. Many different hotspot operations are usually found in any given subwatershed.

### ***Introduction to the HSI***

The site is the fundamental unit to evaluate potential stormwater hotspots. Each hotspot site has its own unique operations, drainage system, and potential pollution risk. As a result, each hotspot must be individually inspected to identify current practices, spill risks, and stormwater problems. Hotspots do have common operations and activities that can contribute to stormwater quality problems, including:

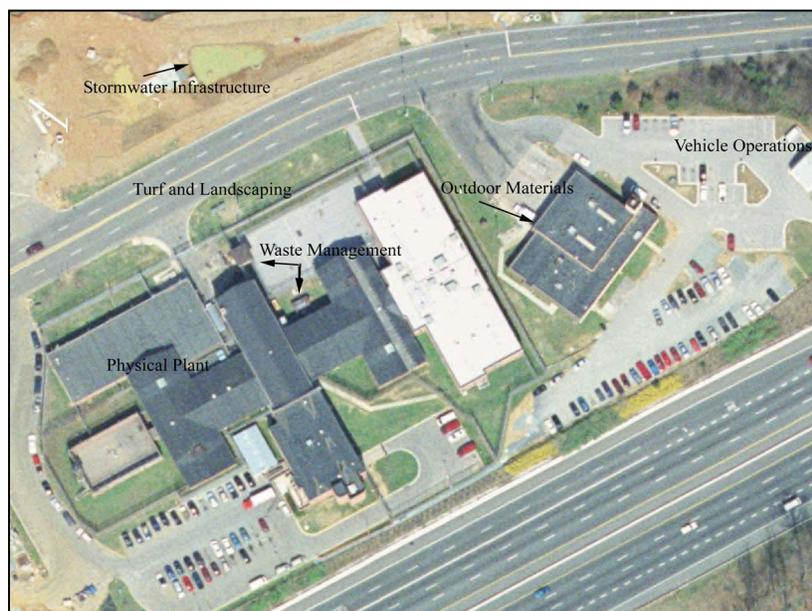
vehicle operations, outdoor materials, waste management, physical plant, turf/landscaping, and stormwater infrastructure (see Figure 2).

The HSI is a rapid survey to assess the impacts of hotspot operations in urban subwatersheds. The HSI investigates six distinct pollution sources at each suspected hotspot, and identifies pollution prevention practices to address those sources. The HSI produces a comprehensive database of confirmed hotspots for each subwatershed ranked by their relative severity. The database can be used to determine what, if any, outreach and education, pollution prevention, or discharge prevention strategies should be pursued. The HSI field form consists of seven parts:

- Site Data and Basic Classification – Collects basic location and land use information about the site, and a brief description of its operations.
- Vehicle Operations – Evaluates routine vehicle maintenance and storage practices at the site, as well as vehicle fueling and washing operations.
- Outdoor Materials – Examines the type and exposure of any outdoor materials stored at the site.
- Waste Management – Assesses housekeeping practices for waste materials generated at the site.
- Physical Plant – Assesses maintenance practices used for cleaning, remodeling, or repairing buildings, outdoor work areas and parking lots.
- Turf/Landscaping Areas – Examines the practices used to maintain lawn or landscaping areas, with special emphasis on fertilizer use and non-target irrigation.
- Stormwater Infrastructure – Evaluates the condition of practices used to convey or treat stormwater, including the curb and gutter, catch basins, and any stormwater treatment practices.

The HSI collects data on more than 20 site factors linked either to pollution sources or potential pollution prevention practices (see Table 2). The HSI form provides a grid to sketch the site and locate potential pollution prevention practices. Photos are also taken to document site conditions. The last part of the HSI evaluates the overall pollution potential for the site and designates it as either a potential, confirmed, or severe hotspot, or not a hotspot at all. The hotspot designation dictates the type of follow-up actions needed for the site. HSI data for the subwatershed as a whole are then entered into a database or GIS system to examine both hotspot density and severity. The resulting counts, maps, and metrics may be used to prioritize pollution prevention and education and outreach activities geared towards commercial, industrial, institutional, and municipal property owners.

**Figure 2: Six Common Operations Found at a Hotspot**



**Table 2: HSI Assessment Factors and Possible Pollution Prevention Recommendations**

<b>Hotspot Factor Assessed</b>	<b>Pollution Prevention Activity</b>
Potential, Confirmed or Severe Hotspot	Permit enforcement
Vehicle Source Areas	Vehicle pollution prevention practices
Outdoor Storage Source Areas	Storage pollution prevention practices
Waste Management Source Areas	Waste pollution prevention practices
Physical Plant Operations	Maintenance pollution prevention practices
Turf/Landscaping Source Areas	Landscaping pollution prevention practices
Uncontrolled Stormwater Discharge	Parking lot retrofit
Suspected Source of Illicit discharge	Investigate discharges
Observed Spill or Illicit Discharge	Contain and fix discharges
Unique Hotspot	Special pollution prevention practices
Catch Basin Accumulation	Catch basin clean-outs

### ***Interpreting and Using USSR Data***

The USSR produces an enormous amount of raw data to characterize subwatershed conditions. It is not uncommon to compile dozens and even hundreds of individual forms in a single subwatershed. The real trick is to devise a system to organize, process, and translate USSR data into simpler outputs and formats that can guide subwatershed restoration efforts. Several different methods, described below, can be used to translate USSR data into effective upland restoration projects.

#### **Simple Subwatershed Project Counts**

This analysis counts the major USSR outputs that appear to have the greatest subwatershed restoration potential. For example, you may want to count the number and distribution of the following:

- Neighborhoods with severe nonpoint source potential ratings,
- Neighborhoods with high on-site retrofit potential,
- Neighborhoods with a large proportion of high management turf,
- Neighborhoods with high or low forest canopy coverage,
- Potential, confirmed, and severe hotspots, and
- Potential generating land uses for illicit discharges.

At this stage, simply count the number of sites in each of the major categories, or express them as a fraction of total subwatershed or neighborhood area. Examples might include high input turf as a percent of total neighborhood area, or pervious area restoration sites as a percent of total subwatershed area. Based on these counts, you may discover that a particular upland restoration strategy may not be applicable in the subwatershed. For example, if no confirmed or severe hotspots exist in the subwatershed, business pollution prevention efforts do not need to be a part of your initial subwatershed restoration strategy. On the other hand, your counts may reveal that there are so many pollution sources or candidate sites that it makes sense to immediately pursue more detailed field investigations or go straight to a source control plan. The key point is to avoid getting lost in the raw data, but focus instead on the data patterns that can shape the development of your initial restoration strategy.

### **Mapping USSR Data**

Maps are always an excellent way to portray subwatershed data. If your GIS system is linked to the USSR database, you can create many different kinds of subwatershed maps that show the distribution of pollution sources or restoration projects. What you choose to map depends entirely on your initial findings, education or restoration goals, and GIS capability. Examples of helpful maps that can guide education and restoration efforts include the following:

- Basic neighborhood maps (these are great for showing local stakeholders where they live in relation to the subwatershed),
- Neighborhoods with high on-site retrofit potential (e.g., rain barrels or rain gardens),
- Neighborhoods with high nonpoint source severity index scores, and
- Clusters of severe or confirmed stormwater hotspots.

Subwatershed maps that depict the locations of all potential upland restoration sites are especially helpful. For example, maps that overlay project locations over aerial photographs can show stakeholders and team members exactly where candidate restoration sites are located in the subwatershed. These maps can also help identify adjacent stakeholders that should be consulted about proposed restoration projects.

A key point to remember is that maps are only a tool of restoration and not a product unto themselves. Try to map with a purpose in mind. A large number of cluttered subwatershed maps may only confuse you, while a smaller number may stimulate ideas for the initial restoration strategy.

### **Devising Subwatershed and Neighborhood Metrics**

“Subwatershed metrics” is a term used to describe the process of aggregating data from individual USSR forms to get a clearer picture of what is happening at the neighborhood or subwatershed scale.

An example of a subwatershed metric is the acreage of high input turf in a neighborhood. This metric can be directly computed from the NSA form by multiplying the fraction of turf cover on the average lot by the proportion of high input lawns in the neighborhood. This fraction can then be multiplied by total neighborhood area to get a planning estimate of the acreage of high input turf for the neighborhood as a whole. The metric is computed by aggregating the results from all the neighborhoods that compose the subwatershed. The high input turf metric provides insight about the significance of lawns as a potential pollution source at the subwatershed level, and can be used to target lawn care education efforts at the neighborhood level.

### **Subwatershed and Neighborhood Metric Screening**

Subwatershed metrics have considerable value to screen or rank the restoration potential among groups of neighborhoods and subwatersheds. The basic approach is simple: select metrics that are most important to your watershed planning goals, then see how individual neighborhoods or subwatersheds rank in the process.

Table 3 provides a hypothetical example of how neighborhood screening works. In this case, the pollutants of concern for the subwatershed were nutrients and bacteria. Four neighborhood metrics were developed that were strongly related to these pollutants. These metrics include the proportion of high input turf, overall turf cover, and the presence of pet waste and septic systems. Based on this simple screening process, it was evident that neighborhood “A” should be the top priority for nutrient education since it scored high for three of the four metrics.

**Table 3: Example of USSR Data Being Used to Compare Across Neighborhoods**

Neighborhood	% High Input Turf	Turf Cover as % of Lot Area	Pet Waste Scores	Presence of Septic Systems
Neighborhood A	65	70	Yes	15
Neighborhood B	10	35	No	12
Neighborhood C	5	35	No	17

### Source Control Plan

Pollution sources and control opportunities are different in every subwatershed. Consequently, a unique pollution source control strategy must be developed for each subwatershed. An assessment framework, known as a Source Control Plan (SCP), has been developed by CWP to define the focus, targets, methods, and delivery of subwatershed source control efforts (Schueler et al., 2004). The SCP is a simple desktop analysis of NSA, HIS, and other subwatershed data to develop the most cost effective strategy to promote better stewardship and pollution prevention practices.

The SCP evaluates subwatershed conditions to answer 11 basic source control questions:

- ▷ What is the primary **pollutant of concern** in the subwatershed?
- ▷ Which subwatershed behaviors are most directly linked to it?
- ▷ What specific **neighborhoods** and business **sectors** are generating the pollutant?
- ▷ Who are the specific individuals and groups that should be **targeted** for outreach?
- ▷ What are the most appropriate **carrot and stick strategies** to apply in the subwatershed?
- ▷ What is the most clear and direct **message** to promote desired behaviors?
- ▷ What **outreach techniques** are most effective at sending the message out?
- ▷ What specific **source control practices** will most effectively change behaviors?
- ▷ How much will the source control practices **cost**?
- ▷ Which partners will be responsible for **distributing** the source control practices?
- ▷ How will **progress** made in source control be evaluated?

The SCP systematically answers these 11 questions within the context of an individual subwatershed. If a large number of pollution sources are discovered in your subwatershed, an SCP should be prepared. The SCP essentially represents the “design” of a subwatershed source control program. It outlines the carrots and sticks to control priority pollution sources, accompanied by a budget and delivery system to implement them. The specific methods to prepare an SCP can be found in the publication, *Urban Subwatershed Restoration Manual No. 8, Pollution Source Control Practices*, available from CWP ([www.cwp.org](http://www.cwp.org)).

### Conclusion

Over the last two years, the USSR has been tested and refined in several watershed plans developed by CWP. In many of these plans, the results of the USSR were used to develop education and outreach strategies and recommendations.

The USSR has proven to be an invaluable watershed assessment tool for many reasons. In particular, for various watershed plans, the USSR has allowed CWP to identify the following:

- Specific residential, commercial, municipal, and institutional pollutant-producing behaviors,
- Other sources of pollution in the watersheds,

- Priority targets for education and outreach,
- Locations for stormwater retrofits, “backyard” retrofits, and restoration projects, and
- Areas where enhanced municipal management is needed.

In addition, the data collected during the assessments allowed CWP to develop metrics that measured the pollution severity of different neighborhoods and subwatersheds. These metrics have been used to rank priority projects, including community education programs, stormwater retrofits, municipal management actions, and pervious area restoration.

More detailed information on the USSR can be found in the publication, *Urban Subwatershed Restoration Manual No. 11, Unified Subwatershed and Site Reconnaissance: A User’s Manual*, available from CWP <[www.cwp.org](http://www.cwp.org)>.

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## Developing a Social Component for the NPS Evaluation Framework

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### Abstract

Rivers and streams in U.S. EPA-Region 5 face significant impairment from nonpoint sources of pollution (NPS): nutrients, siltation, habitat alterations, and related issues are among the most frequently cited causes of impairment. Recognizing the influence of individual management and behavioral decisions on NPS, state programs fund projects that directly address environmental management (such as the installation of various best management practices), as well as more socially oriented projects that increase individual and community capacity to manage water bodies to meet designated uses. Many involved with NPS projects in Region 5 have expertise and knowledge necessary to plan, implement, and evaluate their projects' physical and environmental components, yet addressing and evaluating the social and human-dimension components of NPS remains relatively unfamiliar territory.

In response to this situation, U.S. EPA-Region 5, state environmental agencies, and the Land Grant/CSREES Great Lakes Regional Water Quality Program (GLRWQP) have initiated a project to incorporate a social component into NPS project planning and evaluation for Region 5. The effort involves an inter-organizational team drawing from EPA, state environmental agencies, land grant universities in the CSREES Great Lakes Region (matching U.S. EPA-Region 5), and others. The team is developing a framework for tracking indicators of individual change (such as knowledge, awareness, and behavior), as well as broader social indicators related to communities, organizations, and other contextual factors that can influence NPS water quality efforts.

The initiative has two primary objectives. The first is to develop a system for collecting and using social data to help evaluate NPS water quality management efforts at regional, state, and project levels. The second is to provide support for Region 5, states, and projects to plan and perform effective program and project evaluations, with a focus on human-dimension or social factors. States anticipate using the framework in 2007.

This presentation will discuss the social component of NPS; describe considerations in designing a NPS evaluation framework that spans regional, state and project scales; and describe the collaborative process that supports this effort.

### ***Background***

Pollution from nonpoint sources (NPS) continues to be a major cause of water quality impairment throughout the United States. For decades, federal, state, and local agencies and nongovernmental partners have implemented a variety of technical and financial assistance programs intended to improve water quality by reducing NPS threats. NPS programs generally work through local agencies and organizations to encourage private landowners to adopt and maintain various land management practices that reduce NPS impacts and threats.

NPS programs have had difficulty documenting clear linkages between project activities and measurable progress toward water quality goals. Historically, evaluation efforts have documented project administration, outreach and education efforts, cost-share agreements with landowners, installed management practices, anticipated load reductions associated with practices, and in some cases, data on

water quality parameters. Some focused and heavily monitored efforts have successfully demonstrated water quality improvements associated with the application of a specific practice. For most applications, however, traditional administrative reporting and water quality monitoring have not demonstrated water quality improvements. This perception was reinforced by a recent assessment of the Environmental Protection Agency’s (USEPA’s) NPS program administered through Section 319 of the Clean Water Act (the 319 Program). The assessment found that the 319 Program was not demonstrating results, primarily because it lacked clear efficiency measures, targets and baselines for measures, and regular, independent program reviews<sup>1</sup>.

In an effort to improve evaluation of its 319 Program, USEPA Region 5 and the Region 5 state water quality agencies are working together to develop and implement an evaluation framework for NPS intended to more clearly link program activities to water quality outcomes. The framework incorporates measures for state-level and project-level efforts, builds upon existing data collection efforts of the state NPS programs and their partners, and provides a feedback loop for evaluation information to affect program and project implementation. Also, in addition to capturing traditional administrative measures (e.g., funds awarded and spent, workshops held, projects implemented) and environmental indicators (e.g., physical and biological measures of stream health), the NPS evaluation framework for Region 5 will include *social* indicators of progress toward water quality goals.

For assistance in developing this social component of the NPS Evaluation Framework, the regional 319 Program staff and state agency NPS program coordinators have initiated a joint project in cooperation with land grant universities in the region. The Social Indicators for NPS project came about under the leadership of the USDA Cooperative States Research, Extension, and Education Service (CSREES) Great Lakes Regional Water Quality Program. The project involves a variety of stakeholders and is led by a team with representation from USEPA, state water quality agencies, and land grant universities in the CSREES Great Lakes Region. The framework is expected to be available to state programs in 2007.

### ***What are Social Indicators***

Social indicators are measures that describe the context, capacity, skills, knowledge, values, beliefs, and behaviors of individuals, households, organizations, and communities at various geographic scales. Social indicators are typically used to assess current conditions or attainment of social goals related to human health, housing, education levels, recreational opportunities, social equity issues, and the like. For our purposes, the indicators will most often be used to measure intermediate outcomes that we anticipate will lead to the goal of improved water quality. Intermediate social outcomes reflect a set of NPS program activities that influence social change, such efforts that emphasize building awareness, supporting watershed organizations, and building local capacity for planning and problem solving. Figure 1 provides a simplified illustration of this progression.

**Figure 1. Social indicators reflect intermediate outcomes that lead to water quality improvements.**



<sup>1</sup> United State General Accounting Office. 2003. Grants Management: EPA Needs to Strengthen Efforts to Address Persistent Challenges. GAO-03-846

The decision to develop a suite of social indicators for NPS programs and projects that can be used across Upper Midwestern states reflects a growing recognition that deliberately working with people as they make decisions is critical to protecting and restoring natural resources. This human dimension includes the complex array of factors influencing social change, individual behaviors, and land management decisions. Incorporating these factors helps resource managers assess, for example, whether policies, programs, and initiatives induce “the right behavioral changes among the right target audiences, in the right place, at the right time.”<sup>2</sup>

There are many potential social indicators that could relate to specific types of NPS issues. For example, use of nutrient management plans in dairy operations, incorporation of low-impact development principles in new urban construction projects, public beliefs about the quality of local water resources, the presence of active watershed organizations in a project area, and so on. As with other indicators, a good social indicator would be clear, easily understandable, measurable, acceptable to project managers, relevant to program goals, and practical to gather.

### ***Why Social Indicators for Nonpoint Source Programs and Projects?***

Social indicators can be used in a number of ways as part of a NPS management program:

- They can help managers gauge the efficacy of projects that have outreach and behavior change components. For example, they can measure gains in knowledge or skills required to properly implement comprehensive nutrient management plans (CNMPs), or changes in homeowner beliefs about how their lawn care practices affect local lakes and streams.
- They can support the continuous improvement of NPS programs and projects. For example, they can help determine why certain populations will install BMPs or practice behaviors that protect water quality when others will not, thus helping managers determine when a preliminary outreach component would be most useful.
- Social indicators can often measure change that takes place within grant and project timelines. In many cases, changes in water quality can take much longer. For example, in some areas landowners are reluctant to work with state or federal agencies. If these landowners are in a high priority watershed, a 319 Program may fund the gathering of additional information, as well as education and outreach efforts. This type of project may make measurable progress in changing landowner attitudes about working with government agencies, and lay important foundations necessary for BMPs implementation paid for by future grants.
- They can help managers incorporate contextual information on policy, demographics, and other social factors that may impact the efficacy of NPS programs and projects. For example, if property taxes increase significantly in a county, does this impact farmers’ willingness to leave vegetative buffers along rivers and streams?
- Social indicators can be used to measure outcomes of NPS programs and projects not currently examined. For example, although behavioral decisions are influenced by many factors, increases in knowledge or changes in attitudes often precede changes in behavior. Therefore, documenting these changes can show that landowners are making informed decisions, and can help identify specific barriers to practice adoption. For example, increasing a landowner’s understanding of the effects of using fertilizer containing excessive levels of phosphorous and the importance of soil tests may lead to their use of tests to modify the amount of phosphorus applied to a lawn or agricultural crops. Documenting important intermediate outcomes, such as changes in the knowledge or values of a target audience helps demonstrate accountability for the use of NPS funds.

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<sup>2</sup> Nowak, Pete J., Cabot, Perry E. 2004. The Human Dimension of Resource Management Programs. *Journal of Soil and Water Conservation*, 59(6): 129A

Social information will be most helpful for projects in which changes in individual, community, or organizational decision-making are important to reaching water quality goals. Some social data may be collected and aggregated at a multi-project or state level.

In addition to these points, the use of a common framework of social indicators throughout the region will enable states to share information and experiences in a consistent format. In addition, a common framework will allow for the coordination of ongoing technical assistance and support for the assessment of social change that contributes to improved water quality. Combining the information at the regional level will support inter-disciplinary research, education, and extension throughout the Great Lakes Region. A common framework of social indicators will provide USEPA, other agencies, resource managers, researchers, and others a more complete perspective on regional accomplishments for NPS.

## ***Project Objectives***

The social indicators project has two major objectives. The first is to develop the broad evaluation framework for collecting, assembling, and using social data to evaluate NPS water quality management efforts at regional, state, and project levels. The second objective is to provide technical assistance and support for states and project-level personnel to plan and perform effective programs and project evaluations using the social component of the NPS Evaluation Framework. Both objectives involve several sub-objectives.

### **Objective 1:**

The first objective, developing the framework, involves a number of tasks related to clarifying the project scope and exploring existing approaches for collecting and assessing NPS project information. Sub-objectives related to developing the framework are listed below.

- 1A.** Develop an understanding of the evaluation needs for EPA, the states, and 319 funded projects. Pursuing a set of questions with project stakeholders will help clarify the scope of the social indicators framework and would help place the social component within the overall program evaluation efforts.
- 1B.** Develop a suite of social or human-dimension indicators that will measure outcomes of programs and projects that are precursors to water quality improvement.
- 1C.** Develop measures for selected indicators.
- 1D.** Develop and compile potential methodological approaches and tools for collecting and analyzing information along with criteria for their use and resources for additional information and assistance.
- 1E.** Develop a data entry, storage, and analysis system that is compatible with other regional, state, and project-level systems and capacities.

### **Objective 2:**

The second objective involves providing technical assistance and support for using the resulting social indicators framework. Meeting this objective will involve developing instructional and reference materials that regional, state, and project-level personnel could use and reference as they plan programs and projects, conduct program and project evaluations, and enter data into the framework. Some element of technical support and assistance would be an ongoing need. The project has identified the following sub-objectives for initial and long-term technical support:

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3 United State General Accounting Office. 2003. Grants Management: EPA Needs to Strengthen Efforts to Address Persistent Challenges. GAO-03-846

4 Nowak, Pete J., Cabot, Perry E. 2004. The Human Dimension of Resource Management Programs. Journal of Soil and Water Conservation, 59(6): 129A

- 2A.** Develop and help distribute a guidance and support document (tool kit) that explains the place of a social component in overall NPS management, explains the use of social indicators, measures, data collection, data analysis, and use of the web-based system for entering and analyzing (selected) data.
- 2B.** Provide technical assistance to regional, state, and project-level personnel to plan and perform program and project evaluations, use the social component of the NPS Evaluation Framework, and report and communicate program and project results.
- 2C.** Train and support specialists that will provide technical assistance to regional, state, and project-level personnel in the tasks listed in 2B.

### *Approach and Timeline*

This project involves several levels of participation. A core team from land grant universities in the region has been meeting throughout 2005 to design a process for developing a framework of social indicators for Region 5. In drafting a process design, they have consulted a larger advisory team that includes staff from USEPA and state NPS programs. Once the process for developing the framework is complete, the core team, advisory team, and additional participants will develop, review, and apply the framework. Those involved with NPS state programs and projects will contribute and react to both the process design and the draft framework.

The core team has outlined a plan of work for meeting the project objectives. The plan of work includes activities to clarify the full scope of this effort, assess existing mechanisms for reporting and analysis, identify and develop social indicators and measures, and select priorities for development and implementation of data collection and analysis tools, as well as a system for reporting. The plan also includes provisions to engage NPS program and project staff in each state to help shape the framework and to build capacity for using the framework. Completing the plan of work will require participation of the USEPA, state agencies, local staff in NPS projects, and partner agencies and organizations.

The project plan includes the following steps.

July – December 2005:

Gather and compile information on potential indicators, state needs for the framework, and data management options. This period will include a series of discussions with agency staff, workshop for 319 project managers in each Region 5 state, and a Delphi process for compiling and prioritizing input.

January – July 2006:

Develop a draft framework of social indicators with measures and tools for data collection and analysis. The draft framework will explore options for a data management interface for reporting and accessing framework data.

July – October 2006:

Conduct a second round of workshops in each state outlining the draft framework and generate comments and suggestions; conduct pilot applications of select tools.

November 2006 – February 2007:

Refine the framework of social indicators and develop guidance for use.

March – December 2007:

Work with states and projects to apply the framework.

December 2007:

Convene working meeting to assess the framework and develop further recommendations.

Project partners view the regional nature of this project as one of its most important benefits and one of its greatest challenges. Regional consistency, the ability to share methods and tools, and the potential for

aggregating data all hold great appeal. Implementing a joint project involving institutional and resource variations across the six state and university systems adds challenging complexities. The project partners are committed to addressing these issues as they arise.

For more information and occasional updates, contact your Region 5 state 319 Program coordinator or visit <<http://www.uwex.edu/ces/regionalwaterquality/>> and look for “Social Indicators for Nonpoint Source Evaluation.”

### ***Acknowledgements***

This project is as a joint effort of the USEPA, state water quality agencies in Region 5, and Land Grant Universities through the CSREES Great Lakes Regional Water Quality Program. The project is supported through in-kind contributions from participating organizations, the USDA CSREES Great Lakes Regional Water Quality Program, and state 319 funds. Development of the social indicator framework involves collaborative contributions from the Social Indicators Project Team, comprised of staff and faculty at USEPA, state agencies, and Land Grant Universities in the USEPA Region 5/CSREES Great Lakes Region.

# Best Practices for Field Days: Raise the Impact of Your Nonpoint Source & Stormwater Education Programs

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## Abstract

*Best Practices for Field Days* is a unique University of Minnesota Extension Service Program that provides outreach coordinators and program organizers with guidelines, tools, and resources to help them maximize the educational impact of their endeavors. The Program focuses on the application of six research-based practices that are the foundation to an increased level of achievement to educational program goals: 1) structure your program around a single theme; 2) assess your audience prior to implementation; 3) plan an effective setting (or format) for your outreach programs; 4) use experiential- and inquiry-based teaching methods; 5) develop and implement program evaluation and assessment; and 6) integrate marketing into the planning process. This manuscript will explore the use of the Best Practices for nonpoint source and stormwater pollution education initiatives. The University of Minnesota Extension Service Program consists of the new *Best Practices for Field Days: A Program Planning Guidebook for Organizers, Presenters, Teachers and Volunteers*, interactive planning worksheets, and hands-on workshops to help outreach coordinators and program organizers increase the impact of their programs.

When conducting programs focused on nonpoint source and stormwater pollution education, it is becoming increasingly necessary to prove both the success of these initiatives and detail the impact they are making. While the Best Practices originated through research conducted on outdoor field day programs, they apply to other outreach programs with similar objectives. The umbrella under which nonpoint source and stormwater pollution educational programs are conducted is daunting. The application of the Best Practices to these educational programs will result in more focused efforts with measurable results and ultimately greater impacts.

## Introduction

The Best Practices for Field Days were established after reviewing over thirty field day programs in the State of Minnesota and after careful review of the past literature and research on field days, field trips, and outdoor education programs for youth and adults. While the original intent of the Best Practices was the association and application to outdoor education opportunities under the umbrella of field days, they have evolved into the best practices that can be applied to many education and outreach opportunities and programs. The application of the Best Practices to nonpoint source and stormwater education programs may lead to more effective efforts and desirable outcomes.

## The Best Practices

### Structure Your Field Day Around a Single Theme

Themes create a framework for an event or program. Themes articulate the story or main concepts the program wants participants to relate to. Themes also convey the “so what” of a program or outreach opportunity. Well thought out themes can bring together all facets of an educational opportunity or program creating an effective and longer lasting experience for the participants.

Themes should be one complete sentence. They should resonate with participants by being captivating and memorable. Themes should be repeated before, during, and after a program. Themes are different from learning objectives. Learning objectives suggest desired outcomes. One constructive factor is to use distinct verbs when stating the learning objectives. For example, *“Participants will be able to identify...”*

Ultimately, having a compelling theme and clear learning objectives may lead to a more informed and educated audience.

### **Assess and Know Your Audience**

Regardless of the type or content of a field day, outreach activity, or program, the participants come with a wide variety of learning styles, levels of previous knowledge, cultural backgrounds, and other factors that all play a significant role in what and how much they may learn. Assessing and knowing the audience should be a part of the planning process for a program, not an afterthought. As a coordinator or instructor, knowing these characteristics of the participants will help to design a more effective program.

### **Plan a Setting Effective for Education**

The setting chosen to accommodate an event or program can either enrich the objectives or present challenges in obtaining them. If a program consists of a field day, workshop, tour, or other environment where participants are physically present, then the setting should inspire learning, support the theme, facilitate activities and discussion, and be carefully considered for noise, interruption, and accessibility.

If the education program or outreach endeavor consists of materials such as pamphlets or fact sheets, for example, then your setting may be the layout and design of such publications. While there are many sources for addressing design principles, there are several basic ones to keep in mind. They include paying particular attention to what content is included in quadrants I and III of a publication or fact sheet. The use of pictures and graphics can provide a significant level of understanding, however the selection of these elements should be well considered and support the theme and overall message the program is striving to convey.

### **Use Experiential Teaching Methods**

Learning is enhanced when students and participants are exposed to hands-on, inquiry based learning experiences. Experiential education is a teaching method that has been proven to be an effective technique, especially with young adults. Experiential education takes place when the student or participant is involved in an activity, reflects on it, determines what was useful or important to remember, and uses this information to perform another activity.

### **Integrate Marketing into the Planning Process**

Regardless of the value placed on the theme or content of a program, target audiences may not acquire new knowledge unless they receive the message. Knowing the audience, theme, objectives, and other factors will assist in the design of the message to be marketed and the approach taken. Therefore, marketing should be a part of your overall planning process, not an afterthought.

### **Develop and Implement Program Evaluation Methods**

Program evaluation is a measure not just of participant satisfaction of a program, but a measure of whether or not the program achieved one or more of its objectives. Frequently, the survey at the end of a program is the chosen method of evaluation. However, there are many other sources and methods of evaluation to consider, including personal interviews, case studies, pre- and post-tests, and written essays, just to name a few. If the survey approach is taken, there are a number of survey design practices

that should be considered. The Best Practices Guidebook and related resources offer specific factors to take into consideration.

### **Best Practices in Detail**

The Best Practices for Field Days consists of a great deal of valuable information. This information is efficiently organized in a guidebook that elaborates in much more detail each of the Best Practices. Information discussed includes the research reviewed, implications for all the players involved in such programs, and practical application tips. For thorough information, I highly suggest the Best Practices for Field Days: A Programming Guidebook for Organizers, Presenters, Teachers, and Volunteers (University of Minnesota Extension Service, 2005). Workshops and seminars have been a successful strategy to learn about the Best Practices and may be available to assist you or your organization.

### ***Application of the Best Practices to NPS and Stormwater Education Programs***

While the Best Practices originated through research conducted on outdoor field day programs, they can apply to many other outreach programs. The application of the Best Practices to nonpoint source and stormwater pollution educational programs can lead to more effective efforts. The intent of this manuscript is to inspire the use of the Best Practices for the development, design, delivery, and evaluation of nonpoint source and stormwater pollution education programs.

### ***Acknowledgements***

The Best Practices for Field Days is a University of Minnesota Extension Service Program by the Environmental Science Education Program Team. Portions of this paper are made possible due to the collective work of the ESE Team whose current or original members include Aimee Anderson, Robert Blair, Stephan Carlson, Barb Liukkonen, Valerie Malmquist, Nathan Meyer, Kent Montgomery, Karen Ostlie, Amy Rager, and Valerie Prax.

More information regarding the Best Practices can also be obtained online at <http://www.extension.umn.edu/EnvironEd/>.

## Assessment of Maine's Stormwater Phase II and NPS Outreach Campaign 2003-2005

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### Abstract

The Maine Department of Environmental Protection's first project to be completely based on social marketing principles was a great success—and we have the data to prove it! The *Think Blue Maine* campaign successfully caught the attention and conveyed our message to 14.4% of Maine adults. And, almost a third (32%) of Maine's adults say they plan to or have taken action to protect water quality.

We used market research to set the direction for the state's outreach effort, to implement the campaign, and to evaluate it. We conducted focus groups to learn about our audience: what did they think about the quality of their local waters, what was causing problems, and what practices would they be willing to undertake to protect water quality. We also tested messages and specific ads. In addition, we conducted a pre-survey of 3,600 municipal employees throughout the MS4 (Municipal Separate Stormwater Sewer Systems) communities on their depth of understanding of "watershed" and "runoff." The survey also asked about sources of pollutants and current household and yard practices. We used this data to further define our audience and our outreach campaign.

We targeted those most receptive to environmental messages and most likely to act: 35-55 year-old residents with some college education. We chose a message that conveyed how stormwater gets polluted and the route it takes to local waters—two messages that we knew our audience needed before they could be expected to take actions to protect water quality.

The 36 regulated MS4s, Maine Department of Environmental Protection, and other state agencies formed a statewide partnership. We purchased TV and radio time to insure our message got out when and where we needed it. The ads and media buy were well directed, successfully reaching our target audience in greater numbers than those not targeted.

An independent market research firm was hired to conduct statistically valid phone surveys before and after the campaign to measure our effectiveness. Over 14% of Maine adults recalled images or specific messages from our ads. Most marketing campaigns aim for a 5-10% recall so our effect was significantly above that threshold. When prompted with clues, 66% of Maine adults recalled the TV ad and 40% recalled the radio ads.

One issue that we were particularly eager to improve was public awareness that soil is a pollutant. When we started asking what is polluting our waters in 1996, no one mentioned soil; now 6% mention soil.

To capitalize on these successes, our partnership needs to orchestrate a second year of mass media, while at the same time work locally to encourage individual BMPs and sustainable behavior change.

### ***Introduction***

Maine has 28 regulated small MS4 communities and eight nested entities that are required to implement the federal (National Pollutant Discharge Elimination System) Stormwater Phase II portion of the Clean Water Act. In developing the Stormwater General Permit, Maine took the unusual step of requiring that the education minimum measure target behavior change and not simply information dissemination. Our general permit requires behavior change and impact evaluation. Municipalities must set measurable goals/outcomes for changes in one behavior (e.g., increase in the amount of motor oil recycled instead of dumped on the ground or down storm drains or decrease in the amount of pesticides and fertilizers that lawn care services apply).

To facilitate the approach, Maine Department of Environmental Protection (DEP) staff looked for opportunities and methods to convey the science and approach of social marketing to the regulated

entities. Working with EPA, we were able to offer a day of social marketing training to the MS4s. EPA funded Tetra Tech, the consultant who developed the *Getting In Step Guide* <<http://www.epa.gov/owow/watershed/outreach/documents/getnstep.pdf>> , to provide a training session. In the fall of 2003, we held a workshop inviting both MS4s and our NPS project sponsors. The *Getting In Step* training was very well received.

This workshop proved to be the catalyst for getting some of the groups of communities to propose to work cooperatively. One of the participants then suggested that if half the regulated communities were willing to work together, why not all the regulated communities? The stormwater coordinator, David Ladd, made it a priority to lobby all the regulated small MS4s to participate in a statewide mass media campaign. It was his job to sell the benefits of participating in such a program.

### ***Campaign Development***

Following the process laid out in the *Getting In Step* guide, step one was to set goals and objects and define driving forces. While some of the goals were obvious like "Improve and protect water quality," some were not so obvious until we had additional market research which showed people did not understand the path rain water takes. We also needed each MS4 to identify a behavior they wished to change and set that as one of their goals.

Thus the goals/objectives/needs are:

- Improve & protect water quality
- Increase knowledge of stormwater path
- Increase knowledge of how stormwater becomes polluted
- Specific Behavior change (varies from community to community)
- MS4s need to comply with General Permit
- MDEP needs to show success so MS4s continue to buy into and support both social marketing approach and over all effort
- MDEP & MS4s need to demonstrate success to funders and managers.

The second step was to identify our target audience. Based on the results of past market research, DEP knew that an effort aimed at 35 - 55 year old residents, middle to upper income, and educated would be the most receptive target for our messages.

We tapped available data from previous focus groups (Soil Erosion Campaign), the Lake User Survey, and census data for state demographics to start to develop an understanding of our target audience. However, we also recognized that we needed more targeted information directly related to stormwater issues.

DEP hired a professional marketing company to conduct four focus groups in the summer of 2003. The results from the focus groups provided invaluable information in developing both the type of effort needed and the design of the effort. It was actually the results of the focus group that illuminated the need for an awareness raising effort and the resulting mass media effort. The focus group results are available on DEP's Web site:

<<http://www.maine.gov/dep/blwq/docstand/stormwater/refmarketresearch1.pdf>>

The focus group results illustrated that the majority of Mainers have no idea what a watershed is, where stormwater goes, or what is polluting the water in their neighborhoods. These results are confirmed by previously conducted NPS focus groups and statewide phone surveys. The market research firm concluded, after reviewing the focus group results, that we needed to start with a basic statewide awareness effort.

As part of the focus group sessions, the consultant showed a number of PSAs that were produced by Stormwater Phase I communities. Our goal was to test the various styles and approaches in order to pick

the one that would be most effective with Mainers. We found that the San Diego ‘Fowl Water’ (rubber duck) ad was the one that really caught our focus groups’ attention and conveyed the stormwater message.

To gather additional information and to provide a method for assessment, we conducted a survey of municipal employees with the help of the regulated MS4s (3,600 surveys were returned). We asked questions about water quality and stormwater as well as current practices around the home and what changes or actions they were willing to take. We designed the survey so it would aid in assessment. We intend to repeat this survey from time to time to evaluate our progress and adjust our efforts.

The results of this survey confirmed the findings of the focus groups. Mainers fail to understand the path of stormwater. 34.4% think that all of the precipitation that lands on their yard soaks into the ground, while 17.4% were unable to guess what happens to the precipitation. A little over 7% believe the stormwater and sanitary sewer systems are the same thing, 3% think the stormwater is treated, and 62% had no idea where the stormwater goes. “Watershed” continues to elude most residents; only 21.2% claimed they live in a watershed. The municipal employees are a good representation of our target audience as 59.8% are between 35-54, and 52.6% have a bachelor degree or greater.

When we reconvened the MS4s and their consultants in November 2003, the MS4s suggested that everyone cooperate in a statewide awareness effort. The effort would be a partnership between DEP’s NPS and Stormwater Programs, the MS4s, and Maine Departments of Transportation and Turnpike Authority, Universities, Bangor Air National Guard, Coastal Program, and the Portsmouth Naval Shipyard. The meeting included working out a fair funding formula.

NPS staff could easily see the synergism of working on water pollution issues with the stormwater program. Thus money, staff time, and resources from the two DEP projects were combined to create a larger, stronger, and more effective effort. This also addressed a common complaint by the general public that they hear so many messages they do not know where to begin. Together the NPS and stormwater programs would be presenting the same message, hopefully increasing effectiveness.

Our message (Step 3.) was that polluted stormwater hurts local water quality and that homeowners and renters can make a difference. We knew from the focus groups that we would have to explain the path that stormwater takes, as well as what pollutes runoff.

The 2004 campaign proposal (Steps 4 & 5 - Packaging and Disseminating the Message) included:

- Obtaining permission from San Diego to use their ad and revising it to fit Maine,
- Creating two new radio spots and modifying two existing soil erosion campaign radio spots to have a similar tone,
- Creating an identity (logo and slogan) for the partnership and campaign,
- Creating a Web site that would be the single point of contact for the public in the ads that were funded by 28 municipalities and multiple state and federal agencies,
- Designing a print piece that the MS4s could use to support the outreach effort,
- Purchasing media time,
- Getting media coverage of stormwater issues,
- Hosting/Supporting local events and activities to engage residents,
- Contracting with a firm to handle production and the media buy, and
- Evaluating the effort (Step 6).

## ***The Campaign***

In the spring of 2004, the partnership hired Burgess Advertising to oversee production of the TV, radio, and print piece, do PR for stormwater issues, and purchase airtime.

We hired Market Decisions to help evaluate the campaign. Market Decisions conducts a quarterly, statically valid, omnibus, phone survey of Maine adults. We put questions on the spring survey prior to the campaign and again in the fall after the campaign.

As part of the campaign, the steering committee worked to develop a logo and slogan. Burgess donated staff time to develop the final logo and slogan (Think Blue; Clean Water Starts with You). The University of Southern Maine with pro bono time from Aquarian Engineering, a consultant for some of the MS4s, created the Web site <[www.ThinkBlueMaine.org](http://www.ThinkBlueMaine.org)>. The Maine State Planning Office, Coastal Program and DEP helped cover some of the costs of developing it. This Web site would be the single contact point in the ads.

One element of the campaign that did not proceed as planned in 2004 was the local events and activities that we encouraged the MS4s to undertake as a way of bringing the campaign “home” to the target audience. Mass media is good for raising awareness and making the target audience sensitive to stormwater issues. Our advice to the MS4s was that while the TV & radio ads were running they should host/support local events to re-enforce the message and encourage BMP use. The MS4s are doing much better in 2005 at implementing local events to reinforce the mass media effort.

People usually need more than information to change their behaviors. They need face to face convincing such as getting involved in monitoring a stream, stenciling storm drains, or joining a neighborhood clean-up effort. While some activities were held in 2004, (e.g.; 2,700 stormdrains stenciled in S. Portland, Open Houses at sewage treatment plants and municipal garages to see best management practices, Stormwater fairs at local schools, etc.), only about half of the regulated entities held an event.

### ***Results of 2004 Effort***

We used the Market Decisions statewide telephone survey to assess the effectiveness of the media campaign. We wanted to know whether Mainers 1) saw or heard our ads, 2) got the message that polluted stormwater hurts local water quality, and of lesser emphasis (since we did not expect to influence behavior change with mass media), 3) whether they took any actions to protect water quality as a result of our campaign.

Most follow-up surveys are conducted within a week of a campaign, which maximizes the recall of viewers to what they have seen or heard. However, since we were on a limited budget, we choose to do both the before and after surveys as part of the Market Decisions’ omnibus survey. Hence the fall survey was conducted almost two months after the last ad aired. Traditional evaluation is also done as a stand-alone survey with all questions related to the subject. Results show that an omnibus survey may give lower results since people have to switch gears when answering the variety of questions.

The sampling error for the survey is plus or minus 4.9%.

#### 1) Unprompted responses.

- 30% of respondents said they remembered an ad on water quality.
- When those 30% were asked what they had seen or heard, 19% specifically mentioned rubber ducks; an additional 29% mentioned stormwater or the pollutants mentioned in our ads. *If we want to tease out how many of the 19 % also understood the message, in the future we should do a follow-up question and ask "What was the ad about?"*
- So approximately 14.4% (135,283) of the adult Maine population recalled seeing or hearing our ads about water pollution. *Most marketing campaigns aim for between 5-10% recall, so our effort exceeded the normal goal.*
- 15-16% of 18 to 49 year olds recalled seeing or hearing ads about water pollution while 12% of the 50-59 year olds recalled something and only 8% of those over 60+.

- Approximately 17% of those living in Coastal and Northern Maine recalled seeing or hearing our ads, while only 14% of those in Southern Maine and 10% in Central Maine. *(17 & 14% are not significantly different, however Central Maine is significantly lower than Coastal & Northern Maine).*
  - Those with an annual income of \$30K-\$60K and \$60k+ (14%) are more likely than those with an income of less than \$30K (10%) to have seen, heard, or read any advertisements regarding water pollution. *Note sampling error is 4.9% so this is not statistically significant.*
  - Those who have a college education and above are more likely to correctly recall having seen or heard advertisements regarding water pollution (23%) than those with some college (15%) and almost three times more likely than those with a high school education or less (8%). *We know from other research that those with less education are less likely to be concerned about water quality and are less likely to believe stormwater has an impact on water quality. So did the ads not speak to them, or could it be they have other more pressing issues to worry about? (Approximately 51% of Maine adults 25 years and older have a high school education or less.)*
  - Of those who said they had heard or seen an advertisement about water pollution, those 60+ were least likely to identify our ads (27%) as compared to 40-49 year olds (63%), 18-29 year olds (62%), 50-59 year olds (48%), and 30-39 year olds (44%). However, the 18-29 year olds identified the ads by mentioning the rubber ducks and never specifically said stormwater. While 30% of the 40-49 year olds specifically said stormwater, 19% of the 50-59 year olds, 10% of the 30-39 year olds and 8% of the 60+.
- 2) If we gave prompts, who remembered our ads?
- 66% (620,029) of Maine adults recalled seeing our TV ad when asked if they had seen or heard anything about stormwater pollution that featured rubber ducks.
  - When prompted 76% of the 40-49 year olds had, 69% of the 50 to 60+, 63% of the 30-39 year olds, and 52% of the 18-29 year olds. *With the highest recalls in the age bracket 30-60 and the lowest recall in the 29 and younger adults, the TV buy seems to have been well directed at our target audience (35-55 year olds).*
  - There was no significant difference between male and female viewership.
  - 74% of those living in Northern Maine recalled seeing a TV ad with rubber ducks, 69% of Southern Maine residents, 64% of Central Maine and 51% of Coastal Maine residents.
  - 40% (375,775) of the adult Maine population recall hearing the radio spots when prompted about every day activities running off, going down stormdrains, and polluting water.
  - 52% of adults ages 40-49 recalled hearing one of the radio ads, while 42% of the 30-39 year olds, 40% of the 50-59 year olds, 36% of the 18-29 year olds and 33% of those over 60. *The Radio buy seems to be on target for our audience target of 35-55 year olds.*
  - 45% of Northern Maine residents recalled hearing a radio ad, 43% of Coastal residents, 41% of Southern residents, and 33% of Central residents. *Statistically speaking, with the exception of Central Maine, it appears the radio buy produced even results across the state. We may want to adjust a little for Central Maine.*
  - Among those who could recall (without prompting) seeing or hearing the ads regarding water pollution in the past 30 days, men were more likely than women to recall an ad (20% vs. 9%). However, with the aided question men and women equally recalled an ad (67% vs. 66%). *While not clear cut, it does appear the ads were not as effective at reaching women as men. Women did not remember them as well. As evidenced by the equal recollection of men and women with prompting, we know that women have seen the ads, but they did not make as strong an impression.*
- 3) Who will take action?

- 26% or just over a quarter of the adult Maine population said they have or are likely to take action to reduce stormwater pollution.
  - 36% of the 40-49 said they have or will take action to protect water quality, 35% of the 50-59 year olds, 29% of the 30-39 year olds, 18% of the 60+ and 20% of the 18-29 year olds have or plan to take action. *Once again, our data confirms that we are targeting the correct demographic with the greatest number of people willing to take action in the 30-59 year old age group.*
  - Of the actions the respondents mentioned (careful with petroleum & chemical products, control runoff, don't litter, ...) to protect water quality, there was no statistical difference between what men and women said except men more often mentioned being careful about oil leaks and chemicals (8% vs. 3%).
  - The greater the income, the more likely the respondent was to have said they have taken or planned to take action to protect water quality (\$60K+ - 29%, \$30-60K - 21% and less than \$30K - 15%).
  - The more education the respondent had, the more likely he or she was to have said they have taken or planned to take action. (College and above 26%, some college 23%, high school or less 15%).
  - 25% of Southern Maine residents said they had or would take action to protect water quality, 22% of Central residents, 17% of Northern residents, and only 11% of Coastal residents.
- 4) What do our residents think about water quality?
- There was no significant change before and after the campaign on the number of adults who think stormwater has a major impact or somewhat of an impact on water quality (83% after, 80% before). *With eighty percent or greater already believing stormwater has an impact on water quality we do not need to spend much more effort convincing Mainers that stormwater has an impact. However, we may need to convince them that they, via stormwater, may have a greater impact on water quality than industry. In addition, it may be difficult to move the remaining 20% with mass media.*
  - In the before survey in April, when asked how concerned the respondent was about water quality, 76% were somewhat or very concerned and in October 82% were. This is a significant difference. *We can't claim that our campaign was the sole cause of this change, but it is highly likely that it was a factor since a high percentage remembered seeing or hearing the ads. In addition to our ads, there were many messages throughout the summer talking about water quality. There were ads or news stories about healthy beaches, fish consumption, and mercury.*
  - After the campaign, the college educated were the most likely to be concerned about the quality of our waterways (87%), while those without a college education were less concerned (79%).
  - Before and after the campaign, men and women were equally concerned about the water quality of our waterways (before: 77% men vs. 75% women; after: 79% men vs. 83% women).
  - Before the campaign, more women than men believed that stormwater had an impact (83% vs. 76%). After the campaign women and men had equal beliefs about the effect of stormwater on water quality (83% vs. 84%).
- 5) When asked what is polluting the water,
- 6% of the adult Maine population identified soil erosion as a source of water pollution. When the question was first asked in 1996, prior to any outreach effort on NPS & soil erosion, no one ever mentioned soil erosion. *The increase from zero to 6% awareness,*

*unprompted, can not be contributed solely to the mass media outreach over the past eight years. Rather, it is most likely a combination of the mass media, the NPS Training Center, the Erosion & Sediment Control Law, newspaper articles, DEP's In Our Backyard column, and booths at fairs/events. For more information on Maine's campaign to reduce soil erosion, see <http://www.maine.gov/dep/blwq/watersh.htm>*

**Web site**

We also used the number of hits on our Web site to measure the effectiveness of our campaign. Web site hits are an indirect measure since our goal was not to increase hits but to raise awareness. The primary purpose of the Web site was to be a common funnel for residents who wanted more information. So hits on the Web site showed the number of people who were interested in the subject and paid enough attention to remember the URL address.

**Table 1. Web site hits by month**

Month	Number of Hits
July	674 (first radio & TV ad airs July 26 <sup>th</sup> )
Aug	2,397
Sept	242 (last TV & radio ad aired September 2 <sup>nd</sup> )
Oct	295 (last Public Radio sponsorship ad October 28 <sup>th</sup> )
Nov	234

***Conclusions/Recommendations***

The 2004 campaign was successful in getting the attention of Maine adults so that two months after the end of the campaign, of those surveyed, 14.4% (or 135,279) of Maine adults remembered the ads and the message.

We measured that a third (32%) of Maine's adults say they have taken or plan to take action to protect water quality. We can not credit this campaign with all that. Time and again, surveys show Maine has citizens concerned about the environment, including water quality issues (80%+ said they were very concerned to somewhat concerned about water quality). Therefore, we do not need to spend time selling them on the idea they should care about water quality, rather we should spend time educating them on sources of water pollution and what actions they can take to protect water quality.

We did not expect to get much behavior change with a mass media campaign. The mass media was to raise awareness and sensitize our audience to start thinking about actions. The local events and activities hosted or supported by the MS4s are the stage where we will see the behavior change begin to take place. The regulated communities need to persuade about 15% of their community to take action (based on the social diffusion model). After that the social norm will begin to change, and more residents will see the new practices as the new standard and begin to follow suit.

In 2004, we spent approximately an equal amount of money on radio and TV, but it is not possible to determine if radio or TV was more effective. They worked together re-enforcing each other. Results of the research show that twice as many respondents remembered the TV ads over radio. But, it is common for respondents not to remember accurately where they heard, saw, or read something. For example, four years ago, the soil campaign registered a significant number of adults who saw ads on TV when we only ran radio ads.

The TV market is very fragmented with cable and satellite. The best time to buy TV media is during the local news, as people tend to watch their local news stations for that particular program even if they tend to watch cable or satellite otherwise.

It is easier to target specific markets with radio. Burgess felt that Maine Public Radio was not the most effective way to get out our stormwater message. It basically put the ThinkBlueMaine partnership name and Web site out there, but without any message.

Comparing aided and unaided responses based on geographic locations, Northern Maine appeared to recall seeing or hearing the ads the most, followed closely by Coastal and Southern Maine. Central Maine recalled the ads the least. The media buy was equally effective across the state with the exception of Central Maine, where there was a minor drop. When the campaign is run a second time, the media buy for the Central region of the state should be adjusted.

Looking at the effectiveness of the campaign on men and women, it appears we were more effective at reaching men, although this is not completely clear cut (unaided questions shows significant difference, but aided question shows no difference).

We successfully hit our target audience; the 30-55 year olds significantly recalled our campaign better than those younger or older. And the responses showed that the 30-55 year old age range is still the best target for our campaign – they are the ones most interested and most willing to take action.

DEP and Burgess recommended, if possible, running a second year of the radio and TV to reinforce the stormwater message. Which in 2005, despite the budget difficulties, DEP and the regulated entities are in the process of doing. At the same time, there should be local programs, events, and activities encouraging individual BMPs to help people change their behavior. We are happy to say that the MS4s have been able to do a much better job planning for and executing local activities. We will evaluate the results of the mass media effort with a phone survey. We and the MS4s are evaluating local efforts to affect behavior change.

The regulated and nested municipalities have embraced the education and outreach challenge and are committed to raising awareness and getting their citizens to take actions to protect water quality. They want to be effective and they are willing to measure some of their activities so they have feedback. They share successes and failures. They get very excited when they win “Best Booth” at the flower show or county fair. Working in partnership with them is an efficient and effective way to protect Maine’s waters.

# EPA's NPS Outreach Digital Toolbox: Your One-Stop Shop

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### Abstract

The U.S. Environmental Protection Agency proudly announces the arrival of the *Nonpoint Source Outreach Digital Toolbox* (Toolbox). The Toolbox is a unified compilation of resources to facilitate the development and implementation of locally relevant nonpoint source/stormwater outreach strategies. It is being released for free on CD-ROM and operated through a menu-driven Web interface. EPA hopes to release a Web-based version in the near future.

The Toolbox is the idea of a joint state/EPA workgroup called the Nonpoint Source Information Transfer and Outreach Workgroup, established in 2001. Together with EPA's consultant, the Workgroup researched and assembled a vast array of products from nonpoint source (NPS) outreach campaigns used across the country. The central feature of the Toolbox is a product catalog with more than 700 outreach materials organized across six categories of behavior change: General Stormwater and Storm Drain Awareness, Lawn and Garden Care, Pet Care, Septic System Care, Motor Vehicle Care, and Household Chemicals and Waste.

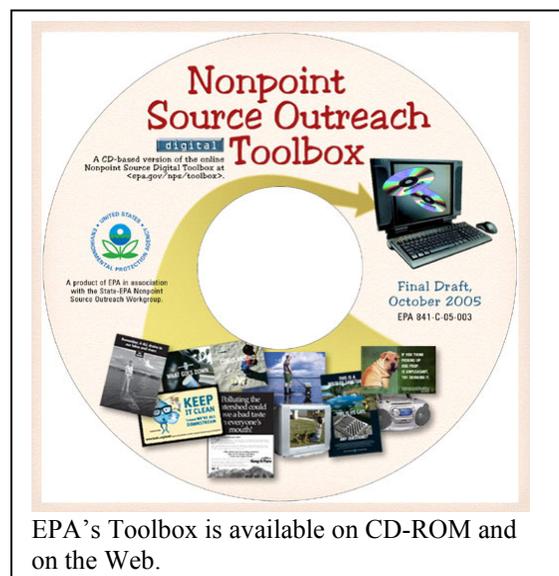
To facilitate evaluation of these materials, each catalog entry includes vital product information, as well as an accessible electronic version of the product itself. Within each category, users will find materials including: TV and radio PSAs in commonly playable digital formats; print ads in a variety of formats from billboards to newspaper ads; printer-ready samples of popular posters, bookmarks, fact sheets, brochures; and more.

The catalog is fully searchable by category, location, and media type. Materials are ready to use either as they are or with their use-restrictions clearly stated and contact information provided. EPA intends for state and local agencies and organizations to use the materials by customizing them with local contact or watershed-specific information—or as inspiration to help develop their own outreach messages.

## Introduction and Background

EPA is proud to announce the imminent release of the Nonpoint Source Outreach Digital Toolbox (Toolbox). The Toolbox is a collection of resources to facilitate the development and implementation of locally relevant nonpoint source/stormwater outreach strategies. It is being released for free on CD-ROM and operates through a menu-driven Web interface for Windows-based PCs. Copies of the CD may be ordered by calling the National Service Center for Environmental Publications toll-free at 1-800-490-9198. EPA plans to release a Web-based version in the near future. The likely URL is [www.epa.gov/nps/toolbox](http://www.epa.gov/nps/toolbox).

The Toolbox is the idea of a joint State/EPA workgroup called the Nonpoint Source Information



Transfer and Outreach Workgroup, established in 2001. Together with EPA's consultant, the Workgroup researched and assembled a vast array of products from nonpoint source (NPS) outreach campaigns used across the U.S.

### ***The Catalog of Outreach Products***

The central feature of the Toolbox is a product catalog with more than 700 outreach materials. Non-EPA products are included in the Toolbox catalog as a public service to broaden the selection of public service announcements and print materials for users of the Toolbox. The materials in the Toolbox have the potential to reduce the time and expense an organization has to spend on developing an effective outreach campaign, so that tight budgets can be stretched farther and more money is available to actually implement the campaign. For example, if there is a radio ad in the catalog that is effective and applicable for use by a different organization, that organization can use its money to buy more air time rather than develop a radio ad from scratch.

The products within this catalog were selected based on the utility and presentation of messages to improve awareness (at a minimum) and change behaviors (as the ultimate goal) across these six categories of NPS outreach:

- General Stormwater and Storm Drain Awareness
- Lawn and Garden Care
- Pet Care
- Septic System Care
- Motor Vehicle Care
- Household Chemicals and Waste

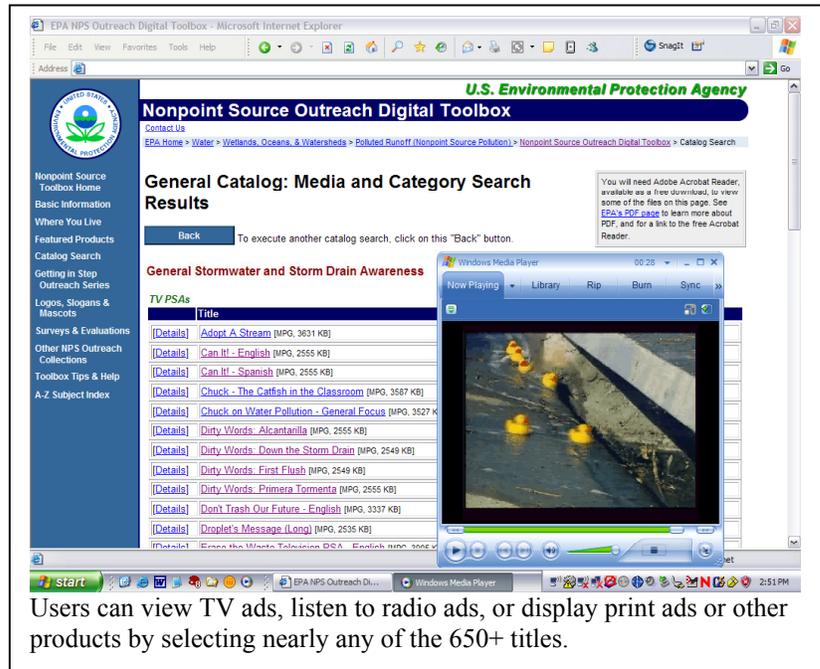
EPA's goal for the products in this catalog is to include sound, tested outreach messages that conform to EPA policies and acceptable messages for environmental issues. All the products in this catalog were reviewed for their value toward supporting EPA Office of Water's goal for clean and safe water and the objectives and strategies for meeting that goal as outlined in its strategic plan (see [www.epa.gov/water/programs/goals.html](http://www.epa.gov/water/programs/goals.html)), as well as to avoid conflicts with the goals and objectives of other offices of EPA.

The products in the Toolbox catalog are designed to help make the job of developing a NPS (or stormwater) outreach campaign easier by providing examples of outreach materials already created by others. However, Toolbox users are cautioned that many of these outreach products were developed for a specific state, region, or locality. Laws and regulations often vary by state and local jurisdiction. Before using any outreach product, users should verify that all of the information included in it is applicable and appropriate for their area.

Catalog users are responsible for obtaining all permissions from the owners of the products they are considering for their own use. To encourage the responsible use of these products, each catalog entry contains details on contact information and the permission policies of the owners that were accurate when the Toolbox catalog was compiled in early 2005. These policies vary by product. Users should consult the information included under the link to "permissions" for each product under the "details" pop-up window.

To facilitate evaluation of the outreach products listed in the catalog by Toolbox users, each catalog entry includes vital product information, as well as an accessible electronic version of the product itself. Within each category, users will find materials including:

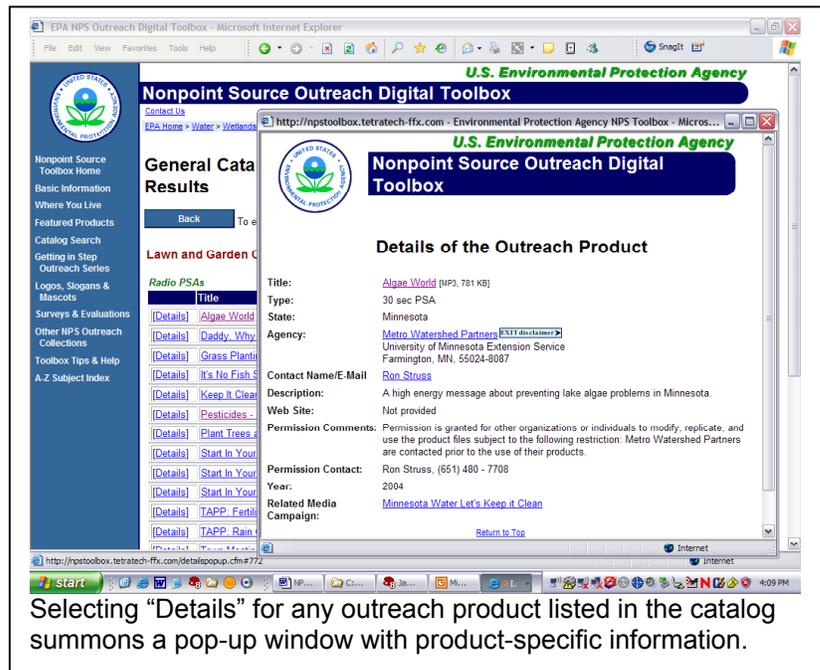
- TV and radio PSAs in commonly playable digital formats (MPG for TV ads and MP3 for radio ads);
- Print ads in a variety of formats from billboards to newspaper ads (predominant digital format is PDF with a few JPG files);
- Printer-ready samples of popular posters, bookmarks, fact sheets, brochures, and more (predominant digital format is PDF with a few JPG files).



Users can view TV ads, listen to radio ads, or display print ads or other products by selecting nearly any of the 650+ titles.

To get more information about a particular outreach product listed in the catalog, Toolbox users may select the “details” link. Selecting this link opens a pop-up window with additional information about the catalog entry including Agency, Description, Agency Contact, Web site, Permission Comments, Permissions Contact, Year, and Related Media Campaign. Toolbox users can then select the Related Media Campaign link, which will bring up a new pop-up window with a listing of all outreach materials from that Related Media Campaign in the catalog, as well as vital campaign evaluation information, if available.

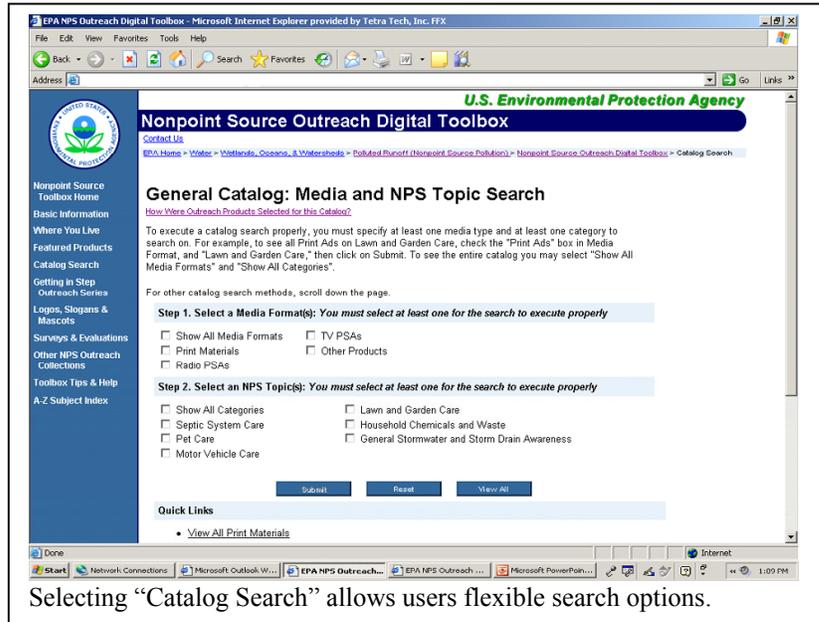
All materials in the catalog are ready-to-use, either as they are, or with their use-restrictions clearly stated and contact information provided. EPA intends for state and local agencies and organizations to use the materials by customizing them with local contact or watershed-specific information, or as inspiration to help develop their own outreach messages.



Selecting “Details” for any outreach product listed in the catalog summons a pop-up window with product-specific information.

### Three Ways to Search the Catalog

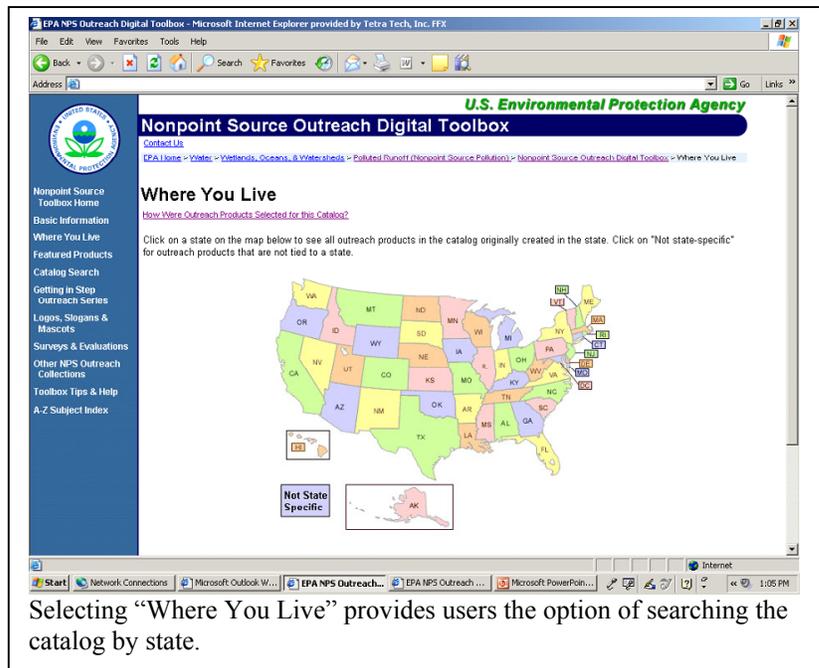
The catalog is fully searchable by category, location, and media type. To facilitate the different ways that Toolbox users may wish to seek out cataloged materials, there are three different ways to search. The primary catalog search tool leads users through an easy-to-use two step process where Toolbox users first select a media format (or “show all formats”) and then select one or more of the six behavior change categories they are interested in (or “show all categories”).



Selecting “Catalog Search” allows users flexible search options.

Users can perform geographic searches by selecting “Where You Live” in the main menu. This calls up a map of the U.S. with clickable states for seeing all outreach products in the catalog originally created for a particular state or locality within that state. Users also have the option of selecting “Not state-specific” for outreach products that are not tied to a particular state.

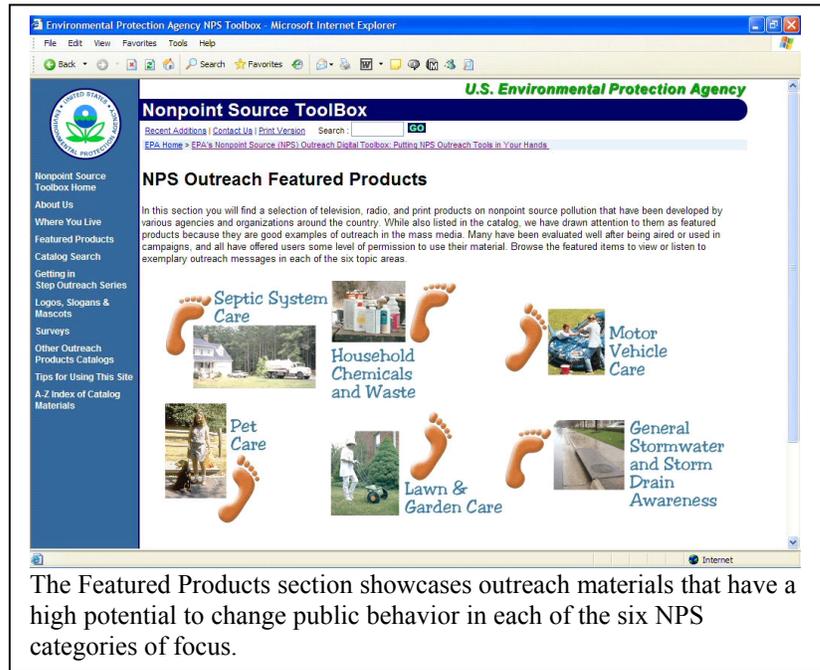
The “A-Z Subject Index” in the main menu allows users to see all the outreach products of a chosen media at one time. This index gives users the flexibility to sort results by state, by sub-media type (e.g., print ad, poster, billboard, etc. for print media), and by product title. The index comes with an alphabetical sort feature for further organizing query results.



Selecting “Where You Live” provides users the option of searching the catalog by state.

## ***The Featured Products Section***

In addition to the catalog, a small subset of the 700-plus products has been selected as featured products for each of the six behavior change categories and four media types (TV, radio, print, and other). Featured products are not necessarily the “best products” for any particular outreach campaign. Goals and target audiences vary widely among different campaigns. Therefore, what is best for one campaign may not work well for another. With regard to ads and other outreach products, the term “best” is subjective. Ultimately, the selection of featured products in the Toolbox was also subjective. Featured products were selected by EPA project staff, with input from the EPA-States NPS Outreach Workgroup, and feedback from reviewers of the draft Toolbox, including EPA’s consultant, Tetra Tech. Featured products represent examples of outreach materials that NPS outreach professionals (and in some cases, focus groups) believe to be particularly well done, and which are likely to be effective at changing targeted behaviors.



The Featured Products section showcases outreach materials that have a high potential to change public behavior in each of the six NPS categories of focus.

## ***Documenting Evaluation of Cataloged Products***

Evaluation data are included in the catalog through several pathways. The most direct paths are from the main menu and the sidebar menu, where users can select “Surveys & Evaluations” to see an organized listing of every survey and evaluation study in the catalog. Surveys and evaluation reports are linked to each listing and exist in PDF format. Another pathway is under the “Related Media Campaign” pop-up window for most product listings, where evaluation studies are included for nearly every product listing that has been evaluated. That is, EPA and its consultant have performed an exhaustive search for evaluation data for every product listed in the catalog and requested electronic copies of every evaluation report discovered. In nearly every case, if an evaluation report exists, EPA obtained permission to include it in the Toolbox. Nearly all of the TV and radio ads selected as “Featured Products” come with evaluation data that are accessible through links in the Toolbox (in the “Related Media Campaign” pop-up window), and a significant portion of all the products listed in the catalog have accessible evaluation data, as well.

## ***What Else is in the Toolbox?***

The Toolbox also includes these related items:

- EPA’s “Getting in Step” series of environmental outreach resources, including a fully hyperlinked PDF version of EPA’s flagship guide, *Getting in Step: A Guide for Conducting Watershed Outreach Campaigns* (EPA, 2003). This book is the recommended place to start for people who are new to NPS outreach to learn how to develop effective outreach. This guide presents the outreach development process as a logical, easy-to-apply sequence of steps. Information is also provided on related resources, including a free video companion guide, free online training on conducting watershed outreach through EPA’s Watershed Academy Web courses, and live training workshop opportunities;
- Proven slogans, mascots, and ready-to-use logos (black/white and color) to help unify and brand a campaign to make it more memorable;
- Web links to collections of NPS outreach and educational products compiled by states and other organizations across the U.S.;
- A robust “Tips/Help” section to assist with catalog searches, browser plug-in issues, and navigating around the Toolbox’s many features and rich content.
- A “Contact Us” page to facilitate user feedback.

## ***CD-ROM and Web Versions of the Toolbox***

The Toolbox is an ambitious undertaking that includes nearly 900 MB of files in its full Web form. The CD version is limited by the storage capacity of a standard compact disk to approximately 700 MB of files. The CD version includes all features and files as the complete Web-based version, with the exception that the PDF files associated with the “Other Products” are not provided. However, in most cases, contact information, external Web site links, and other details are provided for these products. All TV, radio, and print ad files are included in the CD version of the Toolbox, along with all the other features discussed above.

## ***What Does the Future Hold?***

The NPS Outreach Digital Toolbox represents a long-term commitment toward facilitating NPS and stormwater outreach at the local level. Now that the Toolbox has arrived, EPA is committed to providing regular updates and maintenance for this important new tool. One advantage to having a Web version of the Toolbox is that it can be maintained and updated in real time. Although EPA anticipates updating the CD version at some point in the future, the real advantages of the CD include faster file loading times and portability. EPA is also exploring the potential for a DVD version in the future that includes the full set of Toolbox files. EPA invites all who may benefit from this product to explore what it offers and to provide feedback to improve it in the future.

# Selling Low Impact Development: Audiences, Messages, and Media

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**Katherine K. Mull**

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## **Abstract**

In Virginia and elsewhere around the country Low Impact Development (LID) is increasingly viewed as a cost-effective way to control stormwater pollution, the nation's number one water quality problem. The adoption of new approaches to controlling stormwater requires understanding and support on the part of some key players, including governmental policy makers and staff as well as engineers, developers, and citizens. Final decisions often rest with busy officials who have little time to read technical material on the practices they are asked to approve. And, as with the diffusion of any innovation, obstacles to the adoption of LID abound.

To address these challenges, Northern Virginia Regional Commission (NVRC) analyzed goals for LID in Virginia, key target audiences, barriers to LID, and low-cost ways to deliver a message that would help move the region and the state forward. NVRC pursued and secured grant funding from Virginia and worked with a filmmaker to produce a 30-minute film for statewide use. Entitled "Reining in the Storm One - Building at a Time," the film features members of target audiences and defines in simple terms the basic principles of LID, the need, and environmental and economic benefits.

As the storyboard was being written, NVRC ensured that the film would be consistent with future state guidance by participating in Virginia's LID Workgroup. This paper includes a discussion of the challenges, approaches, and lessons learned as NVRC worked with others toward a common goal: to deliver messages that lead to on-the-ground measures to prevent stormwater pollution through LID.

## ***Introduction: Setting the Stage for "Selling" Low Impact Development***

Stormwater pollution is commonly considered the nation's number one water quality problem. Increasingly, local governments are turning to decentralized, site-based planning and design strategies known as Low Impact Development (LID) to manage the quantity and quality of stormwater runoff. Using small, economical landscape features known as integrated management practices, LID techniques work as a system to filter, slow, evaporate, and infiltrate surface runoff at its source.

In 2003 the Virginia General Assembly established the Low Impact Development Task Force to *promote a more complete understanding of the most effective use of low impact development techniques and to facilitate the use of LID*. To further this work, the Northern Virginia Regional Commission (NVRC) received funding from the Virginia Department of Conservation and Recreation and the U.S. EPA Chesapeake Bay Program to foster the adoption of LID principles and practices at the local level. NVRC's project, "Mainstreaming LID," included a 30-minute digital film entitled "Reining in the Storm – One Building at a Time."

While the process of selecting film as a medium of communication is the subject of this paper, other project products included a companion guide to LID for officials, electronic slide show, a regional "state of LID" report, and a design for a LID demonstration site featuring a LID interpretive trail.

## ***Purpose of the Project***

The project was intended to promote a more complete understanding of LID by decision makers and others in order to facilitate locally-driven efforts to implement LID. While this particular marketing effort was not intended to “close the sale,” it was designed to affect knowledge, attitudes, and propensity to act by doing the following:

- Describing LID in everyday terms and providing the basics for an understanding of LID to key audiences,
- Characterizing the relative advantages of LID and featuring on-the-ground examples of LID in familiar settings,
- Featuring testimonials from members of reference groups who influence decision-making at the local level,
- Addressing short- and long-term challenges associated with adoption of LID strategies, and
- Producing materials that would be consistent with future state guidance and appropriate for statewide distribution.

## ***Audiences: LID Communications Challenges***

In selecting a medium to promote a more complete understanding of LID, NVRC considered the nature of LID as a stormwater strategy and the many players involved in the adoption of new or different technologies. In considering how best to tell the story of LID, we found that:

### **We would have to start at the beginning.**

Levels of knowledge vary widely among members of target audiences. Elected and appointed boards see regular turnover among members. More often than not, it pays to assume that some members of the target audience are hearing about a concept for the first time. Communications regarding LID would have to start with the basics necessary to show cause and effect, for example:

- Stormwater runoff – what it is, where does it go,
- Linkages between increases in impervious surface and volume and velocity of stormwater runoff,
- Why control of stormwater is needed; economic and environmental costs, and
- How LID works to address stormwater pollution.

### **There was a lot of ground to cover.**

While an in-depth technical discussion was not necessary, information regarding LID would have to provide sufficient detail for officials to analyze future LID land use cases. Communications would have to reflect the following:

- LID is a comprehensive, multi-dimensional site planning strategy with a number of benefits whose relative importance varies with segments of the target audience.
- LID is not one-size-fits-all; practices selected must reflect local soils and other site conditions.
- LID faces institutional and practical barriers and should not be marketed as a panacea.

### **Thick reports tend to gather dust.**

The nature of both the target audience and the message helped determine media used to convey information about LID:

- Decision-makers are busy, and they generally prefer to get information quickly and succinctly, with technical information in plain English.

- Multiple players are involved in decisions to employ LID strategies, including: elected and appointed officials, builders, engineers, developers, plan reviewers, zoning officials, stormwater professionals, watershed planners, and citizens. Members of these reference groups would be needed to help sell the concept.
- Although some practices have been around for centuries, LID is considered new and different. Often there is reluctance to be the first to try alternatives to conventional stormwater practices. LID success stories need to be told.
- LID has many facets. Information regarding LID would be better remembered if broken down into a set of five principles.

#### **Principles of Low Impact Development (LID)**

The film and accompanying materials were intended to be consistent with future state guidance. While many definitions of LID have been crafted, NVRC in consultation with stormwater experts based its characterization of LID on the following five elements:

- Conservation of natural areas that provide valuable natural functions associated with controlling and filtering stormwater,
- Minimization of impacts by limiting impervious surface,
- Direction of runoff to natural areas,
- Use of small-scale controls or integrated management practices such as rain gardens, and
- Pollution prevention and education, including oversight of construction and long-term maintenance.

### ***Putting It All Together: The Marketing Mix***

Like selling soap, strategies for selling concepts begin with identification of the target market and attention to marketing mix: product, price, place, and promotion (McCarthy, 1971). As mentioned, film was the primary medium used to help promote a more complete understanding of Low Impact Development site design by local decision makers and those who influence them. The marketing mix was the driver for the decision to use film and for development of the storyboard and companion guide.

#### **Product**

As with selling a product, selling a concept involves an assessment of the political, regulatory/legal, economic, social/cultural, technological, competitive, and organizational landscape. How fertile is the soil in which the seeds are expected to germinate? What are the disincentives and opportunities? How can we “sell the sizzle,” i.e., benefits versus features?

An important but often overlooked element of the situation analysis in social marketing directed at behavior change is an assessment of the “competitive” environment. While not competing or vying for market share, knowing of efforts to promote or oppose similar programs or behaviors can be extremely valuable.

NVRC researched existing programs designed to foster the use of LID to look for opportunities to dovetail with parallel efforts, fill gaps, and reinforce messages. Accordingly, a number of professionals involved in the promulgation of LID were featured in the film.

**Barriers.** In devising a communications strategy, NVRC assessed the current situation by interviewing stakeholders regarding disincentives to the acceptance of LID. Messages can be designed to inoculate against criticism. The following are examples of some of the barriers that would have to be addressed in the film:

- Lack of knowledge of, lack of experience with, and incorrect perceptions of LID as a stormwater strategy were fairly commonplace.
- LID is not supported within many existing regulatory environments.
- LID is often considered an unproven technology, requiring longer time for review and approval of plans.
- Costs of conventional and LID stormwater practices may be difficult to compare.

The film attempted to break down some of these barriers by including examples of developers' cost savings in infrastructure, successful update of county local regulations to require LID, homeowner satisfaction with LID, and visible impacts on stormwater runoff.

**Benefits.** Benefits are not one-size-fits all. Programs, strategies, and behaviors represent different sets of benefits to different segments of the market. To the following segments, the film provided the benefits listed:

#### Stormwater professionals

- Reliable, cost-effective control of stormwater, and
- Programs that are easy to administer and compliant with regulations.

#### Developers

- Lowered cost of infrastructure = higher profits, and
- Features that will improve marketability of the property.

#### Homeowners

- Attractive solution to drainage problems in yard, and
- Addition of wildlife or habitat value to property.

#### Elected and appointed officials

- Forward-looking solution to citizens' stormwater problems, and
- Savings of tax dollars via lowered long-term maintenance.

Film was a dynamic media choice to feature members of target audiences and/or reference groups sharing their stories of successful implementation of LID practices.

#### Place

Like deciding to sell banking services in grocery stores, selling ideas or concepts involves looking at whether the product is where the consumer can find it. In the case of the delivery of information on LID, the goal was to take the message to where the target market is, i.e., to present the information using a medium that would be easy to include in a regularly-scheduled meeting, as part of a special event or at the time and place of one's choosing. In presenting LID as a "do-able" technology, success stories in the film were chosen to provide examples of implementation in both urban and rural locales.

## **Price**

The cost of the product to the target market reflects time and effort expended to obtain the information or to engage in the behavior, relative to perceived benefits. How far out of the way must the consumer go? What are the risks and benefits, both monetary and non-monetary? Is there a social risk – what are peers doing?

To “lower the price” of getting information regarding LID and to improve the perceived cost/benefit ratio of the LID strategy, the film had to do the following:

- Be short – goal was 20 to 30 minutes,
- Be engaging, not dry nor too technical,
- Describe the problem to be solved,
- Communicate a sense of what is at stake,
- Recognize political and economic priorities,
- Frame the problem and solution in terms relevant to the target audience, and
- Lower perceived risk of adopting LID by including testimonials from reference groups: elected officials, developers, citizens, and engineers.

## **Promotion**

**Market Characteristics.** Promotional strategies consider target market characteristics and the nature of the message. The primary audience for LID information was governmental decision makers. These officials:

- Possess varying levels of knowledge of water quality issues and LID,
- May feel that potential for use of LID is limited in their jurisdiction,
- Are busy and have little time to read handbooks, view CDs, or attend workshops,
- Interact with and hear from many stakeholder groups, and
- Have other priorities and feel the pressures of current events.

**Messages.** Messages crafted regarding LID would need to address the concerns of the target markets as well as those of their reference groups:

- Stormwater management is a serious problem that affects things people care about, e.g., their drinking water supply.
- Controlling stormwater is a way to make sure that the costs of development are paid by those who incur them, and not passed on to other taxpayers.
- LID has successfully been implemented in residential, commercial, and institutional settings, including on school sites.
- Developers may save money by employing LID practices.
- Homeowners can solve drainage problems and improve the attractiveness of their yard with LID practices.

**Medium.** Film was chosen as the primary medium to help foster the use of LID because of its potential to:

- Command an audience’s undivided attention and engage the viewer,
- Deliver information quickly and effectively,
- Weave a story around real-life players who are members of target audience reference groups, i.e., to feature testimonials by elected officials, developers, homeowners, governmental staff, designers, planners, and others.

- Force a judicious use of words and a disciplined approach to what can be covered and how (short, pointed and vivid), and
- Allow an audience to simultaneously hear key points and see reinforcing visuals.

NVRC worked with talented volunteer filmmaker, Dave Eckert of Virginia Village Productions, who understood the possibilities of LID and was personally committed to the project. He engaged radio host Frank Stasio to narrate and local musicians to compose and perform the score; he also arranged for screenings of the film.

While film was the primary outreach tool, other materials included a companion guide. As a stand-alone piece, the guide defined LID, principles of LID, and challenges. A copy of the guide was mailed to every elected official, planning commissioner, and planning director in the region.

Finally, as the storyboard was being written, NVRC was able to ensure that the film would be consistent with future state guidance by participating in Virginia's LID Workgroup, chaired by the U.S. Army Corps of Engineers. The workgroup drafted a technical bulletin for LID for Virginia. Upon adoption by the state, the proposed technical bulletin would be disseminated to localities in Virginia.

### ***Seven Simple Ideas for Similar Programs***

1. Have a strategy going in. Define your endpoints and benchmarks. Map a route.

When all is said and done, how will you define success? Will your proposed program get you there? In this case, we wanted to expose LID concepts to a cross section of those who make and influence decisions to adopt LID practices.

2. Know the key players and reference groups who influence your target audiences.

Who has to do what to make success happen? To whom do they listen? We identified those who would form the primary and secondary target audiences. In telling the story of LID in "Reining in the Storm," we included members of reference groups, with whom the target audiences could relate, to demonstrate successful adoption of LID practices.

3. Look at the issue from the perspective of the key players.

All too often, stormwater messages reflect the jargon and world view of the sponsoring group, rather than the view of the intended audience. Get to know your target audiences. What are *their* issues and concerns? Why would they be receptive to a new way of doing business (program, idea, concept, or behavior)? What risks do they perceive? What incentives do they need to act? Focus groups are often used to answer these questions.

4. Know where and how your target audiences prefer to get their information.

How do key players and influencers get their information? With busy officials, the message often needs to be brought to them, in their own venue, by a credible messenger.

5. Keep your message simple; test messages with your target audience.

Tie your message to the needs and values of your target market. Use plain English. Repeat and reinforce a few basic concepts. Test the message with your target audience early and often. We ran the script by members of the target audience. Then we re-wrote.

6. Connect the dots; ease the acceptance of "new" technology.

Define what key players need to understand to carry out their roles in making success happen. Public officials are more likely to support programs that solve real problems, save tax dollars, protect public health, and advance community interests. We tried to provide enough information so the audience could:

1) draw a link between the problem and the solution, 2) see results, 3) understand that LID can work where they are, and 4) see that LID can be tried with minimal risk.

7. Allow plenty of time to deliver the message and follow through.

It can take advance planning and long lead times to present messages to public officials.

### ***Some Observations Regarding Film***

- The film appeared to fill a gap and was adapted for use in other states.
  - ▷ Much was being done to promote the use of LID techniques, and the film attempted to build on, coordinate with, and support a number of parallel efforts.
- The film attempted to facilitate the acceptance of LID as a new approach.
  - ▷ Film was a good medium to use to 1) demonstrate the relative advantages of LID over conventional stormwater management, 2) show how LID has been adopted elsewhere and is supported by key players, 3) show how LID can be tried on a small scale without too much risk, and 4) demonstrate results.
- The film connected with different audiences and reinforced efforts to promote LID.
  - ▷ While LID was promoted at conferences and workshops, the film was designed to extend those efforts. “Reining in the Storm” included testimonials from a variety of stakeholders and footage of LID experts and activities to promote the use of LID. The script was based on the elements of LID from the draft Technical Bulletin for Virginia.
- A lot of information was squeezed into a small package.
  - ▷ The film was reasonably short, though not as short as we had hoped. The 30-minute film fit well as part of a scheduled program for a community meeting. However, a number of aspects could have been changed to improve and shorten the film to 20-22 minutes, which would allow for airing on television.
- Much was accomplished on a small project budget.
  - ▷ Filmmaker Dave Eckert is an environmental advocate with a passion for the subject and the ability to translate complex concepts into simple language. He worked with a talented cameraman, and his generosity with his time allowed the film to be made on a very low budget.
- Film events generate “buzz.”
  - ▷ Screenings at a premiere gala and at film festivals created excitement and generated requests for additional screenings or copies of the film. Film as a medium has the potential to create its own context, in this case, with impacts beyond expectations.

## Stormwater, Secret Agents, Soil, and Sumo Wrestlers: Exploring the Secret Agent Worm Interactive Web Site

**Doug Peterson**

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### Abstract

One of our nation's most closely guarded secrets is a classified, underground headquarters staffed completely by talking worms. It's called E.A.R.T.H. (Espionage Agents with Really Terrific Hair), and it's home to the Secret Agent Worms.

At long last, the cloak of secrecy has been lifted. University of Illinois Extension has decided to open E.A.R.T.H. headquarters to the public through the Web. To do this, we have begun work on an interactive Secret Agent Worm Website that tackles vital nonpoint source pollution issues.

The Secret Agent Worms have already appeared in two award-winning, full-color children's books: *The Disappearing Earth* (which teaches about soil erosion), and *Beneath the City of Ooze* (which teaches about stormwater pollution). Both books highlight the antics of two zany worms: Napoleon Soil (Agent 001) and Jane Blonde (Agent 009).

This new and dynamic Website will be divided into two parts: one for teachers, and one for kids. The kids' side of the site will take visitors into several rooms in E.A.R.T.H. headquarters. The centerpiece will be two interactive games, where kids must display specific soil and water knowledge to complete an animated mission.

On the teachers' side of the Website, instructors will learn how they can use the Website in a classroom setting. They will also be equipped with important information and data on stormwater, soil erosion, lakes and rivers, soil health, and worms.

This presentation will provide a sneak-peek at this groundbreaking animated Website, offering ideas and inspiration on how to present nonpoint source pollution information in an entertaining and effective way. In addition, we will explore lessons learned and discoveries made, such as how to track down stunning public-domain images for your own Website.

The Secret Agent Worm Website is funded by the U.S. EPA through Section 319 of the Clean Water Act and is scheduled for completion in early 2006.

Every hero has a secret headquarters.

Batman has the Bat Cave.

Superman has the Fortress of Solitude.

Secret agents from the old TV show, *The Man From U.N.C.L.E.*, slipped into their secret headquarters through what appeared to be an ordinary laundry service.

Maxwell Smart, the bumbling secret agent on the TV classic *Get Smart*, entered CONTROL headquarters through an elaborate series of doors, followed by a telephone booth.

You may be familiar with some or possibly all of these secret headquarters. But what you probably do not know is that one of our nation's most closely guarded secrets is an underground headquarters staffed completely by talking worms. It is headquarters for an agency called E.A.R.T.H.--or Espionage Agents with Really Terrific Hair.

It is also home to the Secret Agent Worms.



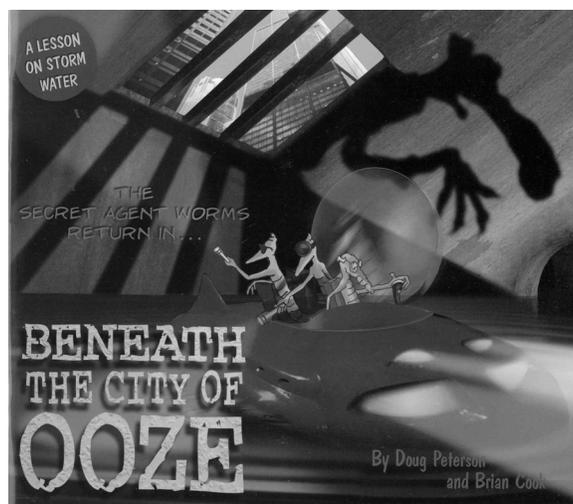
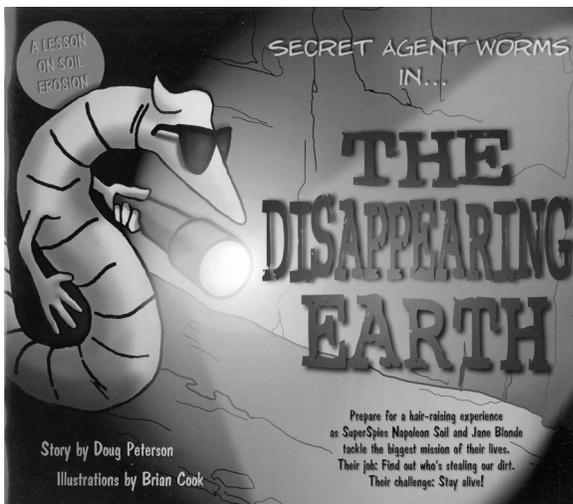
The University of Illinois recently decided that this unique headquarters should remain a secret no more. We are planning to open it to the public through our new interactive Secret Agent Worm Web site, which is still in development. With this Web site, kids will be able to enter E.A.R.T.H. headquarters and see what is going on in the bizarre underground operation of the Secret Agent Worms. Along the way, they will learn a lot about soil, water, and nonpoint source pollution.

What follows is a sneak peek at how we are creating this Web site and what we are learning in the process. But first, you will need to be briefed on the E.A.R.T.H. organization itself.

Napoleon and Jane

E.A.R.T.H.'s most famous super-spies are two worms: Napoleon Soil (Agent 001) and Jane Blonde (Agent 009). The name is Blonde. Jane Blonde.

Napoleon and Jane are the heroes of two full-color adventures published by University of Illinois Extension with funding from the Illinois Environmental Protection Agency. The first book is *The Disappearing Earth*, a soil erosion adventure; and the second book is *Beneath the City of Ooze*, which tackles the problem of stormwater pollution.



Being worms, however, Napoleon and Jane are not especially bright. In their first adventure, for instance, they were convinced that our soil is disappearing because it is being stolen by evil agents from M.U.D. (which stands for Mean and Unfriendly Doofuses). So Napoleon and Jane set off in search of a giant vacuum cleaner, which they believe M.U.D. agents are using to suck up all of the soil from surrounding fields. As it happens, they get swept up in the soil erosion process, and the readers learn what is really happening to our soil. They find out that erosion is pilfering soil from our land.

Both books are supplemented by a teacher's packet and science kit, chock full of hands-on activities.

### ***Going High-Tech***

With the visually stunning images in these books, the Secret Agent Worms struck a real chord with kids. But despite their success, we knew there remained a missing link in our effort to get nonpoint source pollution information successfully past the defenses of grade school kids.

You see, E.A.R.T.H. scientists have determined that the brain of your average kid has a built-in security system that triggers an alarm whenever an adult tries to sneak educational information into their heads. Therefore, we decided we needed a high-tech way to get past this highly developed security system. And after careful analysis by E.A.R.T.H. scientists, we boiled our options down to two basic approaches:

1. Create an interactive Secret Agent Worm Web site.

OR

2. Hire Tom Cruise of Mission Impossible fame to lower himself, with wires, from the ceiling of every home in the United States, where he will drop off information about soil erosion, stormwater pollution, and other soil and water issues.

For some strange reason, Mr. Cruise was not available. So we decided to go the interactive Web site route, and we are now building the site. The Secret Agent Worm Web site is due to go live in spring of 2006, and its tentative domain name is <www.secretagentworms.org>.

So let me tell you a little bit about our goals, our ups and downs, and what we have learned so far while developing this site.

### **Goal 1: A Clear Division**

When kids and teachers come to our Web site's homepage, we want to make a clear division. Educators head off in one direction in the site, while kids go another direction. In other words, there is a clear distinction between the teachers' side of the site and the kids' side of the site. This is important because each side of the site will be treated quite differently.

The kids' side of the site is where we are putting all of our bells and whistles. The teachers' side of the site will be more static because we believe that teachers are not going to care as much about fancy animation; in fact, fancy animated elements would probably be an unnecessary distraction to teachers who are just looking for straightforward information.

Which leads to our second goal...

### **Goal 2: Animation**

If we are going to draw kids to this site, we decided we needed animation--something to boost our site to the level of quality you find on Nickelodeon or Disney Web sites.

Animation costs a lot of money, so we had to be very particular about where we were going to use it. One of the primary spots where animation will show up is in our two interactive games. But you will learn more about the games later.

For now, let us just say that the kids' side of the site is Flash-based. Flash is often used for animation, advertisements, or design elements on web pages because a Flash file can contain more diverse information than a GIF or JPEG file of the same size.

### **Goal 3: Nonpoint and Beyond**

Our third goal--and the reason we are doing this site--is to deliver nonpoint source pollution information to grade-school students. Text for the site has been written at a fourth-grade level, so we are primarily focusing on third through fifth grade. We hope to also attract younger kids if their reading skills are high enough; and we might even be able to draw in older kids with our games and animation.

Unlike our two books, however, the site goes a bit beyond strictly nonpoint issues. All of the material in the site falls into one of five categories:

- Soil Erosion
- Stormwater Pollution
- Lakes and Rivers
- Soil Health
- Worms

#### **Goal 4: Make it Classroom Friendly**

The Secret Agent Worm Web site will be something kids and teachers can explore on their own--like any Web site. But we also want to make the Web site a tool that a teacher can use in a classroom setting. This winter, we will be testing the site in actual classrooms to ensure that it all works together.

#### ***E.A.R.T.H. Central***

With these goals in mind, let me tell you a little bit about each half of the site, beginning with the kids' section. When visitors click on "Kids," they will be immediately whisked away to the nerve center of E.A.R.T.H. headquarters--a high-tech room packed with monitors, as you can see below. This is E.A.R.T.H. Central (minus the colors that you will see on the Web site).



By the way, Napoleon is the worm at the keyboard, Jane is tending to her beehive hairdo, and Jane's grandfather is fiddling with what looks like a high-tech turntable. Grandpa is not an official E.A.R.T.H. agent, but he is the voice of reason in all of Napoleon and Jane's adventures. He is the one who truly knows what is going on, while Napoleon and Jane remain totally clueless.

Many of the monitors on the wall will represent a different area that the kids can visit. There will be six areas in all:

- Game 1: Defuse the M.U.D. Missile!
- Game 2: Snag the Dirtclod of Doom!
- Crunch the Robot
- Slime Theater
- The Worm Store
- Case Files

#### **Games: Mission Possible**

The games section will be the core of the kids' site, and it will feature two missions. The first mission is tentatively being called "Defuse the M.U.D. Missile!"

When kids embark on this mission, they will find Jane Blonde in a perilous predicament. She will be clamped to the side of a rocket, carrying a huge load of mud. Enemy agents are threatening to fire the missile and splatter mud across clean kitchen floors across the country.

Kids will then be told that their mission is to help Jane free herself from the clamps and stop the rocket from launching. Students will be asked a variety of questions that deal with soil, water, and worms. For every correct answer, Jane will free herself from one of the clamps. For every incorrect answer, the rocket moves one step closer to launching.

The site will be programmed to randomly select questions from a pool of 65 multiple-choice questions that we have developed. For every question, kids will be given a choice among a correct answer, an incorrect answer, and a downright silly answer. For example, here are a few choice questions:

**What is organic matter?**

- A. Dead plant and animal material rotting in the soil
- B. Old socks rotting in the bottom of your gym locker
- C. The bedrock below the subsoil

**What is the mouth of a river?**

- A. The part right below the river's moustache
- B. The place where a river connects with a bigger, slower-moving body of water
- C. The place where a river starts

**What is a street sweeper?**

- A. A chimney sweep who is afraid of heights
- B. A machine used to clean up streets and prevent rubbish from getting into storm sewers
- C. A machine used to remove rainwater from city streets

**If pollution comes from many different places on the land, what is it called?**

- A. It is called expanded-area pollution.
- B. It is called nonpoint source pollution.
- C. It is called "George," although it also answers to the name "Big Al."

When the kids answer eight questions correctly, Jane succeeds in her mission. But if they get four questions wrong, she fails and the student must begin the mission over again.

The second mission, which is tentatively called "Snag the Dirtclod of Doom!," will be structured similarly. In this case, however, Napoleon Soil is the worm on a mission. Students will find Napoleon suspended by wires above a glass container of some sort--much the way that Tom Cruise lowered himself from the ceiling in the movie Mission Impossible. Napoleon's task is to lower himself down to the glass case where he must retrieve the Dirtclod of Doom--a dangerous dirtclod that has been designed by M.U.D. to extract organic matter from the soil.

For every question that the kids answer wrong, one of Napoleon's wires will snap or a laser beam might shoot from the wall. But for every question that the kids answer correctly, Napoleon will move one step closer to getting the Dirtclod of Doom.

Whenever kids are given a multiple-choice question, they will always have the option of looking up the answer in what we call the Secret Vault. The Secret Vault is a steel-lined vault, buried deep within E.A.R.T.H. headquarters and closely guarded by worms who know karate. The vault contains over 75 top-secret file folders on various soil and water topics.

If kids need help answering game questions, there will be a direct link to the appropriate file, providing the answer they are looking for.

## Crunch the Robot

From E.A.R.T.H. Central, kids also have the option of visiting “Crunch the Robot,” a mechanical creature that crunches data. It dines regularly on bytes of soil and water information.

This section of the Web site will provide a much simpler game that gives kids a quick snapshot of the kind of data being collected on soil and water. To do this, our challenge was to find a way to make data fun--and I think we came up with a promising solution.

It is all about making wacky comparisons. To illustrate, here are a few examples of the questions kids will encounter in the “Crunch the Robot” section.

### What weighs more?

- A. The amount of soil that erodes from U.S. cropland every year
- B. Two hundred Great Pyramids of Egypt

**Answer:** The amount of soil that erodes from U.S. cropland every year

In the U.S., a whopping 1.8 billion tons of soil erodes each year, according to the 2002 National Resources Inventory. Two hundred Great Pyramids weigh less--1.3 billion tons.

### Which weighs more?

- A. 15 typical Sumo wrestlers
- B. The average amount of soil eroded by water from a single acre of U.S. farmland in one year

**Answer:** 15 typical Sumo wrestlers

An average Sumo wrestler weighs 400 pounds, so 15 of them would weigh 6,000 pounds. The average amount of soil eroded by water from an acre of farmland in the U.S. in one year is 2.7 tons, which is 5,400 pounds.

### Which is taller?

- A. 100 Sears Towers stacked on top of each other.
- B. The amount of soil that erodes from U.S. cropland each year, piled up to create a Soil Tower (with the same size base as the Sears Tower).

**Answer:** The Soil Tower

The amount of soil that erodes from U.S. cropland each year is 1.8 billion tons. If you created a Soil Tower out of that soil, it would rise about 135 miles into the sky--about the same as 490 Sears Towers stacked on top of each other.

## Slime Theater

The next room that kids can get to from E.A.R.T.H. Central is “Slime Theater.” In Slime Theater, kids will find Jane, Napoleon, and Grandpa being briefed in a dark room illuminated by a beam of light from a projector. This room does not actually provide a lot of subject-matter information about soil and water. Instead, kids are briefed on the history of the E.A.R.T.H. and M.U.D. organizations, and they can check profiles of the major E.A.R.T.H. heroes and M.U.D. villains.

For instance, some of the greatest villains to ever wear a M.U.D. badge include Mudfinger, Dr. Nope, Oddclod, and Lotta Pondscum. Each one of these villains is connected to a key subject area. Mudfinger is the M.U.D. agent allegedly behind soil erosion, Dr. Nope continually plots to pollute our stormwater, Oddclod is trying to destroy soil health, and Lotta Pondscum is wreaking havoc on our lakes and rivers. To learn more about these villains, Slime Theater is the place to go.

We do slip some soil and water information into this section, but Slime Theater is primarily there to fill in the kind of details that will make the world of the Secret Agent Worms more real. This room will also help to draw kids to the parts of the site that do more direct teaching.

## Worm Store and Case Files

The final two parts of the kids’ side of the site are the “Worm Store” and “Case Files.”

The Worm Store, as you might guess, is where kids (with their parents) can buy books and other worm goodies. The Case File section, meanwhile, provides free PDF stories featuring the Secret Agent Worms. These short stories are text-only, in contrast to the highly visual Secret Agent Worm books. Our goal is to continually update the site with new short stories, available free to download and duplicate.

## ***Teachers Central***

The teachers' side of the Web site will be HTML-based because it will not be animated. When visitors click on "Teachers," they will be whisked off to Teachers Central, where they have the option of exploring six sections:

- Using the Web site in Class
- Secret Agent Worm Curricula
- The Secret Vault
- The Data Bank
- Links
- Learning Standards

### **Using the Web site in Class**

As you might guess, "Using the Web site in Class" does just what it says. It provides teachers with a plan for using the Web site in school. It describes how to run the kids through each of the two games, as well as how to take kids through the E.A.R.T.H. Agent Training Program. Teachers will even be able to download worksheets to use in the classroom.

### **Curricula, Links, Learning Standards, and Secret Vaults**

The Secret Agent Worm Curricula section describes all of the print materials we have available and provides an opportunity for teachers to order on-line.

The "Links" section, meanwhile, will provide links to various soil and water sites. And the "Learning Standards" section will explain to teachers how our Web site matches various National Science Standards and Illinois Learning Standards.

The Secret Vault gives teachers direct access to the same vault that kids can reach from their side of the site. The Secret Vault is loaded with more than 75 Top-Secret Files filled with soil and water information.

### **The Data Bank**

Finally, teachers can use our "Data Bank" to locate information in these areas:

- Soil erosion rates, both nationally and state-by-state,
- Tillage trends, both nationally and state-by-state, and
- Lake and river conditions, nationally and in Illinois.

Note: Although we do include a little bit of Illinois-specific data, virtually the entire Web site is national in scope.

## ***What We Have Learned***

### **Images Galore**

In the process of tracking down soil and water images for the Web site, one of the most pleasant discoveries was finding that there is a wealth of excellent, public-domain images available on the Internet.

Probably the best source was the photo gallery of the Natural Resources Conservation Service. It is a treasure trove of wonderful images. The site is easy to navigate with photos grouped in clear categories. Each image is available to download as either a TIF or JPEG image. To visit this site, use the following address: <<http://photogallery.nrcs.usda.gov/>>.

We also came across a listing of other governmental agencies that provide copyright-free images. Here, you can find links to free photos from the National Park Service, the EPA, NASA, and more: <[http://stellar-one.com/public/us\\_federal\\_government\\_public\\_domain\\_images.htm](http://stellar-one.com/public/us_federal_government_public_domain_images.htm)>.

### **Go for Cool, Not Cute**

Our second lesson is one that we have learned throughout the Secret Agent Worm project. We have continued to see that when you are trying to reach our age group—third- through fifth-grade—it is important to go for “cool” rather than “cute.”

Cute works for younger age groups, as Barney the purple dinosaur so clearly demonstrates. But when you hit third or fourth grade, kids (especially boys) would much prefer that Barney be extinct. You are going to lose a significant portion of your audience if you go the cute route--creating a cutesy mascot to represent your program, for instance.

So go for cool!

### **Build a Search-Engine-Friendly Site**

Everyone would like their Web site to come out on the top of Google searches, rather than wind up as number 8,560,000 out of 8,560,001 possible sites. One valuable resource that we are using is Search Engine Optimization for Dummies, and it is loaded with tips on how to boost your Web site’s visibility to search engines. This book analyzes the most important search sites, explains where to submit your site’s URL, and provides all kinds of ideas on how to design your site so it comes up higher in searches.

### **Write at the Right Level**

If you are working with kids and want to know how to write at their level, another good resource that we use is a wonderful publication from Writer’s Digest books: the Children’s Writer’s Word Book. This resource does many things. It provides general writing guidelines for various age groups. For example, when writing for fourth grade readers, the guideline is to keep sentences at 20 words or less--with 10 words being the average length. The book also provides vocabulary lists that explain what words are appropriate for different grade levels. It even offers suggested replacement words if you discover that a word is too elevated for a particular age group.

## ***Communication and Entertainment***

As nonpoint source pollution educators, we are a lot like secret agents, smuggling secret communiqués past the checkpoints in kids’ minds. In fact, you might say we’re like the famous World War II spy, Virginia Hall, also known as the “limping lady” because of her wooden leg. Hall, a rather thin woman, disguised herself as a plump, hearty milkmaid in occupied France. Every day, she would bicycle into town to sell her dairy products and pick up the latest information by eavesdropping on the Germans. Then, at night, she would sneak to a hayloft where she had a radio transmitter hidden away. She was so effective in transmitting German secrets that one Gestapo agent wrote: “The woman who limps is one of the most dangerous Allied agents in France. We must find and destroy her.”

Virginia’s job was to milk the Germans for information right under their noses--to sneak information past their defenses without them even knowing it. Our job is almost as challenging--to sneak information past the defenses of unsuspecting kids and into their minds.

With a bit of secret agent silliness, we aim to pull it off. Students will learn and they will not suspect a thing.

Virginia Hall would be proud.

# Water Outreach for NPS Programming: The Best in Education Practices, Target Audience Research, Programs, and Materials

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## Abstract

The new Water Outreach Education Web site, <<http://wateroutreach.uwex.edu>>, provides water management and outreach professionals with education techniques and approaches that have been tested and found successful. Incorporating best education practices (BEPs) into water management strategies is critical for achieving management goals. Resources from the Water Outreach Web site can help educators “tune up” their outreach effectiveness. Web site resources include a BEP Decision-Tree; tips for how to use BEPs, target audience research findings, quick access to education theories, tools for teaching, and a searchable library of water education resources. Conference participants explored several Web site resources in small groups and suggested opportunities for applying each tool to specific issues they face in their work. We also reported a recent project that analyzed 117 research papers that met specified criteria for selected target audiences, water education content, and research techniques. Resulting BEPs are organized according to recommendations about the following: the audience, message content, message delivery vehicle, outreach strategy, public participation, or evaluation.

## Background

The goal of the *Water Outreach Education* project is to increase the capacity of natural resource management and outreach education professionals to choose and use appropriate education techniques and resources in order to improve their ability to deliver water management education programs. Our objective is to supply a Web site and content that provide access to the water outreach and education information, materials, and best education practices that are most needed to enhance outreach and education efforts.

The *Water Outreach Education—Facilitating Access to Resources and Best Practices* (BEP) project is a collaboration of the United States Department of Agriculture (USDA) Cooperative State Research, Education, and Extension Service (CSREES), and other public and private clean and safe water partners, to promote best education practices (BEPs) for water-management education and to improve access to education resources and strategies.

## What are Best Education Practices?

BEPs are clearly defined practices or programs that have been “... refined through repeated delivery and supported by a substantial body of research” (Fedler, 2001, p. 7).

To the extent that research-based information is available, the *Water Outreach Education* project strives to present *best* practices. Where research-based information is not available, we have worked to identify case studies and the best available information, or *good* practices. *Good* practices are widely established practices, applied by experienced educators, which may not have been subjected to researched comparisons. Table 1 lists the definitions of *Good*, *Better*, and *Best Education Practices* used in the project.

**Table 1. Definitions of Good, Better, and Best Education Practices**

<b>Good Education Practice</b>	An education practice that yields desired outcomes when applied under a certain set of conditions with the appropriate audience (after Holsman, 2001a).
<b>Better Education Practice</b>	A good education practice that has been shown; through research, critical reflection, or both; to be more effective in achieving intended changes than some other education practice or practices.
<b>Best Education Practice (BEP)</b>	"...a program or practice that has been clearly defined, refined through repeated delivery, and supported by a substantial body of research (Fedler, 2001, p.7)."

***Where do BEPs fit into outreach planning?***

Designing effective outreach education depends on following planning steps refined through years of experience by expert educators. Planning steps are listed in Table 2 (University of Wisconsin Environmental Resources Center [ERC], 2004a). There is, however, no specific recipe. The focus of a particular outreach effort will probably change along the way, affecting how each stage of the planning process might apply.

**Table 2. Planning Steps**

- |   |
|---|
| <ul style="list-style-type: none"> <li>• Identify the type of outreach effort:             <ul style="list-style-type: none"> <li>▷ Provide information</li> <li>▷ Educate</li> <li>▷ Communicate</li> <li>▷ Build capacity</li> </ul> </li> <li>• Become familiar with the "community of interest"</li> <li>• Define and assess the target audience</li> <li>• Develop clear goals and objectives</li> <li>• Inventory resources and constraints</li> <li>• Focus initiative on goals, audience, and resources</li> <li>• Actively engage target audience in planning</li> <li>• Pilot test and modify</li> <li>• Implement, deliver, or disseminate</li> <li>• Evaluate and revise</li> </ul> |
|---|

As you progress through your watershed management process, your outreach objectives and activities will change. For example, during the early stages it might be necessary to generate basic awareness on watershed issues, but as problems are identified your objectives will focus on educating your target audiences on the causes of the problems. Finally, during the implementation phase of your watershed planning and management process, your objectives will focus on action by your target audience to reduce adverse water quality impacts (MacPherson and Tanning, 2003).

BEPs are applied in every step of the planning process. Planning steps provide the educator with a “to do” list. BEPs provide details for how to do the job well, and a way to check whether the educator has maximized the benefit from each planning step. Application of BEPs is a dynamic process with no straight-line link between planning and practices. For example, an important BEP for each planning step is “For the individual: the learning experience is learner centered, and consequently relates to personal

interests and provides for personal choice and control” (University of Wisconsin ERC, 2004b). If the educator has missed this “essential” point about how people learn, the effort is likely to be unsuccessful.

The Water Outreach Web site presents BEPs in two ways (see Table 3). The *Essential BEPs* (University of Wisconsin ERC, 2004b), which are derived from education theory, are grouped according to typical ways of organizing the learner. In other words, *Essential BEPs* are provided for the following: the individual; the group; web-based learning; the community; and beyond the community. BEPs derived from research about target audiences are grouped according to the purpose of the practice. The practice could relate to the following: the audience; message content, message delivery vehicle, outreach strategy, public participation, or evaluation (University of Wisconsin ERC, 2004c).

**Table 3. How Best Education Practices Recommendations Are Organized**

Education theory (Essential BEPs)	Target audience research
<ul style="list-style-type: none"> <li>• For every education or learning situation</li> <li>• For the individual</li> <li>• For the group</li> <li>• For web-based learning</li> <li>• For the community</li> <li>• For beyond the community</li> </ul>	<ul style="list-style-type: none"> <li>• The audience</li> <li>• Message content</li> <li>• Message delivery vehicle</li> <li>• Outreach strategy</li> <li>• Public participation</li> <li>• Evaluation</li> </ul>

### ***Water Outreach Web site resources for professionals***

*Water Outreach Education* project activities focus on building a repository of audience-specific BEPs and on providing access to those and other water education references, tools, and techniques. BEP lists and planning tools on the Water Outreach Web site are part of a collection of resources that create access to, build on, and link education research, water management research, and water management information.

Education theory, water research, and high quality education materials are linked together on the Web site through the unique tools described below:

- The *Best Education Practices (BEP) DECISION TREE* is set up like a field guide key. The TREE leads to answers for common water outreach problems through a series of yes or no questions. Ultimately, it connects to BEP advice with links to specific applications, tips, and resources that apply to situations that we commonly face in our work as natural resource professionals. For instance, do you want:
  - ▷ Tree 1 – To tackle a *specific* water use or management problem?
  - ▷ Tree 2 – To increase *public awareness* or help the community meet a water goal?
  - ▷ Tree 3 – To build *community capacity* to manage water use and environmental impacts?
- *BEP RESEARCH* tells the story behind education practice recommendations. This section includes the research bibliography, a research summary for specific target audiences, and background about important areas of education theory we call knowledge areas. Table 4 provides a sample of the knowledge areas and target audiences that we address on the Web site.

**Table 4. Water Outreach Web site Knowledge Areas and Target Audience Information**

Knowledge Areas	Target Audiences
<ul style="list-style-type: none"> <li>• Adult education principles</li> <li>• Communication principles</li> <li>• Citizen participation/ Community involvement principles</li> <li>• Education planning</li> <li>• Leadership development principles</li> <li>• Learning theory</li> <li>• Social marketing principles</li> <li>• Technology transfer/ Diffusion of innovation theory</li> <li>• Youth education principles</li> </ul>	<ul style="list-style-type: none"> <li>• Agricultural commodity groups</li> <li>• Environmental/ Conservation NGOs</li> <li>• Farmers</li> <li>• Government agencies</li> <li>• Homeowners</li> <li>• Industrial water users</li> <li>• Landowners</li> <li>• Land development businesses</li> <li>• Local decision and policy makers</li> <li>• Recreational water users</li> <li>• Specific ethnic groups</li> </ul>

- *USE BEPS* helps the educator to analyze the situation, determine the "hook" or the "teachable moment," and use communication and teaching skills to accomplish objectives. Selections lead the educator through a process to do the following: clarify what they want to accomplish; choose a strategy to decide exactly what type of outreach effort is appropriate to the situation; plan using recognized program design and communication strategies; identify BEPs that will help accomplish the objective; assess the program; and learn from others.
- *TOOLS FOR TEACHING* provides quick access to tips and techniques for implementing successful teaching or training initiatives. Resources range from tips about how to facilitate or how to make a presentation, to helpful advice about planning a typical outreach event.
- *SEARCH RESOURCES* allows the user to find high quality water education resources that relate to educational strategies identified elsewhere on the Web site and that may be useful to meet the user’s water management goal.

### ***The Target Audience Literature Study***

When planning an outreach initiative, the first thing you need to do is to develop a rough idea of what you want to do and how you want to do it. Once you have the beginning of a plan, the next step is to familiarize yourself with the “community” and identify one or more target audiences. A focus on a target audience is essential to success, according to research evaluating effectiveness of outreach programs and campaigns. Once you have identified the goal of your outreach effort, the next step is to brainstorm who, specifically, could be a part of making that goal happen.

A **target audience** is a segment of the population that has a *specific opportunity* to take action or is *specifically affected* by the problem you have identified. For example, homeowners have a *specific opportunity* to reduce the amount of nutrients that get into a waterway. A lake in the neighborhood, with a super abundance of nutrients, results in an unattractive recreational resource — *specifically affecting* the quality of life for the homeowners in the neighborhood. Homeowners are the target audience in either case. If the welfare of fish or wildlife in the lake is the primary concern, the educator must choose whether to communicate about the ecosystem problem or focus, instead, on the interests of the target audience — that is the benefits of an attractive recreational resource.

There are many ways to identify your target audience. It is best to begin by breaking down your outreach goal into simpler elements. For example, you want to reduce the amount of soil that gets

washed into the storm sewer during a storm event. Where does that soil come from? If one source is new construction, what *specific* activities take place at the construction site that result in soil erosion during a storm event? Who, *specifically*, can influence how each of those activities is managed?

Involve others in thinking through this part of your outreach plan. Stakeholder involvement builds interest, motivation, and credibility for your effort and is also likely to provide some very good advice.

Find out as much as you can about your target audience. What kinds of information do you need to know? Involve your target audience in deciding which characteristics are important. Ways to gather information about the potential target audience include the following: surveys, focus groups, or a review of the published literature about the topic.

Depending on your education or outreach goal, you might want to know the following types of information about your target audience:

- Age and other demographic characteristics,
- Geographical location,
- Problems they want to solve,
- Educational needs/gaps,
- Recreational/fun interests,
- Where the audience likes to get new information,
- Whether the audience owns or rents the land they use,
- What group activities they participate in, and
- Specific behavior patterns related to the outreach goal.

During the planning process you may be able to gather a lot of useful information about your target audience. Research findings about similar target audiences may also be useful in the planning process. The *Water Outreach Education* project reviewed research about 15 target audiences. Table 4 provides a sample of some of these audiences. Study results are found in the *BEP Research* section of the Water Outreach Web site, <<http://wateroutreach.uwex.edu/beps/research.cfm>>.

The purpose of the target audience literature search was to identify and to promote best education practices for educating specialized audiences about water. This involved identifying, finding, and reviewing the appropriate literature; developing procedures for organizing the relevant literature into useful categories; and drafting a summary of the results (University of Wisconsin ERC, 2004d; Stevens, Reilly, & Andrews, 2002). The study also provided audience-specific examples of themes identified in *Essential BEPs* listed on the Web site.

We undertook this study because few environmental education research papers focus on adult audiences and few papers identify education practices that are best for specific audience groups. Few resource management papers test specific education practices, often relying instead on the admonition that good resource management needs to be accompanied by outreach to the public or to a target audience.

The methods used in conducting the study reflect an iterative learning process. The search for relevant literature started with the identification of significant terms through interviews with key informants and study of USDA, U.S. Environmental Protection Agency (EPA), and other reports. The audiences were identified from multiple sources. Some were listed in the original proposal for this project based on previously identified needs, others were suggested by members of the advisory team, and the rest were identified in our study of provider needs and subsequent reviews of literature on water outreach and education. Each was included because few education practices have been identified and tested for their relative effectiveness with these specialized audiences.

Our search for relevant literature can be divided into two phases. The first phase was a learning phase in which we developed search techniques of increasing power and sophistication, identified the more relevant and productive electronic databases, and refined and expanded the key words used in our searches. In the second phase, we filtered the literature. We first selected the references that appeared to

be topically relevant to our project. From this subset, we selected the references that appeared to report on research that either evaluated education practices in a single case or compared two or more cases to identify one practice as better than the other(s).

Most of the references reviewed did not meet either criterion. From the 15,082 references and abstracts we reviewed, we identified 526 that were topically relevant to our project. One hundred and seventeen of the 526 provided at least a minimal level of case evaluation and critical reflection. Of these, 95 articles specifically addressed water outreach or education and are the sources from which we will identify and promote best education practices for educating specialized audiences about water.

Along with identifying target audience research, we considered various meta-analysis methodologies for organizing and comparing the reviewed literature in useful ways. We drew from established literature in education theory and practice, and from the expertise of our advisory committee. We eventually decided to use a framework employed in Holsman (2001b) both for its relative simplicity and record of successful use.

Findings from specific research and best practices derived from research analysis are too lengthy for this document and are reported on the Water Outreach Education Web site, <<http://wateroutreach.uwex.edu/beps/TargetAudienceResearch.cfm>>. As a sample, findings for one target audience of particular interest to stormwater educators, households, are summarized in Table 5. It is important to note that the practices we have identified through this process "... need to be considered in relation to the nature, aims and context of the particular programmes that were evaluated. That is, they are not necessarily generalisable ingredients for success for any programme of environmental education, but characteristics that yielded differences for particular programmes" (Rickinson, 2001, p. 304).

**Table 5. Households as a Target Audience – Literature Review Summary**

Outreach categories	Research recommendations <sup>5</sup>
The Audience	No research available
Message content	<ul style="list-style-type: none"> <li>• Adapt language and appearance of notification materials to reflect the diversity of those being notified and the literacy level of the group.</li> <li>• Explain the exact nature of the water quality problem.</li> <li>• Make a recommendation for action and provide explicit instructions for how to take action without too much investment of time or money.</li> <li>• Indicate personal risk when risks exist.</li> <li>• Address each goal (change in attitudes, knowledge, behavior intentions, or behavior) because there is no evidence that changes in one area, such as attitudes, will have an impact on changes in another, such as behavior change.</li> <li>• Phosphorus public information campaigns need: <ul style="list-style-type: none"> <li>▷ Clear simple messages</li> <li>▷ Sufficient media exposure to outline the seriousness of the collective problem</li> <li>▷ Some sort of feedback to the target audience about impact of behavior changes</li> <li>▷ To create an atmosphere of social pressure and the feeling that people can do more</li> </ul> </li> </ul>
Message delivery vehicle	<ul style="list-style-type: none"> <li>• Train the person who serves as the agency interface with the public to assure that citizens are fully informed about options.</li> <li>• Promote resources through sources the audience considers credible.</li> </ul>
Outreach strategy	<ul style="list-style-type: none"> <li>• Use multiple channels of communication.</li> <li>• Provide the following when focusing on environmentally responsible behavior: <ul style="list-style-type: none"> <li>▷ An opportunity to demonstrate a commitment</li> <li>▷ A demonstration or model of desired action</li> <li>▷ An opportunity to set goals or respond to goals, including use of prompts</li> <li>▷ Feedback on progress toward preferred environmental change</li> </ul> </li> <li>• If providing explanatory materials by mail to residents from communities engaged in watershed planning, find ways to encourage individuals to engage. Keep in mind that only residents <i>who take the time</i> to review materials are likely to demonstrate knowledge mastery and an inclination to apply results.</li> <li>• Major public media and education campaigns can have a demonstrable effect on attitudes, knowledge, behavior intentions, and behavior change.</li> </ul>
Public participation	No research available
Evaluation	<ul style="list-style-type: none"> <li>• Use a “water demand” mathematical model to provide feedback to citizens and to demonstrate the effect of community water conservation outreach programs.</li> <li>• Maintain a record describing which specific outreach programs were initiated to address which specific community environmental concerns and/or audiences in order to have sufficient data to interpret evaluation results.</li> </ul>

<sup>5</sup> (Dwyer, Lemming, Cobern, Porter, & Jackson, 1993; Gamon, Roe, & Campbell, 1994; Harding & Anadu, 2000; Howard & McGregor, 2000; Michelsen, McGuckin, & Stumpf, 1999; Poe, van Es, VandenBerg & Bishop, 1998; Wagenet, Pfeffer, Sutphin, & Stycos, 1999; Watson, Murphy, Kilfoyle, & Moore, 1999.)

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## **If You Wouldn't Drink It, Don't Dump It: The Stormwater Public Education Campaign for the City of Orem, Utah**

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**Steven R. Johnson**

*City of Orem  
Orem, UT*

### **Abstract**

The city of Orem, Utah has developed a four-way approach to meeting Phase II regulations regarding public education about stormwater pollution. Beginning with the establishment of a storm sewer utility, the city has been proactively educating its residents about nonpoint source pollution. The efforts of the city have been focused on activities to inform four audiences, the general public, elementary school age children, contractors and developers, and businesses.

The city's general public campaign centers around the phrase, "If You Wouldn't Drink It, Don't Dump It." This theme has been included in several formats including pencils, key chains, and magnets. It is also featured in several pamphlets, brochures and other handouts. It is a focus of a booth hosted by the city at the annual Summerfest celebration. At these booths we feature handouts produced by the University of Wisconsin extension. The city has also developed content for its internet website focusing on nonpoint source pollution.

To promote nonpoint source pollution awareness among children, the city has been actively using an Enviroscope model as well as a model developed by the Minnesota Museum of Science to educate school children, scout groups, and church groups about the importance of proper handling, storage, and disposal of potential pollutants. To reinforce these messages, The city has produced bookmarks and activity books that feature cartoon characters and give easy to remember tips about household hazardous wastes. In addition, the city sponsored a poster contest for school children throughout the city.

The city has also hosted events that focus on training people involved in the construction industry. The city's one day training sessions have focused on information about city, state and federal regulations, and erosion and sediment control.

The city has reached out to the business community through the use of a stormwater quality credit program. This program gives incentives to businesses that agree to implement structural and non-structural best management practices.

This campaign has made the city of Orem a leader in public education among Phase II designated cities in the state of Utah. To enhance this position, the city has plans to produce additional materials in Spanish and will participate with the Utah County Stormwater coalition to help consolidate the education efforts of all the Phase II entities in the county.

### ***Introduction***

The City of Orem has a population of approximately 90,000 and encompasses 18.5 square miles. It is located in the center of Utah Valley, 40 miles south of Salt Lake City. Orem is the commercial and technological center for Utah County and is part of one of the fastest-growing metropolitan areas in the United States. Housing, educational, and employment opportunities continue to be in high demand as Orem's population approaches 100,000 residents.

### ***Education Program***

The City of Orem has established itself as a leader in the state of Utah among National Pollutant Discharge Elimination System (NPDES) Phase II communities. Beginning in the early 1990's, it became

clear that Orem would soon fall under the requirements of the NPDES Phase II. The city was quick to move on many aspects of these new requirements; it established a utility in 1996 and began public education efforts shortly afterward. The city was also instrumental in the establishment of a State Stormwater Advisory Committee, as well as the Utah County Stormwater Coalition. Because of our efforts, we are consulted regularly by other communities seeking to set up their own education programs.

The city has implemented a public education program that informs its citizens of ways to keep stormwater clean. This program follows the guidance of the Environmental Protection Agency (EPA) that states, “operators of small Municipal Separate Storm Sewer Systems (MS4s) must implement a public education program to distribute educational materials to the community or conduct equivalent outreach activities about the impacts of stormwater discharges on water bodies and the steps to reduce storm water pollution. The public education program should inform individuals and households about the problem and the steps they can take to reduce or prevent stormwater pollution.”

EPA also suggests, “Public education program(s) should be tailored, using a mix of locally appropriate strategies, to target specific audiences and communities (particularly minority and disadvantaged communities). Examples of strategies include distributing brochures or fact sheets, sponsoring speaking engagements before community groups, providing public service announcements, implementing educational programs targeted at school age children, and conducting community-based projects such as storm drain stenciling, and watershed and beach cleanups.”

The city’s public education program is centered on the slogan “If You Wouldn’t Drink It, Don’t Dump It.” The goal of the program is to promote awareness of stormwater pollution and to help change individual behavior. Specifically, we reinforce messages about proper handling and disposal of four key pollutants of concern: pet waste, automobile fluids, litter and sediment, and lawn care.

The city has targeted four main audiences: the general public, school age children, commercial and industrial institutions, and construction contractors and developers. The following table summarizes these activities and the publications used for these activities. These audiences were targeted to provide the maximum exposure to storm water issues.

**Table 1: Current Public Education and Outreach Activities**

<b>Audience</b>	<b>Activity/Publication</b>
General Public	<i>What You Need To Know About Stormwater</i> (12 page pamphlet)
	<i>WaterWatch</i> (Quarterly newsletter)
	Promotional Items (Pencils, Key Chains, Bags, Magnets)
	Flyers and Pamphlets produced by other organizations
	Community Events
	Interactive Display
	Enviroscape Model
	Storm Water Videos
	Storm Drain Inlet Curb Markers
	Storm Water Web site
School Children	Pre-movie slides and pre-show announcements at local theatre
	Classroom Presentations
	<i>We’re Into Clean Water</i> activity books and bookmarks
Commercial/Industrial	Poster Design Contest
	Storm Water Quality Credit Program
Construction Community	Targeted flyers and mailings
	Contractor/Developer Training Sessions
	Mailings
	Sample Pollution Prevention Permit Application

## General Public

The City of Orem has produced several publications to assist in public education efforts. The first was entitled *What You Need To Know About Stormwater*. This 12-page pamphlet covers many topics including:

- What is storm water?
- Does storm water go to a water treatment facility?
- Why should I be concerned?
- How much contamination can one gallon of pollutants cause?
- What can you do? (Report illegal dumping, proper disposal of chemicals, don't litter, don't leave pet waste, and recycle.)
- What happens when it rains?
- What is a sump?
- What about construction runoff?
- What about maintenance issues?

This pamphlet was originally distributed by mail to each homeowner and business in the city's utility billing database in 1998. We now distribute this pamphlet at the city's Public Works Complex and Utility Billing Office. It is also handed out at the city's Summerfest event in June each year. We continue to receive requests for this pamphlet for businesses to use as training materials for our Storm Water Quality Credit Program (SWQCP).

The development of *What You Need to Know about Stormwater* led to the initiation of a new slogan, "If you wouldn't drink it, don't dump it." This slogan has been featured on several promotional items including pencils, magnets, key chains, and plastic bags. These items are distributed to the public at fairs, lectures, schools, etc.

In April 2000, the city began a quarterly newsletter entitled *WaterWatch* that is mailed to all customer's in the city's utility billing database. Thus far we have featured articles on:

- |                             |                                    |
|-----------------------------|------------------------------------|
| • Car care                  | • Paints and stains                |
| • Car washing               | • Pesticide use                    |
| • Carpet cleaning           | • Pet waste                        |
| • Cleaning gutters          | • Sediment and erosion control     |
| • Clogged storm drains      | • Storm sewer fees                 |
| • Construction activity     | • Storm sewer systems              |
| • Culinary water statistics | • Stormwater management plan       |
| • Fertilizing the lawn      | • Stormwater presentations         |
| • Flood prevention          | • Stormwater quality and treatment |
| • Home water emergencies    | • Street sweeping                  |
| • Household hazardous waste | • Sweeping vs. spraying driveways  |
| • Ice and snow removal      | • Water conservation               |
| • Our Web site              |                                    |

The city has also secured permission to distribute some flyers produced by the University of Wisconsin Extension. The topics of these flyers are:

- |                                     |                                 |
|-------------------------------------|---------------------------------|
| • Lawn and Garden Pesticides        | • Car Care for Cleaner Water    |
| • Lawn and Garden Fertilizers       | • Cleaning Up Stormwater Runoff |
| • Lawn Watering                     | • Pet Waste and Water Quality   |
| • Erosion Control for Home Builders |                                 |

The city has also purchased coloring books entitled *Tommy Trout: Fish Detective* and pamphlets entitled *Know Your Watershed* from the National Association of Conservation Districts. We hand these publications out at fairs and lectures.

The city has participated in several community events. Most notably the city has set up a booth at its annual Summerfest. This has given us a potential audience of nearly 100,000 people each year. Booths at these events have included two models.

- The first model is one that the city purchased from the Science Museum of Minnesota that teaches, “Your Street Flows to a Waterway.” It features pet waste, litter, leaves, and automobile chemicals being spilled into a storm drain inlet and a resulting polluted waterway. It includes suggestions on how to lessen the polluting effects of these materials. It is ideal for display at fairs and at libraries and other public venues.
- A second model is the Enviroscope non-point source pollution model. It is a highly interactive model of a watershed that teaches about non-point source pollution. It allows people to “make it rain” on the watershed. The runoff from the rain collects powdered soft drink mix and cocoa powder (which represent pollutants) and carries them into a lake. This highly visual, hands-on model works well to grab the attention of children and is used as a focal point for public and school classroom presentations, as well as fairs and community events.

The city also uses several videos including: commercials from the Washington State Department of Ecology (Pub #97-2060-WQ) that teach concepts such as, “When you’re fertilizing the lawn, remember you’re not just fertilizing the lawn;” “A Ride Through the Storm Drain” from the Salt Lake County Stormwater Coalition; “Just a Drop in the Ocean featuring Willy Water Drop” by Earth Vision Productions; “It All Adds Up: From Curb to Stream: Cleaning Up Our Urban Waters:” “Storm Sewers and Where They Go” by the National Association of Conservation Districts, and “After The Storm” a video produced jointly by the EPA and the Weather Channel.

The city also initiated a program to mark all public storm drain inlets with curb markers that read: Do not dump, drains to drinking water. Through the assistance of several Eagle Scout candidates, the utility has marked all city-owned storm drain inlets.

The city published useful information to the city’s Web site. Topics covered on the Web site include: How to report illegal dumping; The city ordinances governing the Utility; Environmental Issues; Links to other storm water information; What is a sump?; and Wellhead protection zones. The city has added archives of its WaterWatch newsletters to the Public Works portion of the city’s Web site. In the future, we will add children’s activities to the Web site.

The city and the Sharon’s Cultural, Educational and Recreational Association, or SCERA have formed a partnership in public education that provides an outlet for distribution of *What You Need to Know about Stormwater*, and *We’re into Clean Water* activity books and bookmarks.

### **School Children**

As a part of Phase I of the NPDES, Salt Lake County commissioned a study of stormwater awareness and came to the conclusion that targeting school age children was the most effective way to reach families.

The city has prepared a presentation to be given to children in schools, scouting groups, and church youth groups based on the Enviroscope model. The presentation teaches children where stormwater goes, how natural processes clean water, how urbanization disrupts these processes, watersheds, non-point versus point source pollution, how non-point source pollution adds up, how children can make a difference through proper use and disposal of household chemicals, proper disposal of pet waste, and suggestions how families can keep pollutants that come from automobiles from entering stormwater. The children are given pencils, magnets, and pamphlets to take home and discuss with their families.

City staff created a 16-page activity book entitled *We're into Clean Water* along with an accompanying bookmark. This publication teaches about water conservation and household hazardous waste. Activities include mazes, a word search, a crossword puzzle, a decoding game, and several informational pages. Topics discussed in the booklet include information on the cumulative effects of litter, limited amount of freshwater resources, pet waste disposal, water conservation, the water cycle, and what a sump is (dry well).

Another early effort was a poster design contest. This was held in 1999. We asked school children of all ages to design a poster based on "If You Wouldn't Drink It, Don't Dump It." The contest was well received among elementary school children from whom we got hundreds of entries. Prizes such as Gameboys and bicycles were awarded.

### **Construction Community**

Training for developers, contractors, and homebuilders was held March 5, 2005. It was similar to training that we hosted previously on January 31, 2001. Training covered the specifics of developing Storm Water Pollution Prevention Plans (SWPPPs) for construction, as well as topics relating to the importance of clean stormwater and the effects of pollution.

The one-day training session consisted of an introduction to NPDES Phase II requirements, a session on writing SWPPPs, a session on reviewing SWPPPs, another on commonly used erosion and sediment control BMPs, and a closing session with the State representative about what the State of Utah looks for on an inspection of a site for compliance with SWPPP. The city plans to continue providing similar contractor training sessions.

Additionally, the city provides a contractor library for Best Management Practices (BMPs). This list of bookmarks is available on the city's Web site. We are also distributing posters from the EPA about stormwater and construction sites.

### **Commercial/Industrial Sites**

The city has instituted a Storm Water Quality Credit Program (SWQCP) to encourage the implementation of structural and non-structural BMPs. This program mitigates storm sewer fees for non-residential properties that use the following BMPs:

#### **Source BMPs:**

- Building and Grounds Maintenance
- Proper Container Storage of Liquids, Food Wastes and Dangerous Products
- Employee Training
- Proper Land Use and Planning
- Spill Protection for Liquids Stored in Above Ground Tanks
- Protection of Loading and Unloading Areas
- Maintenance of Stormwater Facilities
- Hazard Mitigation for Outdoor Manufacturing Activities
- Hazard Mitigation for Outdoor Storage of Products
- Public Education
- Spill Prevention and Cleanup
- Street and Parking Lot Sweeping
- Protection of Vehicle and Equipment Fueling Stations
- Environmentally Friendly Vehicle and Equipment Maintenance
- Vehicle and Equipment Washing
- Waste Management

#### **Treatment BMPs:**

- Wetlands
- Infiltration Trench
- Infiltration Basin
- Extended Detention - Dry
- Extended Detention - Wet
- Oil/Water Separators
- Biofilters - Filter Strip
- Biofilters - Grassed Swale

Every five years, the city sends a letter encouraging participation in the Storm Water Quality Credit Program to all businesses that pay at least \$20 monthly in storm sewer fees.

## ***Lessons Learned***

### **You do not have to produce all the material on your own**

As noted previously, the City of Orem makes use of pamphlets, videos, and displays produced by others. Some of the best resources come from other MS4s that are trying to do the same thing you are. For example, when it was time to create a mailer to send to carpet cleaning contractors, I turned to the Internet and found exactly what I wanted to say had already been written by Orange County, California. With a phone call I was able to secure the rights to use the PDF file they had online and get permission to modify it for our city.

### **You do have to produce some material on your own**

There are some things that apply to your city that will not apply to others. For these items you will need to do some work yourself. For example, The City of Orem is located on a gravel bench and makes extensive use of sumps or dry wells. Most MS4s make use of a more traditional piped system and therefore there has not been much written about sumps for stormwater. In order to give an explanation of where stormwater goes in our city, we have to include a discussion about sumps and groundwater.

### **Talking to people one-on-one makes a difference**

As an administrator over the education program, I know what topics we are required to discuss and I know what the typical information about those topics is. But what I find out is that when I talk to people one-on-one, I really learn what questions they want answered. It is very common for me to give a presentation to a Scout group and have the young scouts answer questions that are asked in the presentation and then have their leaders ask several questions afterwards. They usually make comments such as, "I've always wondered what to do about this..." Additionally, it is easier to find allies in the community when talking one-on-one.

## ***The Next Step***

In the near future, we will be attempting to find out how many people read our materials, what they are learning from them, and what behaviors they will be changing because of them. At this point, our feedback is mainly anecdotal with people recognizing our staff from previous presentations, from calls received about topics in WaterWatch, etc.

To assist in the effort to find if our program is working, we have participated in a survey with the Utah County Stormwater Coalition and Brigham Young University to establish baseline data about attitudes and behaviors in the county. Before the first five-year permit coverage time is over, the county coalition plans to redo the survey to see what progress has been made. In addition, we have collected baseline water quality samples so that in the future we can see what effect our overall stormwater management program has had on water quality.

Besides these coalition efforts, the city will be doing surveys of readers of WaterWatch to get an even better idea of how we are doing in changing behaviors. The surveys will probably include incentives. We will also be having quizzes at our Summerfest booth. These items will help us know what we are doing right or wrong. In addition, more emphasis will be placed on producing or acquiring literature for our growing Spanish-speaking population.

## Public Education and Community Outreach Supporting the City of Toronto's Water Pollution Solution

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Toronto, Ontario

### Abstract

Urban development within the city of Toronto and surrounding regions has adversely affected the aquatic environment. Changes to the hydrologic cycle and land use practices have increased flows and contaminant contributions to area surface waters. Increases in stormwater runoff and the associated pollutant washoff, coupled with wet weather flow discharges from combined sewer overflows and sewage treatment plant bypasses have resulted in increased flooding and erosion and water quality impairment along the waterfront and across the city's rivers and streams.

The city has recently developed a comprehensive 25-year Wet Weather Flow Management Master Plan to address the impacts of wet weather flows. In creating the plan, a new philosophy was developed that recognized rainwater as a resource: wet weather flows were to be managed on a watershed basis, a hierarchical approach to wet weather flow management was to be used, starting with at source (*i.e.* on-site), followed by conveyance (*i.e.* within the collection or sewer system), and finally, end-of-pipe control measures.

In support of the Plan, a stormwater public education program was developed to help build an understanding of wet weather flow issues and garner support for all facets of the implementation, particularly on-site source controls. Targeted communication tactics have been employed to promote action and commitment to the implementation of various controls such as reduction of pesticide and fertilizer use, promoting source controls such as downspout disconnection, reducing impervious surfaces, importance of stoop and scoop of pet waste and vehicle maintenance, and the connection between roadside catch basins and lake water quality. Multi-faceted creative ad campaigns have incorporated messaging through newspapers, bus shelters and municipal litter receptacles, radio commercials, and television advertisements. In addition, door-to-door newsletters are distributed across the city to all residents.

A community outreach program was developed wherein funding is provided to community groups for the implementation of projects that further the goals and objectives of the Plan while complementing city-led capital works projects. The public education program was initiated in 2000 as the Plan was being developed. A public opinion/attitude survey was conducted at that time to assess public knowledge of the issues, including stormwater pollution and its association with lake water quality. The results showed that there was little awareness of stormwater pollution, its impact on water quality or the importance of individual actions. Through the public education program, the Plan was rebranded as the "Water Pollution Solution" to make it clearer to residents. Multi-faceted public education campaigns, while focussing on increasing public understanding of the broad issues around stormwater pollution, also contained targeted messaging to influence changes in behaviors (*e.g.* reduction of pesticide use) and area-specific actions (*e.g.* downspout disconnection in basement-flooding prone areas).

To help measure the effectiveness of the program, the public survey was repeated in 2004, and showed that it has been successful in elevating public awareness of stormwater pollution. In addition, more residents now view the prevention of stormwater pollution as an individual responsibility.

### **Background**

Fifteen hundred people strong, Toronto Water, part of the City of Toronto's municipal government, is a leader in providing water and wastewater services to over 2.5 million residents and businesses in the

Toronto area, and portions of two neighbouring regions. We provide a visible and valuable service and aim for excellence in everything we do, including our public communications.

Situated on the shores of a Great Lake – one of the largest fresh-water bodies in the world – it is easy to understand how Torontonians could become complacent about the ability of Lake Ontario to absorb everything we throw at it. However, urban development within the City of Toronto and surrounding regions has adversely affected our aquatic environment. Man-made changes to natural water courses and land use practices have increased flows and contaminants to nearby streams and rivers and, ultimately, the lake. Increases in stormwater runoff and the associated pollutant washoff, along with wet-weather flow discharges from combined sewer overflows and sewage treatment plant by-passes, have resulted in detrimental water quality along the city's waterfront. The most visible sign of this degraded water quality is the posting of Toronto beaches (10 in total) as unsafe for swimming during the summer months. Other problems include stream bank erosion, loss of fish habitat, and basement flooding.

The City of Toronto recently developed a comprehensive 25-year Wet Weather Flow Management Master Plan to address the impacts of wet weather flows. In creating the plan, the city embarked on a new philosophy: manage wet weather flows on a watershed basis and apply a hierarchical approach to wet weather flow management. The approach begins with at-source (on-site) management, followed by conveyance controls (within the collection or sewer system), and finally end-of-pipe measures. The plan also includes enhanced municipal operations, shoreline management, basement flooding protection works, stream restoration works, as well as environmental monitoring and plan review.

In support of the plan, a strong, strategic communications plan was developed to help build an understanding of wet weather flow issues and garner support for all facets of the implementation. Targeted communication tactics support an umbrella stormwater public education program that increases understanding and promotes action and commitment. We will focus on the public education campaign in this manuscript.

### ***Understanding – The Public Perspective***

The first requirement was to assess the current level of public knowledge of key water quality issues, including stormwater pollution and lake water quality. The results would provide guidance for the development of the public awareness strategies. So, in 2000, Toronto Water hired a research firm to conduct a detailed telephone survey of 1,000 residents. This number was chosen to provide statistically valid results that would represent the larger city population.

Results of the survey showed that the educational component of the campaign was critical. Torontonians did not know why the lake was polluted or why the beaches were posted as unsafe for swimming. They did not know about stormwater pollution or combined sewer systems. Toronto residents also did not know which level of government was responsible for cleaning up and fixing lake water quality. Most people thought it was a provincial responsibility when, in fact, it is a municipal one.

### ***Challenges***

The challenge, clearly, was to get Toronto residents to take ownership of the situation. There was a need to build awareness of the issue of stormwater pollution and get residents to understand its impact on water quality. As the survey revealed, *“the call to action is a delicate balancing act...Bringing the public on side is about first generating awareness of the issue and consequently, motivating the public to care.”*

But there were additional challenges. How would we communicate such a complex and unfamiliar topic to a largely uninterested audience? The issues around stormwater management – infrastructure and

treatment plant capacity – are not easily explained. The survey report explained, “*The challenge will be to project the information via the campaign in such a way that the residents are not initially overwhelmed with the complexity of the issue...*” The information had to be broken down into small pieces to make it easier for the general public to understand.

Further, residents were not clamouring for information about this issue; for most citizens, lake water quality did not appear on their radar. This was not a subject with immediate, clearly-defined and personal benefits. The pay-backs in this case were long-term and more for society’s benefit than the individual’s. As well, in promoting behaviour change, residents had to believe in the impact their small actions could have and, more importantly, in the consequences of their inaction. As the survey stated, “*...there is a need to convince residents that they are able to affect change around the issue of stormwater pollution. When asked directly, Torontonians are not entirely optimistic that they (as individuals) can affect change nor do they believe that others are willing to do so.*”

Furthermore, Toronto has a huge population that is multi-culturally diverse with dozens of languages spoken. To reach all residents, we need messaging that is simple and easily translatable. In addition, there are four English-language dailies, more than 150 community and ethnic newspapers, dozens of radio stations and 10 television stations. With no dominant media player, we need every means at our disposal to reach our audiences.

### ***The Water Pollution Solution***

One of the first initiatives was to re-brand the program from *The Wet Weather Flow Management Master Plan* to *The Water Pollution Solution*. This makes it much simpler for residents to understand. Underneath the umbrella of *The Water Pollution Solution* are a number of sub-topics including:

- Downspout disconnection
- Reduction of pesticide use
- Beach water quality

For each of these topics, a separate communications plan with its own strategies and tactics was created. These plans contained targeted messaging to change behaviors (e.g. reducing pesticide use on residential lawns) and/or area-specific actions (e.g. disconnecting downspouts in areas prone to basement flooding).

### ***Speak like a Neighbor***

In each case, advertising appearing in a variety of media was critical in getting our messages in front of our audiences. Toronto Water’s ads have been described as “speaking like a neighbor” because of their light, conversational tone. In an article on the ads, Strategy magazine confirmed that, “*The goal is to deliver friendly, humorous and, most importantly, non-preachy ads to educate citizens about respecting their environment.*” An AdWeek review similarly stated, “*Ads in which a municipality urges its inhabitants to clean up their act tend to fade into the white noise of urban life...So, instead of hectoring people (which they’d tune out) or making a polite request for their assistance (which likely wouldn’t register with them in the first place), the city resorts to a more offbeat approach.*” In addition to opting for a friendly, humorous approach in our advertising, we simplified a complex issue by focusing on one small message at a time.

### ***Initiative/Program: Downspout Disconnection***

Downspouts on many homes in the city carry rainwater from the building roof directly into the combined sewer system. During periods of heavy rainfall, the combined sewer system overflows, bypasses the treatment process, and discharges pollutants directly into our rivers and waterfront. These overflows affect our beaches' water quality. Over the next five years, Toronto's Water Pollution Solution's goal is to disconnect 40% of the existing connected downspouts in the city and to re-route the water from the sewer system onto the ground. This is a voluntary program that requires homeowners to take the initiative and sign up for the free service.

#### **Execution:**

Two ads have been created for downspout disconnection. In order to maximize the available money for the campaign, a targeted approach was used for the promotions. The first ad depicting a downspout with the words "Cut here to open beaches" made the link between downspouts and beach water quality and invited residents to participate in the program. We focused on two areas in the city. These locations were chosen because of a high incidence of connected downspouts and proximity to the lake, which helped residents to "connect the dots" and link what their action was (disconnecting their downspouts) with the impact on water quality.

The second ad had a more specific focus on basement flooding and was placed on outdoor media in neighborhoods where flooding had been a problem after severe rainfall. As in most of our ads, we used humor to deliver our message. The eye-catching ad shows typical basement contents, including a couch, chair and lamp, hanging on a clothesline to dry. As is appropriate for an outdoor medium, the visual carries the message and is supplemented by only one line of text: "Avoid the hassle of basement flooding." It was followed by contact information for downspout disconnection. This is something that residents can relate to and has a direct personal benefit for them. It also educates them on what can happen if downspouts are not disconnected.

The ad campaigns were augmented by brochures, media relations, information on the city's Web site, articles in a semi-annual newsletter (*Water Watch*) that is delivered door-to-door to every home in the city, an insert in the water bill, translated information, and a community outreach program. In addition, communications campaigns such as this, that are customized to neighborhoods and/or particular stakeholders, may include Councillor briefings, newsletters, special events, public consultation, signage, and liaison with local environmental groups.

### ***Initiative/Program: Pesticide Reduction***

It is raining hard. In a natural setting with a lot of grass or vegetation, the rainwater simply filters into the ground and replenishes the underground aquifer. However, like most large, urban centers, Toronto is a city with acres of concrete, asphalt, and brick which fundamentally changes the way rainwater travels. In Toronto's case, the water, and all it picks up on its journey, washes into the rivers, the waterfront, and Lake Ontario – Toronto's drinking water source.

Among the contaminants causing increasing concern in recent years are pesticides. The types of chemical pesticides that are used on residential lawns and gardens are building up in our environment and affecting human health. For the past five years, Toronto Water's public education campaigns have been aimed at explaining how pesticides are carried into stormwater, and how they are a health risk. We ask homeowners to decrease their pesticide use and build a tolerance for some insects and weeds as a reflection of a natural, healthy lawn.

In 2003, Toronto City Council passed a pesticide by-law, which came into effect in 2004. It significantly restricts pesticide use on public and private property and only permits the use of products that pose little or no health or environmental risks. It has been phased in, providing homeowners, lawn care companies, and other pesticide applicators with educational materials and warnings. (Tickets will be issued to lawn care companies beginning September 2005 and to homeowners beginning September 2007.) Toronto Water's approach has been to encourage a reduction of pesticide use before the heavy hand of the law comes into effect. If people change their habits voluntarily, there is a better chance of long-term acceptance and compliance.

### **Execution:**

Prior to the implementation of the by-law (2001 to 2003), three print ads were created providing information and asking residents to reduce their use of pesticides. Ads were placed in a wide range of community papers, major dailies, on transit shelters, and on litter/recycling bins.

The first ad, appearing in 2001, portrayed a realistic, harmless ladybug. Only upon closer inspection was it apparent that one of the lady bug's black spots was actually a tiny skull-and-cross-bones. The tag line, "Please keep poisons off the grass," completed the message by planting the idea that the use of pesticides actually poisons your lawn. The accompanying text read simply "This summer let your lawn grow natural. Don't use pesticides." This ad was ultimately featured in a major magazine article on the court battle between local municipalities and pesticides manufacturers and users.

In 2002 and 2003, aware that the battle of public opinion was heating up, Toronto tried its often-successful approach of using humor to sway public perception. That year's ads, again being more visual than text-based, featured two common garden inhabitants reacting to a pesticided lawn. In one, a stick-legged pink flamingo inches its way up between two trees to get off the poisoned turf. In the other, a garden gnome is seen on a manicured lawn clutching its tummy and holding its hand to its mouth in a classic "I'm gonna be sick!" pose. The headline simply asks "Using too many pesticides?", and invited people to the Web site for more information. In the print versions, an additional paragraph of text made the link between pesticide use and lake water quality. A resident who saw the newspaper ad wrote, *"Your print ads in the Star are great – eye-catching, informative, easy to read and understand yet with depth and good info."* Another wrote, *"Great job on the new ad campaign. I'm extremely pleased to see the water reference. It's very effective."*

In 2004 and 2005, following the by-law implementation, two new ads were created and placed in community papers, major dailies, on transit shelters, and on litter/recycling bins. In the first ad, we decided to tackle the underlying crux of pesticide use: the difference it makes on your lawn. We again used humor to get the message across. Outdoor media depicted a family standing on their lawn, recoiling in horror at the sight of a single dandelion. The headline, "Relax, it's just a weed" brought home the message. A second ad for the print media featured an obituary for "Dan DeLion" who passed away of "natural causes" i.e. being dug up by hand instead of killed by pesticides. The public response to both ads was very supportive. In addition to advertising, we used a phone hotline for more information on how to reduce pesticide use (416-397-LAWN), brochures, media relations, information on the city's Web site, articles in *Water Watch*, translated information, and a community outreach program.

### ***Initiative/Program: Beach water quality***

Pollution from stormwater runoff and untreated combined sewer overflows degrades the water quality of Toronto's creeks, rivers, and Lake Ontario. Excessive *E.coli* bacteria levels in the lake water result in signs warning that swimming at our beaches is a health risk. Toronto Water is actively educating residents on the connection between roadside catch basins and lake water quality and encouraging

commitment for various measures such as reducing fertilizer use, increasing porous surfaces, stooping and scooping pet waste, and properly maintaining vehicles.

### **Execution:**

The first messaging that was produced on beach water quality was deceptively simple. The two-panel ad and accompanying brochure depicted, firstly, an overturned paint can with a plume of orange paint flowing into a sewer grate. The second panel showed a man floating in the lake surrounded by a pool of the same orange. The simple, visually graphic image required no text. The accompanying slogan, “Not grate for the Lake,” reinforced the message by tying the words “grate” and “lake” together in people’s minds. A print version included additional copy.

The second ad depicted a photo of an automobile dipstick, dripping oil, poised over the lake water with the headline “Guess where the oil from your driveway ends up?” The ad referred readers to a free guide that explained more about stormwater pollution and what they can do.

Our next ad was a long-copy ad (headlined “In addition to “Please walk on the grass,” we want to make signs that read “Please swim in the lake.”) that provided people with much more information about the issue. For those who had begun to make the connection between their habits and pollution, the ad provided additional information for them to think about. A review in Marketing magazine opined, *“I like this one. The ad works two ways: The headline is strong enough to deliver the message without one needing to read all the copy, or, if one is particularly interested...one may read all the copy and learn more about what can be done to clean up the lake water. It’s a nice friendly ad; not at all pushy or preachy as public service messages so often can be. Nice work.”*

From there we went to the greatest communications tool of them all – television. Our commercial, with its extreme tongue-in-cheek approach, poked fun at white-coated scientists as they demonstrated “the sophisticated filtration device on our storm sewer system” that can prevent large objects, such as humans, from slipping through a sewer grate, but, alas, not oil, soap, or pesticides. This TV commercial received most of its play during the 2004 Summer Olympics. Public response revealed that many people loved this ad – some also hated it, but either way, they remembered it!

Our final execution brings us to our 2005 campaign. This award-winning campaign brought a new angle, and some new characters, into play on beach water quality public education. And one could say that the characters brought into play have the most to lose – Lake Ontario’s fish. We featured three of them, and three very simple messages, in our visual billboard campaign. Each campaign depicts a dejected-looking fish trudging out of the lake onto the beach. “Dog poo from your lawn ends up in the lake,” cries the catfish. “Suds from your driveway end up in the lake,” wheezes the trout, and “Pesticides from your lawn end up in the lake,” gasps the bass. Feedback, from both the marketing industry and from the public, has been expressly positive.

*“It’s nice to see a municipal ad that states a fact and then relies on citizens to draw the logical inference from it (they shouldn’t slather their lawns with pesticides). It’s difficult in a big city to make the reader feel that one person can make a difference...By focusing on one fish, the ad creates a scale that makes the efficacy of individual action seem plausible.”* –AdWeek

*“A quick note to say how much I like your new fish ads. I literally stopped in my tracks... Bravo! I believe these ads will work.”* –A Toronto resident

In addition to several of the print and outdoor campaigns, Toronto Water also ran radio advertising to complement what residents were seeing. The communications activities also included ongoing media relations, information on the city’s Web site, *Water Watch*, mall displays, translated information, fact sheets, a school outreach program featuring a specially-designed doll house, a water education phone line, participation at community events, and information officers delivering presentations to interested residents. A community outreach program was also developed wherein funding is provided to

community groups for the implementation of projects that further the goals and objectives of the *Water Pollution Solution* while complementing city-led capital works projects.

## ***Evaluation***

The communications strategies and tactics described here for the beach water quality and downspout disconnection programs were part of a submission that won the American Water Works Association's 2005 Public Communications Achievement Award. The award recognized Toronto Water for "significant accomplishments in communication – educating the public, promoting awareness and understanding of water issues, establishing media relations, implementing community involvement programs, and inspiring others to model behavior with the public that builds trust and credibility."

But how has the public responded to several years of public education effort?

In order to measure how successful we have been at relaying our messages about stormwater to Toronto residents, follow-up research was conducted in June 2004. The same research firm and methodology was used as in 2000. This allowed us to get accurate results that we could compare to our original research.

Results showed us that, since 2000, Toronto Water "*has been successful in elevating public awareness of several water quality and pollution issues. Significant improvements have been made in terms of awareness of stormwater pollution, knowledge of Toronto's water system, and ability to correctly identify the causes of stormwater pollution.*" These improvements "*may be linked to City of Toronto advertising*" which "*successfully broke through the clutter in terms of serving an educational function among the target audience.*" For example, nearly 50% of residents surveyed were aware of the recent television advertising campaign – a very high percentage for the Toronto market.

The research also showed that residents are much more likely to view the prevention of stormwater pollution as an individual responsibility now than four years ago. More importantly, residents are "*more likely than they were four years ago to take action against stormwater pollution – primarily by refraining from pouring hazardous material down the storm sewer and avoiding the use of pesticides.*"

It also highlighted some issues that we still need to work on communicating more clearly. For example, residents think that the beaches should be a source of pride for the city, but they are not confident enough to swim in them. And while more inclined to view pollution prevention as an individual responsibility, nearly three-quarters of residents were unable to identify a city action or initiative to reduce stormwater pollution. Now that we are making strides in bringing residents on side, we will need to make some effort in communicating what Toronto Water is doing about the issue so that it becomes a true partnership. The best collaborative efforts with our citizens include a three-pronged message – "this is the problem, this is what the city is doing and this is what you can do." Our middle prong needs more work.

## ***Successful strategies***

In retrospect, the approaches that we have used seem to have been successful so far. They can be summarized as follows:

- Find out what people know or "where they are" (in knowledge and on the behaviour-change continuum) so you can meet them there. Do your research.
- Be wary of being "too close to the issue." You lose sight of the average person's view and that is who you need to keep in mind when communicating.
- Develop a plan and modify as necessary as you go along.

- Do not rely on one tactic. Use a multi-pronged approach to deliver messages (a balance of messages received through advertising, media relations, householders, community outreach, etc.)
- If you have a small budget, try to dominate one media. Do not spread yourself too thin.
- People have busy lives. Your message needs to cut through the clutter. You are competing with Nike whether you want to or not!
- Break a complex message into small, simple pieces.
- Behaviour change is a long-term process. Be patient, it will not happen overnight.
- Deliver messages that resonate with the individual homeowner.
- Empower the individual. Give them practical solutions that they can implement to help out.
- Don't lecture or be preachy.
- Evaluate your program at regular intervals and tailor your tactics and strategies.

# A Federal Facility's Resource-Efficient and Proactive Approach to Phase II MS4 Permit Requirements for Public Education

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## **Abstract**

Fort Benning, located in Georgia, has taken a proactive approach to compliance with applicable Phase II Small MS4 NPDES permit requirements. This manuscript presents details concerning the steps taken for compliance with State and Federal requirements concerning Phase II stormwater regulations. Specific details regarding the approach, compliance documentation, integration with existing public outreach vehicles, augmentation of the current stormwater program, and maximizing the use of available resources with respect to environmental compliance are included in this presentation. While the State of Georgia Phase II NPDES General Permit for Federal Facilities is still in draft form, Fort Benning has initiated preparation of a comprehensive Storm Water Management Plan (SWMP). The SWMP outlines Fort Benning's approach for compliance in detailed, action-orientated steps. Included in this Plan are the steps to be taken to integrate Phase II stormwater requirements into existing public education vehicles.

Enhancement and integration with current installation programs has provided Fort Benning with efficient tools for compliance using limited resources. The SWMP also provides an implementation schedule, details concerning annual data collection and reporting requirements, and print-ready copies of specific public education materials. In addition, Fort Benning has maintained a strong relationship with Georgia Environmental Protection Division (EPD) representatives responsible for approval of the SWMP. The EPD is also responsible for Total Maximum Daily Load (TMDL) development and enforcement along the State's main drinking water source, the Chattahoochee River. Therefore, Fort Benning has integrated critical components of TMDL compliance into the SWMP.

The location of Fort Benning along the Chattahoochee River necessitates a comprehensive approach to compliance and required significant agency input for development of the SWMP. Installation representatives have also coordinated with EPD concerning details of the draft General Permit with regards to Federal facility program structure and compliance approach. The framework discussed in this presentation and the overall SWMP outline offer a proactive and efficient guideline for Federal facility compliance with Phase II stormwater requirements. In addition, this approach and public outreach integration details facilitate agency review and approval, while providing a workable plan that can be implemented using existing program resources.

## **Overview**

This manuscript presents details concerning steps taken for compliance with state and federal requirements under National Pollutant Discharge and Elimination System (NPDES) Phase II stormwater regulations at Fort Benning, Georgia. Specific details regarding the approach, compliance documentation, integration with existing public outreach vehicles, augmentation of the current stormwater program, and maximizing the use of available resources with respect to environmental compliance are discussed. Enhancement and integration with current installation programs has provided Fort Benning with efficient tools for compliance using limited resources. The framework discussed in this presentation offer a proactive and efficient approach for federal facility compliance with NPDES Phase II stormwater requirements. In addition, this approach and public outreach integration details facilitate agency review and approval, while providing a workable plan that can be implemented using existing program resources.

Fort Benning is an Army installation located south of Columbus, Georgia and occupies approximately 183,979 acres of land. Ft. Benning is divided into five major cantonment areas: Main Post, Lawson Airfield, Kelley Hill, Harmony Church, and Sand Hill. Each cantonment area is distinguishable by its geographical location and stormwater drainage patterns. The Chattahoochee River, which serves as the boundary between Georgia and Alabama, is located along the western portion of the installation. The river serves as the primary drinking water source for middle Georgia and provides Georgia, Alabama, and Florida with ecologically and economically significant resources. Current debate and resource claims are often in litigation among these states under an ongoing issue dubbed the “Tri-State Water Wars.” The Chattahoochee River is considered a vital resource in the region, and stormwater discharge to the river must consider regulatory and planning efforts at the local, regional, state, and federal levels.

### ***Regulatory Requirements***

In the State of Georgia, compliance with the Clean Water Act (CWA) and applicable U.S. EPA programs is mandated by state regulations. State regulations also authorize state stormwater programs to administer and enforce federal and state water quality regulations, including stormwater discharge permits. The legislative authority for state stormwater programs is provided in the Georgia Water Quality Control Act, O.C.G.A. 12-5-20 *et seq.* and the Erosion and Sedimentation Act, O.C.G.A. 2-7-1 *et seq.* The primary state programs developed to comply with state and federal stormwater regulations are the NPDES program, Erosion and Sedimentation Control program, and the TMDL program. The U.S. EPA delegated the authority to implement a NPDES program to the Georgia Department of Natural Resources (DNR) Environmental Protection Division (EPD). The Georgia EPD NPDES program has been approved by the U.S. EPA to administer a general permits program and a federal facility permit program.

Impacts to the Chattahoochee River are under scrutiny by both state and regional stakeholders; in addition, several tributary stream and main river segments are considered to be partially or significantly impaired for designated uses under the CWA. The development and industrial pressures on this resource include water withdraw and wastewater discharge by major cities along the river, including metro-Atlanta, Macon, and Columbus in the State of Georgia. In accordance with the CWA, Georgia has identified impaired water bodies and developed Total Maximum Daily Loads (TMDLs) for these areas, in coordination with the U.S. EPA. TMDLs for impaired stream segments located within the Chattahoochee River Basin are summarized in a document developed by Georgia EPD for regional water resource planning, entitled the *Chattahoochee River Basin Management Plan* (1997). TMDL implementation requirements regarding stormwater discharges are specific to each impaired stream segment, pollutant of concern, and potential pollutant source. Fort Benning is currently coordinating with Georgia EPD to comply with TMDL requirements through incorporation in applicable NPDES Phase I industrial source permit conditions.

The State Soil and Water Conservation Commission (SSWCC) also implements an Erosion and Sedimentation Control program required by the Georgia Erosion and Sedimentation Act. Regulatory guidance for this program is provided in the *SSWCC Manual for Erosion and Sediment Control*, December 2000. Fort Benning has maintained a strong relationship with Georgia EPD representatives responsible for approval of compliance with applicable stormwater regulations. Installation representatives have also coordinated with Georgia EPD concerning details of the draft General Permit for NPDES Phase II requirements with regards to federal facility program structure and compliance. The Georgia EPD has developed a General NPDES Storm Water Permit (Draft, No. GAGXXXXXX) and a Georgia Notice of Intent (NOI) to address stormwater discharges associated with small MS4s at military facilities. Military facilities considered to be small MS4s and primarily located within, or partially

within, a designated urban area and can apply for General Permit coverage by submitting a completed Georgia NOI.

The Georgia NPDES program also requires a permit for construction activity disturbing between one and five acres. The Georgia EPD NPDES program has developed a Construction General Permit (CGP) for operators of small construction activities and operators (such as military facilities) can apply for CGP coverage by submitting an NOI for each small construction activity. Currently, the draft permit requires development of an Erosion Sedimentation Pollution Control Plan (ESPCP). The ESPCP identifies BMPs to reduce pollutant runoff from construction activities and establishes procedures to collect and analyze samples from the receiving stream(s) or stormwater outfall(s). One comprehensive ESPCP may be submitted for compliance with both the NPDES program and the Erosion and Sedimentation Control program. Lastly, the draft NPDES Phase II General Permit requires development of a Storm Water Management Program. At Fort Benning, documentation for this program is provided in a Storm Water Management Plan (SWMP).

Local requirements must also be considered in the SWMP and subsequent BMP activities. At Fort Benning, Columbus Water Works maintains the installation water and sewer infrastructure and has developed ordinance requirements consistent with a Middle Chattahoochee Watershed Management Study. These ordinances must be considered regarding issues such as chlorinated water discharges to the sanitary and stormwater systems and potential cross-connections among these infrastructures that may affect stormwater runoff and ultimate discharge to the Chattahoochee River. In addition to federal, state, and local requirements, the U.S. Army has developed guidelines for watershed and stormwater management at Army installations entitled *Environmental Protection and Enhancement*, Department of the Army Pamphlet 200-1. These guidelines were developed to ensure Army facilities comply with applicable environmental regulations, including Phase II Storm Water Management Program requirements. The U.S. Army Environmental Center (U.S. AEC) has developed a Storm Water Guidance Manual (2005) and model SWMP for implementation at Army installations. Information concerning U.S. AEC services and guidance manuals are located at the following Web site: <http://aec.army.mil/usace/compliance-p2/watershed00.html>.

### ***Stormwater Management Plan (SWMP) Development***

While the State of Georgia Phase II NPDES General Permit for Federal Facilities is still in draft form, Fort Benning has initiated preparation of a comprehensive Storm Water Management Plan (SWMP). The SWMP outlines Fort Benning's approach for compliance in detailed, action-orientated steps. Included in this plan are the steps to be taken to integrate Phase II stormwater requirements into existing public education vehicles. The SWMP also provides an implementation schedule, details concerning annual data collection and reporting requirements, and print-ready copies of specific public education materials.

The Fort Benning small MS4 is comprised of residential, commercial, and recreation land uses at the installation, encompassing approximately 5,788 acres of non-contiguous land within the five major cantonment areas. This estimate is based on total area measurements compiled based on land use classifications consistent with the definition of a small MS4. This estimate excludes training lands, industrial areas, and installation areas located in Alabama. Stormwater drainage associated with these areas will be subject to permit conditions and approval, as described in the Georgia EPD NPDES Phase II General Permit. The location of Fort Benning along the Chattahoochee River necessitates a comprehensive approach to compliance and required significant agency input for development of the SWMP. The SWMP is structured as a flexible framework to ensure compliance with Minimum Control Measures (MCMs) required in the permit. The SWMP information is presented in the following categories:

- Plan Certification and Installation Compliance Authority
- Record of Revisions
- Regulatory Overview and Facility Description
- Best Management Practices
- Implementation Schedule
- Evaluation and Compliance Reporting
- Appendices:
  - ▷ SWMP Maps
  - ▷ Georgia EPD Draft General Permit and NOI
  - ▷ Public Outreach Materials
  - ▷ Reporting and Documentation Materials

The state permit required compliance with several MCMs. Actions and practices implemented to fulfill these MCMs are denoted as Best Management Practices (BMPs). At Fort Benning, several organizations are responsible for multiple actions that may qualify as BMPs. Therefore, in addition to delineation of the small MS4 areas, installation organizational responsibilities were also clearly delineated through data collection, report reviews, and staff interviews. An example of this delineation is provided in the table below.

**Table 1. Summary of Organizational Responsibility**

Organization	Land Use Areas and/or Activities
Fort Benning Department of Public Works (DPW) – Environmental Management Division (EMD)	Construction/land development projects, stormwater system mapping, wastewater system mapping, pest management services, hazardous waste disposal, natural habitat monitoring, and natural resource planning
Army Corp of Engineers	Large construction and land development projects
DPW – Housing Division (until December 2005) RCI (after December 2005)	Family Housing Areas (tenant rules, landscaping, debris disposal policies, community recreational areas and pools, and house maintenance and repairs) RCI to be responsible for lawn maintenance in Family Housing Areas in 2006
DPW – Maintenance Division	Vehicle and fleet maintenance
Community Services Division and AAFES	Hospitals, schools, headquarters, administration, Golf Course, community facilities, swimming pools, recreation areas outside of Family Housing Areas, Commissary, churches, gasoline/convenience stations, car washes, oversight of drive through food facilities owned by private companies
DPW – Housing Division, Community Life Office, and troops (unit personnel)	Family Housing Areas and Troop Housing/barracks (debris removal and clearing, lawn maintenance at individual houses)
Troops (unit personnel), Community Life Office, and Military Police	Debris collection at barracks and Main Post (general areas canvassed by Military Police)
DPW contractor (Sinoi)	Trash and yard waste collection/disposal at all base areas – after December 2005, RCI will be responsible for trash collection/disposal at Family Housing Areas
DPW Contractor (Shaw)	Roads and grounds maintenance (landscaping and routine maintenance/debris removal) for Post Cemetery, road medians, road shoulders, slopes, parking lots, office buildings, and barracks (troop housing); street sweeping at Main Post and Housing located at Main Post (other areas may be included by work order request), routine storm water ditch maintenance; BMP maintenance and inspections as requested by work orders
DPW Contractor (Annual Bid Awarded)	Lawn maintenance – mowing contract for the entire base
Columbus Water Works (local water provider – City utility)	Provision of drinking water; operation and maintenance of drinking water infrastructure

Once these organizational areas were identified, existing stormwater-related program activities were reviewed to determine those representing suitable BMPs. Available tools and information currently in place at Fort Benning were then matched with these BMPs and additional measures that may be required to ensure sufficient BMPs were selected for each MCM. For example, several installation programs and activities that were evaluated as potential BMPs, or to facilitate BMP implementation, included:

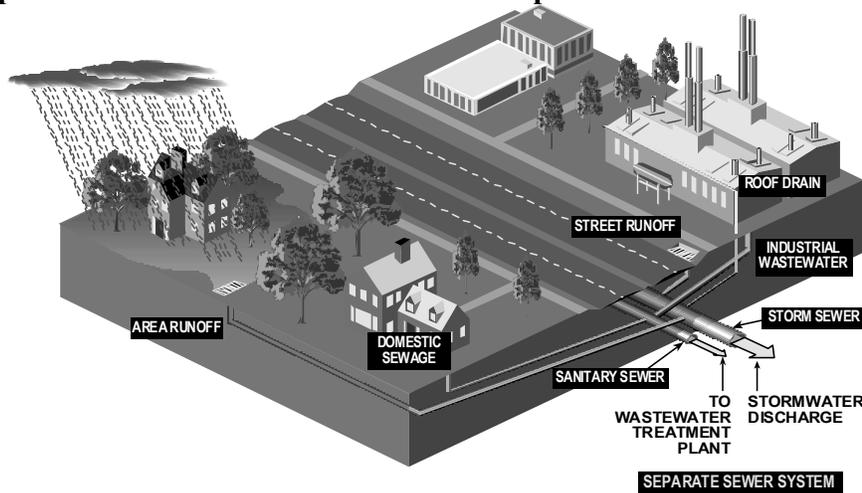
- Other Compliance Plans/Program Activities
- TMDL and Phase I Monitoring Requirements
- Contracting Environmental Compliance Requirements and Checklists
- Installation Community Relations Activities (Earth Day)
- Family Housing Communication Tools
- Unit Training and Inspections; Troop Housing Policies
- Installation-Wide Media Outlets
- Installation Schools and Events for Children
- Storm Water Maps – GIS Databases
- Installation Master Plan – Land Use Surveys
- Other Environmental Program Goals and Measures
- Various Installation Program and Plan Update Requirements
- Army Record Requirements and Documentation
- Multiple Training and Inspection Programs
- Multiple Common-Area Displays
- Single Point of Reporting and Response (Command Structure/Internal Dispatch)

Criteria for selection of BMPs were to not only reflect MCM requirements; BMPs selected must also be measurable in such a way to demonstrate achievement of action-orientated goals. The ability to record, track, and measure BMP implementation, for each MCM, on an annual basis is the key to a successful plan that demonstrates compliance with the state permit.

### ***Public Involvement Strategies***

Public Involvement Materials selected for use in MCM BMPs were evaluated based on potential nonpoint pollutant sources, the target audience, and ease of distribution. Fort Benning is a multi-use installation consisting of residential, commercial, industrial, and roadway areas, as depicted in the diagram below. Potential sources from small MS4 areas include roadway debris, fuel and oil roadway residue, trash, illicit dumping, household hazardous chemicals, lawn and garden fertilizers and pesticides, building roofs and drains, and construction erosion.

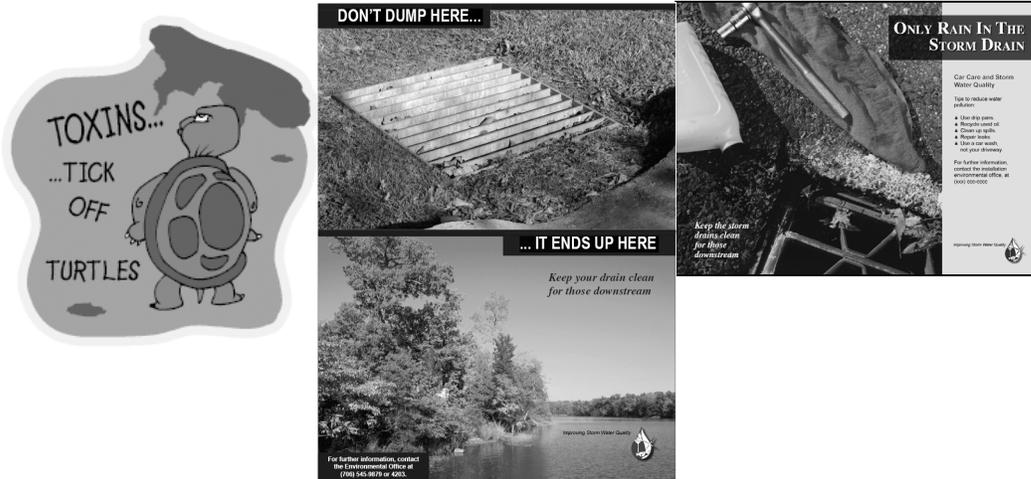
**Figure 1. Multiple Use/Pollutant Source Land Area Depiction:**



The day labor population at the installation may be greater than 100,000 at any given timeframe. Residential populations are considerably lower, and are temporary in nature. Troops, new recruits, and

their families are often at Fort Benning for short durations. Therefore, fostering a sense of community ownership and stewardship must originate based on fostering the Army commitment to excellence and unit pride. These types of materials are typically embodied in motivational tools and materials that reflect compliance as a component of supporting the installation and individual unit mission. Public involvement materials were selected and modified for adults and school-age children from U.S. EPA, U.S. AEC, and Clean Water Campaign (a regional program) sources. Several such resources selected are depicted below.

**Figure 2. Example public involvement materials selected for use at Fort Benning:**



Distribution of educational and other public involvement materials was determined based on existing installation vehicles. Fort Benning has a periodic newspaper, residential housing manuals, common area displays, a scrolling marquis, a Cable Access Channel, radio station, schools, mandatory training, barrack and residential housing policies, and other potential ways to easily distribute materials within current installation vehicles and activities. The tables below demonstrate how the BMPs, distribution mechanism, and record keeping measures were compiled for the public involvement MCMs.

**Table 2. Public Education and Outreach (MCM 1) Actions/Activities**

Action/Activity	Schedule	Reporting Measures	Supporting Documentation	Comments
“Bayonet” newsletter insert	Years 1 to 4	Number of inserts/newsletters distributed to residents	Copy of inserts and dates	A storm water insert will be included on a regular basis
RCI’s new Family Housing Handbook	Years 1 to 4	Number of Handbooks	Copy of Handbook	Each new resident receives a Handbook upon arrival with storm water inserts
Article in the “Ledger – Enquirer”	Year 1 to 4	Number of newspapers	Copy of article	A storm water insert will be included
Command Access TV Channel	Year 2	Number of houses with access	Copy of message	Slides sent to public affairs office

Action/Activity	Schedule	Reporting Measures	Supporting Documentation	Comments
Installation Marquis	Year 3	Number of times message appears	Copy of message	Send copy of message to DCA office
Storm Water Quality Brochure	Year 1	An email with the brochure attached	Copy of email	Request brochure distributed to all personnel
Posters at Common areas	Year 1	Number of posters and where located	Copy of posters	Posters in administration, dining, and housing areas

**Table 3. Public Participation and Involvement (MCM 2) Actions/Activities**

Action/Activity	Schedule	Reporting Measures	Supporting Documentation	Comments
Volunteer monitor and clean-up group	Year 3	Number of volunteers and amount of debris	Photographs of event	Volunteers solicited through public notices and Stakeholder Meeting
Earth Day and other Events	Years 1 to 4	Number of participants; Number of handouts	Photographs of event	Activities in past include: Information Booth at school or library, Essay Contest, Poster Contest, Fair, and Recycling
24-hour Spill Response Number	Years 1 to 4	24-hour number established	Number of calls/reported spills	Phone number (spill beeper) is distributed to residents, posted on website, and included in materials

An important part of SWMP implementation is record keeping and documentation. These items facilitate the annual reporting requirement included in the permit. An Excel spreadsheet is used to track events, training, material distribution, among other BMPs selected for each MCM. The reporting format is based on a template provided by Georgia EPD. Information tracking and goal measurement is designed for direct transfer between SWMP checklists and the annual report format. In addition, print-ready materials are provided for ease of production and distribution during the year. Information solicited from other installation organizations, such as the amount of debris removed during street sweeping, is requested in a pre-designated format based on data collection, interviews, and criteria established in the SWMP. MCM checklists are also provided by year and by MCM for the SWMP manager to complete; these checklists detail information required and source contact information needed to facilitate information collection. Data collected based on these checklists are then directly transferred to the annual report for submittal to Georgia EPD.

### Resource-Efficiency Tools

Several resource-efficient tools were used to develop the SWMP and develop BMPs for the public involvement MCMs. These tools were critical to ensuring compliance with the permit; there are limited resources available to the installation due to multiple program requirements for staff members and the lack of revenue stream for installation utilities. Environmental compliance funds must be programmed in advance of each fiscal year and may be subject to re-distribution based on mission-critical priorities. The tools used for Fort Benning's SWMP are listed below.

- Environmental Program Areas Activities and Goals/Required Planning
- Pollution Prevention and Environmental Management System Goals and Activities

- Water and Wastewater Utility Requirements
- Installation General Plan/ Land Use Designations
- Contracting/Construction Design/ ESCP Requirements
- Record Keeping Requirements (DoD, Army Inspections, Federal, State)
- Reporting Requirements (DoD, Army, Federal, State)
- Authority and Signature Delegation to Program Managers
- Early Coordination with EPD to Identify Challenges
- BMP Leveraging
- Combined Inspections
- Tracking of Environmental Plan Reviews
- Annual Compliance Checklists
- Use of Existing Public Education Materials
- Ongoing Training and Classes

### ***Lessons Learned***

The development of the SWMP involved extensive early stage planning efforts including data collection, document reviews, and staff interviews. Some of the lessons learned that worked well or were determined not to be advantageous are listed below.

- Best Educational Message: Support Mission – Ensure Compliance
- Audience is Temporary – make policies/message posting, orientation materials, and unit pride
- Request a General Permit for Military Facilities to Facilitate BMP Selection
- Training Lands and Ranges – request these to be under non-MS4 designation; these mission critical areas have limitations
- SWMP Integration into Existing Programs
- Program Funding for Storm Water Mapping – for an installation that has housed the Calvary – infrastructure undergoes dramatic changes over time and drainage mapping is not simple and may cover vast areas
- Contract Terms May Limit BMP Implementation – BMPs must work within contractor scope and terms until contract is renewed or re-bid
- Templates Facilitate Contractor Compliance

# Clean Water—Who Cares? Translating Public Understanding into Successful Communication Programs

**Karen M. DeBaker**

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## Abstract

*I sent out a “Clean Water Tips” brochure, so why do these homeowners still continue to use harmful chemicals on their lawn? Don’t they care about clean water?*

If you print it, people will read it and change. This mantra has long been the standard practice for stormwater public education and outreach campaigns. While residents glanced and then tossed out yet another brochure, phosphorus, nitrogen, and bacteria levels remained unchanged in our rivers and streams.

This issue prompted a re-evaluation of how Clean Water Services delivers our messages. After nearly 15 years of experience, we have learned that we need to provide incentive tools and understand the barriers to behavior change. Therefore, Clean Water Services’ survey, *Do Clean Rivers Begin at Home? Exploring the Obstacles and Motivations of Homeowner Behavior* looked specifically at behaviors towards the use of lawn/garden chemicals; use of native plants; and proper dog waste disposal. This information helped us develop water quality education programs that hurdle the obstacles and tap into the motivations for behavior change.

This paper will discuss our survey results:

- How do homeowners deal with doggie “do-rage?”
- What percentage of homeowners even know where the water goes after it enters storm drains and ditches?
- Does the “Leave it to Beaver” neighborhood aesthetic still thrive today?
- Do homeowners care if their lawns are on drugs?

This paper will discuss our public outreach campaigns:

- Does a little girl on a green lawn “sell” organic lawn care?
- How important are the freebies?
- What’s a ladybug got to do with it?
- It’s a bird, it’s a plane, it’s the Clean Water Hero!
- Okay, but did they work? How do we measure clean water campaign success?

Finally, I will stress the importance of partnerships. How sharing information, goals, data, materials, and expertise to convey the same clean water message is vital to social marketing campaign success. We are all in this together, let us use what we know and use what works. Water-is-water-is-water no matter how it is used or where it comes from. Keeping it clean and healthy is everyone’s right and everyone’s responsibility. You *can* get the clean water message across, and still have fun. Just make sure you know what makes your target market tick.

## Background

Clean Water Services is the sanitary sewer and surface water management utility for 12 cities in the urban portions of Washington County, Oregon, small portions of the cities of Portland and Lake Oswego, and Multnomah and Clackamas Counties. Clean Water Services serves nearly 500,000 residents and businesses in one of the most rapidly developing areas of Oregon. Clean Water Services’ service district covers 122-square miles, all of which drain to the Tualatin River.

Operational since 1970, Clean Water Services’ wastewater utility owns and operates four treatment plants, 41 pump stations and manages more than 720 miles of collection lines. In 1989, Clean Water Services became responsible for provision of regional stormwater management services within its

service district. The Surface Water Management (SWM) Plan was completed in 1990, and provided an overall framework for the control of non-point source pollutants. Today, Clean Water Services works with our 12-member cities to manage storm and surface water for water quality protection and improvement, flood management, and the protection of fish and aquatic habitat. The SWM program's infrastructure includes more than 900 water quality facilities that have been constructed since 1990 (both privately and publicly managed), more than 1,200 miles of stormlines and open ditches, and more than 130 miles of open streams.

### ***You say To-may-to, I say to-mah-to***

A healthy environment and livable community is everyone's right and everyone's responsibility. So promoting clean water seems easy, right? However, what "healthy" and "livable" mean to Bob are not necessarily defined in the same manner by his next door neighbor Larry. In addition, whose health are we talking about? Humans? Animals? The watershed? You need to know what is important to your target market and what makes them tick in order to effectively communicate your clean water message. Unless you are able to go door-to-door and spend quality time getting to know your residents intimately, your best option is to conduct a survey to find out what is guiding your community's beliefs and actions.

In 2002, Clean Water Services executed two scientific surveys that looked at the values, motivations, and behaviors of our customers. Our *Public Values Assessment Survey* identified relevant baseline public values and expectations in order to help us develop responses to the Clean Water Act and Endangered Species Act requirements, and to clarify the public's understanding of impediments to healthy streams.

The second survey *Do Clean Rivers Begin at Home? Exploring the Obstacles and Motivations of Homeowner Behavior* supplemented previous public awareness and value studies with data relating specifically to actual habits. The purpose of the survey was to also examine the barriers to, and incentives for, better water quality behavior.

You have to remember that 'regular' people do not think much about water quality, wastewater treatment, or stormwater management. Survey data show us that people do not even have a clue about the basic aspects of water quality. However, surveys consistently show they care deeply about clean water.

In the values survey, we used a comparison exercise that forced respondents to rank the *relative* importance of different, sometimes competing, items. The top two priorities were "clean rivers and streams" and "clean drinking water." Among the general public, "compliance with laws to limit pollution" also showed up among the first tier of priorities.

The survey also asked respondents to rank a number of "threats" to the Tualatin River and its tributaries. The general population believed that industrial pollution was the leading cause of water pollution problems in the Tualatin. What that shows us is that we cannot engage the public in changing their habits, because they do not see themselves as the problem. The problem is the "smokestack." We have to continually remind people that the industrial pollution problems have been solved before we can even engage them in a discussion of their role.

Water quality messages need to focus on drinking water, clean rivers and streams, and limiting pollution. The less important values are flood protection, increased water supply, and health of fish populations in local streams.

From our behavior survey, we noticed a positive trend in the number of people that can identify that stormwater drains to a nearby creek or river. This is improving, but still only 50% know that stormwater drains to nearby creeks and rivers.

How do we change public habits? Our residents told us:

- People wash their cars at home because it is cheaper. If they knew more about the recycled water aspects, they might use a commercial car wash.
- People used toxic weed and bug control because it works. If alternatives were better known and less costly, people might change.
- To get people to give up a lawn, homeowners want help in redesigning their garden, with technical support, and with plant installation.
- People leave their dog poop behind because it is difficult and inconvenient to pick up. The pollsters received the largest number of negative responses in discussing this question with the respondents. A behavior modifier would be fining people for leaving behind dog poop. People really want a sting-type operation for this—there is lots of “do-rage” around this issue.
- People do not volunteer for stream restoration projects because of lack of time and lack of information about volunteer opportunities. Solving this will mean using existing organizations like service groups, scouts, and churches.

The public wants money-saving deals for practical tools to improve water quality. The bottom line is the bottom line.

### *The Clean Water Toolshed*

What to do with all of this important survey work? Listen and disperse the proper tools. Our stormwater public education campaigns follow the basics of community-based social marketing whereby we look at the barriers and incentives to behavior change. Our residents already told us what they needed, so we now can give them the specific tools and techniques to encourage clean water behavior.

#### **Get your lawn off drugs**

Three successful campaigns strived to encourage pesticide-free lawn care through the use of organic fertilizers, water conservation, and native plants. Clean Water Services’ “Go Native” campaign is in action for the second year. In order to protect our streams, it encourages residents to plant native plants, which



require less water and fewer chemicals. The campaign includes 30-second radio spots, a newspaper ad, bus tail, and billing insert. The simple tagline “Native plants. Less water. Fewer chemicals. Healthy streams.” gets right to the point with cost-saving reasons for using native plants; at the same time, it makes the connection to improving water quality. In our radio spots, we even add the connection between native plants and public health with “Native plants. Good for your yard, good for your health.”

**Clean water tool(s):** Residents can request for a free *Gardening with Native Plants* poster containing colorful photos of native vegetation along with their growing conditions. Or, they can go to our online Native Plant Finder to plug in their landscape traits and receive of list of suitable plants with photos for their yard.

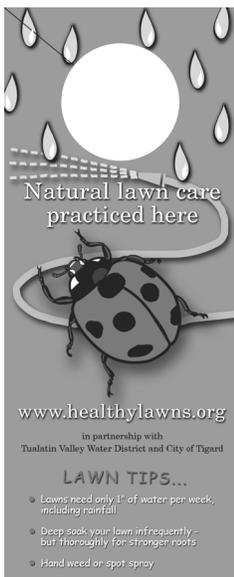
**Results:** During last year’s campaign, we received more than 7,000 requests for native plant information that came from visits to the online Native Plant Finder, phone calls, and emails.

The second and third pesticide-free campaigns involve partnerships with other agencies. The “Is Your Yard Chemical-Free? Maybe It Should Be” media campaign is sponsored by regional stormwater agencies combining their education funds and expertise. The campaign included a radio spot and images in newspapers, transit, and printed billing inserts that showed a little girl lying in the green grass with a boy pulling his puppy in a wagon in the background—direct links between lawn chemicals, pet and public health. Focus groups conducted by the agencies clearly showed their child’s and pet’s health ranked much higher than that of fish and wildlife, environmental health, or even stormwater.



**Clean water tool(s):** Residents can call and request a free Natural Lawn Care Kit that includes gardening gloves, native plant seeds, coupon for discounts on organic lawn products and where to purchase them, and a printed consumer guide that ranks common lawn and garden products according to their human, animal, soil, and water pollution hazard.

**Results:** Over 5,000 kits have been requested in the Portland Metro area in the last five months.



The third lawn care campaign is the Lawn Care Pilot Project which borrowed the “Is Your Yard Chemical-Free? campaign images. The purpose of the project is to advance the science of community-based social marketing and assist agencies in developing more effective and cost-efficient public education programs. The Project is a joint effort between regional stormwater agencies, local cities, and the Department of Environmental Quality. Neighborhoods in three cities were segmented and given incentives of varying quality and quantity to encourage healthy lawn care behavior. Incentives included coupons for natural lawn care products, informational brochures on healthy lawn care tips and an offer to enter a drawing for a free lawn care consultation, and mulching mower. In addition, colorful magnets and hose tags were distributed which included a ladybug and the “Natural Lawn Care Practiced Here” message as part of resident’s pledge. We did a pre- and post-test to mark any behavior changes.

Key lessons learned include:

- Many residents do not view “weed and feed” as a hazardous chemical herbicide so future education efforts will need to draw the connection between “weed and feed” and lawn chemicals/herbicides.
- Outdoor pet owners seem concerned about the risks of “weed and feed,” so the effect of “weed and feed” on pet health may be a helpful relationship to stress. Pet owners seem more concerned than do parents with children under 12 years; perhaps they have less control over their pets than their children.
- Residents, especially in the city of Eugene (a progressive university town), are as concerned with the environmental risks posed by “weed and feed” as the health risks, so the environmental message may be as effective as the health message.
- The survey showed that most people feel that lawns are safe for children and pets within one day to one week after “weed and feed” application. (Actually, it takes two to eight weeks for the lawn to be safe to play on.)
- Personal contact with residents leads to better response.
- People care more about children and pets than fish and water quality.
- Agency politics affect the language that could be used.
- Partnerships are essential.

This information was applied to the 2005 Lawn Care Pilot Project which is currently underway and will be complete next month. It includes the individualized marketing approach calling for the identification of individuals who express an interest in alternatives to “weed and feed” to help them get the exact information they need to make the change rather than inundating every resident with the same message. 2005 project elements include:

- One-on-one conversations with homeowners by walking a neighborhood;
- Creation of the <[www.HealthyLawns.org](http://www.HealthyLawns.org)> Web site (right) which includes a free lawn sign and sticker for those pledging online to practice natural lawn care;
- Giveaways: Free natural lawn care and water conservation assessments, hose tags, magnets, coupons, and informational brochures; and
- Presentations and displays at groups/organizations including home and garden shows, neighborhood associations, farmer's markets, garden clubs, day care centers, moms groups, and faith-based groups.



### ***Make it Personal***

As I stated, the image of a little girl lying in the green grass with the message “Is Your Yard Chemical-Free? Maybe It Should Be” makes that direct link between lawn chemicals and public health. As we saw in our values survey, residents value clean drinking water. They value water as it affects public health. The less important values are flood protection, increased water supply, and healthy fish populations in local streams.

Clean Water Services’ Clean Water Hero campaign added another human element with short features on residents we’ve dubbed “Clean Water Heroes” for their positive water quality behaviors. We use stories focusing on real people in our billing inserts, newsletters, and soon to be posted on our website. We highlight the results, benefits, and outcomes of their clean water behavior rather than focusing on the “how-to” or “what not to do.” Lush native landscaped yards with green grass void of chemical enhancers sends the message “We did it. You can too.” Again, we also included promotion of the *Gardening with Native Plants* poster as their guide to similar natural landscapes.

### ***Conclusion: Measuring Clean Water Results***

Did the freebies work? Is the water clean? Measuring the effectiveness of stormwater education campaigns is difficult. Cleaner rivers and streams result from cumulative behavior changes over time. That is because we have to understand the values that drive people’s behaviors. Our surveys show that clean water is important for most people. But, how they define “clean” and how they value its importance varies from person to person. Norma is an environmentalist and believes clean water is important for fish and wildlife. Mary on the other hand, as a mother, values clean water as a nutrient for her family. You cannot change behavior unless you get to the value that guides it.

In previous years, we have measured effectiveness simply by noting the quantity of brochures printed and mailed or by how many people we spoke with at community events. Then, we moved forward to noting how many residents took the initiative and contacted us in order to request clean water

tools in response to printed, transit, and radio promotions. Currently, we're in the process of following up with those residents who've received these tools and noting if they've used them and made any behavior changes. For example, we are following up with residents who requested our *Gardening with Native Plants* poster and noting how many of them actually bought native vegetation, planted it, and/or reduced their use of chemicals.

Surveys are another way to get insight into residents' values and assess their understanding of how they impact water quality. If we found that 90% of our surveyed sample knew that what goes into storm drains goes directly into the rivers, we would rejoice and hope that translated into clean water behaviors. Then again, we must remember that we are measuring *reported* behavior not necessarily *actual* behavior.

The biggest challenge for stormwater educators is to take our campaign measurement to the next level. We need to find a way to monitor the water quality of the clean water hero's neighborhood stream after he has adopted his healthy watershed behaviors. How we get to that point with increasingly limited resources is a struggle. Until then, we need to work towards educating the public with practical tools that are designed to meet their values and needs. There is a force guiding every behavior, and unless you know what makes your target market tick, you have not yet begun to help residents adopt what we all work daily to protect—a clean water lifestyle.

# The Neighborhood Water Stewardship Program: An Innovative Approach to Behavior Change in Northern Virginia

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## Abstract

A major challenge to improving water quality in streams is getting residents to change behaviors that contribute to nonpoint source (NPS), or stormwater runoff, pollution. The Neighborhood Water Steward Team Program goes beyond many NPS education programs to help residents learn new behaviors that prevent water pollution. The program is a partnership of a non-profit organization "Arlingtonians for a Clean Environment" and three localities in northern Virginia (near Washington, D.C.) To become water stewards, volunteer team leaders create neighborhood-based teams that learn about preventing water pollution. The program is derived from the Empowerment Institute's "Ecoteam" program, and was created in partnership with the Empowerment Institute.

Each Neighborhood Water Steward team involves five to eight households and meets five times over a four-month period. With the help of a step-by-step workbook and a trained volunteer coach, the teams choose from a series of practical actions to reduce NPS and improve water quality. The actions are written in a simple format and designed to not overwhelm participants (even someone very new to the concepts). There are three categories of actions: 1) actions to protect water quality, 2) actions to conserve water, and 3) actions to increase community involvement. Example actions include cleaning up after your dog, fixing oil leaks on your vehicle, reducing use of fertilizers/pesticides on your yard or garden, creating a rain garden, and reducing paved surfaces around your home.

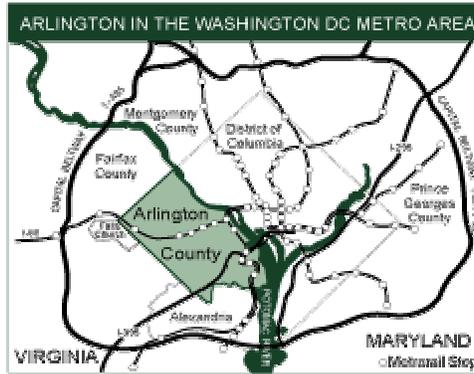
A critical component of the program is information tracking. Team members complete a "before" and "after" assessment form that allows program managers to track which actions team members have adopted and to calculate the environmental benefits of those actions. To date, we have trained 38 team leaders who have led 19 teams through the program. These teams have taken a total of 615 separate actions to protect water quality or conserve water. These actions have resulted in an annual savings of over 1,200,000 gallons of water.

The Neighborhood Water Steward Team program is an important component of the education strategy for the three localities to meet MS4, Tributary Strategy, and TMDL public education requirements. Program partners have developed a strategy to continue to expand the Water Steward Team program with the eventual goal of creating 1,400 Water Steward Teams (representing approximately 15% of the population).

## Background

Arlington, Virginia is an urban county of about 26 square miles located directly across the Potomac River from Washington D.C. (see Figure 1). Arlington had an estimated population of 198,267 on January 1, 2005, reflecting a 5% increase since 2000. It is among the most densely populated jurisdictions in the country with a population density of about 7,700 persons per square mile—higher than cities such as Seattle, Minneapolis, and Pittsburgh. Arlington's population is racially, ethnically, and culturally diverse. More than 40% of Arlington's residents are Hispanic/Latino, African-American, Asian, or multi-racial. Arlington residents are among the most highly educated in the nation, with over 60% of adults age 25 and older have a bachelor's degree or higher and 30% have a graduate or professional degree.

**Figure 1. Map of Arlington County in the Washington, D.C. Metro area**



Development in Arlington has significantly impacted the nearly 30 miles of perennial streams in the county. More than half of the county's original stream network has been replaced by a dense network of underground storm sewers. During storms, these storm sewers convey a large volume of runoff and pollutants to streams at high velocities, causing stream bank erosion, water quality problems, and habitat degradation.

Today, Arlington County is a highly urbanized jurisdiction, with 30-40 percent of the county covered by impervious surfaces such as streets, parking lots, and buildings that do not allow rain to soak into the soil. In general, stream degradation begins when imperviousness exceeds 10 percent, and significant deterioration occurs beyond 25 percent imperviousness (Caraco et al., 1998). Urban development and runoff are among the leading causes of water pollution in the U.S., and more than 20 percent of streams and rivers inventoried by states are impaired because of urban runoff and its effects on water quality and stream habitat (US EPA, 1996).

Four Mile Run is the largest stream in Arlington County and drains approximately two-thirds of the county. The 20-square mile watershed includes portions of Arlington and Fairfax counties and the cities of Alexandria and Falls Church. Lower Four Mile Run was channelized in 1975 following several large floods, and Four Mile Run is listed by the state as a 303d polluted stream. Litter, lawn and garden chemicals, automotive chemicals, and *E. coli* bacteria, as well as sand and sediment, continually degrade the water quality and inhibit aquatic plant and animal life. Many of the watershed's citizens, however, are unaware that water entering storm drains flows untreated into Four Mile Run, the Potomac River, and the Chesapeake Bay.

A Total Maximum Daily Load (TMDL) plan for fecal coliform bacteria has been created for Four Mile Run, with the TMDL Implementation Plan completed in 2002. The Neighborhood Water Steward Team program is an important component of the public education strategy for the three participating localities to meet Municipal Separate Storm Sewer System (MS4), Tributary Strategy, and TMDL public education requirements. In addition, federal funding has been appropriated for a Four Mile Run Restoration Master Plan project to study the flood channel portion of Four Mile Run and create a plan for improving this portion of the stream. Partners on the restoration project include Arlington County, the City of Alexandria, the Army Corps of Engineers, and the Northern Virginia Regional Commission.

### ***Program Development***

A major challenge to improving water quality in streams is getting residents to change behaviors that contribute to nonpoint source (NPS) pollution, or stormwater runoff. The Neighborhood Water Steward Team Program goes beyond many NPS education programs to help residents learn new behaviors that prevent water pollution. The program is a partnership of the following: a non-profit organization,

Arlingtonians for a Clean Environment; Arlington County; the City of Falls Church; and the City of Alexandria. To become water stewards, volunteer team leaders create neighborhood-based teams that learn about preventing water pollution. The program is derived from the Empowerment Institute's "Ecoteam" program, and was created in partnership with the Empowerment Institute with the use of grant funding from the National Fish and Wildlife Foundation.

The Water Stewardship Program is unique among NPS education programs for several reasons. This program goes beyond simply educating residents about preventing NPS pollution and helps them learn new behaviors to protect water quality and conserve water. Participants in the program complete a "before" and "after" assessment, so the program managers can track which new behaviors team members have adopted. A trained coach works with each team, leading some of the team meetings, which helps ensure success of the teams. The neighborhood participation component is also a unique way to attract some team members who may not be interested in environmental issues.

The underlying theory that is the basis for this program is social diffusion research, as described by Everett M. Rogers (*Diffusion of Innovations*, 1995). Rogers studied many types of innovations and how they spread throughout society. He found that people vary in their openness to new concepts or technology. Approximately 15% of the population are innovators or early adopters, and will quickly adopt innovations. Following the innovators and early adopters is the early majority (34%), the late majority (34%) and the laggards (16%), who many never adopt the innovation. Rogers also found that innovations that will succeed in society become unstoppable after reaching the early adopters, or 15-20% of the population.

This information is useful to those doing NPS and environmental education, as it shows it is not necessary to reach 100% of the population. Behaviors that prevent NPS pollution may spread throughout the population once they are adopted by the early adopters, or approximately 15% of the population.

The three key points that are used to market the Water Steward Team program to team leaders and their neighbors are:

- ▷ Get to know your neighbors better and build community;
- ▷ Improve local water quality in streams; and
- ▷ Improve the neighborhood.

### ***Program Overview***

In 2003 and 2004, the Water Stewardship Program and materials were tested. In the program model, trained team leaders invite neighbors to take part in the program, creating a team of five to eight households. The team members participate in five meetings over three months. These meetings are:

- Neighborhood Gathering,
- Team Building Meeting,
- Water Quality Meeting,
- Water Conservation Meeting, and
- Helping Out meeting.

With the help of a step-by-step workbook and trained volunteer coach, the teams choose from a series of practical actions to reduce NPS and improve water quality. The actions are written in a simple format and designed not to overwhelm participants, even someone very new to the concepts. There are three categories of actions: actions to protect water quality, actions to conserve water, and actions to increase community involvement. Sample actions include cleaning up after your dog, fixing oil leaks on your vehicle, reducing use of fertilizers/pesticides on your yard or garden, creating a rain garden, and

reducing paved surfaces around your home. Each team member generally completes six to ten actions by the end of the program. To date, we have established 25 neighborhood-based teams that are implementing watershed-friendly lifestyle actions.

**Figure 2. Volunteers attend a Water Stewardship Team Leader training in Arlington, VA.**



A critical component of the program is information tracking. Team members complete a “before” and “after” assessment form, which allows program managers to track which actions team members have adopted and calculate the environmental benefits of those actions. Following the program, each team member receives a personalized report for their household showing the benefits resulting from the actions they adopted.

Currently, program partners are conducting three team leader trainings each year, for ten team leaders per training. The majority of teams have been neighborhood-based, but some teams have been “at-large” or organized through a community group or church. In 2005, program partners plan to conduct a “coach” training, where former team leaders will be trained to become coaches for new team leaders. The training of new coaches for the program will enable the expansion of the program in future years.

Program partners have developed a strategy to continue to expand the Water Steward Team program with the eventual goal of creating 1,400 Water Steward Teams, approximately 15% of the population. The Neighborhood Water Steward Team program is an important component of the education strategy for the three localities to meet MS4, Tributary Strategy, and TMDL public education requirements.

### ***Program Results***

To date, 45 team leaders have completed the Water Stewardship program training, and have led 25 teams through the program (or approximately 125 households). Each household on average adopts six to eight new actions, resulting in a total of 615 separate actions to protect water quality or conserve water. These actions have resulted in an annual savings of over 1,200,000 gallons of water.

Nationwide results with the original Ecoteam program show household recruitment rate ranging from 20-30%. From the first two years of the program in Northern Virginia, the recruitment rate has been 44%. In 2004, 296 households were invited to participate in the Water Stewardship program. Of those invited, 44% attended the neighborhood gathering to find out more about the program. Of those households attending the gathering, 81% joined the team, or approximately 100 households.

In 2004 and 2005, the top ten actions that were adopted by Water Stewardship Team members are shown in Table 1. Table 2 summarizes all the actions taken by Water Stewardship Team members in 2004-2005.

**Table 1. Top Ten Actions adopted by members of Water Stewardship teams in 2004-2005.**

<i>Action</i>	<i>Number of Households</i>
<b>1. Toxic Sleuth</b>	35
<b>2. Scrub-A-Dub Rub</b>	34
<b>3. Scrub-A-Dub Tub</b>	33
<b>4. Aqua Cop</b>	32
<b>5. Am I Clean Yet?</b>	25
<b>6. Go With the Flow</b>	25
<b>7. A No Rainer</b>	22
<b>8. A Master Waterer</b>	21
<b>9. The Road Less Traveled</b>	20
<b>10. Catch it While you Can</b>	18

**Table 2. Frequency of actions taken by Water Stewardship Team members in 2004-2005.**

<b>Action</b>	<b>Number of Households Who Completed Action</b>	<b>Percentage of Households Who Completed Action</b>
<b>Toxic Sleuth</b> - Replace household chemicals with environmentally friendly products	35	56%
<b>Poop Scoop</b> - Cleaning up after your dog	3	5%
<b>Don't Be an Oil Drip</b> - Identifying and fixing oil leaks on you vehicle	8	13%
<b>No Phos-for-Us</b> - Washing your car with the least environmental impact	11	18%
<b>A Natural Lawn</b> - Reducing your use of weed killers and fertilizers on you lawn	14	23%
<b>A Green Gardener</b> - Reducing your use of toxic pesticides, herbicides, and fertilizers on your garden	20	32%
<b>Cut it High and Let it Lie</b> - Mulching grass	8	13%
<b>Let it Rot</b> - Backyard Composting	16	26%
<b>Down by the Stream</b> - Creating a Streamside "Grow Zone"	2	3%
<b>A No Rainer</b> - installing a rain barrel or downspout extensions	22	35%
<b>Catch it While you Can</b> - Creating a Rain Garden	18	29%
<b>Yard Makeover</b> - Creating a water-friendly landscape	21	34%
<b>Let the Ground Show Through</b> - Reducing paved surfaces	10	16%
<b>The Road Less Traveled</b> - Reducing vehicle miles traveled	20	32%
<b>Aqua Cop</b> - Find and fix water leaks in your home	32	52%
<b>Aqua Tech</b> - Install water saving devices	14	23%
<b>Scrub-A-Dub-Rub</b> - Reducing water used in personal care	34	55%
<b>Scrub-A-Dub Tub</b> - Reducing water used to wash dishes	33	53%
<b>All Bottled Up</b> - Drinking refrigerated water	10	16%
<b>Tanks A Lot</b> - Reducing water used for flushing toilets	17	27%
<b>Am I Clean Yet?</b> - Reducing water used for showers and baths	25	40%
<b>Go With the Flow</b> - Reduce number of toilet flushes	25	40%
<b>Lawn Ranger</b> - Reducing water used for lawns	13	21%
<b>A Master Waterer</b> - Reducing water used for gardening	21	34%

### ***Community Campaign***

Water Stewardship program partners have developed a plan for expanding the Water Stewardship Team program to 15% of the population in the Four Mile Run watershed over the next ten years. This would

require completing 1,425 teams based on the population in the Four Mile Run watershed. Table 3 shows the number of teams needed per year to complete 1,425 teams by the year 2013.

In 2005, with the assistance of a volunteer specializing in marketing for nonprofits, a draft marketing plan was completed for the Water Stewardship program. This plan has helped program managers organize the long-term goals for the program and select some strategies to focus on in 2005 in support of these goals. The goals selected as priorities for 2005 include:

- Raising funds from local businesses;
- Raising funds through grants;
- Bolster awareness and support among the 60 civic associations in Arlington; and
- Solidifying the brand image of the program.

**Table 3. Number of teams needed per year to complete 1,425 teams by 2013.**

<b>Year</b>	<b>Number of Teams</b>	<b>Cumulative Number of Teams</b>
2003	5	5
2004	20	25
2005	20	45
2006	60	105
2007	60	165
2008	60	225
2009	200	425
2010	200	625
2011	200	825
2012	200	1,025
2013	400	1,425

### ***Conclusions***

The Neighborhood Water Steward Team program is an important component of the education strategy for the three localities to meet MS4, Tributary Strategy, and TMDL public education requirements. Initial results from the first twenty-five teams to complete the program demonstrate that the Water Stewardship Team program effectively helps people learn and adopt new behaviors that improve water quality, conserve water, and improve their community.

Households participating in the program to date have adopted 615 new actions, such as installing rain barrels, cisterns, rain gardens, reducing pesticide and fertilizer use, and checking vehicles for fuel leaks. More importantly, new relationships are formed and community bonds are strengthened after people complete the program, resulting in other initiatives in the community. One former team leader has galvanized his community to complete native planting projects, and has organized six large native plant sales in his neighborhood. Members of another team are working with the building and grounds committee at their condominium complex to revise the landscaping contract, and have installed a rain garden in one area of the complex.

The Water Stewardship program will be growing to reach 15% of the population over the next 13 years, creating a network of neighborhoods committed to watershed protection through household actions. Through continued neighborhood meetings, online discussions, and workshops, this network will provide leadership for community improvement efforts and also provide an outstanding base for local watershed improvements by government, local community organizations, and residents.

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# Evaluation of the Cocoa Beach Green Business Program

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## **Abstract**

The city of Cocoa Beach is situated on a barrier island between the Atlantic Ocean and the Indian River Lagoon on the east central “Space Coast” of Florida. Although the city is only six miles long and less than a mile wide, it has 37 canals, 760 storm drains, 23 miles of storm line, and 29 outfalls emptying into the Indian River Lagoon. For every inch of rain, about 25 million gallons of untreated stormwater runs off into the Indian River Lagoon, a significant water improvement management water body and designated national estuary. The city is completely built out with a stable, homogeneous population of approximately 12,000 residents. With little land available for stormwater treatment and an antiquated stormwater conveyance system, the city is faced with the challenge of reducing nonpoint source pollution at the source—in other words, each individual.

The Cocoa Beach Green Business Pilot Project (CBGB) strives to reduce the amount of nonpoint source pollution that enters the Indian River Lagoon from business-related illicit discharges. Approaches for reaching the goal include defining the target audience, identifying barriers and benefits to behavior change, raising awareness about business-specific and homeowner Best Management Practices (BMPs), committing businesses to the effort by engaging them in program activities, using promotion as a motivating tool, and encouraging local consumers to support Green businesses. The pilot project was developed in response to survey data that clarified the need for a business-targeted program in Brevard County. Survey results that demonstrated the need and potential success of CBGB included: 1) less than half (38%) of businesses surveyed had heard of the term “Best Management Practices,” 2) most businesses thought that protecting water resources was important (over 80%); 3) nearly 80% of businesses said that they are willing to change business practices in order to protect water resources; and 4) nearly half (46%) of Brevard County businesses reported that they learned about pollution from the newspaper.

CBGB evaluation includes a comparison of knowledge change using pre- and post-tests, attitude change as reflected in focus groups and interviews, and social diffusion as businesses compel their peers to join and neighboring cities implement the program. Furthermore, investigators are examining the influence of place attachment to the Indian River Lagoon as a means to motivate business and resident commitment to behavior change. The pilot project will be repeated with variations in Orlando, Florida to compare methodologies and investigate transferability. This presentation will provide an overview of the program process as well as the methods used to select the target audiences, engage the local municipality, identify indicators for success, and measure outcomes.

## ***Introduction***

The Cocoa Beach Green Business (CBGB) program is an environmental education and social incentive effort that targets three business types in Cocoa Beach, Florida: lawn care services, restaurants, and painting contractors. The program motivates business behavior change using economic, social, and personal incentives instead of regulation. The CBGB program theory is that participants will be motivated to implement environmentally responsible business practices due to economic benefits like increased advertising and consumer support, social incentives like community and peer respect, personal satisfaction of protecting a natural resource that they depend on for recreation and quality of life, and increased knowledge of pollution prevention Best Management Practices (BMPs). In essence, the program tests motivators and challenges to changing business behaviors. Evaluation explores whether small business owners will be motivated to change behavior in order to gain the reputation of good

environmental citizenship, to increase business, or to protect the surface water feature that they depend on for quality of life.

The CBGB program will be evaluated as part of a comprehensive Nonpoint Source Pollution Education Campaign that targets diverse audiences with effective outreach in order to reduce nonpoint source pollution. The comprehensive program goal is to assist state and federal agencies in developing indicators and guidance for implementing successful nonpoint source pollution education programs. Clean Water Act Section 319 grant funding supports the evaluation of NPS education and outreach methods in order to recommend evaluable measures and performance indicators. Each pilot project evaluation will be utilized to guide future program planning by demonstrating proven strategies and measures for evaluating success. CBGB represents one example of implementing and testing nonpoint source pollution education methods.

The CBGB evaluation report examines the integral steps to evaluation planning including a needs assessment, program theory support, stakeholder analysis, service utilization plan, evaluation questions, realistic indicators, and methods for measuring success at reaching objectives that lead to long-term outcomes. The paper provides a summary of the service utilization evaluation.

### ***Cocoa Beach Green Business Program Theory***

The CBGB program tests the theory that small businesses will be more likely to adopt practices that reduce nonpoint source pollution if they are motivated by place attachment and enhanced social license (or reputation). The program uses educational interventions to teach businesses the link between land-based activities and receiving water bodies – in this case the Indian River Lagoon and increase business knowledge of pollution prevention practices. The program uses promotional incentives to motivate business participation by increasing participant recognition; raising their social license; and attracting new customers. The program employs marketing tools like written pledges to commit business intentions, and prompts to remind employees to practice pollution prevention techniques. Finally, the program engages residents to support program participants through consumer choice and positive reinforcement. Implementation of a multi-faceted approach attempts to heighten the benefits of business participation (increase recognition, social license, and consumer support) while reducing the barriers to behavior change (too much trouble, no profitable gain, do not understand link between actions and water quality, forgetfulness).

The theory is supported by research which shows that businesses will go out of their way to meet the expectations of society and avoid activities that society deems unacceptable, (Gunningham et al, 2004); that place attachment can be a significant contributor to environmentally responsible behavior (Stedman, 2003; Vaske & Kobrin, 2001; Vorkinn & Riese, 2001); and that community support and marketing tools like commitment and reminder prompts can successfully influence behavior change (McKenzie-Mohr, 1999). The CBGB pilot project implementation steps are as follows:

- ▷ Identify targeted businesses by Standard Industry Cod (SIC) and identify BMP criteria that define each industry type as a Green Business.
- ▷ Engage participants in the program by committing them to read Green Business educational materials and to pledge to use prescribed pollution prevention techniques.
- ▷ Promote participating businesses to residents using advertising media and promotions.
- ▷ Promote consumer support for Green Businesses by collecting consumer behavioral information and targeting consumer messages.
- ▷ Evaluate the effectiveness of reaching the target audiences and changing knowledge and attitude about NPS pollution BMPs.

The CBGB pilot project will be implemented in a second pilot project area - Orlando, Florida - in 2006. One fundamental question that will be explored by comparing the two locations is transferability

between communities, so that a statewide effort can be implemented. The outcomes report for both pilot studies will include consumer survey data analysis, recommendations for transferability, process evaluation comparing and contrasting the two locations, lessons learned, and recommendations for regional implementation. These outcomes will be packaged in a Green Business Toolbox that will also include digital files of customizable graphics, spreadsheets, statistics, and templates that can assist others interested in starting a similar program. The comprehensive Green Business project goal is to do the legwork and research that will help others implement similar programs without “reinventing the wheel.”

### ***Location Demographics***

The CBGB pilot project target area is the city of Cocoa Beach, which is located in Brevard County along Florida’s central east coast on a barrier island between the Atlantic Ocean and the Banana River within the Indian River Lagoon System. The city is six miles long with 44 miles of Indian River Lagoon shoreline. The Indian River Lagoon is a state priority water body designated under the Surface Water Improvement & Management Program (SWIM), part of the state’s unified Watershed Assessment, and an “estuary of national significance,” as designated by the EPA’s National Estuary Program. The lagoon is home to more than 4,300 flora and fauna species, and is recognized worldwide as the most diverse estuary in the world. It is estimated that the Indian River Lagoon annually brings \$750 million dollars to the regional economy and is a major contributor to tourism growth, commercial and recreational fishing, and resident satisfaction (SJRWMD, 1994).

The greatest period of Cocoa Beach development occurred between 1940-1960 with the influx of space and military interests in the area. Development included paving almost the entire area of Cocoa Beach, and today 42% is covered in impervious surfaces, such as concrete, asphalt and buildings. The areas unpaved include the islands in the Banana River, the county parks, and the municipal golf course. An antiquated stormwater conveyance system that includes 37 canals, 760 storm drains, 23 miles of storm lines, and 129 outfalls empties over 25 million gallons of untreated stormwater run-off into the Indian River Lagoon with each inch of rainfall.

Demographic and historical information demonstrate that Cocoa Beach is a small community that is completely built out and there is little area left for stormwater treatment or residential development. The people who originally settled in the area came in response to a need for technically skilled employees. The un-retrofitted stormwater control system dumps polluted stormwater directly into the Indian River Lagoon, a receiving water body of significant value to the regional economy and listed as a national priority for protection. Cocoa Beach sits on a barrier island and is bordered by water on two sides, potentially uniting residents in an “island” mentality. Cocoa Beach has a water-oriented community culture, fostered by decades of water-related commercial and residential activities. Demographic information clarifies that Cocoa Beach residents are highly educated, financially stable, homogeneous in racial composition, and many are retired. The city community culture and demographic make it a prime location to implement and test a community-based education and incentive initiative to accomplish this goal.

### **Direct Target Population**

The CBGB program target population is area businesses that have the greatest potential to discharge pollutants into the Indian River Lagoon through regular business practices. To better understand the views and concerns of the target population, interviews were conducted with business representatives and a committee of business “champions” was assembled. The three primary targets - lawn maintenance businesses, painting contractors, and restaurants - were selected by their prevalence and population size, business diversity, and potential to change behavior based on input from local business interests. At project initiation, the target business population was 178 businesses; however, hurricane impacts

resulted in many business failures reducing the target business population by 33% to 121 businesses. Descriptions and population change information for each of the three targeted business audiences is presented below.

- ▷ Lawn Maintenance – As of August 2005, there were twenty-seven (27) licensed, lawn maintenance businesses operating within Cocoa Beach. Thirteen percent (13%) of the original targeted restaurants went out of business since project planning initiated. Operation of these businesses is typically done out of a truck, with little employee training or continuing education. The challenges to reaching this target are 1) no “place” of employment, 2) no organized meetings or committees, 3) high turnover of staff, and 4) staff with low literacy rates and language barriers. Additionally, many lawn services do not acquire city occupational licenses, potentially making them fearful of regulators, and unreachable through city databases. Homeowners, home and condominium associations, businesses, and governments may employ lawn maintenance services, providing another avenue for motivating behavior change. This audience perceives itself and is perceived by others to be “green” already and existing environmental efforts are targeting this industry.
- ▷ Painting Contractors – There were twelve (12) remaining licensed, painting contractors operating within Cocoa Beach, representing the business category hardest hit by hurricane impacts with 54% of painting and masonry contractors out of business. Operation of this business type is typically done on the road and is further complicated by the fact that general contractors tend to be the primary employer. Challenges to reaching this target are 1) no office, 2) no need for continuing education or state licensing, 3) variable employers, and 4) little interaction with the public. This audience also has little interaction with regulators or public officials, except to receive their annual occupational license. As such, it is unlikely that painting and masonry contractors have been informed about nonpoint source pollution and pollution prevention methods. Other home improvement contractors have been added to this business group to increase potential audience size.
- ▷ Restaurants – There are eighty-two (82) restaurants operating within Cocoa Beach. Thirteen percent (13%) of the restaurant population went out of business since the hurricanes hit Cocoa Beach in September 2004. Restaurants as a business type are very diverse, ranging from high-scale dining establishments to convenience stores. The project targets stand-alone businesses that are primarily food serving establishments. This business type is the only one selected that can be reached at a stationary location and that usually holds staff meetings for information sharing. Challenges to reaching this audience include 1) high staff turnover, 2) late hours, and 3) language barriers. Because they must comply with health regulations, this audience may understand business activities that can potentially pollute surface waters.

### **Indirect Target Audience**

Residents and consumers are important indirect targets, because they can motivate businesses to be environmentally responsible through monetary support and social license. Social license refers to “the degree to which a corporation and its activities meet the expectations of the local community, the wider society, and various constituency groups.” Businesses are increasingly concerned about their community reputation, enhancing their social license, and preserving their “reputation capital,” (Gunningham et al, 2004). The more residents are concerned about business activities harming their quality of life; the more they will be supportive of businesses that are acting as responsible environmental stewards. Participating businesses benefit from increased customer satisfaction as well as enhanced social license. Efforts to increase resident’s awareness of the CBGB program also encourage residents to choose participating businesses.

## ***Service Delivery & Utilization***

Examining the service delivery and utilization clarifies the complex nature of engaging the target audience. Service delivery outlines the procedures for reaching the target audiences and service utilization examines the path for businesses engagement. Together, service delivery and utilization evaluation confirm the success at reaching and engaging the target audiences.

The CBGB service delivery employs different methods to reach different audiences. CBGB information and registration forms are mailed to each targeted business, inserted into business occupational license renewal envelopes, and delivered in person to target businesses. Business walk-in visits targeted restaurants, the only business with a stationary location. To reach Cocoa Beach residents, program promotion included a postcard mailed out to all residents, unique webpage on the city Web site, posters in public locations, newspaper advertisements, PSA commercials on the government television channel, and the CBGB information hotline.

An interested business must contact the CBGB coordinator to sign-up and receive the **educational package** that includes a CBGB pledge form, the booklet entitled *Indian River Lagoon: Our Natural Resource*, a business-specific, BMP poster, and a pre-participation survey questionnaire. The education package materials instruct businesses to read the IRL booklet and BMP list, share them with their employees, commit to complying with the requirements of the BMPs, signing the pledge form, completing the Pledge Form Survey, and returning the pledge form and survey to the CBGB coordinator. All businesses that request an educational package are contacted by telephone to discuss questions and solicit their pledge submittal. Additional phone calls and/or visits may follow if a pledge form has not been received in a timely fashion.

Once a business has signed the pledge form, indicating that the owner has read and shared the instructional materials with personnel, the business receives a **promotional package** that includes a “I’m a Green Business” poster, CBGB stickers, a laminated BMP list to post in the business, air freshener reminders for vehicles, and an invitation to the next city commission meeting where participants are recognized as Cocoa Beach Green Businesses by the mayor.

Green Business participants are advertised in monthly newspaper articles and listed on quarterly Green Business posters, the annual “Green Business Directory” mailed to residents, and on the CBGB Web site located at [www.cityofcocoabeach.com/greenbusiness.htm](http://www.cityofcocoabeach.com/greenbusiness.htm).

Service utilization demonstrates that businesses must be proactive in pursuing their participation in the program by requesting information and submitting the pledge form. Requiring their proactive enrollment in advance can be both a hindrance to and an assurance of project goal achievement. Requiring that businesses request information and submit a pledge form may deter some business owners from participating because it requires their time and postage. However, requiring these incremental behavior changes to enroll in the program may result in greater likelihood that businesses will proceed with the other requested behavior changes, thereby assuring that the participants enrolled are likely to incorporate pollution prevention BMPs. Project strategies assume that the burden of enrollment will outweigh the benefit of being a participant and furthermore, that once a business has committed to act, they are more likely to continue to act congruently. Requiring businesses to be proactive from the beginning initiates their action toward incorporating pollution prevention practices into their daily routine. Both service delivery and utilization can be evaluated by measuring indicators of promotional success, program awareness, customer satisfaction, and participation rates.

## ***Service Utilization Questions & Measures***

Service utilization questions measure the extent to which potential participants receive program services and their satisfaction with those services. Process evaluation questions determine whether the

methods and strategies used to reach the project goals are effective. Finally, outcomes measure the potential for sustained behavior change, changes in knowledge and awareness, and project transferability.

### **Service Utilization Questions**

The service utilization evaluation focuses on whether targeted businesses are receiving the program information, whether they are enrolling in the program, whether they are utilizing the programs materials, and whether they are adopting the prescribed BMPs. Indicators of successful target engagement include levels of CBGB program awareness; distribution of materials and promotional products in terms of numbers and diversity; customer satisfaction and participation rates; and how customers learned about the program. Service utilization questions, indicators, and measurement methods are outlined in the following paragraphs.

**Service Utilization Question #1:** Are members of the target audiences aware of the CBGB program?

**Method:** Pre- and post-survey of targeted businesses that ask awareness and subjective knowledge questions. The 2005 Consumer Survey asks respondents in four counties if they have heard of the Cocoa Beach Green Business Program

**Measure 1:** Percentage of target business aware of CBGB – 100%

The CBGB project coordinator contacted every targeted business through a variety of methods. The coordinator telephoned each business, mailed them each an introductory letter, and personally visited every targeted business location. Field notes demonstrate that every targeted business was notified of the project through at least two different methods. The project coordinator is kept apprised of new businesses by the city's occupational licensing bureau, and they are also contacted. From this, CBGB assumes that its entire direct target audience is aware of the service being delivered - an assumption not afforded larger programs with much larger target audiences, and the main benefit of implementing a small scale, limited target pilot project.

**Measure 2:** Percentage of local residents aware of the Cocoa Beach Green Business program: Brevard County, 12.9%; Cocoa Beach, 23%. The measure of resident awareness is taken from the 2005 Consumer Survey conducted by UCF in September 2005. Any awareness of CBGB in Sept 2005 is assumed to be due to project implementation, as prior to implementation, CBGB did not exist and any knowledge reported would be dubious.

Considering the short timeframe for implementation and the dramatic hurricane impacts in the region, the CBGB project name is approaching a tipping point for name recognition. Tipping point refers to the percentage of a population that must know something before natural social activities will cause the information to reach a majority of the people. In comparison to other nonpoint source education efforts, the name recognition appears high. Only 19% of respondents in the 2005 Consumer Survey had heard of the Florida Yards & Neighborhood Program, a statewide landscaping education campaign that has been implemented for ten years.

**Service Utilization Question # 2:** Is the availability of project services, such as enrollment and educational materials, conveniently accessible to program participants?

**Measure 1:** The project printed over 10,500 copies of nine different media forms and distributed between 7% and 91% of each item. The media items used for broadcasting (flyers, booklets, business posters, and air fresheners) were the items most distributed, as expected. The items for business consumption (CBGB and BMP posters) were shared more specifically with potential business interests, therefore fewer were distributed.

**Measure 2:** Response to 2005 Consumer Survey question, "Where did you hear of the Cocoa Beach Green Business Program?" confirms that people are hearing about CBGB from project related methods. The highest percentage of responses indicated they heard of CBGB from the newspaper or a newsletter (44%). The second highest response (20%) was that they heard about the program from a friend,

coworker or family member, indicating that social diffusion of the message was occurring. The third highest response was the city Web site (12%). Thereafter, responses were program coordinator/city employee (9%); CBGB mailed flyer (6%); unsure (6%) and other (3%). Results confirm that project strategies are successfully reaching Cocoa Beach residents; that the message is compelling and understandable; and that residents and businesses are communicating about the program

**Service Utilization Question #3:** What percentage of the target population is participating?

**Indicators:** Percentage of target businesses receiving commitment packages; percentage of participants enrolled; and response from target and non-target businesses.

**Methods:** Counting and calculating the percentages of targeted audience participation; the percentage of businesses that received commitment packages; and the number of non-targeted businesses enrolled in the program.

**Measure 1:** Thirty-five percent (35%) of lawn care providers; thirty-three (33%) of home improvement contractors; and forty-three percent (43%) of restaurants contacted the project coordinator to request the educational package that includes the IRL: Our Natural Resource booklet, the BMP list; the commitment pledge form, and the registration survey. Overall, thirty-seven percent (37%) of the target business population has pro-actively responded to request service delivery.

**Measure 2:** Business participation is measured as the percentage of the target businesses that enroll in the program by completing and returning the pledge form. 21% of targeted landscaping businesses, 25% of home improvement contractors, and 15% of restaurants have pledged to participate in the CBGB program.

**Measure 3:** The number of businesses that received educational packages and the number that pledge into the program differ. Overall, 37% of the targeted business audience requested materials, but only 20% returned the pledge form. There is a 14% difference in the number of landscapers receiving the educational package and enrolling in the program, an 8% difference in home improvement contractors, and a 28% difference in restaurants receiving packages and enrolling. This disparity may mean a couple of things; 1) that businesses read the materials and do not want to participate; 2) that businesses accept the package but never read the materials; or 3) that businesses receive the package, read the materials, and do not respond with a written pledge form. Further investigation will attempt to clarify the disconnect between business interest in the educational package and their active response to submit the pledge form required to register as a Cocoa Beach Green Business.

## ***Lessons Learned***

Achieving a change in behavior through an incentive-based education program requires a long-term commitment. Evaluation demonstrates successful engagement of target audiences as demonstrated by participation rates and awareness. Field notes and interviews with participating business indicate that those receptive to the project had a greater appreciation for water quality issues and more community ethics. Many cited they wanted to “do the right thing” for their community and realized the economic well being of the City of Cocoa Beach is intrinsically tied to the health of the lagoon system.

Lawn care business owners appeared keenly aware of general water quality issues in their area, with many stating they felt they were already doing many of the BMPs during their daily work routine; hence, they felt “green” prior to being approached. The Lawn Maintenance groups also have the potential to be motivated by external audiences such as client residents, homeowner and condominium associations, and other businesses due to their diverse clientele. Their effects on the health of the system can also be widespread for the same reason. Challenges faced with reaching this group include the transient nature of the business and staff, possible language barriers, and no structured licensing or training requirements.

Painting contractors and other home improvement professionals were at the other end of the spectrum from the lawn care businesses. This group was the most difficult to contact, and as a result, had the lowest percentage of targeted businesses requesting additional information. However, this audience was the most likely to return the pledge form after receiving the educational package. Similar barriers to effective outreach as identified with lawn care professionals were found with the home improvement group including the transient nature of the business and staff, little structured licensing and training requirements, and the lack of a business storefront. Initial interviews confirmed that business owners in this category did not see the link between their business practices and impacts to water quality degradation in Cocoa Beach.

The most diverse group, restaurants, had the advantage of a “brick and mortar” location; however, the establishments ranged from single operator storefronts to multiple location ownership businesses and national chain businesses. Successful CBGB partnerships were more apt to be with the small, local establishments – those that had long-term commitments with the community as both business people and residents. Managers and employees who were contacted with large national chain businesses always referred CBGB promotional information to corporate headquarters, where local water quality issues are not a priority. As a result, no national chain businesses joined the CBGB effort. This supports the project assumption that place attachment and community value motivate business participation. Cultural differences and language barriers within this group are challenging, with many local small businesses ethnically owned and operated. Many feared the CBGB program would bring regulatory intrusion and additional expense to their businesses. Cocoa Beach restaurant owners seem well connected to each other and their participation is influenced by the participation of other restaurant owners.

The participation of untargeted businesses indicates that the CBGB project message is diffusing through the community. Untargeted businesses heard about the project from personal contacts, newsprint, and the city Web site. The untargeted businesses that joined the CBGB effort were already trying to be environmentally responsible in their business behavior and wanted the increased visibility of their environmental stewardship. This supports the assumption that businesses will join to increase their community reputation. A diverse group of untargeted businesses – a hair salon, real estate offices, electric contractor – all decided to join the CBGB effort in an attempt to “do the right thing” for their community.

All the CBGB participants are environmentally concerned, demonstrated by survey responses that indicate that more of them already use environmental practices or products, that all participants believe that Cocoa Beach has a water pollution problem, and that most believe that their actions can make a difference in protecting surface waters. Several participating businesses have reportedly gone above and beyond what is required of them to take on additional pollution prevention techniques, such as cleaning storm drains along their route. One restaurant owner translated the BMP list into Chinese in order to inform his kitchen staff.

Cocoa Beach residents are important contributors to the project. By supporting participating businesses through recognition and consumerism, the residents provide a great incentive for business participation. On the other hand, Cocoa Beach residents are also the vigilant enforcers of the social license afforded by the program. Business participants are on the radar screen for resident complaints and as such, it is difficult to use business compliance as a measure of success. Public information about the program was distributed at city hall, civic organizations, public libraries and the Cocoa Beach Country Club. One CBGB participant reported that she noticed increased customers after being advertised as a CBGB participant, indicating that residents of Cocoa Beach were responding appropriately by supporting participating businesses.

The CBGB evaluation will continue to analyze the likelihood that business behavior change will take place and that this can ultimately lead to a reduction in nonpoint source pollution. The next steps in CBGB program evaluation will collect the final participant information about self-reported behavior and

knowledge and to analyze the 2005 Consumer Survey to better understand consumer support for environmentally responsible businesses. Thereafter, the outcomes of the CBGB evaluation will be compared with similar evaluation measures of the Orlando Green Business program to provide a comprehensive comparison and contrast of implementation success. Others interested in starting similar programs will benefit from the outcomes of both projects, which will be shared in the Green Business Toolbox that will combine lessons learned and implementation materials.

Process and Outcome evaluation questions, indicators, measures and methods are described in the full working paper which can be requested by contacting the author, Leesa Souto, at [Lsouto@mail.ucf.edu](mailto:Lsouto@mail.ucf.edu). The CBGB evaluation will be completed in summer 2006.

## **A Tale of Two Programs: Lessons Learned from Two Education Program Structures**

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### **Abstract**

This paper describes two NPDES Phase II educational programs and reviews different approaches to how construction site erosion and sedimentation control education can be implemented. In addition, some lessons learned from implementing these two program approaches are presented and discussed.

This paper draws on the University of Minnesota Erosion and Sediment Control Certification Program which is currently required education for contractors working on County State Aid and Minnesota Department of Transportation projects. States in addition to Minnesota have similar programs and are compared, along with the national Certified Professional in Erosion and Sediment Control (CPESC) program.

The second NPDES education program presented is the Stormwater Management for Construction Impacts “Stormwater-Basics-for-Builders” project. This is a construction site erosion and sediment control education effort led by the Builder Association of the Twin Cities with support from the Minnesota Pollution Control Agency, construction organizations, and technical and education entities including the University of Minnesota.

### ***Introduction***

The following paper presents some of the lessons learned from involvement with two educational programs. Both programs have the goal of educating contractors and designers on the NPDES Phase II regulations and reducing the impacts of development. The two programs have different structures for implementation, which has provided insight to the strengths and weaknesses of each structure. Background and lessons learned are provided below on both the University of Minnesota Erosion and Sediment Control Certification Program and the Stormwater Management for Construction Impacts Stormwater-Basics-for-Builders (SBB) Program.

### ***Background***

#### **U of M Erosion and Sediment Control Certification**

The University of Minnesota has a continuing education program to provide NPDES Phase II education to engineers and contractors. This Erosion and Sediment Control Certification Program has scheduled classes every year with an exam, and attendees that pass the exam get a certification that is valid for 3 years. In this way, organizations such as the Minnesota Department of Transportation can require certified contractors and engineers in project contract documents to make sure their projects are handled by individuals that have a demonstrated familiarity with the NPDES regulations.

This program structure has been used in other states in a similar manner to get contractors and engineers familiar with the NPDES regulations. The state of Maryland has approximately 11,000 individuals certified in this manner. Other states with programs include Delaware, Florida, North Carolina, Tennessee, and Virginia to name a few. There is also an international non-profit organization

that offers a certification exam to become a Certified Professional in Erosion and Sediment Control (CPESC).

The Minnesota program started in 2002 and has approximately 4,000 people certified presently. The Minnesota program offers classes for project designers, construction project managers, and construction installers. Individuals who are responsible for regulation and inspection have been attending the class which corresponds to their responsibilities, such that a regulator who is reviewing plans will attend the design class, and an inspector who is looking at field installations will attend the construction installer class. Often, regulators will attend all of the classes offered.

The Minnesota program has a steering committee made up of individuals from the Pollution Control Agency, Department of Transportation, construction industry, and other stakeholders. This group helps the program address the needs of the participants in the program. Material is presented by the University faculty in addition to guest speakers from the construction industry and regulatory agencies.

### **Stormwater Basics for Builders**

The Stormwater Management for Construction Impacts Project includes a stakeholder research component and an educational program. The educational program is the focus of this paper. Although some of the features of this educational program have been developed using input from stakeholders and Community Based Social Management (CBSM) techniques, the CBSM details of this project are not discussed in this paper.

The Stormwater Management for Construction Impacts Project is led by the Builders Association of the Twin Cities (BATC) in association with the regulatory community and technical assistance providers. The Minnesota Pollution Control Agency, Minnesota Erosion Control Association, and the University of Minnesota are among the organizations involved. Goals of the project include creating an education module through collaboration of industry, regulatory and technical assistance, and presenting this education through peer-to-peer training.

For the educational module delivery, an attempt has been made to recruit members of each community into an SBB Presenter Pool, with the industry representatives taking the lead in a team teaching environment. Additionally, stakeholders from each of these groups participated in a stakeholder research exercise and worked together on SBB program development. The research helped confirm topics to be included in the SBB program content.

Having instructors from individual trades bring the education back into their organizations provides a peer-to-peer learning arrangement. This Presenter Pool arrangement also has the potential for less expensive and more convenient training within an organization once a trainer is established. Referred to, within the program, as a “decentralized” approach, the Presenter Pool idea can be risky without certain conditions in place. Because of a need to expedite program deployment, many logistical and administrative functions are not in place and continue to require development. In the absence of these program foundations, the success and sustainability of this program as a collaborative effort, and one that complements related existing programs is threatened. The presenter pool has not thrived. Limited administrative resources limit both the program’s ability to recruit members from all three groups for the teaching teams for the Fall 2005 sessions; and to offer resources or train-the-trainer support in the way of mentoring or buddy system, instructor notes, feedback loops, etc.

The diversity of audiences with the construction stormwater arena became evident during the stakeholder research and program marketing efforts. The diversity of program clientele is characterized by:

- Roles – personnel roles include contractors, designers, owners, inspectors (regulatory and industry quality assurance), and lawyers;
- Project type - Project types can include categories of project size, project use (commercial building, road, utility), or project sponsor (state, private);

- Level of existing knowledge in stormwater management and construction permit compliance and enforcement issues;
- The ability of the individual to stay abreast of an evolving regulatory environment – a new program remains dynamic through early implementation.

The program has yet to analyze or determine how to create or market one program to this range of clientele. Initially, a decision was made to target the SBB program on small- to medium-sized residential contractors. Requests for access to the material to be customized by former program participants for presentation to other audiences have challenged the need to maintain program integrity and management and ensure the three-community presence in program delivery. A strong desire to share collaboratively is countered with a need to maintain carefully constructed messages, some of which cannot be altered or misrepresented due to their regulatory nature.

Lacking a well developed marketing plan and means of contacting these groups, the larger and better informed organizations have been the primary participants. So far, eight SBB sessions have been led by six instructors to educate a total of 223 individuals. Two of these sessions included a short presentation to encourage individuals to become instructors.

During original project scoping, two additional issues were identified: creating a level playing field with respect to other programs targeting similar audiences, and creating complementary programs from which customers could clearly distinguish products and services of each. Stakeholders complained about a growth in the number of programs and confusion over which to attend. Also, program providers had concern over duplicative and competing efforts. Again, in an effort to expedite SBB development and deployment in the first year of the new NPDES construction stormwater permit implementation, establishing the program's administrative foundation and delineating market were neglected. These issues continue to be addressed as the project continues.

### **Lessons Learned**

The two programs described above have similarities in the class material content, but have different approaches on presenting the material. Some of the lessons learned from each of these are as follows:

#### ***Lesson 1 - Audience Reception***

The Minnesota Department of Transportation has used the U of M program to educate its staff and contractors and many organizations see the U of M program as centered on linear construction projects. To avoid this, guest speakers should be diverse and have relationships to different areas of construction.

If groups rely on an education certification program to assure familiarity with the NPDES regulations, these groups such as cities, counties, or individuals need to feel the material presented in the program is relevant to their needs. Such groups will need communication channels, such as having access to a steering committee type arrangement to express their needs.

The SBB program tries to use a peer-to-peer education method to improve the audience reception. In practice, this program did not have enough instructors involved to fully develop a peer-to-peer arrangement. As an alternative, an introduction by a program host who is a peer to the audience was used.

#### ***Lesson 2 - Keeping the Material Focused and Current***

The common division of audiences appears to fall into lists of project type and personnel roles. Creating education programs focused at specific audiences, such as utility project designers, results in a lot of specialty classes and more resources. Additionally, as suggested in stakeholder research, a large number of available classes leads to confusion of clientele as to which class best suits their needs. Program marketing, including program titles, should plainly reflect the role of the attendee in the class, the potential benefits to a range of clientele, and possibly how various programs complement each other.

Any group that wants to use the certification in their contract language needs to have a clear communication of who needs certification and under what conditions.

The U of M program uses three classes focused on different construction roles, and not focused on construction types. In order to cover a large range of construction types, these programs need to be longer in length, and potentially contain information not needed by some individuals.

Having a focused education module, such as SBB, is another option. Typically, this results in many requests to modify the materials to suit an individual's needs. This is a large problem with a decentralized presenter pool approach. Without a system to review changes to the material, the quality of the educational program can become compromised. Educational materials will always need to be updated and revised. Updates and modifications will likely need a review committee or established procedure, which does not lend itself to a decentralized system.

### ***Lesson 3 – Resources***

The U of M program has stable resources generated by groups using the certification in their contracts. This appears to be a good system to provide stability and sustainability into the future. The difficulty is getting a group to want required education. Organizations do not like to add levels of bureaucracy and expense unless absolutely needed.

The initial concept of a decentralized presenter pool avoided the need to provide resources to instructors. The concept of instructors providing educational benefits to their organization is excellent, but in practice very few instructors or organizations showed commitment. Potential instructors commonly requested resources such as presentation assistance by regulators, printed materials, opportunities to practice or participate with other instructors, and mentoring. This presenter pool approach requires a system for providing resources to instructors. Establishing systems for providing resources to instructors and getting their commitment to be involved may require infrastructure and additional procedures to be developed and administrated. These sorts of overhead costs potentially reduce the economic benefits of the presenter pool approach and may result in a centralized system, as opposed to the desired decentralized system. At a minimum, instructors need to have an understanding of what their responsibilities are and what resources are available and not available.

### ***Lesson 4 – Target the Instructors, As Well As the Audience***

Both programs have targeted audiences for classes. Audience feedback shows that the programs provides the desired education. Feedback on instructor involvement suggests the presenter pool audience could have been targeted better.

In the U of M program, instructors are contacted based on their abilities and interests in the topics to be presented. The presenter pool approach includes a plan to target SBB participants and others with requests that they become involved as instructors. Only six individuals have volunteered for the presenter pool since the program was launched. Many of these are vendors and consultants. Other members include personnel who led the SBB program development. Vendors and consultants can be excellent resources as instructors given their familiarity with stormwater management practices and products. However, the presenter pool needs to be carefully monitored to avoid the impression among participants and the regulatory and stormwater education or consulting communities that it is being used primarily as a marketing or publicity vehicle. Care should be taken in developing materials and protocols to ensure the audience or others do not see the educational program as an advertisement, or that some interested instructors are excluded. Without a planned program of recruiting individuals into the presenter pool and compensating presenters when necessary, concerns arise over whether the collaborative and educational intentions behind the program and presenter pool are being appropriately maintained.

### ***Lesson 5 – Incentives***

Having an incentive helps to get things done. A required certification is a very strong incentive to get education, but this requires enforcement and legal documents. Where it can be achieved, this is very effective.

The SBB program is not required, and attendance is voluntary. Attendance at this program is likely to improve after an assessment of its marketing needs is complete. This might include an informal survey of the past participants regarding the motivation for their attendance and what made this program unique.

An additional system for providing incentives to the presenter pool volunteers would also be helpful in securing commitment and involvement. An unintended consequence of relying on the enlightened self-interest to recruit volunteers into the Presenter Pool can be perceived exclusion of other individuals without such a ready motivation, or the perception that the program is merely a marketing tool. Whatever the incentive is, it should be properly marketed to the audience.

A decentralized approach, such as the one used in the SBB program, needs administrative guidelines to ensure program integrity and program sustainability. Without these, the incentives for participating as a presenter may not be consistent with the program goals and the targeted audience may never be reached.

### ***Conclusion***

There are many education program structures that can be effective. Involvement in different types of structures helps to understand the strengths and weaknesses of each program. Understanding the strengths and weakness of each program points out the areas where improvements can be made. When a presenter pool approach is used, it should focus heavily on identifying and providing appropriate resources to the new instructors.

A certification structure can be sustainable in the long term, but has challenges starting in the short term. The presenter pool structure can be powerful and may be very effective in the short term. If the presenter pool structure is to be sustained for a long period of time, it will need a support structure in place early in the project.

Even though mistakes will be made, we need to continue to try new approaches and be prepared to learn from mistakes and make corrections quickly. Both of the programs discussed here undergo frequent changes to improve the educational effectiveness and undoubtedly will continue to have more lessons learned.

## Hold on to Your Dirt!

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#### **Abstract**

In the early 1990's, erosion from new construction sites had become a serious source of sediment contamination in the streams, rivers, and bay in the San Francisco Bay Area. Fines were levied against builders and some of the fine monies were used to start an education and outreach program to try to bring construction sites into compliance with new regulations written to address the problem. In 1996, the San Francisco Estuary Project and the San Francisco Bay Regional Water Quality Control Board developed workshops to educate the construction industry and local agency staff about why sediment is a problem and how to keep pollutants from entering our water bodies. We started with half-day classroom sessions, which have been expanded to full-day sessions. To keep our rivers and streams clean, we bring technical experts to show the most current Best Management Practices to keep sediment and other pollutants from leaving construction sites, we train municipal inspectors on what to look for at the sites, and we give builders tools to help them comply with current NPDES regulations. The program is self-sustaining now through sales of our popular Erosion and Sediment Control Field Manual and other materials, sponsorships, and nominal workshop fees.

### ***Introduction***

Sediment from construction sites in the San Francisco Bay Area has become an increasing cause of concern to regulators and citizens in the nine Bay Area counties. Not only does excess sediment in streams inhibit reproduction of fish and other aquatic life by smothering eggs that are laid in the interstices in the substrate of streams, pollutants such as metals and organic toxins can adhere to sediment particles and be carried into our waterbodies and increase a stream's turbidity. In addition, as the flat areas in the region were built out, construction moved up into our hills, where erosion was even more damaging than in flat areas. Many of our rivers and streams and the Bay itself are listed as impaired due to sediment by the EPA. To address this problem, U.S. EPA and state regulators began enforcing the National Pollutant Discharge Elimination System (NPDES) requirements. As state regulators visited construction sites, it became apparent that builders were unaware of the damage they were causing by allowing sediment to runoff their sites. In addition, they had no idea how to contain the erosion. Along with builders not knowing how to comply with the regulations, city and county inspectors also needed training in what to look for at construction sites, such as unprotected potential sources of contamination (paint cans, oil drums, etc.), piles of exposed soil, and entryways not constructed to keep mud from leaving the site. The San Francisco Bay Regional Water Quality Control Board (Regional Board), designated by U.S. EPA to enforce the Clean Water Act in California, saw a need to educate both the construction community and municipalities on the expectations for each group under the Clean Water Act and its NPDES component. The Regional Board sought to create a shared set of expectations on effective erosion and sediment control measures amongst all parties involved in

construction in the Bay Area. Regulatory controls, such as Administrative Civil Liabilities (ACLs), have been limited by the small inspection and enforcement staff at the Regional Board, so education programs became a logical component for compliance efforts.

## ***Background***

The executive officer of the San Francisco Bay Regional Water Quality Control Board declared in 1996 that “it appears that erosion control is often driven by tokenism, with control measures intended to demonstrate good intentions, rather than real effectiveness.” The Regional Board staff proposed using a portion of funds derived from enforcement actions against some of the most egregious construction sites for development of an education and outreach program that would educate builders, contractors, and local agency inspectors and planners on effective erosion control measures. The Regional Board directors concurred and designated funds derived from ACLs to be used to develop the program. The Regional Board contracted with a non-profit (Friends of the San Francisco Estuary), with whom they have a close relationship, to develop the program. Friends of the San Francisco Estuary (Friends) used the initial funding to develop the workshops, produce materials including an Erosion and Sediment Control Field Manual, a Guidelines for Construction Projects (a guidance document for preparing a Stormwater Pollution Prevention Plan), and two award winning videos, “Hold on to Your Dirt” and “Keep it Clean.” We used speakers who are knowledgeable and passionate about the subject from their unique perspectives.

## ***The Workshops***

The original workshops were organized as half-day classroom lectures. We presented six workshops at sites throughout the Bay Area. Presenters included staff from the Regional Board and local inspectors. The first series of workshops in 1997 proved to be very successful, with requests for more information about how to implement Best Management Practices (BMPs). As a result, the workshops were expanded the following year to full-day events, with a classroom session in the morning and a visit to an active construction site in the afternoon. The morning class uses speakers from the Regional Board, local inspectors and managers, and a consultant who is a retired manager from the Regional Board. We also bring in representatives from the construction industry to discuss the issue from their perspective. We emphasize that controlling erosion at the source is much more cost-effective than trying to clean up messes at storm drains and creeks. During the afternoon session at a nearby construction site, technical experts demonstrate the most current services and materials available for effective erosion and sediment control. These BMPs are updated each season to incorporate the most practicable and cost-effective methods. We provide a continental breakfast, lunch, and copies of our Erosion and Sediment Control Field Manual, Guidelines to Construction Projects and each presenter’s talk. We give each registrant a test to complete, which entitles them to a certificate of completion. As state and federal regulations change, or new and improved solutions to pollution prevention are developed, we include these updates in our presentations. For example, the Regional Board here in the Bay Area has begun to emphasize post-construction treatments for new and redevelopment construction sites. As a result, we now bring in Regional Board staff and other experts to discuss the importance of incorporating grassy swales, detention ponds, and other treatments into site plans to retain stormwater and irrigation water on site. We also discuss low-impact development ideas. In order to make the workshops more interactive, we have begun a component where the audience breaks up into small groups to fill out a stormwater pollution prevention plan for a model construction site. This exercise allows people to work together to see how best to protect an exposed site.

Because of high turnover in the construction industry, our workshops continue to be in high demand by contractors and others in the private sector. In addition, we are expanding our outreach to city and county planners, managers, and elected officials to strengthen the commitment of municipalities to regulate new construction activities in their own locales. In counties where there are strong stormwater programs, it has proven very helpful for workshop participants to hear from their own local inspectors and program administrators about local issues and problems. Some counties are now contracting with us to present workshops just for their city and county staff. We average 600 people each in our workshops.

## ***Materials***

In order to provide our stakeholders with information they can use in the field and in their own communities, we developed two publications and two videos.

- Erosion and Sediment Control Field Manual – this is a small, 9”x 8 1/2” 3-ring binder that discusses the regulatory background, environmental impacts of erosion, specific erosion and sediment control practices, general site and materials management, post construction, inspection and documentation and sampling requirements. To enhance the text, color graphics are provided that describe each issue or practice.
- Guidelines for Construction Projects – this is an 8 1/2”x 11” soft cover book that provides a more in-depth discussion of the regulatory and permitting processes and provides a template for preparing a stormwater pollution prevention plan, which is required for most construction sites.
- Hold on to Your Dirt – a 20 minute long video which addresses effects of sediment in streams and effective measures to control erosion. The format combines lively interviews with developers, city inspectors, contractors and Regional Board and State Board staff along with discussion on implementing effective Best Management Practices, such as appropriate roughening and terracing techniques, hydroseeding, mulching, erosion control blankets, dewatering, etc. The interviews are conducted with a backdrop of erosion control and other pollution prevention measures being implemented at various construction sites.
- Keep it Clean – also 20 minutes long, this video uses the same format as above and discusses ways to prevent pollution from construction-related activities, such as painting, stucco, concrete washout facilities and saw-cutting. It also includes California’s new state sampling requirements.
- Both videos are available in Spanish and we are in the process of incorporating all the videos into DVD format. We revise our publications every few years, as new regulations and information warrant.

## ***Outreach***

We have developed an extensive list of contacts to whom we mail our registration brochures. The list includes major construction companies in the Bay Area, building contractors, professional organizations, city and county public works departments in our region, and many individual consultants and environmentalists. In addition, Regional Board staff promote the workshops through their inspection work and at their various meetings with local agency staff. We also have some regional stormwater and discharger organizations with whom we work to advertise our program. The workshops have been well attended each year and sometimes are completely filled, so our outreach efforts seem to be working well.

## ***Performance Measures***

We ask each workshop participant to fill out an evaluation form. We use these evaluations, especially the comments that are made, to revise our workshops. We use an A to F range and we consistently receive A's and B's. Since we need to cover a wide range of topics, using a variety of speakers, in a relatively short amount of time, we are criticized sometimes for going too fast. We acknowledge that and ask our audiences to let us know when we are going faster than they would like. An important comment we receive quite often is that the participants find the speakers to be engaging and helpful. We keep that in mind as we line up speakers each year. Many people rated the afternoon construction site activity as the most helpful.

Quantitative measures include the numbers of registrants we get each year and in our publication sales. Both measures are consistent over the years and are high enough to sustain the program. Over 15,000 copies of our printed materials and videos have been distributed statewide and nationally since the inception of the program.

## ***Funding Sources***

- Initial funding through industry fines
- Sales of publications and videos
- Technical expert (vendors) fees for attending workshops
- Workshop registration fees
- Sponsorships from developers and professional organizations

## ***Advice to someone considering a program like ours***

- Providing just a classroom lecture can be boring; we added interactive pieces and the site visit.
- It is important to present enough information without overwhelming the audience.
- Build good working relationships with everyone involved in the construction community – regulators, builders, local permitting, planning and inspection staff, and technical experts.
- Acquire sufficient seed money to get the program up and running.
- Rely on local and regional agency staff for presentations, rather than using only consultants.
- Build as complete a program as possible, using a variety of education and outreach methods, such as publications, videos, and other guidance documents.
- Update workshops and materials frequently to bring in new issues, such as post construction and low impact development.

# Marketing a Successful Stormwater Bylaw: Lessons Learned from Three Massachusetts Communities

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## Abstract

The South Shore Massachusetts towns of Duxbury, Marshfield and Plymouth developed a stormwater management model bylaw in December 2004 that incorporates the latest research, design experience, and permit requirements into a concise document intended for adoption at the local level. The bylaw provides flexible criteria, procedures, and lower-impact development principles that are easily transferable to other municipalities. The project was a collaborative effort of the three towns, the Massachusetts Office of Coastal Zone Management (CZM), the Buzzards Bay Project National Estuary Program (BBP), the North South Rivers Watershed Association (NSRWA), and consultants from Horsley Witten Group.

The project included an education component to garner support for the bylaw that targeted an audience consisting of the general public, town staff and decision-makers, developers, and engineers. Education extended beyond the three towns as the project gained interest from other communities and state-level regulators. The project objectives were not only to adopt a bylaw to meet NPDES Phase II requirements, but also to change conventional attitudes towards stormwater by implementing provisions for innovative design approaches and lower-impact development strategies.

Project proponents recognized potential barriers to adoption of the bylaw including: developers concerned with increased costs; towns concerned with available resources; the public questioning how a stormwater bylaw will directly benefit them; and state-level regulators concerned with how a local bylaw will coincide with state policies.

To overcome these barriers, project proponents used several methods for educating their target audience:

- Advisory committee meetings with CZM, NSRWA, BBP, the Natural Resources Conservation Service (NRCS), and the Towns' Departments of Planning, Conservation, Public Works, Health, Building, and Zoning.
- Workshops for municipal officials and the general public in each of the three towns that were broadcast on local cable television stations.
- Workshop for Engineers and Consultants that drew attendance of over 100 participants from throughout the state.
- Press releases and newspaper articles.
- Presentations at conferences that targeted municipal staff and officials throughout the state.
- Participation in a low-impact development committee that includes representatives from both the public and private sector.

Feedback from the educational campaign is continually being evaluated as Duxbury, Marshfield and Plymouth continue marketing the stormwater bylaw. Communities across the state are carefully watching the outcome so they too can learn lessons from these three towns.

## Introduction

No one said passing a new law was ever easy. Passing a law for stormwater is particularly difficult because often the public does not understand what stormwater is, or does not understand the benefit of spending tax dollars to “manage” stormwater. If your city or town wants to or is required to pass a stormwater law or regulation, a significant education component will likely be required before the municipal officials and the general public “buy into” the law.

The model stormwater bylaw project for the Towns of Duxbury, Marshfield, and Plymouth, Massachusetts addressed the initial phase in marketing a stormwater bylaw to municipal officials, the general public, and the development community. Two major phases can be seen in passing a bylaw: The initial education/marketing of a model bylaw; and the more specific and targeted education/marketing of the actual bylaw. Whether or not the stormwater bylaw will be “successful,” or “passed” in these three communities is still to be determined as the towns prepare for passage at their 2006 spring town meetings. However, the lessons learned from the initial education phase of the model bylaws can be carried to the next phase to make the implementation of the actual bylaw go as smoothly as possible.

## ***Background***

Marshfield, Duxbury, and Plymouth are coastal communities located approximately 35 miles southeast of Boston, Massachusetts. The South Shore's accessibility to the Boston metropolitan area has greatly influenced the growth rates of its communities, as these communities have become residential suburbs. Both Marshfield and Duxbury are approximately 35 square miles in size, while Plymouth is 135 square miles. Duxbury's population is the lowest of the three at approximately 15,000, Marshfield's is at approximately 20,000, and Plymouth's reaches 45,000. All three communities are facing increasing residential and commercial development. As a result, they are seeing degradation in their coastal waters and groundwater due to stormwater pollutants such as bacteria and nutrients, as well as increased flooding and erosion throughout their towns due to increases in impervious surfaces.

The Commonwealth of Massachusetts has long been known for its democratic nature and active local governments. The 351 municipalities in Massachusetts are either cities with mayors and city councils, or are towns, like Marshfield, Duxbury, and Plymouth. The town governments are structured with a Board of Selectmen, a Town Manager/Administrator, and a legislative body that votes on town laws through either open or representative town meeting. Laws in the cities are considered "ordinances," whereas in the towns, they are generally considered "bylaws." Bylaws are only adopted at town meetings, which are usually held once per year.

The Massachusetts Stormwater Management Policy is currently regulated through the State Wetlands Protection Act, and is administered through a local Conservation Commission in each city or town. The policy applies to projects within 100 feet of a wetland resource area or 200 feet of a river. Each city or town also may regulate stormwater through local zoning, subdivision, wetland, health, or building regulations.

With the implementation of the federal NPDES Phase II Stormwater Regulations in 2003, urbanized communities are now required to implement more stringent regulatory mechanisms for stormwater illicit discharges, construction controls, and post-construction controls by the year 2008. Of the 351 Municipalities in Massachusetts, only a handful has a stand-alone stormwater bylaw on the books. The model stormwater bylaw produced for Marshfield, Duxbury, and Plymouth is one of the first comprehensive bylaws created specifically for Massachusetts communities that provides flexible criteria, procedures, and lower-impact development principles. As result, other communities across the state are looking to this model as a way they too can work towards NPDES compliance and improving their local stormwater programs.

## ***Development of the Model Bylaw***

### **Overview**

From September 2004 through May 2005, in collaboration with the Towns of Duxbury, Marshfield and Plymouth, Massachusetts, Horsley Witten Group, Inc. (HW) developed a comprehensive stormwater management bylaw for post-construction controls that incorporates the latest research, design experience, and permit requirements into a concise document to allow for adoption at the local level for each town. The model was tailored to meet the needs of the three South Shore towns, however, the format provides flexible criteria, procedures, and lower-impact development principles that can be easily transferred to other Massachusetts municipalities. The project was funded through the Coastal Nonpoint Source (CNPS) grant program of the Massachusetts Office of Coastal Zone Management (CZM). The Buzzards Bay Project National Estuary Program (BBP) and the North South Rivers Watershed Association (NSRWA) also provided technical and regional staff to provide information, resources, and staff time to this project.

### **Project Goals:**

- To assist the towns in their efforts to implement effective stormwater management measures in the context of promoting conservation of natural resources at the site and municipal levels.
- To develop a comprehensive stormwater management bylaw that incorporates the latest research, design experience, and permit requirements into a concise document to allow local governments to meet the multiple objectives of resource protection and permit compliance.
- To help educate the citizens of each town on the importance of NPS management and to help ensure an educated public prior to the introduction of the bylaw at town meeting.

### ***Frequently Asked Questions***

#### **Why a Stand-Alone Stormwater Bylaw?**

A stormwater bylaw standardizes stormwater criteria and submittal requirements for conservation commissions, planning boards, zoning boards, building departments, and boards of health. A stormwater bylaw will also help expedite the permitting process by providing clear and concise lists and a process for developers and municipal entities to follow. A single bylaw is meant to streamline the process and not create additional bureaucracy.

#### **What is the Purpose of a “Model” Bylaw?**

The model was created for the post-construction stormwater needs of the three towns, but can easily be tailored specific to any Massachusetts municipality. Now that that model bylaw has been completed, each town will need to convene a local stormwater committee to review the model in detail and revise as needed. A legal review performed by the town counsel and/or qualified attorney should also be performed. The model is formatted with fill-in-the-blanks, and with italics as guidance.

#### **How is This Version of a Model Bylaw Different from all the Other Models out There?**

HW received significant and specific input from the Stormwater Bylaw Working Group from three South Shore towns consisting of members from Conservation, Planning, DPW, Health, Zoning, NSRWA, NRCS, MA CZM, and the Buzzards Bay Project. HW also researched the most recent examples from Dedham, MA, the MA Department of Conservation and Recreation, Falmouth, MA, the MA State Policy, Rhode Island, Maine, Virginia, Maryland, and the Center for Watershed Protection for appropriate procedural, administrative, and technical requirements.

### ***Content of the Model Bylaw***

The “Model Stormwater Bylaw” described in these proceedings is in fact a four-part document consisting of:

- A Model Stormwater Bylaw
- Model Stormwater Regulations
- Appendix A: Method of Pollutant Load Calculation for Compliance with Water Quality Standards
- Appendix B: Example System of Stormwater Management Credits and Incentives

#### **Model Stormwater Bylaw**

The actual “bylaw” portion of the document is brief and contains only the requirements necessary to be passed at town meeting. The intent is to keep the contents of this document general enough so that it does not require future revisions at town meeting. The bylaw establishes the ability to create the following key elements: a stormwater authority; stormwater regulations; a stormwater manual; a general

permit for certain activities; a stormwater credit system; and a stormwater utility. The bylaw also defines the applicable projects and exemptions, such as less than 5,000 sf or 25% alteration of land.

### **Model Stormwater Regulations**

The model regulations are intended to contain the bulk of the technical and procedural requirements, and may be revised periodically by the appropriate board or designated “stormwater authority.” Key sections of the regulations include:

#### ***Administration and Applicability***

Administration of the bylaw & regulations is designed to utilize existing boards. Existing procedures are to be used for existing boards, with the exception of permit submittal/plan requirements. The intention is for each board/commission to adopt the stormwater regulations. If a project falls within the jurisdiction of an existing board, the applicant follows the same procedures except for submittal requirements per the regulations. Each applicable board “signs off” on the permit if in compliance, and the final “sign off” comes from the “stormwater authority.” If the project does not fall within the jurisdiction of an existing board, it goes directly to the stormwater authority.

#### ***Permit Procedures & Requirements***

This section includes clear and concise lists of filing application requirements, fees (application, engineer/consultant peer review), public hearings, actions and appeals, stormwater management plan contents, and operation and maintenance plan contents.

#### ***Perpetual Inspection & Maintenance***

This section is intended to ensure long-term effectiveness of Best Management Practices by having maintenance agreements in place, routine inspections and submittal of inspection reports upon request, and possible liens on properties if they fail to be maintained.

#### ***Post-Development Stormwater Management Criteria include:***

- No Untreated Discharges,
- *Channel Protection* - Protection of channels from bank and bed erosion and degradation,
- *Overbank Flooding Protection* - Downstream overbank flood and property protection,
- *Extreme Flooding Protection* - Extreme flooding and public safety protection,
- *Recharge* - Annual recharge from the post development site shall mimic the annual recharge from pre-development site conditions,
- *Structural Practices for Water Quality* - Presumed Compliance with Massachusetts Water Quality Standards and/or Pollutant Loading Calculation Assessment,
- Water Quality Volume,
- *Hydrologic Basis for Design of Structural Practices* - Design assumptions for hydrologic and hydraulic evaluation of development sites,
- *Sensitive Areas* – Designation of critical areas that will be subject to additional or more stringent criteria, and
- *Hotspots* - Specific BMPs required for land uses or activities with higher pollutant loadings.

### **Appendix A – Method of Pollutant Load Calculation for Compliance with Water Quality**

This appendix is included to provide additional guidance to municipalities considering the adoption of the loading calculation approach as a requirement for large or complex projects, or projects located in sensitive areas. For certain magnitude projects, a loading calculation analysis may be required by applicants to document compliance with water quality standards by calculating pre-development pollutant loads, calculating uncontrolled post-development pollutant loads, and then applying prescribed pollutant removal efficiency to selected practices to arrive at a net pollutant load delivery. The post-developed load must be equal to or less than the pre-developed load.

## **Appendix B – Example System of Stormwater Management Credits and Incentives**

In an effort to apply a more holistic approach to stormwater management, five specific non-structural practices called *stormwater credits*, or incentives for better environmental site design, are provided for designers that will significantly reduce the size and cost of structural practices. Non-structural practices are increasingly recognized as a critical feature of effective stormwater management, particularly with respect to site design. In most cases, non-structural practices will need to be combined with structural practices to meet stormwater requirements. The key benefit of non-structural practices is that they can reduce the generation of stormwater from the site. In addition, they can provide partial removal of many pollutants and contribute to groundwater recharge. The five proposed non-structural stormwater credits are:

- Disconnection of rooftop runoff,
- Disconnection of non-rooftop runoff,
- Stream buffers,
- Grass channels, and
- Environmentally sensitive development.

### ***Educational Methods Used***

As mentioned previously, two major phases can be seen in passing a bylaw: The initial education/marketing of a model bylaw; and the more specific and targeted education/marketing of the actual bylaw. Once the model stormwater bylaw was developed by the Stormwater Working Group, the project team moved into the initial education/marketing phase of the model bylaw. The educational methods used to target an audience of the general public, local officials, the development community, and state officials, are described below.

- 1) Education of the key municipal players and advocates
    - HW facilitated project advisory committee meetings that consisted of staff from CZM, NSRWA, BBP, the Massachusetts Bays National Estuary Program, the Natural Resources Conservation Service (NRCS), the towns' conservation commissions, planning departments, departments of public works, health departments, building departments, and zoning boards.
  - 2) Education of developers and engineers
    - NSRWA provided press releases and mailings to area engineers and developers.
    - HW and the project team provided training at an engineer/consultant workshop that drew attendance of over 100 participants at the NSRWA Fall 2004 Green Communities Speaker Series.
  - 3) Education of the general public, town officials, and staff
    - NSRWA and each town provided press releases and advertised training workshops in each of the three towns.
    - HW and the project team conducted three separate training workshops in each town to introduce the criteria, procedures, and detailed components of the model stormwater management bylaw.
    - Local newspaper articles were published after each workshop.
    - Videos of the presentations in Marshfield and Plymouth were played periodically over the local cable stations.
    - Fact Sheets for “Top 10 Reasons for a Bylaw” were distributed at the public meetings.
  - 4) Education of officials and staff from other municipalities
    - Presentations by HW staff and the project team at conferences for:
      - Massachusetts Citizen Planning Training Collaborative
      - Massachusetts Association Planning Directors
-

- Massachusetts Association of Conservation Commission Agents
  - Metropolitan Area Planning Commission 495/Metrowest Corridor Partnership Meeting
  - Town of Bourne, Massachusetts
- 5) Education at the state level
- Education of MA CZM through attendance of CZM representatives at the Stormwater Bylaw Working Group
  - Participation in a MA Executive Office of Environmental Affairs (EOEA) Low-Impact Development Committee that includes representatives from both the public and private sector
  - Bylaw and regulations under review by the Massachusetts Department of Environmental Protection (DEP)
  - Bylaw and regulations under review by the Massachusetts Attorney General's Office

### ***Conclusion: Lessons Learned***

Marshfield, Duxbury, and Plymouth have not yet attempted to pass the stormwater bylaw in their towns, however, they are aiming for passage at the Spring town meetings of 2006. Right now the towns are in the stage of convening their own working groups in order to revise the model bylaw specific to their own needs. In order to pass the bylaw, each town will need to increase their marketing and educational efforts even more to target specific concerns from specific audiences.

Using the following lessons learned from the initial education and marketing phase of the model bylaw, the three towns will be on their way to a “successful” passage of the bylaw. Not only will these lessons help the towns in their next phase, but these lessons can also be transferred to other municipalities as they embark on their journey to pass their own new stormwater bylaw programs.

- 1) It is about the money. Town officials, the public, and even developers are willing to do the right thing, but when it comes to available funding, stormwater is not always a high priority. Any cost savings measures or funding mechanisms should be emphasized in the marketing campaign.
- 2) It is about the time, which goes back to the money. Town staff are already too busy, and there is often little or no funding to hire additional staff. A stormwater program should be tailored to minimize additional staff time as much as possible, otherwise buy-in may not happen from key departments.
- 3) Do your research prior to the education and marketing. Who is your audience? Who are the decision makers? What is the political climate in the town? What will be the challenges? Develop your marketing plan specifically to target the challenges likely from a specific audience. Know which aspects of the program you may be willing to compromise.
- 4) Utilize working groups and involve all types of stakeholders. Feeling part of the decision making process increases enthusiasm and buy-in. You are also training future trainers.
- 5) Utilize non-profit groups. They can be your best advocates, and often have access to contacts and other resources a municipality may not have.
- 6) The business community is very interested in regulatory changes. The developer/engineer workshop was very well attended. Suppliers, manufacturers, and representatives from the agricultural industry (cranberry growers in this case) attended public meetings and would often follow up with phone calls.
- 7) Hold an informational meeting at the same time as a regularly scheduled public hearing. Attendance from town staff and committee members is likely much higher if they are required to be there anyway.

- 8) It's difficult to reach the general public through press releases alone. The majority of attendees at the workshops were town staff or town committee members required to attend, very few members of the public attended.
- 9) Keep the bylaw and your educational material clear and concise. Audiences like and understand bullets, lists, and outlines. Presentation matters.
- 10) Utilize short and to the point fact sheets. The "Top 10 Reasons for a Stormwater Bylaw" was a big hit.
- 11) Do not overwhelm a non-technical audience with technical details. Pictures and concepts are good. Those who understand and want more technical details, will ask you for them.
- 12) Read the newspaper articles the day after a public meeting and check the facts. The facts may not always be correct.
- 13) Get kids involved. High school students in Marshfield constructing a stormwater bioretention facility received ample press.
- 14) Municipalities are looking to model their programs and procedures after successful programs in other municipalities. One of the biggest questions received at conferences with staff from other towns was "did the bylaw get passed?" In other words, share both your success and failure stories with your neighboring towns!
- 15) Make the education fun and entertaining! A humorous power point slide always breaks the ice.

### ***For More Information***

A copy of the complete model stormwater management bylaw is available for download from [www.horsleywitten.com](http://www.horsleywitten.com)

## The University of Minnesota Shoreland Education Program

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### Abstract

Keeping water resources healthy in the face of increasing development pressure requires informed decisionmaking and cooperation on the part citizens and government agencies. The Shoreland Education Program is co-sponsored by Minnesota Sea Grant, Water Resources Center, and Extension Service with the goal of improving water quality, habitat, and aesthetics of lakes and rivers. It seeks to educate shoreland property owners, the landscape and nursery industry, natural resource professionals, realtors, developers, and local government agencies about shoreland management. Key components of this successful program include workshops, hands-on field experience, educational materials, and research and demonstration sites.

Workshops covering a range of topics including basic limnology, best management practices for shoreland property, aquatic and wetland plant identification, erosion control, invasive species control, shoreland revegetation, and shoreland maintenance and management. Many of these workshops provide hands-on and/or field experience; this builds participant confidence and greater long term benefits for urban and rural areas of Minnesota.

Educational products supporting the Shoreland Education programs include an award winning Web site <[www.shorelandmanagement.org](http://www.shorelandmanagement.org)> and promotional materials, monthly newsletter (*From Shore-to-Shore*), fact sheets, how-to workbooks, the *Lake Home and Cabin Kit*, and how-to videos and DVDs.

Since 1997, over 80 shoreland restoration demonstration sites have been implemented on public and private lake and river shorelines. Research has included appropriate installation methods and alternative erosion control techniques. These demonstration and research sites are used to forward the science of shoreland restoration and provide the basis for many of the shoreland educational materials.

These workshops reached over 1,000 people in 2004. Follow up surveys indicate that on the average, each of these participants reached an additional 75 people by teaching youth, engaging neighbors, providing leadership in lake associations, and participating in local shoreland decision making.

### ***Program Overview***

Keeping water resources healthy in the face of increasing development pressure requires informed decision-making, action, and cooperation on the part of citizens, businesses, and government agencies. The Shoreland Education Program is co-sponsored by Minnesota Sea Grant, Water Resources Center, and Extension Service with the goal of affecting change in shoreland management practices that will protect and improve water resources. Other program partners include the University of Minnesota faculty, Minnesota Department of Natural Resources, local government units, lake associations, watershed districts, and non-profit organizations.

Since 1994 the program, working together with its partners, has achieved this goal by providing shoreland property owners, local units of government, natural resource professionals, the landscape and nursery industry, and realtors with workshops, hands-on field experience, numerous research-based educational materials, and shoreland sites demonstrating the use of alternative landscaping and erosion control.

The workshops cover a range of topics (e.g., basic limnology, best management practices for shoreland property, aquatic and wetland plant identification, erosion control, invasive species control,

shoreland vegetation, shoreland monitoring and maintenance, and workshops customized to local needs). These workshops enable participants to better understand the ecology of the water environment and how to minimize human impacts on our water resources through monitoring, legislation, and appropriate shoreland management.

Many of these workshops also provide hands-on and/or field experience that build participant confidence, resulting in long-term impacts in urban and rural areas of Minnesota. Field experience may include plant identification, restoration of native shoreland vegetation, or erosion control along lake and river shorelines. In addition to providing hands-on experience for participants, these restoration and erosion control sites have been used to demonstrate alternative techniques and forward the science of shoreland restoration through research, providing the basis of many of our shoreland educational products.

Educational products supporting the shoreland education programs include an award winning Web site <[www.shorelandmanagement.org](http://www.shorelandmanagement.org)> and promotional materials, a bimonthly newsletter (*From Shore-to-Shore*), fact sheets, how-to workbooks, the *Lake Home and Cabin Kit*, and “how-to” videos and DVDs.

### ***Program Outcomes and Impacts***

Since 1994, over 100 workshops have been conducted and over 80 public and private lake and river shorelines have been restored. But this tells only part of the story. In 2004, these workshops reached over 1,000 people. Follow-up surveys indicate that on the average each of these participants reached an additional 75 people by teaching youth, engaging neighbors, providing leadership in lake associations, participating in local shoreland decision making, and securing grants to implement additional restoration projects.

### ***Program Challenges***

Representing a new direction for extension, the shoreland education program was created within an agency long known for 4-H, Master Gardener and agriculture programs. One of the first challenges was to market the new program under extension’s umbrella. We created a new shoreland logo, attended numerous and varied promotional venues, and developed working relationships and partnerships with citizens, organizations, businesses, and agencies. In order to reach additional target audiences, we consult with outside marketing professionals and cross-market with other natural resources related extension programs (Woodland Advisors, On-site waste treatment, Master Naturalist, Stormwater, Non-point source Education for Municipal Officials)

Two aspects of our programs have been successful in addressing a second challenge – that is to motivate our workshop participants to take action and affect change that will protect and improve water resources. The shoreland revegetation, erosion control, and plant identification workshops have both classroom and “hands-on” field experience components that provide participants with not only the necessary background information, but also an opportunity to develop the skills and confidence necessary to take action on their own. In addition, participants play an important role in applied shoreland research by assisting in establishing and monitoring research sites. Our follow-up evaluations and surveys indicate that these participants *do* get involved in local decision-making, provide further education of local citizens, secure grants to implement projects, and coordinate local restoration and monitoring initiatives.

Finally, the increase in shoreland restoration projects statewide has generated an immediate need for local, commercially available native plants. The program has facilitated the coordination of native plant

demands with the nursery industry. This includes selection of those species effective in shoreland restorations, working with the native plant industry on special plant product needs, collecting “starter seed” for nursery propagation, researching special propagation techniques, and identification of nursery collections.

### ***Closing thoughts – What works well***

Key to the success of the program and affecting change in shoreland management practices that will protect and improve water resources is:

- local community involvement in planning and marketing educational programs;
- an educational suite that includes classroom, hands-on demonstration, and research components;  
and
- long-term educational programming targeting local water quality issues.

# Texas SmartScape™ Program: Smart Gardening for North Central Texas and Beyond

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### Abstract

Many people in North Central Texas are unaware that landscaping practices can result in polluted runoff being discharged into local waterways. There is a general lack of awareness about the benefits of using native and adapted plants to minimize water pollution and water consumption. SmartScape™ is an interactive “how to” guide that teaches North Central and West Texas residents the SmartScape™ concepts of landscaping with native and adapted plants. SmartScape™ was created in 2001 as both a storm water quality best management practice for ‘New Development’ and a water conservation tool. In 2003 the SmartScape™ web site was launched for the North Texas region, and in 2005 it was expanded into the West Texas region. This innovative Web-based program contains photographs, artwork, music, information, landscaping techniques, and a searchable plant database. Since its inception in March 2003, the SmartScape™ Web site has received over six million hits.

The Storm Water Public Education Task Force, a regional group of municipal public education and public involvement specialists in North Central Texas, continues to develop new opportunities to educate the public about SmartScape™. The Task Force initiated the first “March is SmartScape™ Month” in 2002 to provide local governments an opportunity to join others in a common goal to educate citizens on storm water pollution prevention and water conservation. Cities and other organizations interested in participating in SmartScape™ Month plan a variety of activities during the spring season, such as hosting landscaping seminars, conducting tours of demo gardens, planting a new SmartScape™ demo garden, and/or distributing educational materials. Participants determine the extent of participation based on their available resources. Participation in SmartScape™ Month is strictly voluntary. The North Central Texas Council of Governments (NCTCOG) provides some of the planning tools for the events, and conducts regional publicity, including a public service announcement (PSA) campaign inside the Dallas Area Rapid Transit (DART) light rail and bus systems. The 2005 DART campaign alone generally reaches an average of 2.3 million DART users. There have been four successful annual “SmartScape™ Months” to-date.

SmartScape™ has received several awards including the 2002 Texas Environmental Excellence Award (1st place regional government); the Watermark Award for communications excellence (1st place) and the Water Conservation/Reuse Award from the Texas Section of the American Water Works Association; Keep Texas Beautiful (1st place regional government); and the National Association of County and City Health Officials (2nd in the nation for environmental projects).

## Program Highlights

### Date Outreach Began in North Central Texas: May 2001

- Population: 5.9 million
- Location: North Central Texas, a 16-county metropolitan region centered around Dallas and Fort Worth. Currently, North Central Texas Council of Governments (NCTCOG) has 232 members that include 16 counties, 164 cities, 26 school districts, and 26 special districts. The area of the region is approximately 12,800 square miles.
- Project development team: Tarrant County Health Department, Texas Extension Service – Tarrant County, Texas Parks & Wildlife, Tarrant Regional Water District, Weston Gardens & NCTCOG.
- Cost to develop initial CD: \$4,000 not including staff time and volunteer time of over 2,000 hours

- CD distribution to date: over 160,000 CDs distributed by municipalities, but not including individual citizen reproduction
- Cost to develop initial SmartScape™ Web site: \$41,455

### **Date Outreach began in West Texas: March 2005**

- Population: 500,000
- Location: City of Lubbock and surrounding areas. Lubbock is the heart of West Texas. The economic center of a 25-county region that is home to more than 500,000 people. Lubbock is the 9th largest city in the State of Texas and the largest city in West Texas.
- Project development team: City of Lubbock, Lubbock Chamber of Commerce, Texas Tech University
- Cost to develop and maintain West Texas version: \$5,500 (\$4,000 base; \$1,500 annual maintenance fee)

### ***Define the Local Need or Problem***

Increasing population growth in urbanized areas impacts Texas' natural resources and environment. One consequence of this growth is increased water irrigation and changes to urban stormwater runoff quality and quantity. For example, when homes (and many businesses) are built, new landscape plants are selected, planted, and then maintained, typically by applying or over-applying chemicals and water. This has resulted in misuse of valuable water resources and more pesticides, nutrients, and herbicides going into urban storm drainage confirmed by monitoring of local waterways.

Many people are unaware that native and adapted plants consume less water and also require little or no pesticides and fertilizers to grow. Furthermore, individuals are unaware that their landscaping practices can result in pollutants being discharged in runoff to local waterways. Participants of NCTCOG's Regional Storm Water Management Program determined that promoting the use of native and adapted plants through an interactive CD-ROM would be an innovative and effective non-regulatory best management practice (BMP) to address those concerns in the North Central Texas area.

### ***Determine the Target Audience***

Texas SmartScape™ was initially created as a stormwater quality BMP for 'New Development' but has water conservation benefits as well. The primary objective of SmartScape™ is to encourage new homeowners, before they finalize their landscaping plans, to plant native and adapted plants. These plants typically require little or no pesticide or fertilizer to grow. Also, these plants usually require less water to maintain. The secondary objective is to provide SmartScape™ to many others in North Texas also interested in growing beautiful plants that require less pesticide, fertilizer, and water, while providing a beneficial ecological impact to native wildlife.

### ***Recruit a Dedicated Team***

NCTCOG undertook a regional initiative to create the Texas SmartScape™ CD with no special or dedicated funding. Instead, NCTCOG used creative funding alternatives and "sweat equity" from a project team comprised of dedicated experts in stormwater management, landscaping practices, and wildlife habitat management. The CD was assembled by a team of volunteers from different professions. These volunteers include the project manager (Gene Rattan, Tarrant County), CD authoring (Keith Kennedy, Leslie Rauscher and Lee Evans, North Central Texas Council of Governments), commercial

nursery/landscape business (Randy Weston, Weston Gardens, Inc.), county extension agent (Dotty Woodson, Texas Extension Service), and urban biologists (John Davis and Dr. Lou Verner, Texas Parks and Wildlife). Tarrant Regional Water District volunteered to fund developmental materials that enabled NCTCOG to develop the project in-house. In addition, an impressive number of people contributed materials and assistance throughout the project and helped make the CD a reality. Texas SmartScape™ is an innovative stormwater BMP and public education tool that was made possible through the collaborative efforts of many individuals.

### ***Fund the Project***

The interactive CD containing photographs, artwork, music, environmental information, landscaping techniques, and a searchable database of over 200 plants, took 10 months to develop and was released in May 2001. Excluding staff time, the total cost of creating the CD included: \$1,000 CD authoring software, \$2,400 materials and services, \$600 sound studio, and \$57,902 for duplicating the initial 84,105 CDs and cases.

The participating local governments, businesses, and other groups paid the duplication costs. Approximately 2,000 volunteer hours of work by team members and others was donated.

### ***Develop the Public Message***

The Texas SmartScape™ message promotes economic, aesthetic, ecological, and stress relief benefits that every North Texan can enjoy, while at the same time improving local water quality and supply. Below are examples of the messages that appeared this past March inside the Dallas Area Rapid Transit (DART) light-rail and bus systems:

- Don't pour \$\$ down the drain! Use less water and fertilizer in your yard & save \$\$.
- Use plants that beat the Texas heat and save \$\$.
- Cleaner curbs & cleaner creeks for a healthier yard.

### ***Determine the Outreach Strategy***

No specific outreach budget was allocated; the program is very flexible, and participating cities conduct outreach within their existing means. Cities are given the option to participate in SmartScape™ based on their available resources. To further encourage the widest distribution possible at the lowest cost, SmartScape has a unique copyright use agreement for its CD. Anyone can copy and distribute the CD, provided that it is copied in its original form and that it is provided to others at little (duplication costs only) or no cost. In addition, NCTCOG conducts co-operative bulk purchases to lower CD distribution costs for cities, counties, nurseries, businesses, agencies, and others interested in participating in the program. The cost of the interactive CD (case, professional artwork, label, and CD) averaged \$0.73 apiece, which is comparable to the cost of a color brochure.

### ***Implement the Project***

SmartScape™ was initially distributed with little or no charge to the public since it is a non-profit project. Since 2001, over 160,000 CDs have been distributed by local governments in North Texas, not taking into account the copies that private individuals may have made and distributed independently. In addition, several cities have implemented SmartScape™ yard contest including the cities of Arlington, North Richland Hills, Carrollton, Coppell, Garland, Denison, and Sherman. Several cities have officially declared March as “SmartScape™ Month” including Garland, Frisco, and Carrollton.

#### **North Texas Entities that promote SmartScape™ (not a comprehensive list):**

City of Addison	City of Lewisville	Keep Carrollton Beautiful
City of Arlington	City of McKinney	Keep Grapevine Beautiful
City of Benbrook	City of Mesquite	Keep Lewisville Beautiful
City of Burleson	City of North Richland Hills	Keep North Richland Hills Beautiful
City of Balch Springs	City of Plano	Mike's Garden Centers
City of Carrollton	City of Richardson	North Texas Municipal Water District
City of Cedar Hill	City of Rowlett	Raytheon, Garland Facility
City of Cleburne	City of Sherman	Redenta's Garden
City of Coppell	City of Southlake	Sherwood Forest Neighborhood Association (Irving)
City of Dallas Water Utilities and Storm Water Management	Collin County Master Gardeners	Sustainable Dallas 2002
City of Denison	City of Waxahachie	Tarrant Regional Water District
City of Denton	Bluebonnet Resource Conservation and Development Inc.	Tarrant County Public Health Department & Transportation Department
City of DeSoto	Calloway's Nurseries	Texas Cooperative Extension – Denton & Tarrant Counties
City of Duncanville	Cleburne Chamber of Commerce	Texas Commission on Environmental Quality - Arlington
City of Euless	Community News Aledo	Texas Department of Transportation - Fort Worth
City of Farmers Branch	DART	Texas Institute of Applied Environmental Research
Town of Flower Mound	Ft. Worth Botanical Society	Upper Trinity Regional Water District
City of Fort Worth Water Department & Environmental Management Dept.	Ft. Worth Nature Center	Weston Gardens In Bloom, Inc
City of Frisco	Green Mama's Organic Garden Market	Westlake/Tree City
City of Garland	In the Garden Yard and Garden Center	
City of Grapevine	Kaufman County Solid Waste Management Cooperative	
City of Haltom City	Keep Denison Beautiful	
City of Irving	Keep Coppell Beautiful	
City of Keller		

The Storm Water Public Education Task Force, a regional group of municipal public education and public involvement specialists in North Central Texas, continues to develop new opportunities to educate the public about the benefits of SmartScape™. The Task Force initiated the first “March is Texas SmartScape™ Month” in 2002 to provide local governments an opportunity to join others in a common goal to educate citizens on stormwater pollution prevention and water conservation. Cities and other organizations interested in participating in “March is SmartScape™ Month” plan a variety of activities. Activities include hosting SmartScape™ seminars, conducting tours of demo gardens (if one already exists in the city), planting a new SmartScape™ demo garden, distributing the original CDs, bookmarks etc., and scheduling events during the spring season, preferably but not necessarily during March. Participants determine the extent of participation, depending on their available resources. Participation in SmartScape™ Month is strictly voluntary. NCTCOG provides some of the planning tools for the events, and conducts regional publicity, including a PSA campaign inside the DART Light Rail and Bus Systems. The 2003 DART campaign alone generally reached an average of four million DART users. There have been four successful annual “SmartScape™ Months” to-date.

### ***Enhance and Expand the Project***

In order to promote the SmartScape™ principles of water conservation and water pollution prevention to an even greater audience, NCTCOG, in partnership with the major water suppliers in the Dallas-Fort Worth region, developed a fully interactive Web version of the CD that was completed in time to celebrate the second annual “March is SmartScape™ Month” in 2003. A total of \$41,455 was used to develop the interactive Web version of SmartScape™, and was cost-shared equally among the five primary water supply providers (Trinity River Regional Water District, North Texas Municipal Water District, Upper Trinity River Water District, Dallas Water Utility, and the City of Irving). During its first month alone, the SmartScape™ Web site received over 56,000 visitors. Nearly 170,000 bookmarks have been bought and distributed to promote the SmartScape™ Web site.

### ***Adapt the Project***

In 2004, the City of Lubbock and its partners approached NCTCOG to create a SmartScape™ CD project for the West Texas region. The cost to customize a CD for West Texas was prohibitive, so instead the City of Lubbock entered into an agreement with NCTCOG to expand the initial SmartScape™ Web site by creating a plant database specific for the West Texas region. The West Texas SmartScape™ site was launched in time for the 4<sup>th</sup> Annual “March is SmartScape™ Month” in 2005. Since this past March, the enhanced and expanded SmartScape™ Web site is receiving an average of 300 visitors per day.

### ***Measure Success***

Fueled by positive response from the public and media, demand for this type of interactive information continues to grow locally, statewide, and also in other parts of the country. Numerous articles about SmartScape™, along with phone calls and emails received to-date help to document the impact of the outreach conducted thus far. As of this writing, the SmartScape™ Web site has received over six million hits since 2003. The initial SmartScape™ CD’s success has been recognized with multiple awards, including: the 2002 Texas Environmental Excellence Award (1st place government category); the Watermark Award for communications excellence (1st place); the Water Conservation/Reuse Award from the Texas Section of the American Water Works Association; Keep Texas Beautiful (1st place regional government category); and the National Association of County and City Health Officials (recognized 2nd in the nation for environmental projects).

In 2004, the Canadian Centre for Pollution Prevention included SmartScape™ in their report titled “The Impact of By-Laws and Public Education Programs on Reducing the Cosmetic/Non-Essential, Residential Use of Pesticides: A Best Practices Review.” SmartScape™ was as one of nine community case studies from Canada, the United States, and Europe that have implemented innovative educational approaches to limiting pesticide and fertilizer use.

### ***Determine Future Steps***

As water conservation and water quality become an increasing priority for Texas due to increasing urbanization, more citizens should be encouraged to use SmartScape™ principles to decrease polluted runoff and outdoor water use. The SmartScape™ CD is nearly five years old. Due to software compatibility issues, the CD will be phased out in the coming year. Efforts will be directed towards supporting and enhancing the SmartScape™ Web site and associated outreach initiatives such as

“SmartScape™ Month”. NCTCOG is also interested in helping others from re-inventing the wheel and exploring more cooperative opportunities to expand the SmartScape™ program beyond the North Central and West Texas regions to other parts of Texas. The SmartScape™ program is available at [www.txsmartscape.com](http://www.txsmartscape.com). The North Central Texas’ Storm Water Management Program Web site is available at <[www.dfwstormwater.com](http://www.dfwstormwater.com)>.

### Texas SmartScape™ Timeline

July 00 –	Start date to create the CD
May 01 –	CD released to the public
Oct. 01 –	Within six months 84,105 copies ordered/distributed in North Texas by 91 participating local governments, business, and other organizations
Mar. 02 –	“March is Texas SmartScape™ Month” is organized to promote SmartScape™ principles in North Texas region
April 02 –	SmartScape™ is recognized with the Watermark Award for communications excellence (1 <sup>st</sup> place); and the Water Conservation/Reuse Award from the Texas Section of the American Water Works Association
May 02 –	SmartScape™ receives the 2002 TCEQ Texas Environmental Excellence Award (1 <sup>st</sup> place government category)
July 02 –	SmartScape™ is awarded the Keep Texas Beautiful (1 <sup>st</sup> place regional government category); and the National Association of County and City Health Officials (recognized 2 <sup>nd</sup> in the nation for environmental projects).
Sept. 02 –	Five main regional water providers in North Texas sponsor development of Web version
Mar. 03 –	New Web version is launched in time to celebrate 2 <sup>nd</sup> Annual “March is SmartScape™ Month.” Web becomes the preferred method to provide SmartScape™ information; CD is secondary
Feb. 04 –	Canadian Centre for Pollution Prevention releases their report that includes SmartScape™ as a case study
Mar. 04 –	3 <sup>rd</sup> Annual “March is SmartScape™ Month”; discussion launched with Lubbock to create West Texas SmartScape™
Mar. 05 –	4 <sup>th</sup> Annual “March is SmartScape™ Month”; enhanced and expanded SmartScape™ Web site debuts with the addition of the West Texas region

## Lessons Learned: Moving LakeSmart from Pilot to Statewide

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### **Abstract**

Maine has a long reputation for beautiful pristine lakes: clear blue waters, loons calling, and pointed firs framing the shores. But Maine's lakes have been showing declining water quality over the past 20 years. We are losing the clear water, the loons, and the pointed firs. Development has hit Maine—and the associated polluted stormwater runoff that accompanies it has arrived as well.

Lawns are replacing the forested shorelines, mini-malls are replacing the back fields, and miles of camp roads and ditches encircle the lakes. The levels of phosphorus in runoff are five to ten times higher than pre-development conditions.

The Maine Department of Environmental Protection, in partnership with soil and water conservation districts, water utilities, and watershed associations have created LakeSmart to help reverse the problems typically associated with development. LakeSmart encourages best management practices (BMPs), including less lawns, more buffers, better erosion control, less channelization of stormwater, and more rain gardens.

The target audience is lake association members: they are more easily reached with our promotion, they are a cohesive group, and they already have the sparkplug, "can-do" activists. Lake associations will help sustain the behavior change until we are able to get 15% of property owners to change practices (when the social norm will be able to sustain itself).

LakeSmart offers free training sessions to lake associations and free technical advice to homeowners on implementing BMPs to overcome the barriers associated with changing landscaping practices. We use recognition (signs, newsletters, and newspaper coverage) both as an incentive/reward as well as a means to make the behavior change of less lawns and more buffers more visible so as to influence the social norm more quickly.

Program evaluation includes the number of training sessions held, number of follow-up technical assistance site visits requested, and number of recognitions/awards given over time. Long term measurement will be by updating watershed surveys to document reductions in erosion problems, roads and ditch problems, number of buffers, etc.

After two years of successful pilots (based on criteria above), in 2005 we were ready to go statewide. But taking a successful pilot program statewide isn't always so easy. Even a program answering an important problem, built with partnerships, and using social marketing principles can have a hard time making it in a larger market. So it is back to exploring the barriers to success using focus groups and surveys. After some tweaking, we're off again—learning to live lightly on the land for the sake of our lakes.

### ***Introduction***

Maine has a long reputation for beautiful pristine lakes with clear blue waters, loons calling, and pointed firs framing the shores. But Maine lakes have been showing signs of declining water quality over the past 20 years. We are losing the clear water, the loons, and the pointed firs. Development has hit Maine, along with the polluted stormwater runoff that accompanies it.

Lawns are replacing the forested shorelines, mini malls the back fields, seasonal camps are being converted into year-round homes, and miles of camp roads and ditches circle the lakes. The levels of phosphorus runoff are 5-10 times higher in developed watersheds.

Maine lakes needed a program to halt the tide of urban/suburban landscaping practices and to encourage best management practices (BMPs): less lawn, more buffers, erosion control, less fertilizer, rain gardens... In 2001, Maine DEP staff began to organize a new program.

### ***Development Phase***

We gathered partners (Soil & Water Conservation Districts, Cooperative Extension Service, water utilities, and watershed associations) from around the state to help us develop a program to address the decline in water quality due to the change in land use. We followed the ***Getting In Step for Developing a Watershed Outreach Campaign Plan*** listed below:

- 1) Define the driving forces, goals and objectives,
- 2) Identify and analyze the target audience,
- 3) Create the program and tools,
- 4) Package the program,
- 5) Distribute the program,
- 6) Evaluate the outreach campaign, and
- 7) Tweak and implement.

#### **Step 1. Define the driving forces, goals and objectives**

We defined our situation (driving force) as declining lake water quality due to the urban/suburban land-use pattern change. Our goal was to make lake-friendly landscaping practices the norm on lakes throughout the state. We planned to change the norm by offering a program to encourage BMP adoption, and to hasten the adoption by using rewards, recognition, and peer pressure. The specific measurable objectives waited until we determined our message, audience, etc.

#### **Step 2. Identify and analyze the target audience (and the targeted behaviors)**

We used Doug McKenzie-Mohr's Behavior Change Matrix to help sort out the issues, audiences, solutions, etc. We decided our target audience was lakeshore residents and landscapers, and we left municipal code enforcement officers, lawn care companies, and building contractors for another time. We used the 2000 Lake Users Survey and our experience to characterize our audience (concerned, but lacking knowledge on cause and effect, looking for easy fixes, retired).

#### **Step 3. Create the tool and the program**

Working through lots of options using the McKenzie-Mohr grids, we decided to offer a comprehensive program focused at changing landscaping, yard care and structural housekeeping practices of shorefront residents. The program would offer the following:

- free workshops to train residents in good practices,
- site visits to evaluate properties, and
- awards for good land use practices both as an incentive and to increase visibility of the new practices.

The grids helped us decide which BMPs to include in the program. We picked the ones that would make the greatest impact on the lake regardless of how easy they would be to get implemented (e.g.; reducing amount of lawn, creating buffers, replacing old septic systems). But, we also included easier but more palatable ones that people might adopt more easily (e.g.; reducing amount of fertilizer/pesticides, pumping septic tanks, fixing chronic erosion areas). The reason for easier BMPs was to encourage our target audience to feel that they were lake conservationists and then it would be easier to move them to undertake more difficult practices.

Also from McKenzie-Mohr we knew we needed to make the “new” social norm visible. After asking our audience through emails and mini focus groups at meetings (a technique learned from the EPA NPS E&O Work Group), we found that homeowners embraced the idea of posting a visually appealing sign on their property.

The next step was to develop the assessment tool for evaluating properties, and we continued to revise it for the first two seasons. The form gives scores and suggestions for improvements for each of five categories: 1) driveways & parking, 2) structures & septic, 3) yard & paths, 4) shorefront, and 5) undeveloped areas (added in 2005 as a bonus for people who hold greater than 1.5 acres of undeveloped land). Property owners only need a score greater than 67% in a category to qualify. A passing score in all four initial categories earns the “LakeSmart Award” (a personalized plaque and two signs for the property). A passing score for one or more individual categories earns “LakeSmart Recognition” (a certificate). At the end of the site visit, the evaluator gives the homeowner the summary sheet with recommendations and what award or recognition the homeowner has received. If they are an award winner, the evaluator gives the homeowner the signs. The award plaque or certificate comes later with a personal letter from DEP.

Everyone who receives an award or recognition receives mention in the lake association newsletter and is listed on the DEP Web site. Award winners are announced in a press release to local papers.

Next we developed the workshops which would be the training tool to encourage BMPs, as well as a way to spread awareness of the program. The free six-hour workshops included:

- lecture on lake ecology, BMPs, with special attention to buffers,
- field trip to a “good” site and a site that needed help, and
- improving a landscape plan for a sample property.

Finally we wrote objectives for this new program.

- Hold five workshops per year with at least 20 participants each.
- Measure attendees’ satisfaction with workshop.
- Track the number of awards and recognitions per year.
- Long-term measurement would be by redoing watershed surveys to document any reductions in erosion problems, road and ditch problems, increase in number of buffers, etc.

#### **Step 4. Package the program**

The partners selected some possible names and slogans; then we tested them with our audience. We used informal surveys over e-mail and in small groups to pick the program name (LakeSmart), slogan (Living lightly on the land for the sake of our lake) and logo (art work from the Digital Toolbox and adapted by artist, Oan Somboonlakana donated at a discounted rate). The logo became the focal point of the sign. We decided on time of year (summer), developed agendas for the workshops, and created accompanying materials. We hired consultants with credentials in landscaping and lake ecology to deliver the workshops. We contracted with Soil and Water Conservation District staff to do property evaluations to ensure it would be a white hats, no enforcement program and would also be done by folks who had lots of knowledge and credibility on the issues. We did trainings so all evaluators were consistent in their scores.

We promoted the workshops and the program through lake associations and the Maine Congress of Lakes Association's meetings and newsletters. We wrote newspaper articles, had booths at flower shows and county fairs, and created a Web site. Local groups, usually a lake or watershed association, co-



hosted the workshops. It was not until the second year (2004) that we distributed a brochure that lake associations wanted to hand out to prospective participants.

### ***Implementation Phase: Pilot Two years (2003-2004)***

#### **Step 5. Distribute the program**

We offered five workshops per year, but four were cancelled due to insufficient attendance. In addition, the workshops were not as well attended as we had hoped; the attendees versus pre-registered folks often dropped by a third. But, we still seemed to be successful in getting people to take actions to protect water quality.

Here are some examples of the enthusiasm of the participants.

Joe heard of the program at the lake association meeting. He enlisted the aid of his five and seven-year old grandsons to dig a turnout along his driveway in order to get the extra point needed so he could be the first on his pond to get an award.

*John went to a workshop, enlisted six of his neighbors to have evaluations, and got his septic tank pumped 2 days after his evaluation in order to get an award.*

*Ellie, who attended a workshop, requested an evaluation the next week and got four more of her neighbors to sign up for evaluations. (Her neighbors had not attended the workshop.) After her evaluation she moved wheelbarrows of crushed stone to make wide beds under her drip edges and then more stone to fortify the inlets and outlets of 2 culverts. She hauled gravel to create 3 berms in the drive and parking areas. She dug out the woody growth on her septic field and signed up to have her septic tank pumped every 3 years. She did all this work herself in just under a week from the time of her property evaluation because she wanted that award. (We estimate that Ellie is in her late 60s.)*

For those who wish to hire a contractor, we set the stage. We trained 149 LakeSmart Certified Landscapers in 2004 but only 22 landscapers were trained in 2005. It looks like we have picked the low hanging fruit for interested landscapers for now, but these professionals are ready to fill the demand that will come.

#### **Step 7. What next?**

In the Spring of 2005, we had many more requests for workshops than we could service. We had completed evaluations on 22 different lakes. We were moving the program statewide and offering workshops further a field from our initial geographic areas. But, there was a lack of response to the first two workshop offerings. Was it a problem with when and where the workshops were being offered? Were there other barriers? Were we ready to go statewide?

Right about the time when we were in a quandary figuring out what was wrong with the program, it was time for the Performance Partnership Agreement (PPA) with EPA and the Annual Progress Report was due to EPA. As we reviewed what we told EPA about LakeSmart we had an—Epiphany! We forgot the magnitude of **Step 6. Evaluate**. Oops!

#### **Step 6. Evaluate**

We knew the process indicators: the number of workshops and attendees and the number of property evaluations. For example in the first year, 2003, we held three workshops and did nine evaluations that resulted in three awards and six recognitions. The second year (2004) we held three workshops and did 59 evaluations that resulted in 24 awards and 33 recognitions.

Also, we had evaluated the workshops; what folks liked about the workshops, ratings of speakers, etc. We met with our original partners and the property evaluators to review the program and streamline the management of the evaluations. We were doing okay by our initial objectives, though low on numbers of participants, especially considering the relatively large expense of putting on the workshops.

Were we spending our money wisely? Besides educating one or two dozen people per workshop, how many evaluations could be attributed to the workshop?

We analyzed the database. We found that there were five lakes that had many evaluations completed. At some of these lakes there was a workshop presentation nearby, but for others there was no workshop. It seemed that sometimes the workshop promoted the program (generated requests for evaluations), but sometimes the workshop did not result in a flurry of evaluations. Then there were lakes in the program where only one person or nobody had attended a workshop but we still had requests (often a lot) for evaluations.

We realized that we needed to pay attention to the impact evaluation: the number of people who actually did something as a result of the program—the number and location of recognitions and awards (a measurement of lake friendly properties).

As we considered the PPA, we realized we wanted to use the Social Diffusion theory to our advantage; have the early adopters carry the message to the other lake shore residents and eventually to those in the watershed. For this to work, we needed a crucial portion (15%) of residents to be embracing the BMPs. Furthermore, these lake-friendly practices needed to be visible and highlighted by the LakeSmart sign. So we added an objective: 15% of lakeshore properties on a project lake will be LakeSmart and have LakeSmart signs.

To meet this new objective, we had to consider context evaluation: who is responding, who is getting awards, why others are not, what support is needed, why are some lakes successful and others not. To learn more, we undertook some market research and analysis. We did a phone survey of those who had registered for workshops—whether they attended or not. The survey asked if they had learned something new, if they had implemented a new BMP, if they needed more support, and what type of support. If they had not attended, why and what would be an incentive? It also asked questions about the person's involvement in other lake oriented activities and how much time they spent at the lake.

### ***Results of the market research***

The following statistics and conclusions are based on the August-September 2005 follow-up phone calls to all 2004 workshop registrants. We were able to survey approximately 72% of the people who attended the workshops.

- 61% of people who signed up attended a workshop.
- 72% learned something new and could describe what they learned.
- 37% had a property evaluation done in that year as a result of that workshop.
- At least 47 more evaluations were requested in 2005 as a result of someone attending a 2004 workshop or as a result of the phone survey.
- 83% took action as a result of attending (e.g.; planting shrubs, diverting runoff).
- Our audience of lake shore residents has been narrowed to those who are year-round or seasonally around. These are the folks who are embracing the BMPs, apparently the ones with enough time at the lake to do projects.
- The target audience is also lake or watershed association members because they are more easily reached with our promotion, they are a cohesive group, and they already have “sparkplug,” can-do activists. Almost everyone who attended a workshop has been an association member. Lake associations will help sustain the behavior change until we are able to get 15% of properties to be lake-friendly when the social norm will sustain itself.
- We have found on large lakes that a smaller focus on road associations is more effective. You reach the 15% sooner so people take notice if they see three or four signs on one road as opposed to one sign here and another sign a mile away.
- The follow-up phone surveys acted as prompts/reinforcement for the program. It reminded participants of their original plans and gave us a chance to offer support or suggest an evaluation. From now on, we will tell participants at presentations and evaluations that we will call them in a

year to see how they are doing and if they need help. That will help reinforce their intentions even more.

### ***Results of Informal Interviews***

We interviewed evaluators and active lake association members. Patterns began to emerge. Success in a couple of cases was due to one person.

- Lake associations that were most successful had a member that was a “sparkplug,” a board member willing to be a leader, and offer some incentive/support to members.
- The property evaluators were very important, not just for the process of completing evaluations. They helped reinforce the need for BMPs, gave concrete suggestions for improvements, and sometimes became a sparkplug promoting the program. The evaluators need to set aside time for the program or have back-up evaluators.
- For some lakes, no workshop was necessary. For one lake in particular, a presentation at the lake association meeting was enough to generate 12 requests for evaluations on a lake with 54 houses. On this lake there were five awards and seven recognitions. So they have reached 9% LakeSmart awards for the lake. All they need is three more of the recognition properties to implement what was recommended by the evaluator and the program will have its first goal of 15%. This did not involve a tremendous effort as it is a small lake, with a sparkplug, and eager evaluators.
- On the other hand, another lake association went to a great effort with a mass mailing to 1,150 homes around the two lake region and tried to saturate the newspapers and newsletters with articles for the LakeSmart workshop. But a week before the workshop, they hardly had enough people to meet the minimum requirement to run the workshop. Yet they pulled it off with 19 out of 22 attendees and all 11 board members signing up for evaluations. The organizers of the workshop, educated in the principles of social marketing, really made the difference. They offered free plants for each attendee (could be considered a McKenzie-Mohr prompt as it sits in the backyard waiting to be planted). Everyone was encouraged to sign a pledge to have an evaluation and implement at least one recommendation within a year (another technique learned from McKenzie-Mohr).

### **Now Step 7. What next; Lessons Learned and applied**

- Only one of the pilot lakes is approaching the crucial tipping point of 15% lake-friendly properties. We need to narrow our focus and concentrate on current lakes:
  - 1) We will offer support to lake associations for longer and help them include more social marketing (incentives, prompts, pledges, etc.) to ensure that we reach our goals on each lake.
  - 2) We will offer current project lakes a shortened workshop. We had shorted it from six hours to four hours but our survey of lake association members, who had not attended a workshop, showed that most people preferred 2-3 hours. So, we will offer an even shorter training called LakeSmart Walk 'N Talk. We will have an increased emphasis on participants making actual plans for their property to increase the number of folks taking action. We have found that giving a pre-workshop assignment of bringing a sketch of their property to the workshop allowed them to work on their action plan in the workshop. This removes what we believe is a major barrier to action.
  - 3) We will keep an eye on the lakes to see if the new social norm takes hold.

### ***New Objectives***

- 1) 75% of workshop or Walk 'N Talk participants take action – either requesting an evaluation or implementing a BMP within two years.
- 2) 15% of properties on two project lakes are LakeSmart in two years. Two additional lakes reach 15% within four years.

- We will choose new lakes more carefully. They should meet these 10 criteria:
  - 1) A local “Sparkplug” for a contact who will help to promote program.
  - 2) Active lake association as demonstrated by projects, workshops or other activities.
  - 3) No other big projects going on around the lake. We do not want competition for their attention and energy (watershed survey, plant patrol workshops, etc.). But, LakeSmart would be a good follow up activity to a watershed survey or 319 implementation program. DEP and our partners need to discuss the bigger picture and the sequencing of lake protection activities to facilitate more effective use of staff, time, money, and volunteer commitment.
  - 4) A minimum two-year commitment (from sparkplug and lake association) to promote LakeSmart and to achieve a minimum of 15% LakeSmart Award properties. Commitment from lake association board members to be leaders and promoters for the program.
  - 5) Lake association willing to offer incentives to promote LakeSmart properties. (Some form of matching grants, free plants, discounts at nurseries, pledge forms, or Youth Conservation Corps - high school students who supply cheap labor for homeowners who buy the materials.)
  - 6) Local interest, a minimum of 20 people willing to attend a workshop or six people for the shorter Walk 'N Talk.
  - 7) Support from local Soil and Water Conservation District or similarly qualified people to be the trained LakeSmart evaluators.
  - 8) A high percentage of year-round and summer residents as opposed to weekenders.
  - 9) A high percentage of shorefront property owners are members of the lake association.
  - 10) Lake residents have sense of community: consider size of the lake, number of towns bordering lake, and access points. For large lakes, concentrate on road associations as the vehicle for distribution.

We need to keep in mind that just because we built the program according to sound principles does not mean it will succeed. We need to be SMART (have Specific, Measurable, Action-Oriented, Relevant, Timely goals). We need to remember that the TOOL (e.g.; satisfactory workshop or consistent property evaluation form) is not the GOAL (having homeowners implement BMPs to improve water quality).

After analyzing the many aspects of evaluation, we are excited about moving ahead with this new-found knowledge of our audience, their barriers, and incentives. We are eager and confident that the LakeSmart program will encourage people to support and implement more lake friendly practices that protect water quality in Maine.

## WaterWorks! In the Mainstream: Social Marketing

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### Abstract

Water education is “real life” education. If Tennessee’s population continues to grow at the current rate, our citizens will soon be approaching a crisis situation regarding clean, potable water. Our economy, the health of our citizens, and wildlife habitat are dependent on plentiful and safe sources of clean water.

*WaterWorks!*—a new initiative in outreach education for the Center for Environmental Education at Middle Tennessee State University and funded by the Tennessee Department of Agriculture Nonpoint Source Program—was launched in fall 2003 and focuses on improving water quality in Tennessee through a series of radio and television announcements.

*WaterWorks!* models social change through focused marketing to an audience of Tennessee households and homeowners, with specific components designed to promote and reinforce the message of individual responsibility. The program includes:

- a series of video and audio public service announcements promoting clean water quality through responsible action;
- a Website showcasing public service announcements, watershed maps with links to a GIS site, Tennessee water-related groups and other resources;
- “Stream Savers,” a recognition program for youth groups completing projects that improve water quality;
- state-wide surveys providing information about citizen attitudes and actions regarding water;
- brochures focusing on proper homeowner practices (with additional agriculture and construction brochures planned);
- a free CD of brochure designs and other print media available by request;
- an interactive watershed map with links to groups, stormwater information, and county/city contacts;
- stakeholder partnerships; and
- exhibits and demonstrations for special events/presentations dealing with water quality

To document the effects of the announcements, *WaterWorks!* has contracted with the University of Tennessee Social Sciences Institute to conduct two surveys of Tennessee citizens: a base-line survey, as well as a second survey timed a year and a half into the program.

Preliminary results indicate that almost one-half (44%) of the respondents recalled seeing at least one ad about clean water quality on either commercial or public television, and one-fourth of those who had seen the ad reported they had seen the ad on commercial TV or on local access channels. The ads resonated with about one-fourth of the respondents by instigating self-reported changes in behavior. Ninety-three respondents were able to articulate specific changes in attitudes or behavior that they linked directly to seeing or hearing the ads. Impressively, 53% of those reporting a behavior change stated they had reduced littering and dumping and had increased recycling.

### Introduction

Water education is ‘real life’ education. If Tennessee’s population continues to grow at the current rate, our citizens will soon be approaching a crisis situation regarding clean, potable water. Our economy, the health of our citizens, and wildlife habitat are dependent on plentiful and safe sources of clean water.

In the fall of 2003, the Center for Environmental Education at Middle Tennessee State University (MTSU), launched *WaterWorks!*, a new initiative in outreach education funded by the TN Department

of Agriculture Nonpoint Source Program. WaterWorks! focuses on improving water quality in Tennessee through a series of radio and television announcements.

WaterWorks! promotes social change through focused marketing to an audience of Tennessee households and homeowners, with specific components designed to promote and reinforce the message of individual responsibility.

At the same time that WaterWorks! was in the planning stage, the 85 Phase II stormwater communities (communities with municipal separate storm sewer systems, or MS4's) in Tennessee were beginning to write and submit their NPDES permit applications for approval. In many communities, those officials in charge of stormwater programs were not prepared to plan educational or outreach campaigns, a required part of the plan; they were overwhelmed just by the daily workload. Through 319 funds from the Tennessee Department of Agriculture's Nonpoint Source Program, WaterWorks! provides public education and outreach through public service announcements and other products and services to Phase I and Phase II stormwater communities in the state.

### ***Unique Partnerships***

WaterWorks! and the Tennessee Association of Broadcasters (TAB) proposed a unique partnership to the MS4 communities. With a membership of over 320 radio and television stations, TAB offered to air WaterWorks! announcements in a "noncommercial sustaining announcements" category. This classification includes contributing funds from WaterWorks! and the MS4's at much lower than commercial rates and guarantees a minimum of four times the paid value in airtime. (The actual value is much higher, up to ten times the paid amount.)

Initially, WaterWorks! bought \$2,500 worth of airtime a quarter. In the first two months of the campaign, the actual results showed that the advertising value was \$88,800. The television spots aired more than 460 times and radio announcements had 4,519 airings. (Because not all stations report the airing of these announcements, the true value of this program is actually much higher.)

Each of the MS4 communities may sign on to this statewide outreach campaign at \$500 per quarter, and are guaranteed a minimum of \$2,000 of airtime value. TAB partners choose the time slots and also report airtime for the quarter. Even though some announcements are during the 'wee' hours (not really a problem since many Tennesseans work 2<sup>nd</sup> or 3<sup>rd</sup> shifts in hospitals and industry) many announcements have been heard or seen during sports events and "drive times" at the beginning and end of the average workday.

Because of the ability of the WaterWorks! program to provide needed outreach education about water quality to Tennesseans, the Tennessee Department of Environment and Conservation will match MS4 and WaterWorks! funds for additional airtime for ads that target oil and other automotive products that can pollute the state's waterways.

### ***Benefits***

The benefits of the WaterWorks! and TAB partnership to the MS4s are many, and include:

- professionally created messages,
- statewide airtimes,
- unified messages,
- increased support for each other's program,
- leveraged local limited funds, and
- fulfilling all or part of public education responsibilities by partnering.

## ***Procedure***

In thinking about solutions to environmental issues and problems, the focus is usually on a change in *behavior*, one brought about either through a revision of attitudes or a forced compliance to a rule or law. The WaterWorks! campaign is based on raising awareness, building knowledge, increasing skills, and reinforcing an “It’s easy for me to do it!” attitude through social marketing. An excellent source about the theory and application of social marketing techniques is Fostering Sustainable Behavior by Douglas McKenzie-Mohr, who advises those interested in social marketing techniques to study benefits of, and barriers to, the desired behavior.<sup>6</sup>

### **Set GOALS:**

- Raise awareness of the causes of water pollution in Tennessee
- Build awareness of the consequences of individual action
- Instill a sense of empowerment of Tennessee residents
- Change behavior that causes water pollution through motivation for responsible behavior
- Promote requests for more information

### **Examine BELIEFS:**

- Only 37% of Tennesseans feel water quality in streams is good or excellent
- 63% rate drinking water quality as good or excellent
- Younger groups feel technology should solve pollution problem
- Over all, 82% believe human behavior can improve water quality

### **Determine MOTIVATIONAL FACTORS:**

#### ***Many citizens:***

- Will respond to messages of personal responsibility
- Are influenced by children
- Link poor water quality to adverse health effects
- Link poor water quality to loss of recreational opportunities
- 

### **Select AUDIENCE:**

- |                                 |                                  |
|---------------------------------|----------------------------------|
| • Suburban and urban homeowners | • Educators                      |
| • Do-it-yourselfers             | • Outdoor recreation enthusiasts |
| • Parents                       | • Opinion leaders                |
| • Youth                         |                                  |

### **Choose DESIRED RESPONSES:**

- Rivers and streams are an asset to everyone in Tennessee.
- People who cause water pollution are driving up the costs of my water bill.
- People who cause water pollution are driving up costs for all of us (health care, taxes, government spending on cleanups.)
- What I do does indeed affect people, and all living things, downstream.
- My litter pollutes the water.
- I can make a difference by doing simple things to reduce water pollution.
- I need to be more responsible in the way I change my oil, use fertilizers and other chemicals.

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<sup>6</sup> McKenzie-Mohr, Douglas, *Fostering Sustainable Behavior*, published June 29, 1999 by New Society Publishers

- Now that I know I'm contributing to the problem, I will change my behavior.

**Select POSITIONING STATEMENTS:**

**Organizational:**

“Protecting our water...for life!”

**Motivational:**

“Water pollution. It's NOT the other guy's problem.” (2003-2004)

“Water pollution. It's EVERYONE'S problem.” (2005-2006)

**Select STRATEGY:**

- Keep creativity fresh while keeping quality high...produce a series of spots that can be released throughout the broadcast year.
- Appeal to pride in Tennessee's water resources. Use representative scenes and appeal to hunters, fishers, boaters, and other outdoor recreationists.
- Appeal to desire to conserve our beautiful resources so that future generations can enjoy them and have clean, safe water.
- Show sources of water pollution and solutions to water pollution. Use messages that reinforce positive behavior.
- Appeal to urban and suburban audiences.
- Use localization for television and radio spots.

**Additional Notes on Procedure**

- Select an agency with shared values that can understand your goals and work within your budget.
- It is beneficial to include funding agency personnel (or oversight committee members) in all stages of planning at appropriate intervals, especially on the sign-off of creative ideas.
- Use focus groups of similar demographics as your intended audience and listen to what they say.

***WaterWorks! Products***

- PSA's (or noncommercial sustaining announcements), both television and radio
- 1<sup>st</sup> creative phase—“in your face” attitude of main character, a catfish
- 2<sup>nd</sup> creative phase—softer approach, appeal to the future, Tennessee's beautiful rivers and streams, wildlife habitat
- Print media—FREE CD with print designs, which help MS4s that use print materials as part of their education and outreach plan. The design for a homeowner's brochure can be localized for an MS4 or citizen group; the poster design with educator activity can be used in other ways; the black and white student page may ‘outlast’ the brochure as it will be brought home and posted on the home refrigerator
- Print Ad designs, as created, will be placed on the ‘Print Media’ page on the WaterWorks! Web site <[www.tennesseewaterworks.com](http://www.tennesseewaterworks.com)>
- Stream Savers Program—awards for youth groups that complete projects that improve water quality (stream cleanups, water monitoring, bank restoration, education, etc.) Groups, either classroom or clubs, scouts, can win money for their group, specially designed t-shirts, and a certificate of recognition
- Watershed Map—a map of Tennessee which provides stormwater program information by county and watershed, with downloadable ‘pullout’ maps and contact information for MS4s, watershed groups, and water quality problems
- Stream Assessment information provided through the Tennessee Department of Environment and Conservation, GIS format

- Statewide Surveys—Conducted in 2003 and 2005 which provide information about citizen attitudes and actions related to water quality
- Website—<[www.tennesseewaterworks.com](http://www.tennesseewaterworks.com)> showcases program components as well as some lovely Tennessee rivers, streams, lakes and waterfalls on the homepage, with a list of links and resources organized for use by K-12 educators, citizens, watershed groups, and municipal stormwater managers

### ***Assessment***

There are two aspects of assessment—the effectiveness of the WaterWorks! announcements on improving water quality in the state, and the increasing use of the announcements by the MS4 communities through partnership in the TAB program. Regarding the effectiveness of the program, the main question revolves around the ability to document behavior change directly related to the airing of the announcements. In the 2005 survey, respondents were asked if they had seen or heard the ads, and if they had changed any behavior because of it. Almost one-half, or 44%, of the respondents recalled seeing at least one ad about clean water quality on either commercial or public television. One-fourth of those who had seen the ad reported they had seen the ad on commercial TV or on local access channels.

The ads resonated with about one-fourth of the respondents by instigating self-reported changes in behavior. Ninety-three respondents were able to articulate specific changes in attitudes or behavior that they linked directly to seeing or hearing the ads. Impressively, 53% of those reporting a behavior change stated they had reduced littering and dumping and had increased recycling.

As far as the MS4 participation in the TAB partnership, more stormwater communities are joining in as funding becomes available to their programs. With the additional impetus that the TDEC match program gives WaterWorks! to help extend MS4 budgets, more stormwater communities will be able to share a statewide message.

It still remains to be seen if water quality improves significantly (based on past and future reports from the Tennessee Department of Environment and Conservation) and if improvement can be directly related to the WaterWorks! campaign. Very possibly, water quality improvement could be credited not only to this campaign but to the efforts of many active and effective watershed groups, to the MS4 program managers, and, in the coming years, to an increased national focus on the importance of water quality.

### ***Lessons Learned***

Year one—Use focus groups that represent the population of the desired audience. Make sure the people IN the announcements are representative of the desired audience. (Our first ads were aimed at a suburban audience, and the stormwater manager in a large urban area pointed out that as attractive as the ads were, they did not represent the diverse urban population he served.)

Make sure appropriate contracts are in place for both recorded, as well as print images, if you want to use both. (A limited budget and personalities prevented print use of photos of an actor.)

### ***Successes***

Build and maintain a good team and good partnerships. Thank and give credit to everyone who helps. Cultivate patience. Be flexible; learn to juggle many ongoing tasks (managing Web site, creating new announcements, new products). Enjoy the process!

# Adapting and Scaling Social Marketing Techniques to Regional, Municipal and Neighborhood Stormwater Objectives: A Case Study from South Burlington and Chittenden County, Vermont

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### **Abstract**

Communities engaged in stormwater issues face a complex landscape of public objectives, constituencies, and constraints. Social marketing techniques, now commonly used in stormwater education programs, also have been adapted to achieve more challenging municipal objectives such as building support for utilities or costly capital improvements.

Community-based social marketing also shows promise for moving well beyond the traditional goals of information delivery and building political support. The ongoing experience in the city of South Burlington, Vermont provides an excellent case study of social marketing techniques applied to a complex set of stormwater management problems, and illustrates the potential to use social marketing to achieve a greater level of "systems thinking" and more effective public engagement in local stormwater management decisions.

In this city of 17,000 on Lake Champlain, the town is using social marketing in three contexts simultaneously: a county-wide education program, a local stormwater utility, and design of an individual neighborhood's stormwater management solution. This presentation will outline the social marketing techniques, such as using formative research for target audience segmentation and profiling which have been applied in each case. The presentation provides viewpoints and experience from the academic, municipal, and private sector groups involved, including a brief overview of the three programs as well as their related regulatory contexts, behavior change objectives, social marketing techniques, and lessons learned in each:

- the Chittenden County Regional Stormwater Education Program (RSEP), which has gained national acclaim as an innovative and cost-effective approach to meeting MS4 education requirements;
- South Burlington's Stormwater Utility, the first established in Vermont and the first in the nation to use satellite imagery to map impervious surfaces; and
- the University of Vermont's Redesigning the American Neighborhood (RAN) project in the Butler Farms neighborhood of South Burlington, which is evaluating the social acceptability and environmental outcomes of different scales of stormwater management interventions.

This presentation will conclude with a facilitated discussion on the need, potential, and techniques for using social marketing to help move communities beyond simple information delivery to greater behavior change and engagement.

## ***Introduction***

Communities engaged in stormwater issues face a complex landscape of public objectives, constituencies, and constraints. While social marketing techniques have been used successfully across the nation in stormwater awareness, education and behavior change campaigns, especially as communities work to fulfill the requirements of EPA's Phase II Municipal Separate Storm Sewer System (MS4) rule, social marketing also shows promise for transfer beyond the typical school-based or local audience into arenas with different constraints and objectives.

Affecting behavior change around stormwater management at other decision-making levels, particularly when money is at stake, requires careful adaptation of social marketing techniques and a special focus on *scale*: the scale of the target audience, financial implications, geography, and decision-making process involved. The three-part regional, local, and neighborhood education campaigns underway in Chittenden County and the City of South Burlington, Vermont show how the creative adaptation and scaling of social marketing techniques can go well beyond conventional education for behavior change. Particularly at a neighborhood level, social marketing techniques can be used to introduce whole-systems thinking about stormwater management.

Whole-systems thinking, which has been expressed as "...a process through which the interconnections between systems are actively considered, and solutions are sought that address multiple problems at the same time<sup>7</sup>," is often lost in the pressure to meet stormwater permit standards, minimize per-unit costs, avoid regulatory complications, and simplify issues for the public. Typically used in the same context as "sustainability," and most often applied to regional issues around resource consumption, the whole-systems objective of finding solutions that address multiple problems can apply directly to local stormwater financing, regional coordination, stormwater system design, and notably, decision-making around localized stormwater management approaches.

This paper outlines the regulatory context, public objectives, and social marketing techniques being used simultaneously at regional, municipal, and neighborhood scales and the implications for whole-systems thinking. Examples include the following: (1) the Chittenden County Regional Stormwater Education Program (RSEP), which has gained national acclaim as an innovative and cost-saving inter-municipal approach to meeting MS4 education requirements; (2) establishment of Vermont's first stormwater utility in the City of South Burlington; and (3) the joint University of Vermont-City of South Burlington "Redesigning the American Neighborhood" (RAN) project in the Butler Farms neighborhood, which is evaluating the social acceptability and environmental outcomes of different scales of stormwater management approaches in a neighborhood facing an expensive stormwater system upgrade. The paper evaluates how issues of scale have affected program design and outcomes, and summarizes implications of the lessons learned for increasing systems thinking and providing more meaningful public engagement in stormwater management.

## ***Project Setting: Chittenden County and South Burlington, Vermont***

A swirl of high-profile lawsuits, legislation, municipal activity and regulatory changes has made "stormwater" a household word for the 141,000 residents<sup>8</sup> of Chittenden County, Vermont (Figure 1) between 2001 and today. This highly complex political situation, which received extensive media coverage, largely defined the initial information needs, and behavior change objectives of the three education and outreach programs.

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<sup>7</sup> Wilson, Alex et al., *Green Development: Integrating Ecology and Real Estate*. Snowmass, Co: Rocky Mountain Institute, 1998.

<sup>8</sup> Data based on the U.S. 1997 Economic Census and City of South Burlington data.

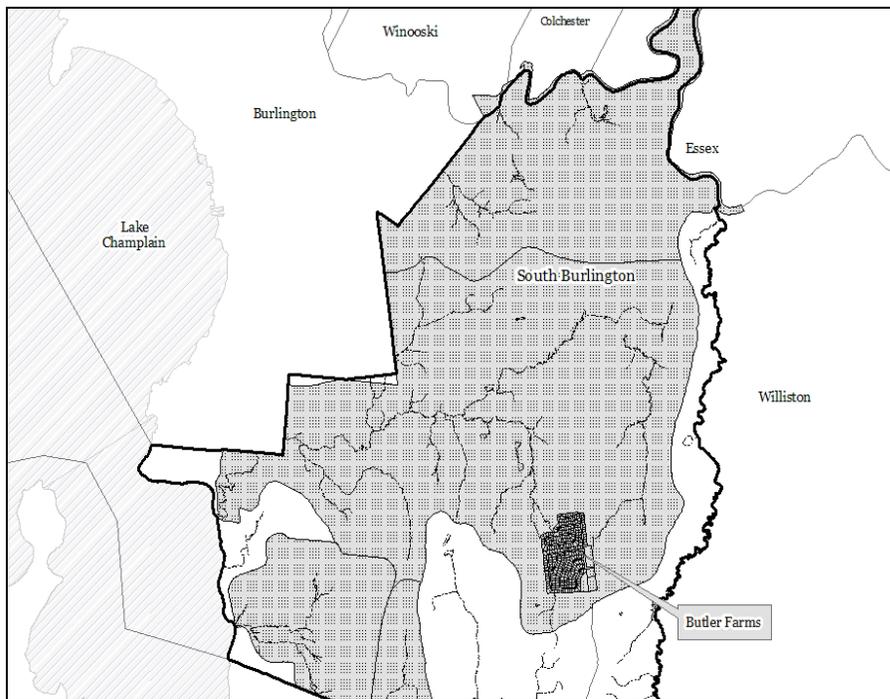
### Figure 1. Location Map

Home to 23 percent of the state’s people and jobs, and most of the area subject to the EPA Phase II MS4 rule, Chittenden County also has more than its share of Vermont’s urban stormwater management problems. The county is home to nine of the seventeen streams on the State’s 303(d) list of waters impaired by urban stormwater runoff (Figure 2). Most of these streams discharge directly into Lake Champlain, prized for recreation and the drinking water source for most of the county. The Lake’s phosphorus TMDL attributes roughly 30 percent of the nonpoint source load to runoff from urbanized land in Vermont<sup>9</sup>.



**The Lowe’s Case:** As of 2001, when the state began gearing up to implement the Phase II rule, no TMDLs had been prepared for these impaired waters and over 1,000 state stormwater discharge permits had expired - most without notice to the property owners. As a result, Chittenden County and especially the City of South Burlington became the epicenter of a political and legal crisis in June 2001 when the Vermont Water Resources ruled that no new or increased discharges of pollutants could be added to any impaired waterway without a TMDL<sup>10</sup>. This ruling, known as the *Lowe’s case*, halted stormwater permit issuance and renewals in impaired watersheds, stalled many property transfers and developments, and set off a multi-year legal and legislative process to clear the expired permit backlog, develop TMDLs, and clarify permit standards for new development.

Figure 2. Stormwater-Impaired Watersheds in South Burlington & Location of Butler Farms



<sup>9</sup> Lake Champlain Phosphorus TMDL. Vermont Department of Environmental Conservation and New York State Department of Environmental Conservation, September 25, 2002, Fig. 2, page 5.

<sup>10</sup> In re: Hannaford Bros. Co. and Lowes Home Centers, Inc., Docket No. WQ-01-01, Memorandum of Decision. Vermont Water Resources Board, Jun. 29, 2001.

**Regional Stormwater Education Program:** About the same time as the *Lowe's* case was decided, public works managers and planners from the municipalities and other agencies subject to the Phase II MS4 permit (notably Burlington International Airport and the Vermont Agency of Transportation) were meeting monthly to discuss implications of the Phase II permit. There was a shared concern that if handled locally, public education and outreach compliance might consist only of local officials reprinting EPA brochure templates. This was not seen as an efficient or effective use of money or time.

From this shared concern arose the concept for an inter-municipal agreement to develop a regional education plan, funded jointly by all of the permittees, with the professional resources and capabilities to accomplish an effective campaign. There was strong support from the legislative bodies of all of the permittees, as well as the Agency of Natural Resources, and through a Memorandum of Understanding the RSEP was established in January 2003. Funding was done on a formula basis with each permittee contributing an annual amount equal to what the state estimated would be required to meet the permit condition individually. This yielded a five-year budget of \$250,000.

Through a competitive bid process, a consulting firm with strong media and social marketing expertise (as opposed to environmental advocacy or municipal government experience) was chosen to prepare a five-year strategy, including pre- and post-program surveys to help define target audiences, desired behavior changes, barriers, motivators, and measures of success.

**South Burlington's Stormwater Utility:** Also at the same time, the City of South Burlington had begun exploring a municipal stormwater utility to deal with its unique land use environment. South Burlington, with 17,000 residents, is Vermont's fifth-largest municipality and it is fastest growing by far, with an annual average of 250 new housing units and a burgeoning employment base. Home to Burlington International Airport, Vermont's largest regional shopping mall, and six miles of public roads per square mile of land, the city also contains all or part of six impaired watersheds and over a quarter of the state's expired stormwater permits.

South Burlington faces the pressing need for a stable and robust funding stream to deal with backlogged capital projects and increased maintenance requirements. The city council and staff also desire to do watershed planning in a more integrated manner than the state proposed. Therefore, the city spent three years studying its stormwater management options. In March of 2005, amid the regional education and outreach campaign, the City Council established Vermont's first stormwater utility by ordinance, with a fee of \$4.50 per month per equivalent residential unit (ERU)<sup>11</sup>. The ordinance survived Vermont's thirty-day public appeal period unchallenged, and billing began in July.

The utility offered a critical carrot to city homeowners affected by the *Lowe's* case. The ordinance stipulates that any residential system that has been upgraded to meet current state standards can be taken over by the utility, regardless of the status of the system's state permit. The city's offer to place itself between individual residents and the state permit quagmire greatly increased the perceived value of the utility to residents. However, as the Butler Farms case is demonstrating, this policy also creates a strong incentive for homeowners and associations to upgrade stormwater systems to state standards as quickly and cheaply as possible, which may or may not be consistent with whole-systems thinking about watersheds and stormwater management options.

**The Butler Farms Neighborhood:** Stuck between the state's legal and permit tangle and the city's new utility were two dozen residential subdivisions in South Burlington whose residents gradually discovered, after *Lowe's*, that their homes are subject to long-expired state stormwater discharge permits, and that their systems do not meet current state standards. Butler Farms was one such neighborhood. This classic half-acre lot, single-family subdivision of 253 homes is subject to two different stormwater permits (both expired), has no homeowners' association, and is plagued by localized flooding and stream quality problems. Problems with home sales in the wake of *Lowe's*,

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<sup>11</sup> ERU refers to the average amount of impervious surface of a single-family residence (2,700 SF in South Burlington), with other properties charged based on the number of ERUs of impervious surface owned.

frustration with flooding, and confusion about the relationship between the city’s utility and the state permit impasse led to frustration and even outright anger on the part of residents.

During this period, the University of Vermont’s Rubenstein School of Natural Resources (UVM-SNR) began looking for a candidate neighborhood for a research and community involvement project called “Redesigning the American Neighborhood” (RAN), aimed at exploring how community decision-making affected the choice and scale of stormwater management interventions. Working with city officials, UVM-SNR faculty and staff began discussions with Butler Farms residents and eventually began outreach within the larger neighborhood. At its outset in 2003, the RAN project intended to provide information, but also to work on defining the communication and decision-making problems within the neighborhood related to water quality and stormwater.

These three education programs thus came into effect roughly simultaneously, and in a highly charged environment in which many citizens associated “stormwater” with political conflict and problems with home sales. A very diverse set of stormwater education and outreach needs were faced simultaneously by the municipalities subject to the MS4 permit, the City of South Burlington, and the Butler Farms neighborhood (among many others). A comparison of the scale issues among these three settings (Figure 3, below) illustrates the challenges for adapting social marketing to each setting. The responses illustrate a wide spectrum of ways that social marketing techniques can be adapted to deal with different needs, while capitalizing on work done elsewhere.

**Figure 3. Scope, Decision-Making, and Financial Implications**

	Geographic Scope & Target Audience	Decision-Making Body	Key Regulatory Authority	Financial Implications for Target Audience
Chittenden County RSEP	17-municipality County; area served by major Burlington media	Ten-town Steering Committee governed by MOU	U.S. EPA & VT Agency of Natural Resources	None; objective is individual behavior change
South Burlington Stormwater Utility	Single municipality (16.1 square miles, 17,000 residents)	Five-member City Council	VT Enabling Legislation for Utilities; City Council	Average of \$54.00 per household per year; average of \$800 per business per year
RAN – Butler Farms Neighborhood Stormwater Upgrade	253 single-family households	Informal residents’ committee, with City Council and VT ANR	VT Agency of Natural Resources	Potentially \$3,000 - \$5,000 per household, financed over 10 years by City

***Social Marketing Techniques: Starting with the Region, and Scaling Down***

While the context and objectives for each of the three projects was somewhat different, the Chittenden County Regional Stormwater Education Project (“the RSEP”) became the foundation for the use of social marketing in the other two cases. The overall purpose of the RSEP social marketing program is to cost-effectively close the gap between the Chittenden County public’s current stormwater-related knowledge, attitudes, and behaviors and the desired knowledge and behaviors based on the EPA’s best management practices (BMPs). The measurable outcomes in this case, described in more detail below,

were to achieve three goals during the five-year program: (1) People living and working in the Chittenden County MS4s will be able to explain the link between stormwater runoff and water quality; (2) People living and working in the Chittenden County MS4 areas will be able to identify resources to help them maintain a stormwater-friendly lifestyle and spread the word to their friends and colleagues; and (3) People living and working in the Chittenden County MS4 areas will adopt specific behavior and lifestyle changes identified by the results of a 2003 public stormwater awareness survey.

Using social marketing techniques, the RSEP communications and marketing strategy identifies the needs and wants of specific target audiences and identifies messages designed to modify each target audience's behaviors. The RSEP uses a combination of television, radio, print, video, and a program Web site, as well as educational events to distribute messages linked to understanding stormwater and how individual behaviors affect specific stormwater problems (such as pet waste, home projects, toxic chemicals, car washing, erosion, and fertilizer).

For the RSEP campaign, Social Learning Theory (SLT) informed the assessment of the interaction of personal factors, environmental influences, and stormwater-related behaviors. A basic premise of SLT is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions. SLT also predicts that individuals can build confidence (self-efficacy) in their ability to take action/change in small steps, if they are given information about the likely results of action, combined with encouragement and clear benefits. A social norms approach was also used to reinforce the perceived benefits of small individual stormwater behavior changes and to overcome the perceived barrier of what could otherwise be seen as the overwhelming challenge of achieving a large, collective behavior change before water quality is improved.

Diffusion of Innovations Theory addresses how new ideas, products, and social practices spread within a society. The RSEP campaign activities were designed to stimulate the diffusion of new social practices and perceived norms about stormwater-related behaviors and products. These theories were selected because research suggests that a multi-level approach that includes awareness, social norms, and an individual sense of self-efficacy best support successful behavior change and maintenance.

To conserve resources, ads were developed for the RSEP by building, with permission, from existing stormwater programs. Through background research on other programs, specific messages and behaviors matching the targeted behavior changes for Chittenden County were identified. For example, a pet waste TV ad developed for the city of Tuscon, Arizona, matched both the message and behavior identified for the RSEP, but the visual landscape of Tuscon is very different from the landscape in Chittenden County, Vermont. A small portion of Tuscon's ad could be used to reduce the costs of creating material tailored to target audiences in Chittenden County.

In addition to the media campaign, the RSEP uses an interactive Web site called "Smart Water Ways" <[www.smartwaterways.org](http://www.smartwaterways.org)> to raise awareness and encourage positive behavior change in Chittenden County residents. The Web site includes a five-minute video and an interactive map that provides receiving water information for each of the jurisdictions participating in the RSEP, as well as an overview of stormwater problems related to targeted behaviors. Through the Web site, users can watch the cable television advertisements or view the storyboards for the ads. They can also obtain fact sheets that contain simple practices to address various stormwater problems. In the fifth year of the RSEP social marketing campaign, the results of a post-campaign survey will be compared to the 2003 baseline survey as one measurement of the program's effectiveness in changing stormwater knowledge, attitudes, and behaviors.

***South Burlington Stormwater Utility:*** Roughly two years after RSEP, the City of South Burlington retained the consultant conducting the RSEP to prepare an outreach plan in anticipation of adopting the state's first stormwater utility – and the associated fee of \$4.50 per ERU per month, or about \$54.00 per year for the typical household and \$800 per year for a typical business or non-profit. The desired outcome in this case was far more focused, and targeted only to land owners within South Burlington: to

build public support for the city council's anticipated adoption of a stormwater utility ordinance and fees, and to prevent a voter backlash that could recall the ordinance and derail the process.

In strong contrast to the Butler Farms and RSEP efforts, the outreach plan focused almost exclusively on costs and benefits to prospective rate payers and minimized behavior change and larger watershed issues. This was a simple issue of triage; to get the utility up and running with sufficient resources, there had to be a sufficiently direct relationship between the utility's costs, and the public operational needs and ratepayer benefits. Ironically, the state's permit problems made it much easier for the city to make the case that having trained staff and resources to help with permit issues was worth the cost.

However, as in the other two cases, target audience definition – identifying similarly affected groups of prospective ratepayers with common issues – was crucial and proved highly successful. The outreach plan used meetings with different target audiences – large ratepayers, institutional uses, condominium associations, medium-sized businesses – as an important way to gather more information on citizens' perceptions and needs around stormwater. As an example, several common legal and permit renewal issues for lot owners in commercial subdivisions were discovered that required state action. The city's utility staff has been able to address this with state regulators, where individual business owners likely would not have been able to do so. This is a good example of how public managers involved in stormwater can use the basic social marketing concept of target audiences to tailor services more directly to community needs.

***Butler Farms – Redesigning the American Neighborhood:*** The third program to get started was the Butler Farms – RAN project. Working with South Burlington staff, the UVM-SNR faculty identified this neighborhood as an ideal laboratory for looking at how stormwater treatment choices affect water quality in a typical American suburban subdivision. Where social marketing is concerned, the desired outcome of this initiative is to evaluate the impact of community decision-making on the choice and scale of stormwater management interventions, and the subsequent impact on water quality.

Entering into Butler Farms in the midst of the state stormwater permit crisis took time, patience, and persistence. Citizens just discovering that the title to their homes was threatened by an expired stormwater permit, and that the new city fee of \$54 per year would not remove that threat, did not make an easy or receptive audience for social marketing around behavior change and community decision-making. After some initial, cautious outreach to a group of residents concerned about water quality, a pre-program survey was administered by the University of Vermont and the results compared to the RSEP survey (Figure 4). This information was then filtered by city staff and UVM-SNR faculty to design an information program<sup>12</sup>. Through several presentations by the City and UVM-SNR faculty, and additional mailings, neighborhood residents slowly came to sort out issues of the state permit problems, the city utility, and their own homes. Once the roles and responsibilities of different agencies were sorted out, it became clear that there is a pressing need to work with the city, upgrade the neighborhood's privately-owned stormwater system to state standards, and turn over the system to the newly-formed stormwater utility – thereby relieving neighbors of individual responsibility for the state discharge permit. Roughly 25 citizens have formed a volunteer study group, under the auspices of the city, which is now exploring the ecological, financial, and aesthetic implications of different approaches to fixing the neighborhood's system.

The UVM team is now applying an innovative approach called Participatory Modeling; as an ongoing process of collecting information, discussion groups are formed around a systems model that is built with the citizens' participation. This information is tested against the knowledge available from the residents, and the assumptions and data sets translated into the formal language of dynamic models<sup>13,14</sup>.

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<sup>12</sup> Results on understanding of the overall stormwater system were very consistent, but the Butler Farms neighborhood had unusually high rates of pesticide, herbicide, and fertilizer use compared to the region.

<sup>13</sup> Gaddis, E., Vladich, H., Voinov, A. 2005. Participatory modeling and the dilemma of diffuse nitrogen management in a

This serves as a common ground for discussions and helps discipline the process of deliberation and decision-making. Citizen participation is especially important to design scenarios for change and to test the feasibility of the proposed management practices.

**Figure 4. Comparison of Regional and Butler Farms Survey Responses**

		Chittenden County Regional Survey	Butler Farms Neighborhood
<i>Use pesticides?</i>	Yes	39%	82%
	No	61%	18%
<i>Use lawn fertilizers?</i>	Yes	40%	85%
	No	60%	15%
<i>Always clean up after pets?</i>	Yes	72%	73%
	No	28%	27%
<b>Where does stormwater go?</b>			
Don't know		27%	32%
Streams/Lake Champlain		20%	19%
Stormwater treatment system		27%	35%
Wastewater treatment plant		3%	10%
Absorbed into ground		19%	2%
Other		4%	2%

### ***Lessons Learned***

The over-arching theme from the experience in Chittenden County and South Burlington can be summed up as educational triage in a social marketing context. Choosing the key desired outcome at a given program's scale; defining and understanding the target audience's greatest barrier; and accepting that not all of the outcomes, particularly behavior change, can be accomplished if the priority outcome has significant implications for the audience. Put more bluntly, when asking a target audience for money for stormwater projects, asking for behavior change may be asking too much and may undermine your key objective – unless the behavior change has a sufficient financial incentive attached.

The scale of the financial implications is especially important in designing a message and using social marketing. In general, the larger the potential financial burden, the less likely households are to internalize simple behavior changes at the same time. "I may have to pay \$3,000, and now you want me to stop washing my car at home?" Intensive, detailed, and carefully presented information is needed for the projects with significant financial implications, and can help move residents towards a solution. However, over-loading the message with behavior change information can backfire and undermine the overall goal. Policy-makers must, faced with this situation, choose the more important outcome and save the less pressing need for later. The exception, of course, is if sufficient financial incentive makes the perceived cost of the behavior change worthwhile.

With respect to whole-systems thinking, all three programs indicate that scale and the presence of financial issues play a major role in when and how to use social marketing to introduce whole-systems thinking. The surveys from both the RSEP and RAN show that in the absence of a strong education program, there is little systems thinking about regional or neighborhood stormwater issues. Persistent

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residential watershed. Environmental Modeling and Software (in press).

<sup>14</sup> Van Den Belt, M., 2004. Mediated modeling: A systems dynamic approach to environmental consensus building, Island Press, Washington.

themes of concern for the environment, paired with a disinclination to change individual behaviors, were present in both. The neighborhood and regional surveys also are consistent with national findings that higher levels of education do not necessarily translate into sound environmental decisions or a willingness to accept whole-systems thinking. Citizens with advanced degrees often display behavior patterns totally divorced from what best management practices recommend.

It is not yet clear to what extent the financial implications serve the purpose of whole-systems thinking. The RAN team's early discussions with neighborhood residents about the systems approach to stormwater management garnered only lukewarm interest and participation. But growing neighborhood awareness of the financial implications of the *Lowe's* case and city utility for home sales and costs invigorated the process dramatically, and attendance at meetings jumped by an order of magnitude.

The challenge in Butler Farms now is to frame conversations about who pays, how much, and when in a whole-systems context. It appears that this combination of a large potential financial impact, an intensive, detailed and neighborhood-specific education program, and community decision-making, may offer the opportunity to incorporate systems thinking into the choice of stormwater solutions. However, there is a constant danger of "too much information," and placing too many behavior change demands on individuals faced with a large cost. The final outcome of this project hopefully will shed some light on how these objectives can be balanced.

A municipally-scaled program with some financial impact is perhaps the trickiest of the three scales and settings for social marketing and promoting whole-systems thinking. A municipal program at this scale gives citizens the opportunity of communicating most directly with elected officials, but also the threat of local ordinances, property taxes, and fees. Social marketing campaigns must strike a careful balance between what a municipality can compel its citizens and landowners to do, through ordinance or fees, and promoting what the governing body would like its citizens to do in the way of stormwater-friendly behaviors. The fine line is between encouraging citizens to pick up after pets with signs and poop-bag stations, and adopting an enforceable leash law or clean-up ordinance.

In addition, the variability of public discussion and opinions at the municipal scale makes it especially difficult to stick to a long-term outreach and education plan with pre- and post-implementation monitoring. A neighborhood-scaled project can and should reflect the unique needs of a discrete group of residents with a defined physical and social geography, and a multi-year regional project is less affected by the month-to-month fluctuations of public opinion, letters to the editor, and statements at public meetings. In a typical Phase II MS4 community, however, the tenor of a single city council meeting can swing the debate, or create a distracting issue requiring a quick and flexible response.

The best scale of outreach in the South Burlington experience came at the target audience level, where city administrators were able to identify common stormwater issues that were best addressed by the public sector. The utility's ability to respond to needs defined by the target audiences (e.g. providing an authoritative "FAQ" document about state permits for homeowners' associations and developing a model process for commercial subdivisions with single discharge permits) has built strong support and goodwill towards the city's utility. Above and below this level, however, municipal outreach had to stick to the basics of costs and benefits of services to be effective.

The hope for greater whole-systems thinking at the municipal, neighborhood, and regional levels is in greater citizen engagement in decision-making and reinforcement of social norms for acceptable individual behaviors. Citizen engagement is a costly and intensive process that may be hard to afford and accomplish on a statewide or even a larger municipal scale. The RAN-Butler Farms case study, which is showing great promise in this area, is still somewhat special, enjoying financial support from the U.S. EPA and the city. Balancing the high costs and time needed for full-scale citizen education and involvement programs, with the need for significant and urgent capital programs and permit compliance, is a challenge yet to be conquered.

# Practical Evaluation of Outreach and Public Relations Strategies

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## Abstract

Agencies and organizations spend a great deal of time and money designing education programs for specific outcomes. Measuring the impact of programs, particularly when programs depend on behavior change, can seem a formidable task. Good evaluation is about program planning and implementation, not about post-mortem analysis. A viable evaluation strategy provides documentation of results *and* useful information for program management and decision making. The workshop provides an overview of outreach, education, and public relations strategies and defines monitoring and evaluation for those strategies. Additionally, the workshop outlines an evaluation framework that participants can implement immediately. Participant situations will be used as examples and case studies.

## Introduction

Water quality agencies, stormwater management operators, and watershed organizations employ a variety of education, outreach, and public relations activities to encourage, inspire or compel people to take certain actions or adopt certain behaviors. Indeed, public participation is a key component of Phase II of EPA's National Pollutant Discharge Elimination System (NPDES) program. Public participation is deemed necessary for awareness, education, and action to meet regulatory, water quality, health, and quality of life objectives.

The purpose of this manuscript is to clarify and distinguish between education, outreach, and public relations activities, and outline evaluation strategies to determine the impact of those activities.

Outreach and public relations are generally considered distinct strategies—activities that are somehow separate from the “real” work of the organization. However, this presentation uses these underlying principles:

Public relations is everything an organization does and says; it is every “moment of truth” with the public or potential audience. It is not just messaging or public service announcements.

Goals, programs, outreach, public relations, and evaluation are integrated parts of a whole. It is important to be clear about the role of outreach and public relations and how it supports moving people to action. Everyone or the “public” is not your audience even though water quality affects everyone and you are a government agency or nonprofit organization.

## Outreach and Public Relations

Agencies and organizations tend to use education, outreach, and public relations interchangeably. They are the set of strategies or activities that are used to create awareness, provide information, or motivate people to adopt new behaviors. It is useful to define the terms and understand the distinctions.

Outreach strategies are any number of activities to reach an audience. Outreach includes special events like river cleanups, posters and billboards, and direct contact strategies such as direct mail or internet action alerts. Public relations is a specific subset of outreach (also called promotion).

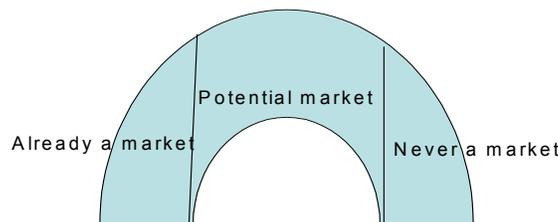
Public relations often refers to earned media, as compared to advertising. It is the exposure an organization gets when someone else writes or talks about them. However, the field of public relations is much broader than media relations. The broader definition is the relationships an organization develops and maintains with its publics to create a positive image and presence so that the organization's outreach can be most effective. For example, if the community perceives a watershed organization as fringe environmentalists, that image may detract from the organization's effectiveness in engaging the community in the cause. Earned media, or press coverage, whether on television, radio or in print, is one way that organizations enhance their public relations.

An organization's presence in its community and participation with others is also part of a public relations strategy. The committees or boards the organization representatives participate in, the partnerships they establish, and their public visibility are also public relations strategies. Effective public relations serves to establish and maintain mutual lines of communication, understanding, and acceptance between an organization and its publics.

### ***Markets and Publics***

There is another distinction between outreach and public relations. Outreach activities have target markets and public relations has publics. Target markets are those audiences that are most likely to take action on your behalf. Target markets are those with whom you enter into an exchange. In business, that exchange is typically currency in exchange for a product or service. In government or nonprofits, that exchange is education, information, or services for a change in understanding, attitude, or behavior.

The concept of target market is particularly important because of its focus on action. For example, in any community there is a group of people who already understand and care about water quality issues. They are educated and aware. They have integrated behaviors and lifestyles that are respectful of the water resource. Not only do they practice behaviors in their own lives, but they may also be advocates and spokespeople to their family and friends. Interesting enough, these people are NOT your target market. To expend resources to reach those already taking action on your behalf would not much further your cause. On the extreme other hand, there is a group of people that for whatever reason, no matter what one does, how much information they have, or how much is spent to change their behaviors, will not voluntarily change. (These are the people for whom laws are passed). In most cases, these are also not your target market. The target market are those whose behaviors you are trying to influence and who are most likely to take action on your behalf.



Marketing is a process of creating outreach strategies based on a deep understanding of the target market. Consider that an organization's outreach strategies are as much its programming and positioning as they are direct contact, advertising, earned media, and special events. Which strategy is most appropriate and most effective (given limited resources) depends on the market.

In comparison, publics are those broader audiences and stakeholders who may not be your target market, but are important to the work you do. They are those with whom you want to maintain solid, positive relationships in order to create a positive, productive image or presence. For example, businesses maintain a community presence through sponsorship of events, volunteering, or donating in order to create a positive image so that their target markets will be more inclined to buy their services. (Who wants to buy services from a company with a negative public image? A company, for example, perceived as not being a good corporate citizen or one that is perceived as not treating its employees equitably.)

Similarly, in public sector work, the agency or organization wants to maintain relationships with taxpayers or donors, other agencies and organizations, decision makers, community leaders, and media representatives. It is important to be well thought-of, considered credible, and effective in order to provide the foundation to most effectively reach and engage the target market.

### ***Awareness is Not Good Enough; Education is Only Slightly Better***

Outreach and public relations strategies must be integrated into the program plan and have specific goals. Once you have defined the outcomes or results that you are hoping to achieve, then you can define what you must accomplish through your outreach and public relations activities. An outreach goal to make 100% of citizens aware of the watershed is not a useful goal. If people are aware, SO WHAT? Awareness is only the first step in the process. Second, they may need to be educated about the issues, problems, and opportunities, as well as their individual role in creating clean watersheds. The goal, however, needs to focus on ACTION. What do you want people to DO as a result of their awareness and education?



A requisite part of an effective outreach and public relations campaign must be a solid understanding and design of the program. Remember, outreach and public relations are only means to an end. It is necessary to define what that end is.

### ***First Things First: Integrate Public Relations into the Program Plan***

A good program plan will be clear about who the target market is and what is the desired behavior. The target market is not “everyone” and “awareness” is not the desired behavior. The project plan for the program will create objectives and tasks to achieve desired behavior towards a specific goal. The outreach activities should be an integral part of that plan and public relations should be a major objective towards the goal, not a separate component.

Here are two templates that may be useful.

Strategic Goal	Critical Tasks	Necessary Outcome	Primary Responsibility	Due Date
Objective 1				
Objective 2				
Objective 3: Public Relations*				

Public Relations Objective*	Profile, needs / interests relative to project	Message	Medium	Tasks
Public 1: media				
Public 2: community leaders				
Public 3: other agencies				
Etc...				

### ***The Public Relations Process***

Establishing a public relations program has four components: research, planning, communication, and evaluation. Research defines the most appropriate strategies based on program goals and an understanding of the publics you are trying to reach. By profiling those publics, the message and medium become apparent.

A solid public relations plan will include specific tactics, as well as a calendar and budget. Communication will be clear, concise, and consistent and will align with the publics needs and interests related to your program. Testing messages prior to launching the campaign is important to determine the extent to which those messages resonate and are effective. The remainder of the manuscript focuses on evaluation strategies.

### ***Evaluation***

Evaluation is a process that looks backwards at a project to see if it achieved desired results. Monitoring is a process to assess progress towards results on an ongoing basis. Monitoring should be built into all public relations plans, with specific checkpoints along the way. For some organizations, monitoring is most important. If an organization is going to undertake evaluation, it is useful to be clear about the purpose of the evaluation and who will use it. Evaluation can be as simple as a post-campaign or post-

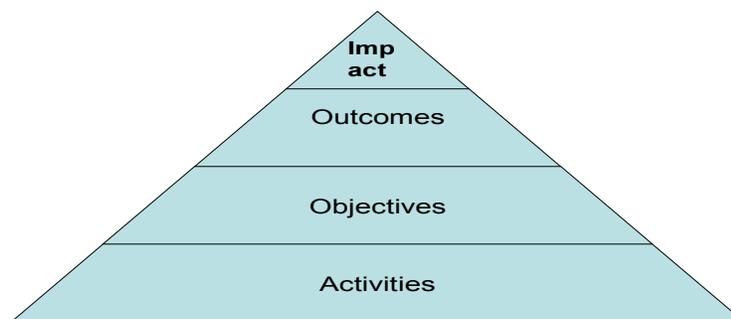
program meeting to examine what went right and what did not. The project de-brief can be a simple, almost no-cost process. In some cases, that is all that is needed. Doing your monitoring throughout the program provides the relevant information.

Agree on the scale and scope of the evaluation. Never make the evaluation more complicated than it needs to be. Evaluation processes can sometimes be more detailed (and more expensive!) than the program themselves. Unfortunately, evaluations can also be expensive and costly (lots of reports and statistics), and then never used. The scale and scope of the evaluation depends on the organization, the situation, the funding, and the use.

### ***Levels of Measurement***

A simple evaluation framework that applies to all programs is:

## **Evaluation Framework**



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Activities, sometimes called output, measure what you did; how many meetings, memos, or reports? Objectives measure the process; what did the activities accomplish? For example, what was the increase in media exposure or increase in knowledge of training participants? Outcome is what happened as a result of activities and objectives. For example, increased media exposure led to a change in the percent of people who know the organization or watershed's name, or the people who participated in training were able to do something different. Results or impacts are what you are ultimately striving for. The activities, objectives, and outcomes do not matter if they do not lead to a decrease in nonpoint source pollution.

Of course, it is easy to measure activities and more difficult to measure impact. In most cases, impact requires longitudinal studies, for which most organizations do not have the time, money, or staying power. Assigning cause and effect is a challenge in outcome evaluation.

### ***Applying Evaluation to Public Relations***

The application of the evaluation framework to public relations integrates the concepts discussed in this manuscript; be clear about the audience and the desired action and behavior change goal.

The levels of measurement for public relations are:

- Production
- Message exposure

- Audience awareness
- Audience attitudes
- Audience action

Production measures staff productivity by counting the number of press releases, annual reports produced and sent, or the number of press conferences held. Message exposure is what you hope to gain from the production—the number of impressions gained from the placement of press releases, for example. Media impression is counted by number of stories times the size of the circulation. One public relations colleague documented success by showing the article that was published from her press release and the number of people it reached. Other measures are the number of people that show up at an event. Another organization uses a more corporate approach of advertising equivalency, which values each column inch of earned media at the cost it would have been for an ad of the same size. This figure is sometimes multiplied by three to six times to document the greater credibility that an article has over advertising.

Production and exposure should lead to audience awareness. Was the message received, understood, and retained? Random surveys can be used to ask if people saw an article and if they can recall what, or whom, it was about. People attending events can be asked upon exiting if they know who sponsored the event.

Awareness is the first stage of change in attitudes or perceptions. Measuring a change in attitudes, by definition, requires baseline or benchmark information. Pre-and post-tests are one evaluation tool. However, be sure to design the evaluation tool to fit the project scope. Pre-and post-testing can be as complex as large-sample, statistically valid, elaborate surveys by specialists, or as simple as smaller, random-sample, informational interviews. Without the benefit of pre-testing, an organization can ask for self-evaluations. This is often done in training situations.

For example, on a scale of 1-5, what was your knowledge of “x” before the training and what was it after? Or a simple question can be asked; tell me how your perceptions have changed as a result of our brochure, our article, or our event? Response cards, or other promotions, can be used to encourage two-way communication and feedback. For example, a public health campaign to change people’s behavior relative to the use of insecticide to prevent West Nile Virus used a promotion that offered a cash discount (with ad or brochure) for the purchase of insecticide. A simple random sample of vendors could document if the promotion was used and to what extent.

And finally, did awareness and attitudes lead to behavior change? What has the audience stopped doing or started doing? Polling, informational interviewing, anecdotal information, and observation are evaluation tools. Remember, depending on purpose, use, and audience, qualitative evaluation can be just as important as quantitative evaluation. Do not downplay the stories and the informal anecdotes that build around a campaign. As most of us know, just because we are able to say that 48% did “x” and 52% did “y”, does not make the campaign more valid or valuable. Ultimately, this is where monitoring and evaluation relates to programming—has there been a change (over time) in the amount of nonpoint source pollution?

### ***Simple Evaluation Tools***

Organizations have more opportunities to monitor and evaluate than they think. The evaluation program does not have to be a distinct, expensive, or formal effort. Agency personnel and organization staff and volunteers come into contact with the target audience on a daily basis. Keeping one or two key questions at top-of-mind, asking them, and then reporting back at the next staff meeting is a hugely effective monitoring tool.

For agencies, organizations, and programs with advisory committees or boards, a key role is public relations and interaction with the public. Have each board member ask five people (friends, coworkers, neighbors) each month if they have done something different as a result of “x.” If 20 board members report back, you have a sample of 100 responses! Or, it could be as simple as asking people who call how they found out about “x” and what they think.

One watershed program in a small community was embarking on a written, direct mail survey to understand the impact of a high-school education program. Given the audience and the scope of the project, a survey to 100 people was not likely to yield a significant sample of returns. In developing a clearer definition of the purpose and focus of the evaluation, it was determined that less than 20 10-minute phone calls with participants, partners, and other stakeholders would yield much more valid and substantive information at much less the time and expense.

## ***Conclusion***

A key lesson about evaluation is to never collect more data than you need. Agree ahead of time who will use the data and information and for what purpose. Determine the format of the evaluation product. Does it need to be a formal public report, a presentation, or an internal memo? It is always useful to create the end result outline at the very beginning to ensure that data and information can be collected throughout the program.

And finally, remember that the public relations strategy is only valuable if it is integrated into the program plan from the beginning. Therefore, the education, outreach, or public relations evaluation is in fact part of the overall program evaluation. Did the overall program achieve desired results? This is most easily measured if the goals are measurable in the first place. So at the end, the message is to start at the beginning!

For more information on program evaluation, marketing, strategic planning, or organizational development, contact Shelli Bischoff-Turner at 303-223-4886 or e-mail [shelli@conservationimpact.com](mailto:shelli@conservationimpact.com). Since 1996, Conservation Impact has been impacting the ability of conservation organizations to successfully achieve their missions. The company blends practical, nonprofit management experience, conservation knowledge, and organizational development expertise to help groups achieve tangible, lasting outcomes. [www.conservationimpact.com](http://www.conservationimpact.com).

# Eyes on the Environment: Environmental Education for Broadcast Meteorologists

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## **Abstract**

To support the notion of the “station scientist” and encourage dissemination of environmental information during on-air weathercasts, The National Environmental Education & Training Foundation (NEETF) has partnered with the American Meteorological Society (AMS) to develop education and training materials for broadcast meteorologists, including on-line courses on environmental topics, and tools to help meteorologists use environmental information in their weather report.

Meteorologists are highly trusted individuals that are not only the leading source for weather information, but also serve as a regular source of complex scientific information about the atmosphere and the Earth for most Americans. Both NEETF and the AMS believe that weathercasters are an underutilized public resource and would like to see AMS’s 1,500 broadcast seal-holders and other trained weathercasters become more central to improved science reporting. Research shows that the media is the leading source of environmental information for most people, including children, and weather reporting is well positioned to cover environmental topics by routinely explaining and depicting logical and sequential causal connections. Additionally, weather reporting is well suited to presenting geographic and environmental relationships, including watershed and air quality awareness, ecosystem processes, smart growth and development issues, and others.

To provide weathercasters with necessary background knowledge to become a “station scientist,” NEETF, in partnership with the Cooperative Program for Operational Meteorology, Education, and Training (COMET), is developing a set of online courses with a strong relationship to ongoing weather reporting. Courses will give meteorologists a solid background in environmental science fundamentals and processes, will make links between environmental concepts and topics currently covered on the air, and will provide tools and resources to enhance their ability to “tell the story” to their viewers. Our first course focuses on watersheds.

NEETF is also developing Earth Gauge™, designed to make it easy for weathercasters to explain the environmental implications of weather events and what viewers can do to help address those implications by providing brief, tailored environmental information and graphics tied to the 3-5 day forecast. Hundreds of Earth Gauge™ messages and graphics will be refined and rotated, keeping material timely, fresh and interesting.

This presentation will explore the development of online courses and the Earth Gauge™ tool for use by weathercasters, in partnership with local, regional, and national agencies and organizations, as well as how the tools will be promoted and distributed. Through the Earth Gauge™ effort, NEETF and AMS will test how broadcast meteorology can improve Americans’ environmental knowledge and stewardship.

## ***Introduction***

The National Environmental Education & Training Foundation (NEETF), in partnership with the American Meteorological Society (AMS), has developed the *Eyes on the Environment* initiative, designed to provide broadcast meteorologists with core environmental science content that can be easily conveyed to their viewers. Local weather reports provide a unique opportunity to increase the public’s understanding of complex natural systems, and offer an ideal opportunity for meteorologists to bridge the environmental information gap by conveying important environmental information that is relevant to people’s daily lives.

Through the American Meteorological Society (AMS), we are reaching 1,300 broadcast meteorologists with workshops, on-line courses, and tools on topics where there is a natural link between the weather and the environment, such as air quality, fire ecology, floodplain management, urban sprawl, watersheds, and water quality.

### ***The Need: Bridging the Environmental Knowledge Gap***

NEETF's annual *Report Card on Knowledge, Attitudes, and Behaviors* demonstrates that 68% of U.S. residents do not know the reasons for—or grasp the implications of—sprawl, ecosystem decline, loss of biodiversity, global warming, non-point source pollution, poor solid waste management, watershed degradation, and other significant environmental subjects. This lack of knowledge extends even to the most fundamental public needs—the air we breathe, the water we drink, and the energy we use. Moreover, as rapid advances continue in the scientific and environmental fields, the gap between the knowledge of the professional science community and their lay counterparts could become even wider.

### ***The Solution: Environmental Education and Tools for Broadcast Meteorologists***

Television and radio newscasts are the most popular item in any media market, and research in major television viewing areas reveals that a majority of viewers (as many as 80%) list the weather as the primary reason they watch local news. This often means that people are highly attentive and therefore in a “learning mode” while watching the weather report. In addition, they watch weather reports repeatedly, thus greatly improving impact of educational information.

The AMS embraces the concept that AMS weathercasters can become resident “station scientists” and can, with additional training, be called upon to cover many science-based news topics. The AMS believes that weathercasters are an underutilized public resource and would like to see its 1,300-member division of television and radio broadcast seal-holders and other trained weathercasters become more central to improved science and environmental reporting at their respective stations.

These trusted professionals can succeed in imparting complex topics where environmental educators have failed in the past. In response to this challenge, NEETF developed the *Eyes on the Environment* program to provide broadcast meteorologists with environmental education and training, as well as tools and resources to “tell the story” to their viewers on-air.

### ***Education: Connecting Weather to the Environment***

Although broadcast meteorologists are trained to be experts in atmospheric sciences and the art of broadcasting, they have a more limited background in hydrology, air and water quality principles, ecosystem and watershed functions, and other environmental science subjects that could easily be incorporated into their daily weather forecasts.

A major emphasis of the *Eyes on the Environment* program is on developing an initial set of courses that have a strong relationship to ongoing weather reporting – watersheds/water quality, airsheds/air quality, impacts of natural hazards, coastal zones, forest ecology, and the use of data and enhanced satellite imagery (Table 1). Course content will include: environmental science fundamentals; how environmental processes work; how environmental problems develop; and linking fundamental concepts to topics currently covered on the air. In addition, it will teach the skills needed to easily explain these concepts to the public, both on the air and in community outreach activities, such as school visits. Courses will use simple analogies, such as easy-to-apply demonstrations or experiments; employ broadcast-quality computer graphics or videos; and show members how to access government data and use the latest satellite technology to enhance their ability to “tell the story.”

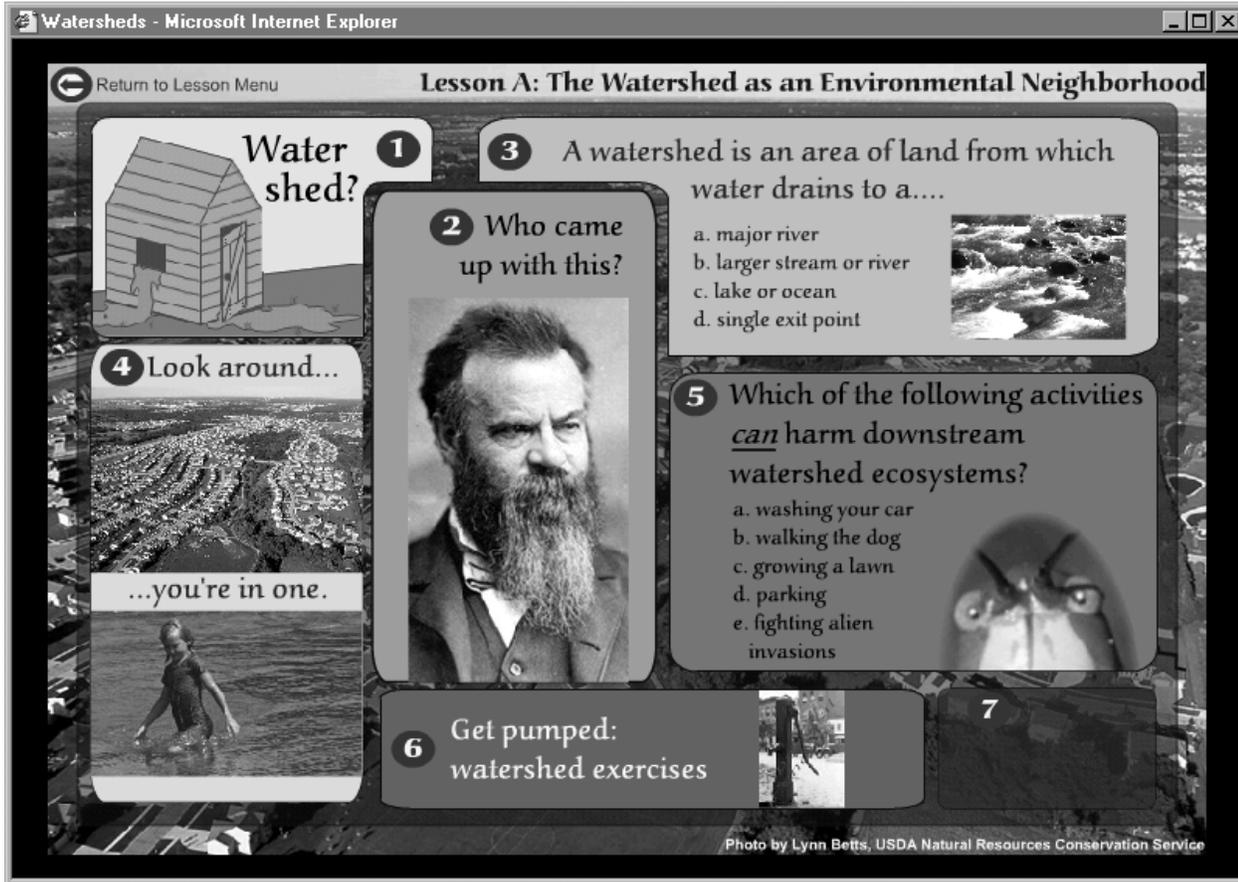
**Table 1. Sample Course Subject Profiles**

<b>Course Topic</b>	<b>Weather/Environment Nexus</b>
Watershed threats	Flooding Quality of drinking water supplies Runoff, non-point source pollution Sprawl and land cover
Air-shed threats	Ozone Traffic and transportation Smoke and fine particles Public health
Natural hazards	Air quality (fires, heat waves) Drinking water (floods, hurricanes, drought) Habitat loss (hurricanes, floods, fires)
“Smart Growth” vs. sprawl	Air and water quality Congestion Habitat loss

NEETF and The University Corporation for Atmospheric Research’s Cooperative Program in Meteorology, Education and Training (COMET) are currently developing our first, prototype course, *Watersheds: Connecting Weather to the Environment*, to be launched in March 2006. The six-unit course, which is designed to only require 2-3 hours of time, introduces the watershed concept, and makes connections between weather events and watersheds through short, 15-minute, audio-visual lessons (See Figure 1). The on-line course materials will not only serve as a learning resource for broadcast meteorologists, but they will also serve as a source of materials that the broadcast meteorologists can use as a resource for educating their audience. The Watershed course materials will reside on the COMET Program’s Meteorology Education Web site (MetEd: [www.meted.ucar.edu](http://www.meted.ucar.edu)). Under the “Communities” section of this Web site, a “Weathercaster” page will be established to contain the online course materials; the page will also serve as a homepage for further online materials that will be developed to support the broadcast meteorology community. Examples of these additional resource materials, some of which will be developed as part of this prototype curriculum effort, are:

- **Reporting Tips:** Tips for broadcast meteorologists on how to easily explain watershed issues both on the air and in community outreach activities using simple analogies and easy-to-apply demonstrations or experiments;
- **Real-time Data:** Information on how to access government data and use the latest satellite technology to enhance their ability to “tell the story” on the air;
- **Using Satellite Imagery/Graphics:** How to integrate watershed information into the local weathercast including special segments on watersheds, showcasing watershed boundaries on radar and satellite images and real-time water quality information, etc.;
- **Tips for the Public:** Tips for the public on how they can protect and preserve their watersheds and drinking water supplies in their home and garden, on the road, at work, and at play.

Figure 1. Watersheds: Connecting Weather to the Environment Lesson One interface.



The AMS is committed to ensuring that broadcast meteorologists have the environmental knowledge they need through its Continuing Education Program and its new certification and re-certification requirements. Shaping courses on key environmental topics will not only teach a few motivated meteorologists, but also support a larger effort by the AMS to actually require environmental education as part of its continuing certification rules for broadcasters. At the AMS June 2002 Annual Meeting, members endorsed the concept of expanding the AMS continuing education program into the environmental arena and basic environmental knowledge as a precondition to the annual renewal of the AMS broadcast seal.

### ***Testing the “Station Scientist” Concept***

Three years ago, the National Environmental Education & Training Foundation, working with StormCenter Communications ([www.stormcenter.com](http://www.stormcenter.com)), tested the “station scientist” concept with Chief Meteorologist Bob Ryan at WRC-TV in Washington, DC. We developed a comprehensive Web site about the Chesapeake Bay Watershed – *Watersheds: Where the Atmosphere Meets the Earth* (<http://wrc.iewatershed.com>). The Web site is embedded into WRC-TV’s Web site and serves as a source of background information for on-air stories mentioned by WRC’s weather team. In the last two years, WRC meteorologists have done over 30 on-air watershed stories during the news hour, and directed the public to the Web site to learn more about what they can do to protect their local watershed and the Chesapeake Bay.

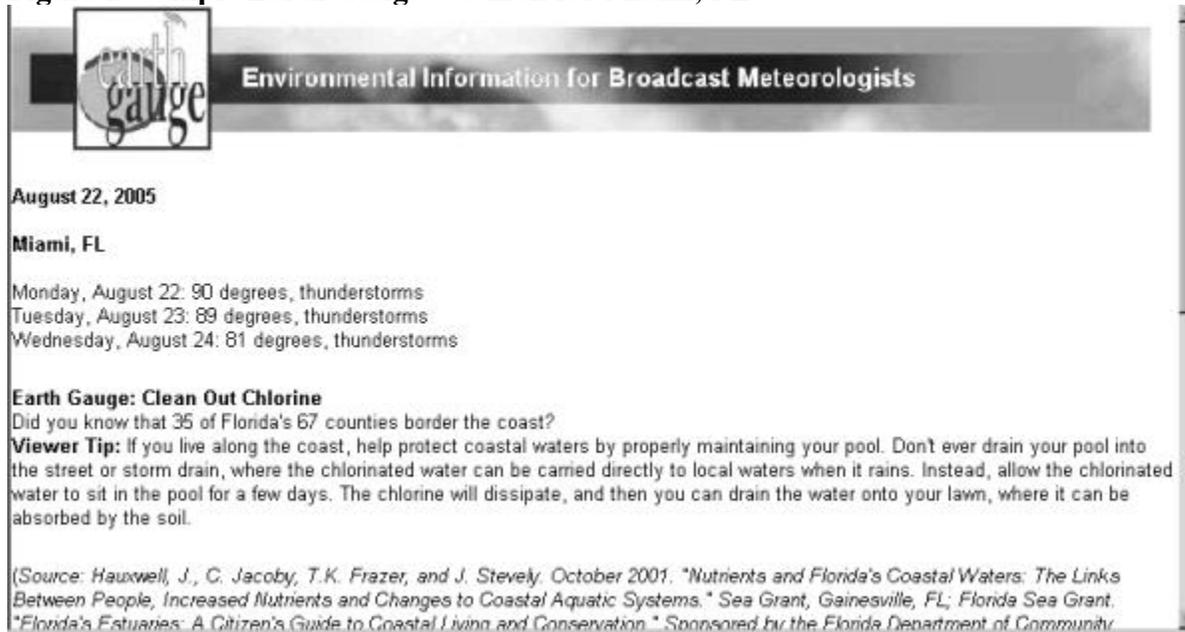
Based on the success of the WRC-TV pilot, NEETF and StormCenter Communications expanded the project to Philadelphia, PA and Minneapolis, MN. Since then, StormCenter Communications has added Austin, TX, Montgomery, AL, Mobile, AL, and Tampa, FL. They expect to add new sites in Colorado, Nevada, North Carolina, Pennsylvania, and Texas in fall 2005. At each TV station Web site, the public can access the latest on-air news features from the stations, as well as an archive of all the news features and environmental news stories. All of the pilot projects have been developed in collaboration with a broad range of federal, state, and local governments, as well as local academic, scientific, and environmental/watershed organizations.

### ***Making it Onto the Airwaves: Earth Gauge™***

Throughout the development of the *Eyes on the Environment* program, NEETF has received repeated advice from busy television weathercasters and news directors that the best way to break through the overwhelmed news agendas of the average station and get the weathercasters to present environmental content on the air is to feed it to them in bite-size, interesting pieces. The information must also be timely and relevant to the weather news of that week or that day. Based on this advice, NEETF and AMS developed *Earth Gauge™*, a free, weekly environmental information service for broadcast meteorologists.

Based on the approaching 3-5 day weather forecast in the major US media markets, brief, tailored information and a viewer action tip are e-mailed weekly to broadcasters in each market. *Earth Gauge™* information is a logical and natural continuation of the weather forecast, and is designed to make it easy for weathercasters to explain the environmental implications of weather events, and what their viewers can do to help address those implications. *Earth Gauge™* is developed with information from a variety of national, regional, and local agencies and organizations, including America's Clean Water Foundation, National Wildlife Federation, NOAA National Weather Service, USEPA Office of Wetlands, Oceans, and Watersheds, The Chesapeake Bay Program, The Coastal Resources Center at the University of Rhode Island, and others.

*Earth Gauge™* addresses a number of weather/environment topics, making clear causal connections between the weather and environmental events and processes. Figure 2 shows an example of a weekly *Earth Gauge™* e-mail. Currently, the *Earth Gauge™* information service is being distributed in seven pilot media markets: Atlanta, GA; Cleveland, OH; Detroit, MI; Miami, FL; Providence, RI; San Francisco, CA; and Washington, DC. The service is also being piloted by The Weather Channel. The pilot stations are providing valuable feedback about *Earth Gauge™* content and logistics.

**Figure 2. Sample Earth Gauge™ e-mail for Miami, FL.**

In Fall 2005, we will begin distributing *Earth Gauge™* information widely to all AMS Broadcast Seal Holders and National Weather Service Warning Coordination Meteorologists. We will also add ten additional targeted media markets in Fall 2005.

### ***Weathercast to “Envirocast”***

Through on-line course development, Web projects, and *Earth Gauge™*, the *Eyes on the Environment* program is working to integrate environmental information into the training of broadcast meteorologists, while providing the tools necessary to incorporate environmental information on the air. Through this innovative program, NEETF and AMS will test how broadcast meteorologists can change their weathercast to an “envirocast,” while improving Americans’ environmental knowledge and stewardship.

### ***Organization Backgrounds***

Chartered in 1990, the **National Environmental Education & Training Foundation (NEETF)** develops and supports innovative environmental learning programs to meet social goals, such as improved health, better education, “greener,” more profitable business, and ecological protection. NEETF also makes challenge grants to innovative programs and recognizes outstanding achievements in the field. Our goals include (1) core environmental literacy for America’s children while improving their overall academic success; (2) baseline environmental knowledge for adult Americans to increase individual stewardship; (3) a stronger public health system through environmentally educated health care givers; and (4) training and information for a critical mass of environmentally effective and responsible business managers.

Founded in 1919, the **American Meteorological Society** is the world’s premier scientific and professional organization for weather. With more than 11,000 members, the society is a scientific and professional organization that promotes the development and dissemination of information on atmospheric, oceanic, and hydrologic sciences. The AMS publishes nine well-respected scientific journals, sponsors scientific conferences, and supports public educational programs across the country.

## Weather Matters Month: Bring on the Barrels—The “Art” of Social Marketing

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**Angela Poe Dossett**

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### **Abstract**

Weather Matters Month is a multi-faceted program designed to inform Central Kentucky citizens about non-point source pollution. Rain barrels decorated by local artists are at the heart of this program. The barrels are placed in libraries, coffee shops, restaurants and other Central Kentucky businesses. An interpretive display and brochures that include simple suggestions on how people can reduce their contributions to non-point source pollution accompany each artistic barrel. The barrels also receive print, radio and television coverage. Through the brochures and media coverage, citizens are encouraged to visit Bluegrass PRIDE’s Web site to vote on their favorite artistic rain barrel. Once there, they can learn more about preventing stormwater pollution.

### ***Introduction***

Weather Matters Month is a multi-faceted program designed to inform Central Kentucky citizens about stormwater runoff, how it becomes polluted, and how they can prevent such pollution. The program consists of both youth and adult components including:

- Sticker books with a non-point source pollution theme
- Themed placemats for restaurants
- Storm drain stenciling activities
- A traditional media campaign
- Rain barrel workshops
- Artistic rain barrels.

The artistic rain barrels have clearly been the most successful component of this effort. Therefore, this paper focuses on the “Bring Out the Barrels!” program.

### ***Background***

Weather Matters Month is carried out by Bluegrass PRIDE (Personal Responsibility In a Desirable Environment), an environmental non-profit serving eighteen counties in Central Kentucky, including seven MS4 permitted communities. The needs of these seven communities along with the rapid population growth of the Central Kentucky region were the inspiration behind Weather Matters Month, which was first implemented in March and April of 2004.

That same spring, Bluegrass PRIDE, in partnership with the University of Kentucky Natural Resource Conservation and Management capstone class and the University of Kentucky Survey Research Center, conducted an environmental awareness and attitudes survey of its service region. The results of this survey reinforced the need for non-point source pollution outreach in Central Kentucky. It was found that, though 79.7% of respondents felt their day-to-day actions directly impact the environment, 46.3% felt their actions had no impact on water quality. Another 48% of respondents felt

that their actions only somewhat impact water quality. Of the 264 respondents that answered yes or no to the question, “In your county, does rainwater runoff go to a treatment plant before it goes to rivers and lakes?,” 48.9% believed that the runoff was treated. Of the 476 total people who took the survey, 44.5% responded, “I don’t know” to the previous question.

## ***The Process***

The following process focuses only on the artistic barrel aspect of PRIDE’s Weather Matters Month campaign. The steps are PRIDE’s best advice on carrying out such a program based on two years experience.

### **Step 1: Selecting and Converting Barrels**

PRIDE has used white oak (bourbon) barrels and 55-gallon plastic, food grade barrels. Both work well though there are pros and cons associated with each type.

#### ***White Oak - Pros***

- More aesthetically pleasing than the plastic, which allows the artists to leave portions of the barrel unpainted.
- They hold paint very well.

#### ***White Oak - Cons***

- More difficult and time consuming to convert than plastic.
- HEAVY!!! This makes them extremely difficult to move. A truck and a dolly are required.
- Hard to maintain in a display setting. (Once they are cut, they need to be “watered” regularly so they contain a minimum of 5-gallons of water or they will shrink and fall apart.)
- If previously used, they can emit a bourbon smell when first cut and a vinegar smell after a while, which can be a problem for display sites.
- Can leave rust rings on the floor of display or storage sites.

#### ***Plastic - Pros***

- Light enough for one person to handle.
- One will fit in the back seat of most cars.
- Available free in most areas. (PRIDE’s came from bottling companies.)
- Easy to convert to a rain barrel.
- Easy maintenance once on display.

#### ***Plastic - Cons***

- Must transport in an enclosed vehicle. They will fly out of the back of uncovered trucks.
- They do not hold paint well, and must be treated before and after painting to avoid chipping or peeling. (For pre-treatment, the barrels should be sanded and coated with a plastic primer. After they are painted, they can be shot with a coat of clear car finish.)

Another option is to use small wooden barrels that are traditionally used for home vinegar or wine making. These can’t be converted to rain barrels, but are good for display locations with limited space. PRIDE used seventeen of these as part of our 2005 campaign, and they were extremely successful.

Directions for converting the barrels into rain barrels can be found at the end of this paper. Please note it is advisable to convert the wooden barrels after the artists have decorated them, just before they go on display. This will help prevent them from drying out as quickly.

### **Step 2: Recruiting and Working With Artists**

PRIDE uses several methods to find local artists willing to participate in the “Bring on the Barrels!” program. A Call for Artists is posted in local art supply shops, on PRIDE’s Web site, and in the

organization's newsletter. The Call for Artists is emailed to local art leagues and colleagues who may have artistic connections. High school and university art departments are also contacted.

To provide incentive for artists to participate in the program, PRIDE emphasizes that thousands of people will be exposed to the rain barrel artwork through display sites, media coverage, and PRIDE's Web site. Artists are recognized in the site display and on PRIDE's Web site. Additionally, PRIDE offers the Earth Artist Award to the artist(s) responsible for the rain barrel that receives the most votes through its Web site. To help defray the costs of supplies, PRIDE offers \$30 to artists who decorate a full size rain barrel.

PRIDE developed a set of guidelines that is given to all artists electing to participate in the program. Even though deadlines are clearly outlined in these guidelines, it has been our experience that artistic muses often do not work well within deadlines. One of the most stressful aspects of the program is making sure that barrels are done in time to be displayed. Therefore, PRIDE has started making the barrel artwork deadline in early February, and only recruiting enough display sites for the barrels turned in at that time. (Weather Matters Month is now held in April.) The February deadline also leaves plenty of time for wooden barrels to be converted or for plastic barrels to be shot with car coating before they go on display.

There are several ways to minimize the panic associated with getting the artistic barrels back in time for a successful program. Give artists as much time as possible- at least three months. Follow up with the artists before the deadline. Never allow a single artist to be responsible for more than two barrels. If they really want to do more, do not give them more barrels until their first two are turned in.

### **Step 3: Selecting Display Sites**

Since PRIDE's target audience is homeowners in the seven MS4 permitted communities it serves, the organization initially used home improvement stores in those cities as display sites. Often the rain barrels ended up hidden or not well maintained in the large chain stores, so they were not included as display sites in 2005. PRIDE has shifted its focus to specialty stores that deal with lawn and garden supplies. The organization also seeks out locations that attract those concerned with and active in environmental issues, which included outdoor sporting good stores, natural areas, outdoor activity sites (canoeing, hiking, etc.), and natural food stores. Other locations that worked well included libraries, local restaurants, and coffee shops.

The rain barrels are displayed inside, which is why some sites may require the smaller wooden barrels. An inside display is necessary because the interpretation is not weather proof. Having the barrels inside also helps reduce vandalism and prevents theft.

### **Step 4: Developing Outreach Materials**

Outreach materials associated with the "Bring on the Barrels!" aspect of Weather Matters Month include interpretive displays, brochures, a section on PRIDE's Web site, and press releases. The purpose of all the outreach is to make Central Kentuckians aware of runoff, how it becomes polluted, and how they can prevent such pollution.

The interpretive displays that PRIDE uses are extremely simple. They are an 8.5" by 11" sheet of paper that exclaim, "Bring on the Barrels!" The document contains a short explanation of why it's great to install a rain barrel and encourages people to take a brochure and/or visit PRIDE's Web site for more information. The most prominent part of the display, besides the program title, is the information about the art - the title of the piece, the artist's name, and the artist's interpretation of the work. Program sponsor logos and information on the auction of the artistic barrels are included at the bottom of the display.

An acrylic display holder that sits on top of the barrel contains the interpretation described above and brochures. The trifold brochure contains the following:

- A cover panel,
- A panel describing Bluegrass PRIDE,
- A panel focusing on the benefits of rain barrels,
- A panel that discusses purchasing artistic or plain rain barrels,
- A panel that lists the display locations of all barrels (This helps when recruiting display sites.), and
- A panel that lists simple steps people can take to prevent water pollution.

The brochure encourages people to visit PRIDE's Web site to view all the artistic barrels, vote on their favorite, and learn more about how they can prevent stormwater pollution.

Much of the information contained in the interpretive displays and brochure is also included on the Web site. Photos of each of the artistic barrels are posted on-line with the artist's bio, interpretation of the piece, and contact information. PRIDE encourages people to vote on their favorite barrel through the Web site. The results of this vote determine the winner of the Earth Artist Award. The Web site also contains a stormwater quiz and detailed information on rain gardens, integrated pest management, and other stormwater pollution prevention measures.

Press releases should be sent as soon as the barrels are on display. All radio stations, television stations, and newspapers in PRIDE's service area receive a media advisory by fax or email and a follow up call to schedule interviews or answer questions. Articles are written for newspapers, highlighting local display sites and/or artists.

### **Step 5: Bringing on the Barrels!**

When the barrels, displays, and brochures are delivered, PRIDE leaves a set of instructions with the display site. These instructions do the following: explain the program; give a general time when the barrel will be picked up; identify who to call if there are questions or if more brochures are needed; and outline barrel care. A couple weeks after the barrels are in place, PRIDE sends a follow up thank you letter with reminders about barrel care and restocking brochures. When white oak barrels are used, it is especially important that someone with your organization checks on them every couple weeks to make sure that the barrels and displays are in good condition.

PRIDE typically leaves the barrels and displays in place for 4 to 8 weeks.

### **Step 6: Selling the Barrels**

Since the program works best if there are new artistic barrels each year, PRIDE holds an auction every summer. In 2004, the barrels were sold in a silent auction. The organization brought in just over \$5,000, which allowed PRIDE to fund an AmeriCorps member to work with schools for the following year. In 2005, the barrels were auctioned off in a live auction, which took place during a celebrity waiter dinner. The barrels did not do as well as anticipated, probably because the audience primarily came for the celebrity dinner, not the rain barrels. In the future, the rain barrel auction will be held separate from other fundraising events.

PRIDE also sells undecorated rain barrels throughout the year. Plastic ones are available for \$115 and wooden ones cost \$160. Orders trickle in, especially during the weeks that the artistic rain barrels are on display. For those who are interested in a rain barrel but cannot afford to purchase a completed one, PRIDE occasionally hosts rain barrel workshops for \$85. All participants leave with their very own white oak rain barrel.

### ***Program Results***

Unfortunately, it is hard to know how many people "Bring on the Barrels!" has reached, and even harder to know how many people have changed their behavior to reduce non-point source pollution as a result

of the program. Hopefully, the environmental awareness and attitudes survey conducted in the spring of 2004 will be redone in 2009, giving some indication about the effectiveness of PRIDE's stormwater message. In the meantime, there are some accomplishments that can be tracked. These include:

- Over 100 rain barrels have been sold to Central Kentucky citizens in just two years.
- Traffic to PRIDE's Web site increased during the campaign. In just three months in 2004, over 700 people voted on their favorite rain barrel. In 2005, more than 1,600 first-time visitors checked out Bluegrass PRIDE's Web site between April and July.
- Unknown numbers of people have been exposed to newspaper articles, and radio and television interviews relating to stormwater issues. In 2004, the Lexington Herald-Leader, the largest paper in the region, featured "Bring on the Barrels!" in a lead article in its Home and Garden Section, and the local CBS affiliate not only covered the rain barrels but also ran a series of seven stories on non-point source pollution, in partnership with PRIDE. The 2005 campaign alone generated 20 media hits of which PRIDE is aware, including two hits on the local NBC affiliate and three on the local CBS affiliate. (Another benefit of auctioning off the barrels is getting two bites at the media apple—one for the campaign and one for the auction.)

## ***Conclusion***

"Bring on the Barrels!" has been a huge success in Central Kentucky. The program itself has generated a noticeable response from the general public. Plus, the program has helped Bluegrass PRIDE strengthen its relationship with local media outlets.

## ***Making a Rain Barrel***

### **Materials**

- Pencil
- Drill
- Jigsaw
- Downspout connector
- 3/4" Spigot (Hose Bibb)
- 7/8" wood boring drill bit
- 6" aluminum louver with insect screen
- 3/4" Hose adaptor
- 3/4-14" taper pipe tap (threader)
- caulk
- caulk gun
- Vice-grip
- Safety goggles

### **Directions**

Trace the louver and the downspout connector on the top of the barrel. These are usually placed opposite each other. Make sure there is enough room between the edge of the barrel and the tracing so that the jigsaw can be easily maneuvered.

Use a large drill bit to drill holes along the traced line. This will make it easier to use the jigsaw. After the holes have been drilled, follow the lines and cut out the holes for both the louver and the downspout connector. Caulk should be placed around the downspout once it has been installed. If the louver does not fit tightly, caulk can be used to ensure a snug fit.

Directly across from the downspout, along the front of the barrel, is where the overflow and spigot should be placed. By turning the barrel on its side, drill two holes using the 7/8" wood boring drill bit. The holes should be above one another and about 5" from the top and bottom. (If using a bourbon barrel, the holes should be just below the top band and just above the second to last band.)

Once the holes have been drilled, they need to be threaded. By using a vice-grip, place the threader into one of the holes. Slowly and carefully turn the threader clockwise into the hole. Make sure not to strip the threads by backing the threader out (counter clockwise) a half of a turn for each full turn.

After threading both holes, screw the hose adaptor into the top one and the spigot into the bottom hole. These can also be caulked if necessary.

# Stream Side Science: Tailoring Watershed Education to Meet the Needs of Teachers

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## Abstract

This paper describes the strategic approach we took to increase water quality awareness by students through the use of our stream monitoring activities. We identified barriers to adoption of these activities by teachers, and used a focus group of formal and informal teachers and education professionals to adapt our existing materials to a set of lesson plans correlated to the learning objectives and standards of a required 9<sup>th</sup> grade science class in Utah. The resulting Stream Side Science curriculum addresses each of the major barriers we identified. Strong partnerships have resulted in support for this curriculum throughout the state and region. We support the curriculum through teacher trainings, assistance with equipment and supplemental materials. Early evaluation results indicate strong teacher support and an increase in student knowledge. Additional more detailed program evaluations are being conducted throughout the fall of 2005.

## Introduction

This manuscript discusses the strategy that Utah State University Extension's Water Quality Program implemented to reach our goal of increasing the use of water quality educational materials in Utah's schools. The strategy included an assessment of barriers to using existing materials, the use of focus groups, and input from partners throughout the state to develop materials that address the needs of teachers. The strategy also included marketing the final product with teachers and other water quality educators, and providing an ongoing support system for the final curriculum.

For the past six years, Utah State University Extension's Water Quality Program has used stream monitoring techniques to educate adults and youth about water pollution and watershed functions. We have focused on secondary level educational programs for several reasons. When we began our efforts there were fewer existing high-quality hands-on materials for this age group than for younger students. Also, research indicates that targeting secondary students can significantly impact adult attitudes and concerns about the environment (Palmer 1993). Therefore, working with secondary level students and their teachers appears to be an effective way of increasing our long-term impact.

Our outreach programs involve over 5,000 youth each year with activities that range from one hour to all day. In an attempt to reach more young people, we also train teachers to use our activities; however, classroom adoption of these activities has remained limited to those teachers with a special interest in water or outdoor education. In informal discussions with teachers, we became aware of probable barriers to wider use of our activities by educators, the most significant being the increasing need for teachers to focus on core curriculum standards with end of year testing in mind.

On January 8, 2002, President Bush signed the reauthorization of the No Child Left Behind Act (NCLB) (Goldhaber, 2002). The accountability provisions of NCLB allow the federal government to penalize schools that fail to achieve “adequate yearly progress,” as defined by student performance on standardized tests (Goldhaber, 2002). NCLB has resulted in a focus on core curriculum standards and objectives, because end of year standardized tests are based on the core curriculum guidelines for each state. It is expected that the NCLB goal of student proficiency in reading and math will continue to pressure schools for at least the next decade (Oliva, 2005.) Although NCLB does not apply directly to 9<sup>th</sup> grades through federal funding, some schools may evaluate teacher progress or ability based on end of year test scores. The push to teach to the core guidelines may limit the number of teachers who address issues such as water quality because they do not fully address the information on standardized tests.

## ***Methods***

We first needed to better understand both the needs and constraints of Utah teachers as these pertain to adopting existing water quality materials. We met with the Utah State Office of Education (USOE) Science Coordinator to discuss materials we had developed, and to solicit his support in our efforts. In particular, we were interested in modifying our Utah Stream Team manual (Geiger and Mesner, 2002), which is an extensive and detailed stream monitoring program developed for formal and informal educators. The Utah Stream Team manual provides background and resources for designing and implementing a stream monitoring program, but does not include specific lesson plans. With the USOE’s assistance, we organized and worked with a focus group of teachers and district science coordinators who helped identify teacher needs and constraints and also helped review the materials we developed. Participants in the focus group met twice in extended face to face meetings, and were contacted individually throughout the project. We also solicited ideas and feedback from our partners in water resource management and education across the state.

At our first focus group meeting we reviewed the Utah Stream Team manual and identified where water quality education and monitoring activities could fit into the core curriculum of different high school classes. Based on this input, we developed a set of specific lesson plans for Utah’s 9<sup>th</sup> grade Earth Systems Science course utilizing stream monitoring activities. These lesson plans, which we collectively title Stream Side Science, follow a set format, each one providing a purpose for the lesson plan, summary of the activities, background information, list of materials needed, a step by step set of instructions for classroom and field activities, and discussion questions and ideas on graphing, presenting, or applying the data. During development, members of the focus group reviewed materials and commented on the relevance of the lesson plans, clarity of instructions, format, age appropriateness, and content. The materials were also reviewed by water resource specialists and researchers for scientific accuracy.

A completed draft of the Stream Side Science manual was distributed to an expanded focus group which included the original teachers, science coordinators, and state water resource specialists. These individuals read and reviewed the entire 167 page draft document before meeting as a group. Although all activities had been previously field tested for the Utah Stream Team program, three teachers in this group also field tested three of the lesson plans for clarity of instructions, format, and content.

At the final focus group meeting, participants were asked to:

- Confirm that the curriculum would meet the needs of teachers;
- Correlate specific lesson plans to the core curriculum standards and objectives and intended learning outcomes;
- Discuss any further changes that needed to be made after teacher review and pilot testing.

We solicited the support of the USOE in distributing and promoting the manual throughout the state. At the advice of the USOE and the focus group, we developed a strategy for ongoing support for teachers using this curriculum.

We are currently conducting a formal evaluation of the curriculum. We are using pre- and post-tests which have been developed in coordination with the USOE Assessment Specialist. The intent is to measure changes in knowledge of water quality concepts, and we hope also to learn whether this curriculum will improve end of year test scores. We are evaluating other factors as well, such as whether the amount of time spent on the different activities or the total number of lesson plans used affects the students' test scores. We used a panel of university professors, teachers, general citizens and an assessment specialist to review the content, validity, and readability of the tests.

During the spring of 2005, a pilot of the pre- and post-test program was given to 184 students and 12 teachers. The data collected were used to check the test for commonly missed questions by students and ensure ease of use by teachers participating in the study

During the Fall of 2005, 450 additional pre and post tests are being delivered to teachers in Utah, and an estimated 300 more students will participate by the end of the year. The teachers are asked to give their students the pre-test prior to any discussion of water quality or watershed issues. They are given a 10 question test for each activity they complete in the Stream Side Science Manual. Within two weeks of completing the activity, they are asked to give the post-tests. The teachers do not see the test questions before conducting the lesson plans to avoid skewing the data by "teaching to the test."

The teachers are also asked to complete a survey. The survey evaluates their background in water quality, including educational experience or degrees, teaching or other work experience, and whether they have attended a Stream Side Science training course. The teachers are asked to indicate hours spent in preparation, in classroom teaching, and in the field when they used the Stream Side Science lesson plans, and to indicate other information such as proximity of their classroom to a stream site and the use of other resources. In addition, participating teachers will complete a survey for each activity they used, polling them on how closely they followed the lesson plans, and if they used all components of the lesson, including the activity extensions, further discussion questions, and student worksheets.

## ***Results***

Our first focus group identified six barriers to using watershed and water quality resources:

- 1) Teachers need to focus on core curriculum standards with end of year testing in mind;
- 2) A majority of teachers are not confident in their knowledge of water quality science;
- 3) Teachers want specific lesson plans, not a manual from which they have to pull together their own lessons;
- 4) Teachers may be unwilling to take students to a stream setting because of safety concerns;
- 5) Teachers are financially strapped and may be unwilling to use a curriculum that requires additional materials; and
- 6) Teachers may have a limit on the number of field trips each year.

To address these barriers, the following features were incorporated into the Stream Side Science manual:

- 1) All activities are tied to the Utah State core curriculum for 9th Grade Earth Systems Science and the corresponding intended learning outcomes. These are identified on the first page of each lesson plan. In addition, a summary table provides all correlations for all lesson plans. In total, the curriculum addresses three of the six standards for this course, including 14 objectives and 35 intended learning outcomes.

- 2) For each lesson, we provide a brief discussion of background scientific concepts. We also provide study questions and answers for each lesson. Resource pages at the end of the lesson plan lead to more detailed information about water quality or watershed science concepts.
- 3) The lesson plans are formatted to lead teachers through the activities easily.
- 4) Safety concerns are explicitly addressed in the appendix of the manual and also in each lesson plan when necessary.
- 5) The activities utilize low-cost monitoring equipment. We include supplier information for all monitoring materials, and also advice on constructing equipment and finding low cost alternatives.
- 6) The manual contains tips on how to “bring the stream to the classroom” for those who have a limited field trip budget or limited access to natural streams or other waterbodies.

In September of 2004, the USOE assisted in distributing the Stream Side Science manual to all 285 of Utah’s ninth grade Earth Systems Science teachers. The teachers also received a letter endorsing the curriculum from the State Science Coordinator. In addition, over 250 manuals were distributed to resource specialists, nonprofit agencies, state and federal agencies, other teachers, and interested parties out of state.

To provide ongoing support for this curriculum, we have developed and offer an eight-hour training for teachers. This meets the requirement for ½ university graduate level credit or eight relicensure points. We have obtained financial support so that trainings are free for participants. The workshops teach basic watershed and water quality science, and watershed issues in Utah. Teachers learn how to perform the water quality tests, how to interpret the results, and how to adapt the activities for individual classroom situations.

Since 2004, 117 teachers have attended Stream Side Science workshops and we continue to schedule more workshops. Teachers have also requested advanced training. We have now offered three workshops on macroinvertebrate identification and sampling, attended by a total of 47 teachers and other resource specialists. In 2004 and 2005, we partnered with the Utah Geographic Alliance, combining our watershed lessons and water quality monitoring with training on GIS mapping and GPS. Forty-nine teachers attended three of these workshops. We continue to look for new partners in our teacher training efforts.

The Spring 2005 pilot testing suggests a measurable increase in test scores of 184 students who were taught lessons from Stream Side Science. On average, students increased 2.3 points (out of 10 points) from the pre-test to the post-test. Additionally, 12 teachers who participated in the Stream Side Science training showed an increase in knowledge.

Data collected from the Fall of 2005 will be used to evaluate more than just knowledge change in the students. Overall test score changes of the students will also be used to evaluate the importance of the following factors:

- 1) Teacher’s prior knowledge or background in water quality science;
- 2) Teacher interest in water quality
- 3) Teacher attendance in a Stream Side Science training workshop;
- 4) The amount of time teachers spent on the activities;
- 5) Classroom proximity to stream sites;
- 6) Use of all the activity components versus partial use of the activities; and
- 7) Rural versus urban classrooms.

We hope that these results will help us identify important aspects of the Stream Side Science program, and help us modify the materials, training, and marketing of the the program to ensure that it is as useful a resource to teachers as possible. In addition, if our evaluation shows that students who use this

program perform better on their required end-of-year tests, this may lead to further support by the state Office of Education and may be an incentive for more teachers to use the Stream Side Science program.

## ***Discussion***

We have produced a curriculum for a required class in Utah that has been very positively received by teachers and agencies. The identification of specific barriers and suggested solutions by our focus group resulted in a highly usable manual for working teachers. Support from the Utah State Office of Education provided greater validity in the teaching community and also provided a means for distribution of the manuals. Currently, we know of over 200 formal and non-formal teachers who are using Stream Side Science.

According to initial testing, the materials appear to increase student and teacher knowledge and awareness of water quality and watershed concepts. Our more detailed evaluation of the program being undertaken during the fall of 2005 will provide us with additional data on whether these materials lead to improved knowledge on water quality and to improved end of year test scores by students. We will also use these results to further modify and improve the program.

We continue to be responsive to needs expressed by teachers throughout the state. We have provided checkout trunks of materials in each county Extension office. We are also currently developing supplements for specific watersheds in the state. These provide more detailed maps, localized background material, local contacts, and ideas on monitoring locations.

The collaboration of many different agencies and organizations has strengthened the Stream Side Science program. In July 2004, Governor Olene Walker adopted Stream Side Science as the high school curriculum in support of her state Watershed Initiative. She personally endorsed it at Utah's 2004 Non Point Source Pollution conference. The quality of the Stream Side Science curriculum has also been acknowledged outside of Utah. It received the 2005 Gold Award for Long Publications from the Association of Natural Resource Extension Professionals. The curriculum is also being used as the text book for an on-line secondary science teacher education course being developed by Montana State University and Utah State University.

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# Clean Ways for Waterways: Washington County High Schools' Stormwater and Nonpoint Source Pollution Lesson

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## Abstract

Three high schools in Washington County, Wisconsin, participated in a two-part stormwater and nonpoint source pollution lesson as part of the stormwater pollution education campaign required by their municipalities' NPDES Phase II permits. The University of Wisconsin-Extension and MSA Professional Services, a Madison-based engineering and planning firm, collaborated to write and teach the two-part lesson.

Students were introduced to the concepts of stormwater runoff, nonpoint source pollutants, watersheds, and erosion control best management practices. Students used two web-based programs, the DNR Webview Mapping tool and the Long-Term Hydrologic Impact Assessment (L-THIA) to map urban development and calculate its impact on water quality. Students also photographed erosion control BMPs in use within their communities and evaluated their effectiveness.

To evaluate the program, students filled out interview questionnaires from which quotes were drawn to produce school and community newsletter articles on the project. In one class, students also wrote extra credit essays.

Teachers who would like to try implementing the Stormwater and Nonpoint Source Pollution lessons should lengthen the time for this program to four 50-min. periods, use as detailed information on the local watershed as available, use high quality GIS maps through your city engineering department, and take advantage of Phase II NPDES funding sources. This lesson is suitable for upper level high school students with access to fast and reliable internet connection service.

Teachers interested in implementing a similar project in their schools should view copies of lesson plans and accompanying materials from the Clean Ways for Waterways website: [www.cleanways.org](http://www.cleanways.org). Click on Community Events and under the High School program description click "More info" to download files in PDF format.

## Background

Washington County's High School Stormwater and Nonpoint Source Pollution lessons were part of the "Clean Ways for Waterways" public information and education (I & E) campaign under the requirements of Wisconsin's Phase II NR 216 Stormwater rules. The entire campaign, including the high school program, was funded by Washington County under a Wisconsin Department of Natural Resources (WDNR) Urban Stormwater/Nonpoint Source Pollution (USW/NPS) Planning Grant. With the grant, Washington County hired a consultant (MSA Professional Services) to develop a public I & E program, with high school students as one targeted audience. The high school lessons and all work assignment materials were developed by Amy Workman, Milwaukee River Basin Educator for Southeast Area UW-Extension, and Ann Dansart, Water Resources Planner, of MSA Professional Services. All lessons were co-taught by Amy Workman and Ann Dansart. The lessons could not have been developed without the resources and training provided by Chris Welch, Natural Resource Educator, WDNR. The Stormwater and Nonpoint Source Pollution lessons were taught in three separate high schools in Washington County to a total of 125 students. The lesson involved two-parts, each conducted over one or two 50-minute periods. Teachers received copies of all curricula produced. This project was conducted at all schools during or after Earth Week in the spring of 2005.

### ***Stormwater and Nonpoint Source Pollution Lesson- Part I***

In part I, students were shown a PowerPoint presentation that introduced the concept of watersheds and included how to define watershed boundaries and locate the watershed they live in. Students interpreted slides of soil erosion and urban runoff and learned how excess soil in streams and rivers degrades fish habitat and overall water quality. Students were given local information about the characteristics of their watershed and the major identified threats to water quality facing their watershed. Students were then shown slides of construction site erosion and erosion control Best Management Practices (BMPs).

Students were given a two-part homework assignment. Students were trained to use one of two web-based mapping tools, the West Bend GIS Map Server or the DNR Webview program, to map four specific sites within their community where urban development was occurring. Part I of the homework assignment was to use aerial photos available through the web-based program to estimate the area of four sites in their community where construction was currently happening. For Part II of the homework assignment, each pair of students was given a disposable camera to photograph evidence of erosion or examples of best management practices at the sites they previously mapped. Between the two lessons, MSA developed the photos taken by the students.

### ***Stormwater and Nonpoint Source Pollution Lesson- Part II***

In part II, students compared the aerial photos of their sites obtained from the web-based programs with the photos taken at each site the previous week. Students picked 3-4 photos and placed them using a dot and string on a larger map of their community. When approximately 30 photos were placed, students were asked to identify patterns of urban development taking place within the city or village. Students were asked to brainstorm categories in which to group the remaining photos on a sticky wall. The students were asked to identify patterns of BMP use and to make a judgment on how well their community was controlling erosion based upon the photographs. To estimate the water quality impact of the development witnessed in the watershed, students utilized the L-THIA (Long-Term Hydrologic Impact Assessment) web-based program. Using the program, students calculated volume changes in total runoff and a variety of nonpoint source pollutants based upon the land-use changes they documented with their photographs.

To evaluate the lessons, students filled out an interview questionnaire. Responses from the questionnaire formed the basis for school newsletter and community newspaper articles, illustrated by the students' photos. One teacher also gave extra credit for stormwater and nonpoint source pollution essays written by students.

### ***What Worked Well***

The two classes that functioned best were conducted at West Bend High School in West Bend. A number of factors contributed to this success. First and foremost, the interest and involvement of the teacher was extremely high. This lesson was treated as if it were a normal part of the curriculum with the same expectations for student involvement and performance, so the students took the homework assignments and class discussion seriously. Secondly, the block scheduling at West Bend HS allowed for a double period (1 hour, 40 min.) for Part II of this lesson, and the extra time was fully utilized to complete the lesson plan's contents. Thirdly, the subwatershed in which West Bend HS was located had its own protection plan which gave detailed information on the status of the watershed. The availability of local information on the subwatershed added relevance to the lesson, as the students were very familiar with the creek that ran behind their school.

Other components that worked well in all schools were the photographing of BMPs and the photo visioning exercises. Students took a large number of erosion and BMP photographs and were able to articulate verbally how well the BMPs they witnessed were functioning in preventing erosion. The use of high quality GIS maps was essential in aiding the students to locate and label where urban development was taking place and view a pattern of construction development within their communities. The two GIS Map Servers utilized in this project, the West Bend GIS Map Server <<http://arcims.ci.west-bend.wi.us/website/westbend/startadminf.asp>> and the DNR Webview program <<http://maps.dnr.state.wi.us/imf/dnrimf.jsp?site=webview>> worked extremely well because they were easy for students to use and, most importantly, created maps based on older aerial photographs. The older aerial photos showed a visual comparison between previous and current land use, which was particularly useful in entering scenarios for the L-THIA program. For the purposes of community education, the evaluation tool used was very successful. Definitions of stormwater runoff and explanations of nonpoint source pollution's impact on water quality were all provided using student answers from the interview questionnaire. Because of the high interest and involvement of their teacher, the quotes from West Bend students created the best newsletter article.

### *What Did Not Work Well*

Some of the contents of this lesson were too advanced for the freshman students at Hartford High School. The inability to drive hindered some of the students in photographing erosion and best management practices throughout their community. Some of the students lived in towns outside the city where their high school was located, which meant their photographs could not be represented on the GIS map showing patterns of urban development. In addition, some students had difficulty thinking spatially and could not locate their own town on a map of the watershed. Another problem in some lesson periods, one that is always a hazard when using web-based programs, was slow internet connections and computer freezes.

### *Advice*

To teachers interested in adapting this lesson to fit into their classroom programming, consider making these changes:

- **Assign more time to this lesson:** Make it a three part lesson (1<sup>st</sup> period – 50 min., 2<sup>nd</sup> period – 1 hr, 40 min., 3rd period – 50 min.), or a 4-part lesson of 50 min. each, splitting up the photo visioning exercise and the demonstration of the L-THIA program.
- **Extend the L-THIA section:** As written, this lesson does not include an adequate debrief of the results of the L-THIA pollution modeling program. The lesson would be more complete if an in-depth discussion of L-THIA results and the implications for the watershed were included.
- **Get the most local information on the watershed possible:** Giving specific statistics on the status of your local waterway will increase the relevance of the information enormously and will connect learning in the classroom with their everyday experience fishing, hiking, or in other ways utilizing the river. Check with your local Land and Water Conservation Department to determine if the watershed or subwatershed has a protection plan, and if so, use it.
- **Find the necessary internet resources:** Check to see if your city or state has a web-based GIS mapping programming similar to the WDNR Webview or West Bend GIS Map Server. (L-THIA is a national program and should cover your community.) Check your city engineering department or department of natural resources (or equivalent) Web site for a GIS mapping program.

- **Locate a funding source:** Financial resources to cover the cost of disposable cameras and film developing are a part of this program. Check to see if there is a stormwater or nonpoint source pollution public information and education campaign similar to Clean Ways for Waterways happening in your community or county. Funding may be available through this program. Check environmental education grant program guidelines to determine the suitability of funding this type of program. Corporate sponsors may also be willing and able to donate disposable cameras and film development costs.

### ***More Information***

Copies of lesson plans and related materials are available from the Clean Ways for Waterways Web site: <[www.cleanways.org](http://www.cleanways.org)>. Click on Community Events and under the High School program description click “More info” to download files in PDF format. Contact Amy Workman, Milwaukee River Basin Educator, 414-290-2434 or [amy.workman@ces.uwex.edu](mailto:amy.workman@ces.uwex.edu) for more information on this program.

Special thanks for making this program possible go to Ann Dansart of MSA Professional Services, Chris Welch of WDNR, Paul Delain of West Bend High School, Larry Wehrheim of Hartford Union High School, and Chuck Ritzenthaler of Germantown High School. Additional thanks go to the 125 students who served as the guinea pigs.

# Is Your Public Education, Outreach, and Participation Program Working?

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### **Abstract**

Public education, outreach, and participation programs for addressing water quality issues have gained momentum in recent years because of the nature of the water quality problems faced today. With these increased efforts comes an increase in resources spent on the programs. Now, managers, commissions, regulatory agencies, and even the public are asking if the programs are working and where the money has been spent.

A key to a successful public education, outreach, and participation program is being able to evaluate the program and show that it has been a success. Program managers should be able to track activities and the budget; state that the intended target audiences (e.g., public, industrial sector, commercial sector) have not only become aware of the issues, but have changed their behaviors; and determine that the goals were appropriate and were met. With the demand for resources growing, public education, outreach, and participation programs must be evaluated to make sure that they are as effective as possible.

## ***Introduction***

Public education, outreach, and participation/involvement programs for addressing water quality issues have gained momentum in recent years because of the nature of the water quality problems faced today. With these increased efforts, the resources spent on the programs also have increased. Now, managers, commissions, regulatory agencies, and even the public are asking if the programs are working and where the money has been spent.

A key to a successful program is the ability to evaluate it and show that it has been a success. Program managers should be able to track activities and the budget; state that the intended target audiences (e.g., public, industrial sector, commercial sector) not only have become aware of the issues, but also have changed their behaviors (e.g., have started recycling their used motor oil instead of illegally dumping it down a storm drain); and determine that the goals were appropriate and were met. With the demand for resources growing, public education, outreach, and participation/involvement programs must be evaluated to make sure that they are as effective as possible.

Since 2001, Tetra Tech has evaluated more than 130 municipal stormwater programs, including the public education and outreach and public participation/involvement elements. Tetra Tech has developed an evaluation process to determine whether appropriate goals and performance measures have been established and whether the various outreach activities have been effective. Tetra Tech's evaluation process for these programs goes beyond counting the brochures. It looks at the entire program and asks key questions like the following:

- Is there an overall outreach strategy that is aimed at changing behavior and identifying actions to measure change?
- Has the organization segmented the “public” into specific target audiences to better tailor publications and activities?
- Is the program working? Have the target audiences changed their behaviors?

The first two sections of this paper will present the above questions along with the proven technique that any stormwater program manager can use to evaluate these programs. Although many stormwater program examples are cited throughout this paper, managers of other types of programs with a public education, outreach, and participation/involvement component will find these techniques useful. The third section of this paper will summarize how the Watershed Approach to Stream Health (WASH) Project, an award-winning regional stormwater program in Colorado, used Tetra Tech’s evaluation process to evaluate its public education, outreach, and participation/involvement program. Also included are the WASH Project’s lessons learned and changes planned in response to its evaluation.

### ***Getting Started***

Unlike some types of National Pollutant Discharge Elimination System (NPDES) permits, which typically contain specific water quality limits, municipal separate storm sewer system (MS4) permits instead include more program and BMP-based requirements. Public education and outreach and public participation BMPs can include fact sheets, posters, classroom presentations, stream cleanups, and storm drain stenciling. Two of the six minimum control measures (i.e., required program elements) involve the public—public education and outreach and public involvement/participation. MS4 permittees are allowed flexibility in the types and frequencies of BMPs offered to meet their permit requirements, especially in public education and outreach and public participation/involvement.

This flexibility makes it more difficult to evaluate MS4 programs. To help with MS4 evaluations, this paper provides you, the stormwater program manager, with the background information and questions necessary to conduct a comprehensive evaluation of the public education and outreach and public participation/involvement components of your stormwater program. Answers to these questions, plus answers to other questions that you might have, can help you determine if you are implementing the program to the maximum extent practicable (MEP) and if it is working (i.e., the public has changed its behaviors). You might decide to focus your resources away from a publication or activity that is not working to one that is working. Evaluating your program might also build a partnership with another department or entity, help you with your annual report, or assist with an inspection performed by your state’s (or federal) permitting agency.

Each stormwater program is unique; therefore, this paper covers the main areas of your program that should be evaluated. Use it to guide you in evaluating your public education and outreach and public involvement/participation efforts.

### **The Regulations**

Congress amended the Clean Water Act in 1987 to require a national program to address stormwater dischargers. Phase I, promulgated in 1990, requires NPDES permits for stormwater dischargers from medium and large MS4s (usually 100,000 or more in population) and certain categories of industrial activity, including construction sites that disturb five or more acres. Phase I required the development of a stormwater program and public education.

Phase II, promulgated in 1999, requires NPDES permits for stormwater discharges from small MS4s located in urbanized areas and construction sites that disturb one or more acres. Phase II also requires the development of a stormwater program addressing six minimum control measures (MCM)—Public Education and Outreach, Public Participation/Involvement, Illicit Discharge Detection and Elimination,

Construction Site Runoff Control, Post-Construction Runoff Control, and Pollution Prevention/Good Housekeeping.

Phase II also requires measurable goals, described in the Phase II rule as BMP goals, that quantify the progress of program implementation and the performance of the BMPs. They are milestones that you use to track the progress and effectiveness of your BMPs in reducing pollutants to the MEP. As noted, this paper will concentrate on evaluating the first two minimum control measures.

### Getting Started

In addition to understanding the two phases of the NPDES program, you must also fully understand the roles and responsibilities of the other entities and responsible parties for public education and outreach and public participation/involvement in your MS4.

Effective stormwater management is key to a successful program. Each program must have a process to coordinate activities between departments and entities (if applicable), develop goals and objectives, develop a public outreach strategy, decide which BMPs will be implemented, apply for funding, manage resources, and evaluate the program for efficiency and effectiveness.

Think about:

- What are the boundaries of my MS4?
- What departments in my MS4 would have stormwater information for the public or sponsor activities for the public related to stormwater?
- Is the stormwater program coordinated with other departments and programs, such as underground injection control, household hazardous waste, recycling, etc.?
- Who are the stormwater staff members that conduct public education and outreach and public participation/involvement? How much time do they spend on public education and outreach and public participation/involvement publications and activities? What are their other responsibilities?
- Could nearby cities, towns, townships, or villages be partners for public education?
- Are there any nontraditional MS4s within my MS4, such as state departments of transportation, airports, universities, school districts, military bases, and prisons?
- Who are the responsible officials of each of those additional entities?

Many MS4s have become partners and co-permittees to combine resources. If you are in such a partnership, think about:

- Does the strategy (or other document) outline the roles and responsibilities of each co-permittee?
- Does a commission administer the stormwater program? Does it include all of the partners?
- Is there a formal agreement, such as a Memorandum of Understanding, among the partners?
- Does the commission meet regularly, with rules and procedures?
- Does each partner submit funds for the committee to manage?

These and other questions will help you start to think about other departments and entities involved in (or that could be involved in) your stormwater program. Maybe a local military establishment produced fact sheets about stormwater or a school district hosts an annual stream cleanup. Part of evaluating your stormwater program is thinking of ways to make it more efficient and successful. Partnering with other entities can combine or focus resources for a more effective program.

Have these materials handy:

- Public education/involvement requirements in your MS4 permit,
- Public education/involvement activities described in your Stormwater Management Plan,
- Public education/involvement activities from your latest annual report, and
- Any relevant correspondence (including inspection reports) with your state (or federal) permitting authority.

## ***The Program Evaluation***

### **Public Education and Outreach and Public Participation/Involvement**

Note that public education efforts usually aim to inform the target audience about the issues, educate them on how they help, and inspire them to change their behavior to protect stormwater quality. At least, municipalities should allow the public to participate in the development, evaluation, and revision of the entire stormwater program. Many municipalities facilitate involvement by coordinating or encouraging volunteerism in activities such as storm drain stenciling, stream cleanups, riparian tree plantings, and other programs.

Many BMPs are similar within public education and outreach and public participation/involvement programs. Therefore, many MS4s combine them into public outreach program components. For example, a brochure about stormwater effects could invite residents to participate in a stream cleanup or storm drain stenciling project. Several co-permittees often combine resources and produce one set of public outreach materials or simply use another municipality's existing materials for all co-permittees (i.e., the WASH Project).

Although not required in the regulations, you should have a strategy to address public education and outreach (and public participation/involvement). It should establish who is responsible for specific tasks to implementing each BMP, the responsible party, anticipated budget, a timeline with milestones (especially if the municipality must apply for funding support), and measurable goals. After this evaluation of your program, adjust the BMPs and timeline in your outreach strategy. The strategy should periodically be revised as necessary.

MS4s must educate the public on the hazards of illicit discharges, and many MS4s have construction operator training. These messages and target audiences, along with the public, should be included in your outreach strategy. Remember to include documents and activities produced for these target audiences in your outreach strategy and evaluation under the Illicit Discharge Detection and Elimination (IDDE) and Construction Site Runoff Control minimum control measures.

### ***Goals and Objectives***

An MS4's public education and outreach and public participation/involvement program should include goals based on specific stormwater quality issues in the community and pollutants of concern, and should target specific audiences (i.e., children, construction operators, dog owners, etc.). Goals are broad statements that express the general focus of your public education and outreach and public participation/involvement plan. Objectives should be designed to achieve your goal(s) and be specific, measurable, action-oriented, relevant, and time-focused. Overall goals and objectives for your public education and outreach and public participation/involvement program are different from your measurable goals associated with each BMP. Goals can be short- or long-term but should be designed to be reassessed regularly.

Think about:

- Do you have a public outreach strategy that includes a list of BMPs, the responsible party, anticipated budget, timeline, and measurable goal? How do you track the effectiveness of the BMPs and the overall public education and outreach and public participation/involvement efforts?
- Does your strategy identify pollutants of concern, impaired waterbodies on the 303(d) list, and waterbodies with total maximum daily loads (TMDLs)? Does it list BMPs to be implemented in those areas of concern or focus on a target audience?
- Is the strategy organized by watershed?

#### **Helpful Resources**

EPA has a web site of helpful resources for developing public education campaigns and engaging the public in your stormwater program.

<http://www.epa.gov/owow/watershed/outreach/documents/>

- Have you applied for funding in time, and have the responsible parties implemented the BMPs on time and within the budget?
- Does the strategy include specific goals and objectives? Do the goals reflect the stormwater quality issues in the community and pollutants of concern? Do the objectives focus on specific audiences?
- Have you adjusted the public outreach strategy in response to the success or failure of a BMP? Is there a scheduled review/adjustment of the strategy?

### ***Messages***

Your stormwater outreach messages should be clear, specific, and tied directly to elements that each audience values. Messages should also relate to the goals established for your overall program. Multiple messages may be necessary to address various audiences or behaviors.

Think about:

- Did you research your target audiences?
- On what issues are the messages based (i.e., pollutants of concern, general awareness, problem audience)?
- Are different messages used for different audiences (i.e., children, adults, pet owners, industry, etc.) or is one central message used for all?
- Do the messages encourage participation in stormwater-related activities?
- Do the messages educate about behaviors that the audience can change to be a part of a solution?
- Have specific messages been developed to reduce illicit discharges with information about how to report the discharges to the appropriate authorities? Remember that under the IDDE minimum control measure, the public must be made aware of the hazards of illicit dischargers.

### ***Target Audiences***

Your program should identify target audiences that you need to reach with appropriate messages. Target audiences can be segmented by geographic location, demographics, occupation, or behavior patterns (i.e., the public can be segmented into homeowners, dog owners, and children). Selection of a target audience can also be based on stormwater quality issues and behaviors to be altered. Nontraditional MS4s often have a more specific target audience than a traditional MS4 program. For example, school districts will target schoolchildren and teachers; military bases will target on-base personnel and subcontractors; and state departments of transportation will target their staff, subcontractors, and the road-traveling public. Many nontraditional MS4 entities partner with traditional MS4 programs to develop and distribute materials.

You should determine what your target audience already knows about stormwater, its perceptions on its role in stormwater issues, the profile of the target audience, and barriers to reaching this target audience. As the target audience becomes aware of and learns about stormwater issues, they just might change their behavior to help improve stormwater quality.

Think about:

- Have you identified target audiences for outreach efforts? How are these target audiences selected?
- What land use groups (i.e., industry, commercial businesses) have you selected?
- Have different ethnic groups or nationalities been considered as a separate target audience?
- Have you targeted pesticide, herbicide, and fertilizer applicators (including homeowners) and construction site operators?

### ***Formats***

MS4s use various formats (or types of BMPs) to deliver messages to different target audiences. BMPs can include documents, such as brochures, annual reports, and posters; items such as videos and giveaways; and activities such as TV and radio spots, presentations, stream cleanups, and storm drain stenciling. Remember, the message will not reach the audience if the format is not appropriate (i.e., a 3-hour video about stormwater is not appropriate for young children).

Think about:

- Do you have a variety of written educational materials and a variety of other formats?
- What opportunities do you give to the public to review and comment on the development or revisions of the overall stormwater program?
- What volunteer opportunities or formats do you coordinate or publicize to encourage the public to participate in stormwater-related activities? Activities can include beach, stream, or lake cleanups; volunteer stream monitoring; Adopt-A-Stream or equivalent activities; stormwater citizen panel; storm drain stenciling; trainings for construction operators; and a hotline, Web site, etc. so the public can report illicit dischargers.
- Did you produce the materials in the languages spoken in the community?

### **Don't reinvent the wheel!**

EPA has researched and developed case studies of successful stormwater programs throughout the country. EPA obtained permission for anyone to download and use their materials.  
[www.epa.gov/npdes/stormwater/casestudies](http://www.epa.gov/npdes/stormwater/casestudies)

### **Need Ideas for Public Education and Outreach and Public Participation/Involvement BMPs?**

EPA has also developed a Menu of BMPs to help program managers think of documents, activities, and programs. [www.epa.gov/npdes/menuofbmps](http://www.epa.gov/npdes/menuofbmps)

### ***Distribution Mechanisms***

There are many ways to distribute the many formats of outreach materials and activities. Distribution methods should be specific to the target audience and format selected. Make a list of all the potential distribution mechanisms for each format (or BMP). For example, a stormwater article can be submitted to the environmental reporters at local newspapers, and to homeowner's association newsletters. Videos can be given out at events, given to teachers, and sent to local nonprofits to show at their monthly meetings.

Co-permittees or other partners (i.e., nonprofit organizations, watershed groups, other government agencies) can share the distribution costs to best use available resources. Many goals or permit requirements are tied to distribution; therefore, municipalities should track distribution of materials and information where possible.

Think about:

- Do you use a variety of distribution mechanisms to reach various audiences?
- What are the potential distribution mechanisms for each document or activity? Have you listed them in the outreach strategy?
- Do you track distribution of materials and events to measure if you have met your goal(s)?
- Are your goals associated with distribution (i.e., number of brochures mailed)?

### ***Measurable Goals***

Measurable goals are described in the Phase II rule as BMP goals that quantify the progress of program implementation and the performance of your BMPs. You can also think of them as ways to evaluate if each BMP has been completed or if the overall program is changing public behavior.

Assess the measurable goals to determine if the permittee is on schedule and whether the measurable goals are being met. The most common technique for evaluation is tracking quantifiable data, such as brochures and videos distributed, people trained, participation in events, volunteer hours, etc. More importantly, more MS4s realize the value of tracking behavior changes in the public—the key to demonstrating that your program is working. For example, you distributed 15,000 household hazardous waste brochures, but how many of the target audience actually read the brochure and how many actually participated in the next household hazardous waste collection day? If you know how much household hazardous waste was collected before and after the brochure was mailed, you might be able to measure the effectiveness of the brochure.

Many MS4s think that they have to conduct an expensive phone survey before their program starts and annual surveys to see if it is working. Although this is one approach, few MS4s have the resources

to conduct so many expensive phone surveys (some of which can cost \$11,000 or more). Many MS4s either conduct phone surveys less frequently (i.e., every 2 to 5 years) or consider other ways to gauge the public's knowledge and if the program is working.

If your program is on a budget, consider conducting a paper-based survey, which usually only has a 30 percent response rate. Also consider convening focus groups, asking local university students in a relevant program or summer interns to conduct a mall or dog park survey, or pass out surveys or quizzes before and after your presentations. Furthermore, as in the example above, if you are trying to solicit more participation from the public to properly dispose of household hazardous waste, participate in a stream cleanup, or pump out their septic tanks every 3 years—try gathering the numbers before and after your documents and events.

Think about:

- Do you have a quantifiable measurable goal for each BMP?
- How do you evaluate the effectiveness of your overall outreach efforts?
- Have you conducted a public awareness survey? Focus group? Paper-based survey? Mall or dog park survey? Before-and-after presentation quizzes?
- Which outreach materials and events have been the most effective in soliciting public involvement and participation? Changing audience behaviors? Increasing general stormwater awareness?
- Have any changes been made to the outreach strategy or materials based on an evaluation of effectiveness?

### ***Final Steps***

Once you have evaluated your public education and outreach and public participation/involvement program, you need to analyze your program for any permit violations and deficiencies. Your evaluation may find that you were not in compliance (a violation) with a specific permit requirement. Program deficiencies might impede the success of your program. They typically include the identification of areas where there are not enough BMPs, the BMPs are not in the right format for the target audience, or the strategy does not provide enough detail on how to implement a BMP.

Assess how your program is working and if your target audience is changing its behavior. That way, you will be able to review your outreach strategy and adjust the development, implementation, or distribution of any BMPs as necessary. Always remember to document these changes in your outreach strategy and annual report.

### ***The WASH Project***



The WASH Project, a regional stormwater quality management program, serves the communities of Boulder, Longmont, Louisville, Erie, Superior, and Boulder County. The WASH Project emphasizes cost-effectiveness by sharing programs and by using common strategies. WASH also calls for the use of existing programs where possible.

WASH contracts with two entities to perform the majority of its public outreach. The Partners for a Clean Environment (PACE) Program provides one-on-one outreach to the businesses with the potential to effect stormwater such as vehicle service facilities, restaurants, landscapers, property managers, auto parts store customers, rental store customers, and municipal operations. This work takes approximately one fourth of the total WASH budget.

The City of Boulder's education program provides the remaining outreach to the residential sector through brochure distribution, Web site maintenance, teacher training, puppet shows, event booths, school programs, storm drain marking, and a speakers' program. A third of the total WASH budget funds the City of Boulder's contract.

This evaluation will look in-depth only into the City of Boulder's contract and the scope of work addressing MCM #1 and #2. The commercial outreach performed by the PACE program will be mentioned where appropriate.

### **Program Management**

WASH has three part-time education specialists and one quarter-time education coordinator. The equivalent of 1.75 full-time employees works on MCM #1 and #2 with a total budget for personnel of \$93,833. This funding represents one-third of the overall WASH budget for MCMs #1 through #6. Eighty-seven percent of the \$93,833 is earmarked for MCM #1 and 13% for MCM #2. Combined, 80% of staff time is spent on public education and 20% of staff time is spent on public participation/involvement. The WASH education staff works solely on MCM #1 and #2 activities. However, they work closely with the County PACE Program, which hosts educational training sessions to meet requirements of MCM #6. Although messages are often the same for NPS pollution prevention, the two programs have different target audiences. WASH also promotes the household hazardous program by listing the phone number in outreach brochures and Web site materials.

### **Outreach Strategy**

Our outreach strategy is listed in the WASH MCM #1 and #2 Scope of Work. We also offer our school programs to the coordinators of the two district high schools' nonstandard MS4 permits. Our goal is to reduce NPS pollution by providing public education and outreach and public participation/involvement programs that increase public awareness of NPS pollution prevention activities and involve the public in volunteer water protection activities. Our message is more generally focused on increasing homeowners' and school-aged children's awareness of pollution prevention behavior. For this reason, WASH education and public involvement/participation activities are geared toward adult and K-12 audiences. WASH takes a watershed approach to water protection because our messages and programs are the same in both the Boulder Creek and St. Vrain watersheds.

WASH partner funding provides for activities outlined in MCM #1 and #2. However, additional funds have been secured from private industry and the state NPS program to support activities not required by the permit. Our responsible parties have implemented the BMPs on time and within the budget.

Each year, WASH looks critically at the activities outlined in MCM #1 and #2 and makes changes as needed. A comprehensive evaluation will occur in 2007, year five of the permit cycle. Each year, we adjust the public outreach strategy in response to the success or failure of a BMP. For example, with low citizen attendance at the annual public meeting (three attendees in one community), we realized the need to involve the public in a different format. We correctly determined that an informative and educational WASH outreach booth at one event in each WASH community would reach a larger public audience. Average public attendance at the outreach booths is 464. In addition, WASH created the [basin.org/wash](http://basin.org/wash) Web site and upgraded this site to be more user friendly in 2005. We created stickers, magnets, door hangers, newspaper inserts and notepads with the Web site information on them. Average monthly Web site hits increased from 52 requests before materials were distributed to 3,857 requests after materials distribution began.

### **Goals and Objectives**

WASH Public Education/Outreach goals and objectives include distribution of outreach materials (brochures, fact sheets, stickers, magnets, etc.), creation of alternative information sources (Web site, print and bus ads, etc.), hosting school-based education programs, coordinating an annual Children's Water Festival, and installing tributary signage throughout the waterway. Public participation/involvement programs include coordinating a storm drain marking program, annual public

meetings (outreach booth at public events), supporting volunteer water monitoring, and a speakers program. Because NPS pollution harms the waters in the Boulder and St. Vrain Creek watersheds, the strategies or activities outlined in the scope of work seek to educate, inform, and involve the public so they can make more responsible water protection decisions and behaviors. Our objectives focus on specific target audiences. Some activities focus on youth audiences, while others (a teacher workshop and a speaker's program) relate to adult audiences.

### **Messages**

One year before to the WASH permit cycle, the City of Boulder distributed a survey as a city utility bill insert. Survey results showed that though most respondents indicated they knew that storm drains lead straight to creeks, most did not realize that daily behaviors such as properly fertilizing lawns and picking up pet waste can affect water quality.

In 2005, we surveyed the 5<sup>th</sup> graders who attended the Children's Water Festival. Before and after test results show that as a result of water festival education activities, 58% of the students learned that stormwater is not treated before it flows to creeks. WASH used survey information from the League of Women Voters Colorado Water Protection Project to help develop content for the award-winning Keep it Clean campaign and associated materials. Messages identify pollutants of concern (motor oil, pet waste, fertilizer) and general awareness (storm drains lead to creeks, daily activities can affect creek health). The messages are the same for different target audiences, but the delivery vehicle differs. Adults receive training or attend presentations, but children participate in school-based educational programs. We encourage all participants to volunteer for creek cleanups, storm drain marking and water quality monitoring activities. Along with each message, we provide tips for what people can do to prevent specific types of pollution. For example, dog waste contains bacteria that can make people and animals sick. Tip: Scoop the Poop. We distribute door hangers in neighborhoods with a storm drain marking program. The door hangers include information on water protection and conservation and list the phone number to call to report a spill. The WASH brochure also explains the importance of reporting spills and lists the spill hotline number.

### **Target Audiences**

We have identified target audiences for outreach and selected the target audiences by age groups and area of interest. Our target audiences include adults (speakers program, volunteer monitoring, storm drain marking, creek clean ups), teachers (school program participation including Children's Water Festival and annual Teacher's Workshop), troop Leaders (EPA Water Drop Patch and community action programs), non formal education providers (after-school programs and nature program providers), and children. We have specific programs for K-3, K-5, and 6-12. Homeowners are also a target audience within MCM #1 and #2. To reach adult audiences, we also offer a speakers program to neighborhood groups, local organizations, and commercial businesses.

Land use groups (e.g., industry, commercial businesses) are not target audiences for MCM #1 and #2, but rather for the PACE program. Within the PACE program, we have identified commercial sectors with the potential to affect stormwater--restaurants, vehicle service stations, municipal operations, facility managers, pressure washers, residential auto mechanics, rental store customers—and have developed outreach materials with BMPs for their activities. The PACE program also reaches out to the landscapers with a certification program that addresses water quality. Evaluation of both the PACE and Education/Public Participation Program is continual, but a formal evaluation will occur in the coming year.

## **Formats**

We have a variety of educational materials, such as brochures for specific audiences (homeowners, do-it-yourself and auto-repair facilities, etc.); door hangers for neighborhoods; Web materials such as fact sheets and printable brochures; newspaper inserts for schools; giveaway materials such as stickers, tattoos, and magnets; and bus and newspaper ads with water protection tips. We also installed 60 signs along roads by creeks throughout the WASH communities. Our educational materials focus on minimizing specific priority pollutants such as pet waste, fertilizers, vehicle maintenance products, trash, construction debris and erosion control, do-it-yourself rental equipment such as power washing and carpet cleaning, and household hazardous waste. All materials explain stormwater issues in terms that each target audience can understand. These materials are available in English and some (the general WASH stormwater brochure and the neighborhood door hanger) are also available in Spanish. The WASH Speakers program, which began in 2005, provided six presentations that reached 138 adults.

WASH hosts an outreach booth in each WASH community at least once each year. The professionally created, interactive booth invites visitors to learn about stormwater pollution. WASH staff members also distribute a survey that invites public questions or comments about their stormwater program. WASH promotes stream cleanups, storm drain stenciling/marketing, and volunteer creek monitoring activities via our school program brochure and through public forums and occasional press releases in local papers. WASH also sponsors a spill report hotline, an informative Web site, and distributes flyers with the spill report number so the public knows why and how to report illicit discharges.

In addition to providing school programs, beginning in 2004, we joined with the local paper to distribute the Get to Know Your H<sub>2</sub>O school newspaper insert, distributed to 1,815 students in 2004 and 2,000 students in 2005.

WASH supports school groups who wish to done-time water quality monitoring. Throughout the year, dozens of school groups participate in water quality monitoring activities. However, the WASH volunteer monitoring or Stream Team program currently consists of only one volunteer group in Boulder. By September 2005, one group in the St. Vrain Watershed is expected to participate.

The Keep it Clean campaign materials such as bus and print ads, tattoos, educational activity sheets, radio PSAs are distributed to increase awareness of NPS issues. Tens of thousands of these materials are distributed each year in the schools program and at outreach events.

WASH also sponsors the Children's Water Festival for an average of 800 participants each year. In 2005, all St. Vrain Valley School District (SVVSD) teachers participated in the Ambassador Program, an expanded six-week program that prepares students for the festival with classroom activities on various water topics. Each year, more than 75% of Boulder Valley School District (BVSD) teachers participate in the Ambassador Program.

## **Distribution Mechanism**

WASH distributes materials at outreach events to adult and public audiences, and we distribute targeted information to children and indirectly to their parents through our schools program. We have a goal of reaching every household in the WASH community with a brochure. Since 2003, WASH has distributed 141,295 general stormwater brochures. To date, three communities have exceeded distribution beyond the household equivalent, and three communities need to meet the 100% distribution goal. Publications are also distributed at county and city facilities, such as recreation centers, utility billing offices, local businesses and through direct mail in each community. The distribution mechanisms are not clearly outlined in the outreach strategy.

### **Measurable goals**

We have measurable goals (host school programs, teacher trainings, etc.) However, they are not all quantifiable (a goal for number of school programs, a number of creek cleanups, etc.). Each year, we determine if we completed all activities outlined in the Scope of Work by comparing the activities completed to the measurable goal. In addition, we look at teacher evaluations of school-based programs and the teacher workshop. Teacher evaluations and word of mouth tell us that the formats are appealing. A public survey would provide more reliable information. We also receive some completed survey forms from the WASH outreach booth. We track distribution of materials at events to measure if we have met our goal(s). Some goals are associated with specific distribution numbers (brochures to 100% of household equivalent, 5% of storm drains marked each year), but some are not (provide school education programs.)

Though WASH has used some evaluation tools, we have room to expand our evaluation program. Focus groups helped to develop the Keep it Clean campaign. The information gained helped guide developers in determining the logo, mascot and message. We also used a before-and-after presentation test at the Children's Water Festival to determine students' knowledge gained through festival activities. We have not conducted a public awareness survey, paper-based survey, or mall or dog park survey.

### **Successes**

The school-based program includes WASH staff presenting NPS programs in schools (annual average of 120 programs serving 4,313 students) and distributing informational materials (brochures, stickers, etc.), the storm drain marking program (average 216 volunteers marking 662 storm drains in WASH communities), enhancement of the BASIN.org/wash Web site, and the WASH outreach booth (average of 464 contacts per outreach event). They have been the most effective in soliciting public involvement and increasing general stormwater awareness.

### **Potential Program Changes**

- We do not have quantifiable information that shows us behavior change. We should use cost effective and efficient evaluation strategies such as focus groups and paper based surveys to determine behavior change.
- We should focus on homeowners who live directly on waterways. Developing a program for the green and landscaping audience (including homeowners) also would be helpful.
- Though WASH has developed a general stormwater pollution prevention brochure in Spanish, additional research could determine if additional materials are needed or additional languages.
- We have measurable goals, but they are not all quantifiable (goal for number of school programs, number of creek cleanups, etc.).

## Testing Education Methods Before Districtwide Launch Pays Off

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#### **Abstract**

Florida is one of the fastest growing states in the nation. The state's rapid growth brings serious water issues, especially considering that the quality of life in Florida is inseparably linked to water resources. Rapid population growth around the Tampa metropolitan area and the changes in development patterns that accompany growth can threaten southwest Florida's water resources if we don't change the ways we live and work. The Southwest Florida Water Management District (SWFWMD) is responsible for managing the water resources and related natural systems of west-central Florida. To address the impacts of rapid growth on water resources, the SWFWMD needs the cooperation and participation of residents and visitors to achieve its mission. Education is key in gaining that cooperation and participation.

In 1999, SWFWMD staff determined that watershed education was the best way to foster a sense of cooperation and stewardship toward local watersheds. SWFWMD selected the Brooker Creek Watershed for a pilot watershed education program. This 39 mi<sup>2</sup> watershed ultimately drains to Tampa Bay, and it contains the last green space in the most densely populated county in Florida. Brooker Creek was chosen for its relatively good water quality despite escalating development pressure. SWFWMD recognized that the public's actions could still make a difference in protecting the watershed. Florida's flat topography, however, presented a challenge to helping residents understand the concept of watersheds. In fact, survey research showed that only 19 percent of watershed residents knew what a watershed was.

With the goal to raise awareness, increase knowledge, and change behavior, the SWFWMD worked with consultant Tetra Tech, Inc. to design and implement the Brooker Creek Pilot Watershed Education Program. Applying social marketing techniques, the SWFWMD used focus groups and surveys to identify audiences, select messages, and design a multipronged approach that included media messaging, direct mail, workshops, special events, a teacher institute, and a grant program. Messages concentrated on simple steps people could take related to landscaping, septic tank maintenance, and water use activities. Results included a 58% increase in watershed awareness and a 72% increase in awareness of Brooker Creek.

SWFWMD has since begun four additional watershed education programs adapting materials and programs developed in the pilot program as indicated by further research. Presenters will discuss the background, techniques, and lessons learned in the pilot program as well as in additional programs. Each attendee at this session will receive a CD containing the materials developed for the pilot program.

### ***Introduction***

In 1999, the Southwest Florida Water Management District (District) recognized the need to develop a coordinated, comprehensive watershed education program to raise watershed awareness and protect water resources in Southwestern Florida. Ultimately, the District hopes to provide watershed education to all regions; however, initial efforts focused on the development and implementation of a pilot program in the Brooker Creek watershed, in northern Pinellas and Hillsborough Counties. The District selected this 39-square-mile watershed, which ultimately drains to Tampa Bay, because it contains the

last green space in the most densely populated county in Florida. Brooker Creek was also chosen for its relatively good water quality despite escalating development pressure. The District recognized that people's actions could still make a difference in protecting the watershed. Florida's flat topography, however, presented a challenge to helping residents understand the concept of watersheds. The District began this pilot project in March 2003.

### ***Pilot Brooker Creek Watershed Education Program***

The Pilot Brooker Creek Watershed Education Program provides watershed-specific information to selected audiences in a variety of ways. Messages include watershed characteristics, watershed protection, and water conservation. The program has two main goals: (1) building awareness of the watershed and water management issues and (2) educating residents and visitors about the origin of the water resources and the need for conservation of water in the environment. Phase I of the pilot project included research, identification of audiences, development of messages and materials, and program implementation. The preliminary research for the pilot program included a public opinion survey, focus groups, and interaction with interested parties in the region. The first step of the education program consisted of researching and analyzing the target audience for the program—watershed residents. The District designed a comprehensive public survey to determine perceptions of watershed issues, common practices related to the areas of concern, behaviors in which watershed residents currently engage, and behaviors that should be the focus of the messages developed for the pilot program. The results of the survey confirmed the need to develop and implement a watershed education program for the Brooker Creek watershed. Only four percent of residents who were surveyed were able to clearly explain what a watershed is, and only 19 percent of residents surveyed knew they live in a watershed.

The information collected through this background research was used to develop a comprehensive watershed education plan for the Brooker Creek Watershed Pilot Program. The plan was developed in September 2003 and finalized in November 2003. The plan laid the foundation for the pilot program and included information on the goals and driving forces; plan objectives; key target audiences and their characteristics; selected messages, formats, and distribution mechanisms for the messages; and evaluation indicators of the education effort.

The overall message that was selected by the District was “Brooker Creek Watershed. My Watershed. My Choice. Our Future.” This message was used to develop a project logo, which was displayed on all materials developed for the project, including the project Web site. From the initial focus groups conducted, the District learned that many citizens are concerned about water resources in their communities and have a great sense of ownership over their water. This sense of ownership was infused into the message through the phrase “My watershed.” That ownership was coupled with the idea of personal responsibility for the quality of water in the watershed and with the idea that the choices made by citizens can and do affect the future of community water resources.

The District selected and developed numerous outreach materials and activities to distribute the watershed message. A comprehensive Web site, <[www.brookercreek.org](http://www.brookercreek.org)>, was developed that contains information about the mission of the District and the Brooker Creek Preserve Environmental Education Center, basic information on watersheds and the impacts that urbanization can have on water resources, the characteristics and challenges facing the Brooker Creek watershed, and what citizens can do to protect their local water resources. It also contains activities for students, a watershed pledge form, and a watershed quiz.

As described in the plan, in the first year of the program, the District concentrated mainly on increasing the general awareness of the watershed concept and how citizens affect watershed resources. However, objectives for providing education and motivating behavior change were also set. For example, to encourage a positive change in behavior, the District developed a watershed pledge similar

to pledges used in other areas of the country such as Whatcom County, Washington. The pledge asks that individuals (and families) commit to adopting several new behaviors that will protect water resources in the Brooker Creek watershed. The watershed pledge includes activities such as having septic tanks inspected regularly and pumped as needed; redirecting downspouts to vegetated areas; leaving grass clippings on the lawn; and other activities that help reduce nonpoint source pollution. The pledge was publicized and distributed through the project Web site, local newspapers, and through area schools.

Because so many in the target audience reported that they read the *St. Petersburg Times* and *Tampa Tribune* much more frequently than other (including community) newspapers, the District developed an educational watershed newspaper insert for distribution through those papers. The insert included sections describing the health of Brooker Creek, the agencies and organizations working to protect the watershed, and what watershed residents can do to improve and protect water resources within the watershed. It also includes an advertisement for the recently opened Brooker Creek Preserve Environmental Education Center, as well as a kids' page. The District printed 47,000 inserts and of those, sent 31,000 to the newspapers for distribution. The remainder of the inserts was distributed through area schools, at special events, and in several public locations.

Other materials developed and distributed included the slideshows, giveaways (tote bags, magnets, mirrors, pens and pencils, micro-irrigation kits), posters and other display materials, and a youth activity packet for school-age children. In addition to the outreach materials, the District conducted a series of educational events as part of Watershed Wonders Week. The goal of the events was to convey the following messages: 1) Everyone lives in a watershed; 2) My watershed is Brooker Creek; and 3) There's still time to protect our watershed.

To accomplish these goals, the District reached out to the community through a school artwork competition, a school field trip to the Brooker Creek Preserve Environmental Education Center, direct mail, mall displays, movie theater messaging, three 30-second television public service announcements (PSAs), print ads, three radio PSAs, a homeowner workshop, and a rain barrel workshop. Two of the watershed TV PSAs were about watersheds in general, whereas the third specifically mentioned the upcoming events of Watershed Wonders Week. The District also ran a newspaper ad publicizing the watershed events in the *Tampa Tribune* and the *St. Petersburg Times* two days prior to the start of Watershed Wonders Week in regional editions that cover the watershed area. An educational watershed ad ran in 20 theaters at the in the area for eight weeks totaling 142,085 impressions.

In addition, the District held a number of parking lot events to educate residents about the Brooker Creek watershed. Two area radio stations—WYUU-FM and WRBQ-FM—promoted the events and were on hand for live broadcasts.

The District also partnered with Pinellas and Hillsborough counties to develop and post 10 watershed signs along frequently used roads in Hillsborough County and 15 signs in Pinellas County. The signs alert drivers that they are entering the Brooker Creek Watershed and mention that the watershed is part of the Greater Tampa Bay Watershed.

### ***Results of the Pilot Program***

To determine effectiveness of the outreach materials and activities undertaken for the pilot project, the District conducted a follow-up phone survey in November 2004. The follow-up survey focused on the respondents' recall of receipt of watershed educational materials and messages through various media mechanisms (radio, television, and newspaper notices) and activities carried out for the project. The survey was also conducted to measure post-project watershed awareness and to assess whether the target audience had heard of or attended any of the events or activities conducted as part of the project.

Final survey statistics show that the effort resulted in a 58 percent increase in watershed awareness. Survey statistics also indicate that before the project began, only 6.7 percent of all survey respondents knew they lived in the Brooker Creek watershed. After the project was implemented, 11.5 percent of all survey respondents knew they lived in the Brooker Creek watershed. That represents a 72 percent increase in awareness of the Brooker Creek watershed. Although that increase is high, both surveys indicate that only about 37 percent of residents, on average, who said they live a watershed, are able to correctly name their watershed.

Of those reporting in the follow-up survey that they had heard of the Brooker Creek watershed, the majority (27.6 percent) of respondents stated that they had heard of it through the newspaper. The second most reported mechanism was the fact that they live near it (21.3 percent), the third most reported mechanism was through family (13.1 percent), and the fourth most reported was television (11.3 percent). In the baseline survey, most respondents reported that they had heard of Brooker Creek because they live near it (42.8 percent). The second most reported mechanism was through family (22 percent), and the third most reported was through the newspaper (8.1 percent). The change in these results shows the impact that publishing watershed messages in the newspaper had on the target audience.

**Table 1. Brokker Creek Pilot Project Costs**

<b>Brooker Creek Pilot Project Costs</b>	
Public surveys, plan development, outreach materials	\$100,000
School outreach, 4-day summer institute, education materials and models for participating schools	\$32,000
TV/radio PSAs (designed to use in subsequent efforts)	\$15,000
Newspaper ads	\$4,000
Special events	\$3,000
Direct mail	\$21,600
Movie screen PSAs	\$3,500
Total	\$179,000

### ***Lessons Learned from Pilot Program***

After our review of the Brooker Creek final report and our experience with program implementation in the watershed, we have identified several lessons learned. They include:

- *Do not try to do too much at once.* We have learned to focus on two or three efforts that are manageable and can be properly implemented and evaluated. This is especially important considering the limited staff and budget available to these projects. In the pilot program, the education plan that we developed included many things that we would like to have done, such as target visitors (primarily winter vacationers/residents), as well as lawn care companies. However, we did not reach these audiences because our materials were not developed specifically for them; we had not been able to conduct the research needed on these audiences to determine which messages and materials would be most effective at reaching them. In the follow-up watersheds, we tried to keep our efforts more manageable by focusing on an awareness phase that offers fewer messages, partnering with existing groups within the watershed to expand outreach, and targeting specific audiences based on follow-up research. We also learned that school outreach is quite effective and should lead outreach efforts rather than follow them.

- *Isolated public events are not cost-effective.* Although we placed a fairly heavy emphasis on publicizing our targeted “parking lot” events and those who attended those events were largely those who were not knowledgeable about watersheds, the turnout did not justify the expense and staff time. In the follow-up watershed efforts, we changed our tactic by piggybacking onto existing special events, creating more targeted presentations in the community, and holding watershed leadership workshops.
- *The need for partners is substantial.* In the Brooker Creek pilot, partners were limited and it left much of the effort to a small staff at the District and the Brooker Creek Preserve Environmental Education Center. Our effort was timed to happen concurrently with the opening of this new education center. However, this timing meant that the critical staff members involved in both projects were overwhelmed, which probably detracted from the overall effectiveness of both efforts. In follow-up watershed efforts, we have made partnerships a top priority, coordinating the creation of a consortium of watershed stakeholders to share research, expand audiences, and compound results.
- *Take a closer look at existing efforts that can be piggybacked.* This year, in the Brooker Creek watershed, we have been able to enhance our efforts by focusing on the expansion of existing programs such as Adopt-A-Pond, Florida Yards & Neighborhoods, and outreach at the Brooker Creek Preserve Environmental Education Center.
- *Place more emphasis on awareness and education at the outset versus behavior change.* When we first set out to undertake the pilot program, we had lofty goals in mind of changing behaviors throughout the watershed. However, as the effort moved forward, we quickly learned that the first change that needed to take place was a change in awareness. We needed to inform watershed residents what a watershed is and how it is important in the environment. As the program has moved forward we have been able to slowly change our focus toward actions and behavior changes. For example, in Phase II of the Brooker Creek program, the District is partnering with septic tank companies to provide reminders and incentives for owners to inspect their systems periodically as appropriate. In addition, a series of watershed leadership workshops targeting homeowners associations are planned. We have also altered our cooperative funding (50-50 match) criteria to give preference to projects that use research and target behavior change.

## ***Moving from Lessons Learned to Next Steps***

### **Brooker Creek Watershed**

During the initial research for the Brooker Creek pilot program, the District learned that one-third of the residents surveyed reported having a septic system. Forty percent of these septic system owners do not use inspections to regularly monitor the condition of their septic systems. Most of these residents state that they do not have them inspected because they do not see the need for the inspections or because of the cost involved in doing so. This lack of understanding of the environmental impacts of failing systems, as well as the cost of inspections, are both barriers to behavior change. As mentioned previously, Phase II of the Brooker Creek Watershed Education Program will target septic tank owners in the watershed.

In addition to targeting septic systems owners, the District will also target landscape management companies. Forty-three percent of watershed residents who report having a lawn use a lawn service for some or all of their yard maintenance. Because nearly half of the residents use lawn services, it will be important to develop educational materials targeting lawn services or to partner with such companies to encourage water-friendly lawn maintenance. The District is part of the Landscape Education Coordination Initiative, which includes the University of Florida’s Institute of Food and Agricultural

Science and the Florida Nursery Growers and Landscapes Association (FNGLA), which strives to provide consistent messages throughout the green industry and to the public. As part of this coordination, the District's input was used in a recent revision to landscape certification programs. In addition, the District conducted a focus group with the Pinellas County chapter of the FNGLA. This input guided us to help create a public demand for certified professionals. Starting in October 2006, the District will launch a yearlong media messaging campaign promoting "Florida-Friendly Yards—Grow Smart" (environmentally friendly landscaping). This campaign will include radio and print ads, written materials, Florida Yards & Neighborhoods outreach, a "design-your-own-yard" Web site and an extreme makeover-type promotion that will retrofit the winner's yard from traditional to Florida-friendly.

As a result of the lessons learned during the pilot program for Brooker Creek, the District has begun moving forward with repeating the new watershed education program in four additional watersheds that fall with the District's Comprehensive Watershed Management (CWM) Program---Peace River, Lemon Bay, Hillsborough River, and Crystal River/King's Bay. Future educational efforts will be developed for the six remaining watersheds in the District (Myakka River, Manatee River, Little Manatee River, Alafia River, Withlacoochee River, and Lake Wales Ridge).

### **Lemon Bay Watershed**

The Lemon Bay Aquatic Preserve, located in Charlotte and Sarasota Counties, consists of approximately 7,667 acres of pristine submerged lands surrounded by a rapidly urbanizing basin. There are several driving forces that are contributing to the need for a watershed education program in the Lemon Bay Watershed. The future health of the estuary depends upon an educated public that is concerned and involved in supporting decisions to retain and/or improve its biological values and functions. The water quality in the bay has been steadily impacted by stormwater runoff. In the past, agriculture played a role in the stormwater issue. However, in recent years, new residential development is increasing in the watershed. Urban development is becoming a driving force within the Lemon Bay watershed. This development pressure is placing a strain on water supplies, flood protection, water quality, and natural systems. The Charlotte Harbor Environmental Center (CHEC) has brought together a group of watershed education providers for the purpose of program coordination and consensus in future educational efforts. So far, CHEC has conducted a series of watershed workshops and focus groups with local governments, organizations, and educators to determine what is already being done and what is needed. The end result for phase one of this effort is a plan for continued watershed education that includes recommendations for specific messages and targeted audiences.

### **Hillsborough River Watershed**

The Hillsborough River traverses three distinctive zones of use from its origins in the headwaters of Green Swamp to its final destination in Tampa Bay. It flows in a southwesterly direction for 54 miles through forest, farms, suburban residential neighborhoods, and the high-rise commercial district of downtown Tampa. This important natural resource drains approximately 690 square miles and sends an average of 212 million gallons of fresh water into Tampa Bay each day. Care of the Hillsborough River watershed is crucial to the economic and environmental health of the Tampa Bay area. The watershed is currently served by education efforts from a variety of sources. The Tampa Mayor's Beautification Program (MBP) is undertaking the development of a plan for watershed education. Goals include the development of a coalition of agencies, non-profit organizations, businesses, and individuals that have a stake in the health of the watershed; determination of the level of public knowledge; determination of the most appropriate audiences; and the development of a watershed education plan. In addition to partnering with the MBP, the District will be partnering with the Hillsborough River Greenways Task Force for future implementation. The task force is made up of a several key organizations that have an interest in watershed health.

### **King's Bay/Crystal River Watershed**

Similar to many Florida springs, nitrates in Crystal River/King's Bay have increased with development of the surrounding lands. Primarily, changes in land use, from natural to commercial and residential development, have increased nitrates in the bay's springs through leaching of inorganic fertilizers into the Upper Floridan aquifer. The District is implementing an aggressive education campaign designed to provide information and incentives to encourage positive changes in landscaping practices for homeowners, recreation, landscape design and maintenance professionals, landscape material retailers, builders/developers, real estate professionals, septic tank maintenance professionals, and the marina industry. The campaign goal is to minimize further water quality impacts. As opposed to the Brooker Creek watershed, King's Bay/Crystal River watershed is a smaller geographic location with only 7,000 households. The smaller size of the watershed allowed us to concentrate on only one goal---minimizing further water quality degradation in the springs; only one slogan---"Know where it flows"; and on only two applications---fertilizer use and septic tank maintenance. It also allowed us to expand radio and print media advertising and devote a temporary staff person to do the outreach.

***The two-year education program for the watershed has three main components:***

- 1) Research: Creation of the public education campaign is based on research from a focus group conducted earlier this year, combined with previous research.
- 2) Campaign Design and Implementation: A marketing firm was selected to design and implement the campaign components that include radio, newspaper ads, a tabloid, television weather station ad, direct mail, and billboards. The theme of the campaign will be "Know Where It Flows." The campaign will begin in the fall of 2005 and continue for a year.
- 3) Education and Outreach: This component will involve presentations and educational workshops on water quality issues of the area. A local educator will work under contract to the District to provide the education outreach to the general public and targeted audiences. From the pilot project, we learned that having a local educator on board to spearhead the outreach effort is critical to its success.

For each of the follow-up watershed education projects, the District is in the research phase to determine which materials and activities can be used/modified from the Brooker Creek pilot and what new components will need to be developed. In the Hillsborough River and Peace River watersheds, the District is conducting pre-project public surveys based on the survey conducted for Brooker Creek. In the Hillsborough River watershed, the District is partnering with the Tampa Mayor's Beautification Program to conduct a small, informal survey that is circulated among a variety of people. In the Peace River watershed, a large 600-response telephone survey is being conducted across four counties. These research efforts will help the district better understand and target the audiences that need to be reached in these watersheds. Based on preliminary data received from early focus groups, landscapers and septic system owners seem to stand out as target audiences. This finding is similar to Phase II of the Brooker Creek program, in which education is needed and could have the most impact on watershed quality. In the Peace River watershed, there is a strong agricultural component and the District will also be focusing on that population.

## Teaming up to Tackle Program Evaluation for Stormwater Education Programs

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### Abstract

For more than ten years, the City of Portland Environmental Services has provided free science-education programs for classrooms and community groups within the City of Portland, Oregon. These hands-on classroom and field programs teach students about the causes and effects of water pollution and what individuals can do to protect rivers and streams. Stormwater education is a major focus of the Clean Rivers Education Program.

Historically, the Clean Rivers Education staff has collected data on program *outputs*: numbers of students, schools, lessons/field trips, participating teachers, etc. Teacher satisfaction surveys have also been conducted to gain insight and provide feedback for education staff. Until recently, no major program impact assessment has been conducted to measure students' attitudes, knowledge and awareness gain about watershed and stormwater issues, or intention to take action to protect rivers and streams after participating in Clean Rivers Education programs.

With limited time and staff resources, the Clean Rivers Education Program sought a partnership to accomplish such a program assessment. In the fall of 2004, a partnership was formed between Environmental Services and Portland State University's Center for Science Education. The Center for Science Education (CSE) offers expertise in the area of science education research that Environmental Services is unable to duplicate internally. Environmental Services, by sponsoring a graduate student research internship, provides CSE an opportunity to conduct authentic research in the classroom and train future teachers in best learning methods for science-education. This presentation will cover how to establish evaluation partnerships, strategies and techniques for conducting nonformal program impact assessments for K-12 students that focus on stormwater, as well as unique challenges to evaluating nonformal education programs. NOTE: as of the conference deadline, this project is in year two and will be completed in the summer of 2006. Therefore, results of the evaluation will not be addressed.

### ***Introduction***

The Clean Rivers Education Program has reached more than 16,000 Portland youth annually for more than 12 years offering classroom lessons, field study experiences, assembly programs, teacher workshops, and community events. Individual feedback and past teacher satisfaction surveys have shown that the program is well respected and sought after by area teachers and by community organizations. Each year, more teachers request programs than the education staff can serve.

While the program has enjoyed continued success over time, there has never been an outcome-based evaluation conducted to determine if the Clean Rivers Education Program objectives are being met. Questions remain, such as: Are students learning the clean-river concepts we set out to teach? And, are there areas of improvement for our programs? We face a common predicament among other stormwater education outreach programs. We *need* to evaluate our programs, we *want* to evaluate, but we are limited in time and staff resources.

### ***Why not use community expertise?***

After looking at a host of options, including hiring an outside professional evaluator, hiring an intern through the agency's intern program, or hiring a temporary part-time employee, the Clean Rivers Education program chose yet another option: to support a graduate research assistant through a local university. Portland State University Center for Science Education's (CSE) mission is to enhance science teaching and learning through innovative education, research, and community outreach programs. The center offers a Master's in Science Teaching program and has valuable experience in science education assessment. Environmental Services' Clean Rivers Education program chose to support a graduate student from the Center for Science Education to conduct the evaluation because of the unique partnership potential.

### ***A Symbiotic Relationship***

In this evaluation partnership, both organizations have elements to offer. Clean Rivers Education offers a structured, authentic research opportunity for a masters student; professional development opportunities in nonformal science education; financial support for the graduate research assistantship; and as an agency, Environmental Services is investing in community partnerships, in this case with a local higher education institution.

Portland State University's Center for Science Education offers financial match for the graduate assistantship; a self-motivated 'employee' – a graduate student with academic interests in program evaluation; faculty supervision and expertise; a high quality product that also serves as the graduate student's masters thesis; plus other university resources such as other faculty expertise (e.g. statistics) and university library resources.

There are a few challenges with this type of partnership, although the benefits outweigh them. There is a learning curve for the graduate assistant, as she did not have prior program evaluation experience. The evaluation process might have been faster had a professional evaluator been hired, but it would have been more costly and the professional development aspect for the student would be lacking. There also have been some additional administrative processes involved with this partnership. Because CSE has a goal of publishing the results in a peer-reviewed journal, a Human Subjects Review by both the University and the school district's Internal Review Boards had to be completed. Also, the interagency agreement and contract was a lengthy process.

### ***The Clean Rivers Education Assessment Project***

Assessing a nonformal science education program is quite different than an evaluation for a formal classroom setting. Clean Rivers Education works with approximately 80 schools per year, makes more than 16,000 student contacts, offers ten classroom lessons, a variety of field study experiences, and accomplishes this with only two education staff.

There is also a variety of ways in which teachers work with the Clean Rivers Education Program. Some teachers plan a yearlong study and request numerous classroom lessons and several field trips. Other teachers request a single lesson. While there is a basic menu of program options, by design, the Clean Rivers Education program is not one-size fits all. Clean Rivers Education staff work with participating teachers to develop a plan that fits teachers' curriculum needs.

Because of the wide variety in program offerings, it was crucial to answer some key questions to develop the evaluation plan. It was helpful to have the outside perspective of the graduate student and faculty advisor during this process to ask follow-up questions and request clarification:

- What is the purpose of our evaluation? (WHY are we evaluating in the first place?)
- What are we going to evaluate? (Classroom lessons? Which ones? Field programs? Which grades? Which schools? How many students? etc.)
- How will the results be used?
- What have other organizations done?

Based on the answers to the above questions, we chose to focus on lessons that have a stormwater focus. Three lessons, *Watershed Awareness*, *It's an Overflow (CSOs)* and *Soak it Up* were selected. The grades most appropriate for the lesson material were identified (6<sup>th</sup>-10<sup>th</sup>). It was also decided that teachers that have requested our programs would be a part of the study (i.e. we would not cold-call teachers and ask to present lessons so that we may evaluate them.) It was also a goal to include schools representing diverse geographic areas of the city and schools that represent diverse student populations.

### ***Prep Work: Creating a Logic Model***

Before the graduate student evaluator could get started on the research design, Clean Rivers Education had to do some homework. After answering some hard questions as part of the evaluation plan, a logic model was created for each lesson. The following categories were included in each logic model:

- Educational Purpose
- Educational Tools
- Delivery Strategies
- Short-Term Learning Outcomes - What students should know or be able to do after the lesson presentation. These outcomes represent awareness, knowledge, and knowledge of action skills.
- Intermediate and long-term outcomes. These outcomes represent taking action/ behavior changes. (We recognize that long-term behavior change is not applicable to assess in the research design for this project.)

**Table 1. Example of Clean Rivers Education Logic Model – Soak it Up lesson**

<b>Stormwater Soak it Up</b>	
<b>Educational Purpose</b>	Discover how polluted stormwater affects rivers and streams. Calculate impervious surface and use green stormwater solutions to redesign a neighborhood. (Math application lesson.)
<b>Educational Tools</b>	Model neighborhood maps, stormwater solutions photo boards, aerial maps, auto pollutant jars.
<b>Audiences</b>	Portland students, grades 5/6-12
<b>Delivery Strategies</b>	Cross-disciplinary classroom lesson. Option of follow-up: stormwater solution field tour, storm drain curb marking, other stewardship projects.
<b>Past Program numbers (2003-2004)</b>	890 students
<b>Short Term Learning Outcomes:</b>  What students should know or be able to do after the lesson.  knowledge and awareness, including knowledge of skills.	<b>Primary outcomes:</b> <ul style="list-style-type: none"> <li>• Identify at least 3 stormwater pollutants and their sources.</li> <li>• Distinguish between pervious and impervious surfaces.</li> <li>• Describe at least 4 sustainable stormwater management facility types (bioswales, ecoroofs, porous pavement, etc.) and the appropriate onsite location (parking lot, rooftop, etc.)</li> <li>• Discuss the role of sustainable stormwater solutions and stormwater pollution prevention in addressing water quality issues. (Why is stormwater pollution prevention important and how do these stormwater facilities improve our river water quality?)</li> <li>• Identify 4 actions that individuals can take to prevent stormwater pollution. (BMPs)</li> </ul>
<b>Intermediate and Long term outcomes</b>  taking <i>action</i> .	<b>Intermediate:</b> Students (and their families) take individual action to prevent and solve water pollution problems. (implement appropriate BMPs)  <b>Longer term:</b> Continue to take individual action (above) and as taxpayers, support City policies and projects regarding stormwater pollution prevention. ( <b>Not applicable to assess in this project.</b> )

***Research Design - Evaluation Tools***

Much time was spent developing the research design. The quality of data gathered, hence the quality of analysis and results is dependent on a well thought-out research design. Our design consists of pre/post questionnaires disseminated one week before and one week after the lesson presentation. Multiple-choice, fill in the blank, and open-ended questions were used for knowledge and awareness measures. A five-level Likert scale format was used for measures of attitudes and intention to act. A goal of 300-400 completed pre/post tests for each lesson was established.

Thought was put into the design and layout of the pre/post questionnaires. A graphic designer from environmental services formatted the tests in attempt to make them look less ‘test-like’ and to make it easier for the graduate student to score them. Different colors of paper and graphic icons on the first page differentiate each lesson for quick reference.

One month after the presentation, brief individual interviews will be conducted with a small percentage of participating students (approx. 5% of study participants). Interviews will be conducted to gain insight into pre/post questionnaire answers and to follow up on possible behavior change/actions taken by students.

The research design also includes a teacher pre/post questionnaire. The goal of the pre-questionnaire is to find out what else the teacher is doing to address water quality and stormwater pollution prevention (other presenters, projects, etc.); the teacher's perception of student interest in water quality issues; and the teacher's intention to teach about water quality after the presentation. The pre-questionnaire also serves as a mini needs-assessment and asks teachers if there are other topics they would like to see developed and incorporated into the Clean Rivers Education program. The post-questionnaire is a satisfaction survey to determine the effectiveness of presentation methods and style.



WATERSHED AWARENESS

## PRE - QUESTIONNAIRE

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Gender:  Male  Female Age: \_\_\_\_\_

Grade: \_\_\_\_\_ Teacher's Name: \_\_\_\_\_

**PART 1:** Please answer the following questions by circling the best answer.

1. Have you been to Outdoor School?  YES  NO
2. Do you remember any guest speakers in the past who have spoken to you about water quality?  YES  NO  
If you answered yes, what do you remember? \_\_\_\_\_
3. Do you recycle at home?  YES  NO
4. Did you volunteer in the past year to help the environment?  YES  NO  
What have you done? \_\_\_\_\_
5. Where do you get most of your information about the environment? (check ONLY ONE)  
 Parents  Teachers  Friends  
 Newspaper  Internet  Television  
 Books  Other (identify): \_\_\_\_\_

**PART 2:** Please answer the following questions as best you can. If you don't know the answers, just mark "I don't know."

6. What is a watershed?
  - a. A shed with water in it.
  - b. An area of land where all the water drains to the same place.
  - c. Bodies of water like a lake or river.
  - d. I don't know.
7. What watershed is your school located in?
  - a. Columbia Slough
  - b. Balch Creek
  - c. Tryon Creek
  - d. Fanno Creek
  - e. Johnson Creek
  - f. Willamette River
  - g. I don't know.

### ***Research Design - Analysis***

Questionnaires will be scored based on a key developed jointly by the graduate student evaluator and Clean Rivers Education staff. Common themes will be identified in open-ended answers. SPSS statistical software will be used to run statistical analysis.

### ***Pilot-Testing***

During spring of 2005, pre/post questionnaires were pilot tested with approximately 200 students. The pilot-test process illuminated minor flaws in the questionnaires, including unclear questions, questions that were similar enough to others that observant students could read one question and find in it answers to another question. Changes were made to the questionnaires based on this information gained in the pilot test process. The pilot-tests were also used to develop a scoring key.

### ***Implementation and Analysis***

The pre/post questionnaires will be disseminated and interviews conducted in fall 2005 and winter 2006. Analysis and reporting will take place in spring/summer of 2006.

### ***Project Timeline***

Below is a table showing a general timeline and roles for the project:

**Table 2. Timeline Year 1**

<b>Clean Rivers Education</b>	<b>Graduate Student Evaluator</b>
<ul style="list-style-type: none"> <li>• Established partnership with PSU</li> <li>• Created logic model; refined learning outcomes</li> <li>• Collaborated on research design and development</li> <li>• Served as liaison between teachers and evaluator</li> <li>• Supervised graduate student</li> </ul>	<ul style="list-style-type: none"> <li>• Observed all Clean Rivers Education lessons</li> <li>• Researched other nonformal program evaluation projects</li> <li>• Developed research methods and tools</li> <li>• Pilot-tested questionnaires</li> <li>• Developed scoring guide</li> </ul>

**Table 3. Timeline Year 2**

<b>Clean Rivers Education</b>	<b>Graduate Student Evaluator</b>
<ul style="list-style-type: none"> <li>• Notify teachers of project during scheduling;</li> <li>• Serve as liaison between teachers and evaluator</li> <li>• Supervise graduate student</li> <li>• Manage contract with PSU</li> <li>• Troubleshoot</li> </ul>	<ul style="list-style-type: none"> <li>• Send out teacher packets; permission forms</li> <li>• Administer pre/post tests, interviews</li> <li>• Enter and analyze data</li> <li>• Report findings / masters thesis</li> </ul>

### ***Conclusion - Some Advice***

This project is still underway. There are, no doubt, more hurdles to jump and pitfalls to avoid before completion. However, we can offer the following advice to others looking to embark upon an evaluation project:

- Allocate the **time and resources** – you might have to convince other decision makers the need for your evaluation project.
- Seek out a **partnership** where appropriate and available. Look into local universities, community colleges, and non-profit organizations. They are often looking for authentic projects for their students/members.
- Answer **key evaluation questions**: What is the purpose of the evaluation? What are you going to evaluate? How will the results be used? What have other organizations done and what can you learn from them?
- Take the time to create a **logic model** for your program. You might think you already know your program inside and out, but organizing it in the format of a logic model helps with the evaluation research design / tools, as well as helps you answer the key evaluation questions.
- **Don't reinvent the wheel.** Find out how other organizations have accomplished program evaluation. Learn from their mistakes.
- **Start small and focus.** You may not be able to evaluate *all* aspects of your program at once.
- The **research design** will determine the quality of the data gathered and ultimately your results. Determine the best way to gather data based on your timeline and resources.
- **Pilot test, pilot test, pilot test.**
- **Share** your information—both results and process. We all can learn from each other.

## Evaluating Landscape Education Programs: Examples from Florida, Texas and Pennsylvania

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#### **Abstract**

Homeowner landscape practices are increasingly targeted by stormwater and nonpoint source pollution education programs. Adequately measuring the environmental impacts of these educational programs in a relatively short time frame is challenging. Three landscape educational programs associated with EPA's Lawns and the Environment Initiative are presented. Florida Yards & Neighborhoods, a statewide educational program implemented through University of Florida/IFAS Extension, has used as its main evaluation tool pre- and post-program surveys to measure changes in adoption of environmentally sound landscape practices. Early surveys demonstrated that participants receiving more intensive training (individual consultations) adopted the most practices, and those attending an educational seminar adopted more practices than those receiving publications only. More recent results from nine counties indicate significant differences in adoption for all categories of landscape practices from the pre- to the post-program survey. However, correlating those behavioral changes with changes in environmental conditions has not yet been possible.

The San Antonio Lawns and Environment Model and the EPA Region III Healthy Yards, Healthy Lawns, Healthy Environment campaign have taken the evaluation of landscape education programs to a much needed next step. In the first, a program of the San Antonio Water System, measurements of runoff events, water use, landscape waste use and changes in habitat are being compared in three sets of paired neighborhoods with similar economic and social characteristics following intensive contact by trained volunteers in the target neighborhoods and no education in the control neighborhoods. In the second, neighborhood stormwater retention ponds are being monitored following dissemination of outreach materials on responsible lawn care and landscaping, with comparison to a control neighborhood having a comparable pond but not receiving outreach. Water is being monitored quarterly for both a nutrient panel (including total direct nitrogen, phosphorus and chlorophyll A) and a pesticide panel. Although results are not yet available for these demonstrational studies, the approach can serve as a model and discussion point for directly evaluating the environmental impacts of landscape education programs.

### **Introduction**

Homeowner landscape practices are increasingly targeted by stormwater and nonpoint source pollution education programs because we know that homeowners and the landscape maintenance companies they hire are often applying large amounts of fertilizers and pesticides and are not always aware of the

environmental effects of inappropriate use of lawn and landscape inputs. We know the water quality issues resulting from nonpoint source pollution in stormwater runoff. But what we do not know as readily is how to measure the environmental changes that result from behavioral changes in landscape practices that in turn result from educational programs, how to separate out the many factors that could potentially be involved, and how to complete an adequate evaluation within the time frame desired by funding agencies. This paper will describe what some example programs are doing to address some of these issues.

Two of the three programs highlighted here have developed demonstration projects for the Lawns and the Environment Initiative, a national EPA-supported partnership to improve water quality through changes in landscape practices. This group of industry organizations, environmental groups, and government agencies promotes responsible lawn care and landscaping that is environmentally sound, economically viable, and socially responsible. A set of guidelines was developed to relay the educational message, and partner cities were sought for public education demonstration projects. EPA and the Lawns and Environment Initiative have recognized three programs, on different scales, as models for sustainable landscaping education and evaluation. Two of these, the San Antonio Lawns and Environment Model and the Healthy Yards, Healthy Lawns, Healthy Environment campaign, are in the process of evaluating actual environmental impacts of the landscape educational programs. The third, Florida Yards & Neighborhoods, has focused on survey data and yard evaluations to document practice changes.

### ***Florida: Florida Yards & Neighborhoods***

Florida Yards & Neighborhoods (FYN) is an educational program implemented by the University of Florida/IFAS Extension in partnership with federal, state, and local agencies. It works to protect natural resources by helping stakeholders create and maintain landscapes with minimum impact on the environment. The program was begun by the Sarasota Bay and Tampa Bay National Estuary Programs in cooperation with the University of Florida to reduce pollution in stormwater runoff from landscaping in the Sarasota Bay and Tampa Bay region. More than ten years later, it is now active in 43 of Florida's 67 counties.

While the program continues to focus on water quality protection and water conservation, it does so in a holistic way that creates overall environmentally sustainable landscapes—providing wildlife habitat and reducing the threat of invasive plants to urbanized and natural areas. To achieve greater acceptance and adoption of the recommended practices, the program emphasizes to homeowners and professional audiences how they can beautify landscapes while saving time, money, and energy, therefore benefiting both themselves and the environment.

FYN programming is based in nine principles for Florida-friendly landscaping:

- Right plant, right place
- Water efficiently
- Fertilize appropriately
- Mulch
- Attract wildlife
- Manage yard pests responsibly, using IPM
- Recycle yard waste
- Reduce stormwater runoff
- Protect the waterfront

In addition to the resources of UF/IFAS, the program has been strongly funded by EPA Section 319 grants through the Florida Dept of Environmental Protection, as well as Florida's water management districts, utilities, and county and city planning, stormwater and environmental resources departments,

many of which are recipients of NDPES stormwater permits. Additional partners include the National Estuary Program, the Florida Department of Agriculture and the Florida Department of Transportation. The program has also worked with school districts, the Green Industry, and non-governmental environmental organizations.

Early survey data measured adoption of recommended practices by program participants and non-participants and compared the effectiveness of different delivery methods (Israel et al. 1999). Results confirmed that relying only on publications to deliver information to homeowners was less effective than combining either educational seminars or intensive training with appropriate publications. Intensive training such as that received by Master Gardeners was the most effective. Delivery of the educational message has therefore focused on workshops and seminars, with accompanying educational materials. Kiosks, displays, and promotional materials have also been used to supplement the primary delivery mechanism of FYN workshops. Training and involvement of Master Gardeners, a recognition program for Florida-friendly yards, and demonstration gardens have also played important roles in delivering the overall FYN message. While the program largely targets homeowners, it is increasingly reaching out to landscape professionals and builders and developers.

Evaluation of FYN has focused on surveys of practice adoption, with the initial survey given to participants at the start of a workshop or other program. Post-program surveys are mailed to participants six months later for comparison, with correspondence to non-respondents. Recent survey results covered nine counties with 1,789 respondents. The surveys questioned homeowners about 32 practices taught by the FYN program. Nearly all practices showed a mean increase in adoption from the pre to post surveys (Table 1).

Table 1. FYN practice adoption from pre- and post-program surveys in 9 counties, 1999-2004.

<b>FYN-Taught Practice</b>	<b>% increase from pre to post survey</b>	<b>% using practice at post survey</b>
Slow release fertilizer used	20%	88%
N applied $\leq$ 1 lb./1000 ft. <sup>2</sup> per application	29%	64%
Iron sulfate used to green lawns in summer	34%	49%
Clippings left on lawn	9%	91%
Routinely check for pests	17%	86%
Apply controls only when pest problem is confirmed	17%	90%
Spot treat infested areas only	19%	85%
Avoid practices that encourage pests (i.e., mowing too low, excessive watering or fertilizing, improper pruning)	20%	90%
Use reduced-risk products	18%	77%
Water plant beds separately from lawn	28%	77%
Apply $\frac{1}{2}$ to $\frac{3}{4}$ inch water per irrigation	25%	77%
Adjust watering according to rainfall and season	9%	95%
Downspouts drain onto lawn/beds	14%	77%
Porous surfaces used	16%	71%
Collect rainfall for irrigation	29%	43%
Low areas filter stormwater	24%	62%
No-fertilizer, no-pesticide zone along shoreline/seawall	2%	17%

Many of the practices showed high adoption even before exposure to the FYN message. Even so, paired t-test results indicated that FYN participants made significant increases in the use of practices in all four main areas surveyed (fertilization practices, pest management practices, irrigation practices, and design practices), as well as on the overall index (Israel and Knox, unpublished data). These surveys have the disadvantages associated with a self-reporting instrument, and they tell us about practice changes, not about how those practice changes affect the environment. However, they can be useful in determining which practices already have a relatively higher adoption level and which areas need more attention.

In the past, FYN has also attempted to measure the effectiveness of the educational programming by comparing water samples from neighborhoods receiving the educational message with control neighborhoods. In one case, a partnership was formed with the St. Johns River Water Management District Watershed Action Volunteers (WAV) and in another attempt with the Lakewatch Volunteer monitoring program. In the WAV project, volunteers in six counties in Northeast Florida sampled stormwater retention ponds in their neighborhoods both before and after educational programming, and water quality improvement was used as a measure of the success of the educational programming. After significant rainfall events, samples from pond outlets were analyzed for nitrates and phosphates with a portable spectrophotometer. Unfortunately, sufficient data was not able to be collected because of drought conditions throughout the study period and a lack of interest from the homeowners in the selected neighborhoods. The sampling was then expanded to include more neighborhoods, and results showed that the highest nutrient concentrations were found in samples from neighborhoods with lush, well-manicured lawns and the lowest concentrations from samples where undeveloped areas were within or adjacent to the study neighborhoods.

In over a decade of educating Floridians about sustainable landscaping practices, there are several things we have learned from the program:

- Participants want to follow recommended landscaping practices and are willing to change behavior if it is relatively easy.
- Many participants in the program already follow many of the recommended practices, and we need to find better ways to reach people who are not already aware.
- Integrating the program into Master Gardener activities for those that choose to participate as Yard Advisors helps ensure greater support at the county level.
- Partnerships and collaboration with organizations with common educational objectives are essential. For example, Florida's two largest water management districts now view FYN as the delivery mechanism for the common message of environmentally sound landscaping, simultaneously marketed as Florida-friendly landscaping. By working together with them to develop a common educational message, their multimedia campaigns reinforce what our extension agents are doing on a more individual basis.
- It is difficult to reach one audience, such as homeowners, without simultaneously teaching related audiences like landscape maintenance companies and all the professionals involved in landscaping decisions, including builders and developers. Particularly with new construction, if we fail to get in on the ground floor we are missing key opportunities. Working with developers at the planning stage is most effective.

FYN has been functioning on a regional level since 1994 and at a statewide level since 1998, and we have also learned some lessons about funding the program. Counties that are given three or more years of program funding have been more likely to develop their own funding sources and continue the program. However, there is a need to balance funding for county programs with needs of statewide activities to support those local programs with grant administration and materials development. Local funding is easier to come by than funding for statewide activities and has increased as the Florida

Department of Environmental Protection (FDEP) has encouraged holders of NPDES permits to support FYN to fulfill the permit's educational requirements.

What we have learned specifically about evaluating the program is that many participants report already following many of the recommended practices. Some of that could be related to the self-reporting nature of the surveys, but we need to find better ways to reach those who are not already aware of the educational message. In addition, the pre- and post-program surveys have shown differing adoption levels for many of the practices, so they are useful in determining where to focus program resources. Individual yard evaluations, while time consuming, are useful for both recognition purposes (providing incentives for participants and role models for their neighbors to help change community norms) and to more accurately assess practice adoption. Finally, we need more research to make the connection between the behavioral changes and environmental changes. Once that connection is made more strongly, we could then focus on demonstrating behavioral changes. For example, current research at the University of Florida is being conducted to measure runoff from turf areas receiving different fertilization and irrigation regimes, to confirm the BMPs being taught. If we know how much nitrogen in runoff can be reduced by applying recommended fertilizer rates and we can measure how many people begin to apply no more than those recommended rates, we should be able to calculate the overall reduction in nitrogen in stormwater runoff at a larger scale. Such research is site-specific, and there are a large number of gaps that need to be filled. While those results are not as desirable as demonstration of direct environmental impact, it may provide an intermediary solution.

Some of the challenges we have encountered are the need for greater research to support all of the program's recommendations, the difficulty in reaching many audiences simultaneously with limited funding, and the difficulty in measuring environmental impacts. Starting with the survey data we have, we need to evaluate in more depth which practices are being adopted more readily and what the barriers to adoption are, to make the program more effective. In addition, being able to measure the actual environmental impacts of our program is vital to its future. There are numerous sources of water quality data already available in Florida from agencies that regularly monitor water bodies. Once funding can be secured, we would like to try to correlate the available data with survey results and with information we have from our yard recognition program. Given the many complexities involved, that may prove to be very difficult, but using already existing water quality data would keep the cost down. An alternative is to correlate specific behavioral changes with environmental impacts and continue to collect data on behavioral changes, as discussed previously. Another area we plan to explore once funding for evaluation is secured is a direct comparison of the runoff from Florida-friendly landscapes with traditional landscapes, using sites with new development. A previous attempt to compare runoff from these two types of landscapes in a controlled experiment at the Fort Lauderdale Research and Education Center experienced only one minor runoff event during the 12 month study period, with insignificant nitrogen losses from both treatments.

### ***Texas: San Antonio Lawns and Environment Model***

One program that is already measuring tangible environmental impacts is the San Antonio Lawns and Environment Model of the San Antonio Water System. A demonstration project is being conducted to determine if environmental quality can be improved by teaching about the guidelines for environmentally sound landscaping developed by the Lawns and Environment Initiative, of which the San Antonio Water System is a member. The demonstration project was organized last March as a three year experiment that will cost approximately \$1,000,000, including volunteer services, with about \$300,000 still being sought for sampling equipment.

The program provides education on environmentally sound landscaping practices to the test neighborhoods, primarily through contacts by specially trained Master Gardener volunteers.

Neighborhood classes are supplemented by emails and newsletters, special school programs, door hangers, and rebates and incentives from the Water System.

Three sets of paired neighborhoods are included in the study, one higher class, one middle class, and one working class. The target neighborhoods will receive intensive attention from the Master Gardener volunteers, and associated control neighborhoods will not. The target and control neighborhoods are subwatersheds; the water going in and the runoff leaving the neighborhoods can be measured. There are few ponds in the neighborhoods and major rainfall events are experienced, so runoff can be measured and is collected and analyzed for nutrient and pesticide profiles. Water bills are compared to measure water use changes in each neighborhood. In addition, the amount of garbage coming out of each neighborhood is being measured to determine if target neighborhoods reduce the amount of recyclable materials leaving the site. Changes in habitats in each neighborhood are mapped by several volunteer groups. In addition, the program leaders are considering also measuring changes in property values based on improved environmental situation in the neighborhood. Finally, a baseline of attitudes and behaviors and pesticide and fertilizer use is collected and then repeated each year by a survey, which will include feedback on educational materials. Master Gardeners and other volunteers are helping to administer that survey.

### ***Pennsylvania: Healthy Yards, Healthy Lawns, Healthy Environment***

A similar example project comes from EPA Region III's Healthy Yards, Healthy Lawns, Healthy Environment, an educational campaign to improve water quality through the adoption of environmentally sound landscaping practices. The objectives of the program are to increase public awareness of the benefits and practices of responsible lawn care and landscaping, to help homeowners save time, energy and money on landscaping, and to increase communication among stakeholder groups, much like the goals of other landscape education programs like FYN. In addition, with this program EPA seeks to provide scientific data on improving water quality, show measurable results, and to provide consumer use data on current landscape maintenance practices.

The program has two principal components. It is hoped that the demonstrational research project, which serves to measure the impacts of the Lawns and Environment Initiative, will document the success of an intensive outreach project in a controlled area. Additional outreach will be extended to the public through lawn and garden retail centers.

The program, like the other landscape educational programs previously discussed, has a range of educational messages related to responsible and environmentally sound practices for fertilization, watering, pest control, and other topics related to lawn care and landscaping. The outreach component emphasizes easy to read materials for homeowners and distributes the information through lawn and garden retail outlets, horticultural organizations, and government agencies. Training of sales associates in those retail outlets is also a part of the program.

Healthy Yards, Healthy Lawns, Healthy Environment works with local partners, including school districts and teachers, environmental organizations (which can help get the information to neighborhood associations), lawn and garden retailers, product manufacturers, IPM programs, and the Penn State Cooperative Extension Service and associated Master Gardeners. The effects of outreach will be measured through the demonstrational research project, and it is anticipated that neighborhood surveys and on-line surveys will provide additional evaluation data.

The demonstrational research project involves a comparison of stormwater retention ponds in two neighborhoods in Bucks County and Chester County, PA. A GIS team looked for ponds that were less than two acres, self-contained, and in a neighborhood with known fertilizer and pesticide use. Study sites were also chosen based on topography and consideration of what would drain into good sized ponds from the neighborhoods.

Two ponds meeting the criteria were identified for the study. The half-acre pond in the neighborhood targeted for educational outreach is in Upper Southhampton, PA, in a single family neighborhood with mean family income of \$50,000-\$120,000. Ponds were also chosen in part by demographics and family income to find neighborhoods where residents were likely to maintain their own landscapes, or if not, they would have enough education to be able to talk to the maintenance company they hire about what they were learning. Inlets from storm drains in the neighborhood are mowed right up to the edge, so the potential for NPS pollution in the pond is high. The ponds in each community have three storm drains running into them. The control pond is located in Westtown, PA. The community in which it is located will not receive any educational outreach.

After establishing baseline data, quarterly monitoring of the ponds in both communities is being conducted for a nutrient panel, including ammonia, chlorophyll h, nitrate N, nitrite N and total phosphorus, and a pesticide panel for commonly used pesticides. The nutrient and pesticide panels are comparable to those being measured in the San Antonio study, so results can be compared.

### ***Challenges and Lessons Learned in Measuring Environmental Effects of Landscape Education Programs***

There are a number of challenges that projects like these face. It may be difficult to distinguish the effects of the specific educational program being evaluated from similar messages the target group receives from like-minded organizations. In addition, on a watershed scale, how do we distinguish changes in agricultural runoff versus residential runoff in agricultural-urban interfaces where the adoption of agricultural BMPs is also being promoted? Even if we could distinguish these factors completely, adoption of new behaviors can take time, and once new behaviors are adopted there is a time lag until we see the resulting environmental changes. This makes it very difficult to propose evaluation projects to funding agencies that limit the budget time frame to only one or two years, often three at the most.

There are a number of things we can do to improve the success of landscape education programs, including having a clearly defined message targeted to specific audiences; reaching homeowners where they get their gardening information (retail garden centers, neighbors, landscaping professionals); reaching all audiences in the chain, especially when dealing with new construction; developing multiple partnerships and collaborating with all stakeholders; and measuring actual environmental changes when possible to know where to put our limited resources. Measuring behavioral change is an important first step, but we have to find ways to measure actual environmental changes, or future funding of these programs may be in jeopardy.

In order to adequately measure the success of landscape education programs, we must devise demonstration research projects that are based on sound science and replicated. When doing so, the choice of study sites is critical to avoid confounding factors. For greater success, funding agencies need to allocate resources for evaluation over a longer time frame. Finally, it is only recently that program funding has begun to be dependent on demonstration of environmental impacts of educational activities; with the inherent difficulties in doing so, we all need to learn from each other, sharing study methods and results.

### ***References and Resources***

Israel, Glenn D., Janice O. Eaton and Gary W. Knox. 1999. Adoption of Landscape Management Practices by Florida Residents. *HortTechnology* 9(2):262-266.

**For more information:**

- Florida Yards & Neighborhoods: <http://fyn.ifas.ufl.edu>
- San Antonio Water System: <http://www.saws.org>
- Healthy Yards, Healthy Lawns, Healthy Environment:  
<http://www.epa.gov/reg3wcmd/pesticideslawn.htm>

# Tracking California's Nonpoint Source Education Programs for Marinas and Recreational Boating

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### **Abstract**

The State of California is developing a methodology to track implementation of its nonpoint source management measures, including education programs, in six nonpoint source categories (agriculture, forestry, urban, marinas, wetlands, and hydromodification). This effort was undertaken to meet the tracking and evaluation requirement of the Coastal Nonpoint Program, however, such knowledge of management measure implementation also can help California and other states direct their NPS program resources where they are needed most.

As part of this tracking effort, California recently initiated a project to determine the extent to which nonpoint source management measures, including public outreach and education, have been addressed at marinas. This presentation will provide an overview of the state's objectives for this effort, which include (1) determining where nonpoint source education programs that target marina operators and boaters are located across the state, (2) identifying which geographic areas/marinas are covered under these programs, and (3) determining what nonpoint source topics the programs emphasize in their outreach efforts. By analyzing these data, the state will highlight geographic areas that are not receiving focused outreach and identify subject areas that might not be included in the education programs' messages. This information can help California identify ways that it can support education programs to improve awareness and increase participation of specific target audiences in water quality protection activities.

The manuscript also will address some of the challenges to tracking management measures, including education programs, not just for marinas but for other nonpoint source categories as well. The methodology being used by California to gather and analyze data on existing marina and boater education programs also will be discussed, including examples of data sources and the nature of the information required for the analysis. Results of the data collection and analysis effort for California's marinas will be presented with a summary of future management and tracking efforts. Finally, lessons learned from the marina tracking effort will provide a set of key principles to guide tracking of other nonpoint source categories.

## **Background**

Tetra Tech, EPA, and the State of California have been working together for the past several years to develop guidance to implement the state's Nonpoint Source Control Program (NPS Program) and to develop a better accounting of management activities across the state. As part of this effort, the state has begun developing a process to track implementation of its 61 nonpoint source management measures,

which specify actions to reduce nonpoint source pollutants from six land uses and activities: agriculture, forestry, urban areas, marinas and recreational boating, wetlands and riparian areas, and hydromodification.

Unlike other states, California's NPS Program has been applied statewide and is mandatory for both inland and coastal areas. A summary of the state's regulatory framework for managing nonpoint source pollution can be found in Chapter 1 of the *California NPS Encyclopedia* (available in PDF format from <http://www.waterboards.ca.gov/nps/encyclopedia.html>). This document also includes fact sheets for each of the state's 61 management measures that provide guidance and resources for dischargers as well as state and local pollution control authorities.

### ***California Nonpoint Source Management Measures Tracking***

In 2004, the California NPS Program began looking at ways to track the implementation of nonpoint source management measures and management practices statewide. Needless to say, this is a daunting task. There are 61 management measures in six land use/activity categories that specify management practices at numerous scales—from watershed-wide planning to silvicultural post-harvest evaluation to construction site chemical management.

After an initial effort to determine if it was feasible to evaluate all of the management measures, the state decided it was best to look at each land use/activity category individually and prioritize the tracking effort based on program history, data availability, and future management options. Subject-matter specialists at the state developed questions about the status of management activities for each category, accompanied by a set of data sources and a plan to consolidate these data to identify the scope of potentially polluting activities as well as management activities.

#### **Marinas and Recreational Boating Tracking Project**

For the marinas and recreational boating category, the state focused its tracking efforts on water quality assessment, sewage and waste management facilities, and public education and outreach. These areas had been the focus of the state's Marina Interagency Coordinating Committee working group, and data had already been compiled about marina locations and management practices. Public education and outreach was selected in particular because it was the primary implementation mechanism used statewide to control nonpoint source pollution from boating activities.

The state, with Tetra Tech's assistance, undertook a mapping exercise to summarize and plot the locations of marinas relative to the locations of local and regional clean boating education and outreach programs being implemented in the state. The goal of this exercise was to highlight geographic areas where marinas are located that have targeted education and outreach programs in place, as well as identify those areas that are not receiving focused outreach. By examining the nature of the education and outreach programs, the state will be able to identify the specific subject areas that were not included in the programs' messages. Ultimately, this information can help California identify ways that it can support education and outreach programs to improve awareness and increase participation in water quality protection activities. Additionally, this effort will produce information that can be useful to other agencies with jurisdiction over marinas and recreational boating. The state anticipates sharing this information with the Marinas Interagency Coordinating Committee and the Monitoring and Tracking Committee, along with other groups, to identify and fill gaps in programs to manage nonpoint source pollution from marinas and recreational boating.

## ***Data Sources***

### **Marinas**

The marina demographic and location data were obtained from a multi-agency effort called the California Marinas Mapping Project. The California Coastal Commission was the lead agency for the project, which included the following other state agency partners: the California Integrated Waste Management Board, the Department of Boating and Waterways, the Office of Spill Prevention and Response, the San Francisco Bay Conservation and Development Commission, the state Water Resources Control Board, and the California State Lands Commission. The purpose of creating the California Marinas Mapping Project group was to avoid duplicating efforts among the agencies and to share resources.

In 2003, several meetings were organized among the California Marinas Mapping Project members to discuss how each agency was going to participate and collaborate in this effort. The group created a California boating facilities master list with a total of 644 boating facilities by compiling databases provided by the Coastal Commission, the Department of Boating and Waterways, and the Office of Spill Prevention and Response. Several agencies agreed to collect field data for selected marinas, while other agencies offered technical assistance, funding, and existing data.

A letter was mailed to each of the marinas and boating facilities to inform them about the purpose of the project and that field data collectors were going to contact and visit them. A form was developed for field data collection, which included questions about contact information, ownership, latitude and longitude coordinates, storage capacity, availability of environmental services (e.g., used oil collection facilities, bilge and sewage pumpouts, and absorbent pad distribution and collection), and other information. The Department of Boating and Waterways provided the coordinates for most of the facilities from the master list. The Boating Clean and Green Campaign staff of the California Coastal Commission, with assistance provided by other Coastal Commission and San Francisco Bay Conservation and Development Commission staff, phone-surveyed the facilities that were not field-surveyed by the other agencies. To map these facilities, campaign staff used some of the coordinates provided by the Department of Boating and Waterways and cross-checked this information with other resources, including maps, Internet software such as Terrafly, Californiacoastline.org, USGS quad maps, and aerial photographs, among others. Field data collection was completed in December 2003, and campaign staff finished entering data into the GIS system in March 2004. A total of 644 marinas and boating facilities were surveyed and mapped.

The California Marinas Mapping Project GIS was essential for this analysis because it contained a wealth of information and map locations for California's marinas. It is assumed that some changes have occurred since the data were collected, and not every boating facility in the state was captured by the survey, but the data offer insight into the extent of boating facilities and the types of nonpoint source management practices being implemented at the marinas.

### **Clean Boating Programs**

Tetra Tech assisted the state in developing a summary of the public education and outreach programs targeting boaters and marina operators. The summary was based on Internet research and the state's institutional knowledge of existing programs. The programs were evaluated for the subject matter included in the products offered, which were organized according to nonpoint source management measures. For example, the Lake Don Pedro Marina has an education and outreach program that includes information pertaining to stormwater runoff, fueling station design, sewage facilities, waste management facilities, solid waste control, liquid material control, boat cleaning and maintenance, and public education and outreach.

The area of influence for each program was inferred based on the nature of the program. For example, several programs were specific to a single marina or a single water body, which was easy to locate in a GIS. Regional programs often included a description of the towns, counties, or water bodies that were included.

The programs were evaluated relative to the data on marina locations to determine the number of marinas and the number of boats/boaters (inferred from the number of slips, moorings, and dry storage berths) that were covered by each program.

## Results

### Marinas

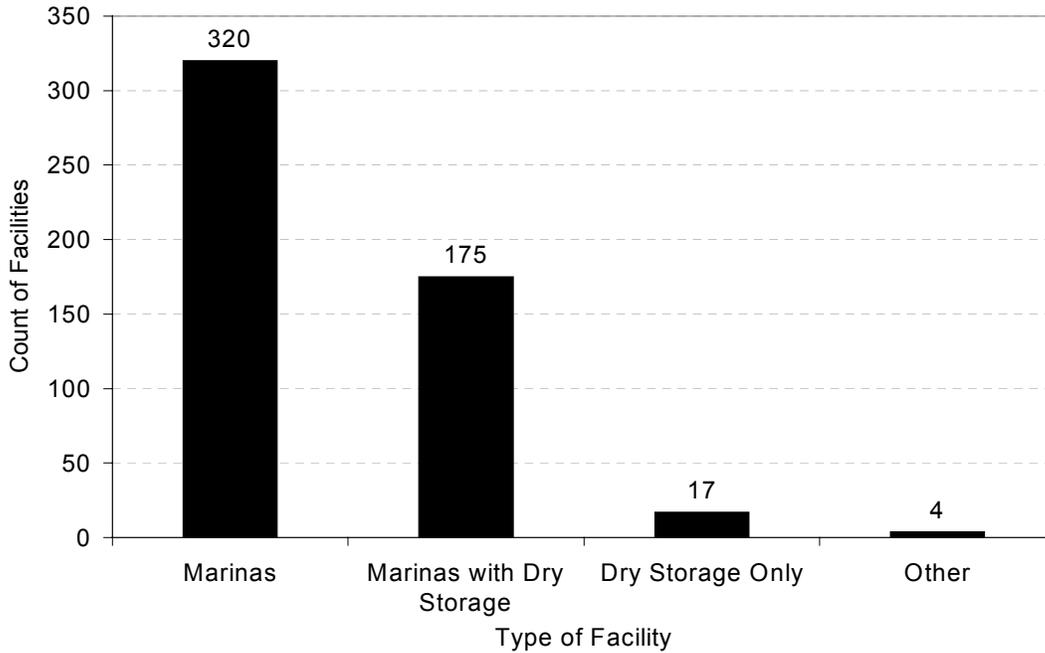
A brief summary of the data from the California Marinas Mapping Project is presented in Table 1. For illustrative purposes only, the boating facilities were categorized by the type of boat storage available, including: marinas that offer slips and/or moorings; marinas with dry storage that offer slips and/or moorings and dry storage berths; dry storage only, offering only dry storage berths; and other facilities that were categorized in the GIS database as boat sales facilities or guest docks. For this analysis, only boating facilities with capacity to store 10 or more boats (based on the total number of slips, moorings, and dry storage berths) were included. This is based on the regulatory definition of a marina.

**Table 1. Summary of Boating Clean and Green Program Survey of Boating Facilities.**

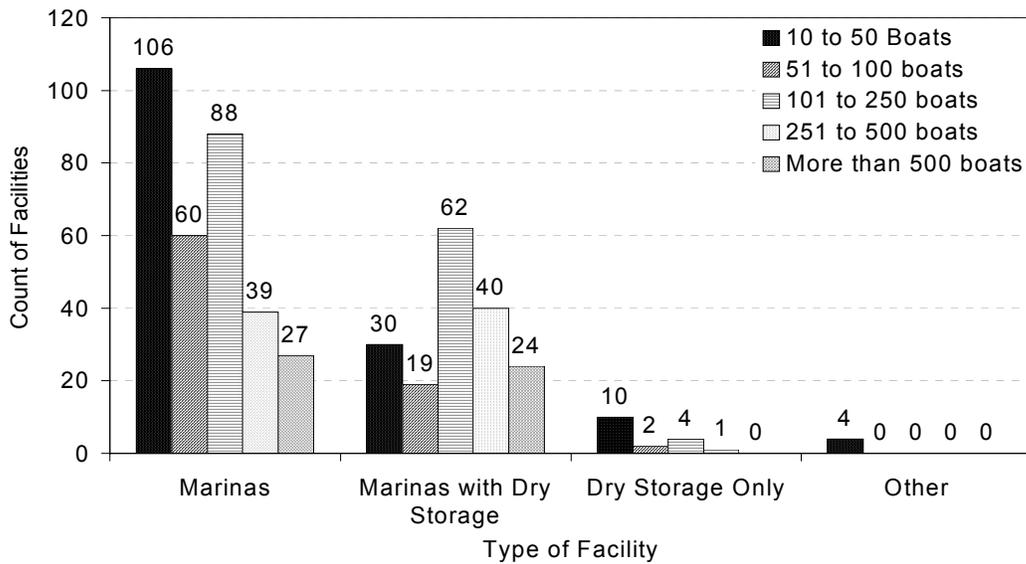
Description	Number of Facilities			
	Marinas	Marinas with Dry Storage	Dry storage only	Other
10 to 50 boats	106	30	10	4
51 to 100 boats	60	19	2	0
101 to 250 boats	88	62	4	0
251 to 500 boats	39	40	1	0
More than 500 boats	27	24	0	0
Total number of boats	320	175	17	4

As shown in Table 1 and Figure 1, the majority of boating facilities (320) were marinas with slips and moorings. 175 facilities offered dry storage berths in addition to slips and moorings. Seventeen facilities housed boats exclusively in dry storage berths. Four facilities were categorized as “other facilities.” Table 1 and Figure 2 show the size distribution, in terms of boat storage capacity, of the different types of facilities.

**Figure 1. Number of Marinas by Marina Type .**



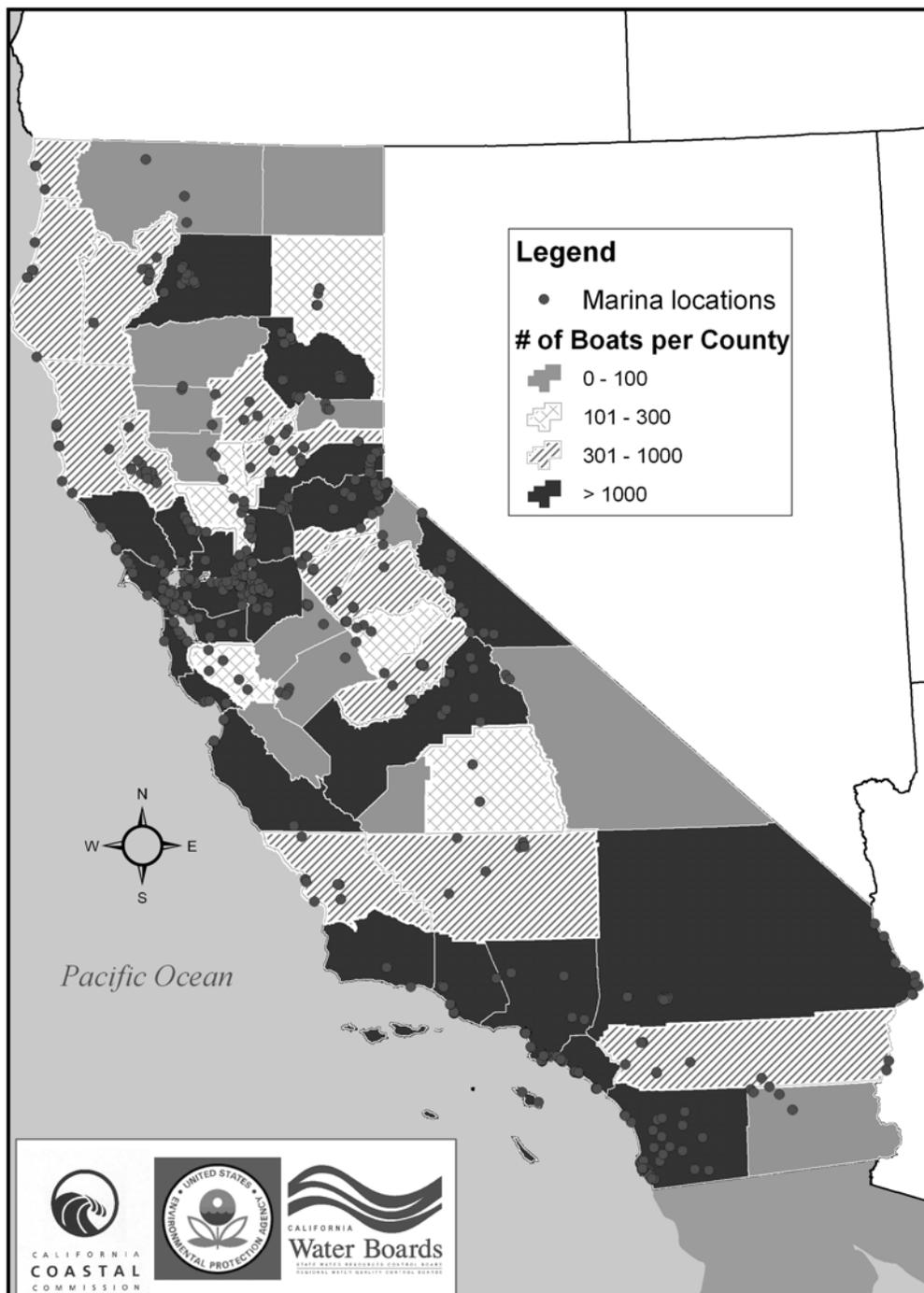
**Figure 2: Number of Marinas by Marina Type and Size.**



The geographic distribution of boating facilities is shown in Figure 3. Note that a significant proportion of the facilities are located on rivers and lakes throughout California, not just along the Pacific coast.

Clusters of boating facilities can be found in major urban areas, such as San Francisco, Los Angeles, and San Diego, and at major water bodies, such as San Francisco and San Pablo Bays, the San Joaquin Delta, and Lake Tahoe. Also displayed is the number of boats by county (based on the boat storage capacity at each facility in the county), which provides a good indication of the relative concentration of boaters across the state.

**Figure 3: Geographic Distribution of Marinas and Number of Boats/Boaters by County.**



### Clean Boating Education and Outreach Programs

Figure 4 shows the locations of the 36 researched clean boating education and outreach programs, characterized by the geographic scope of the program, including: local, covering a single city or town; regional, covering multiple cities/towns or entire counties, marina-specific, which are programs at individual marinas; or water body-specific, covering all marinas in a particular water body. Three statewide programs are not displayed in Figure 4.

**Figure 4. Location of Marinas and Recreational Boating Programs in California.**

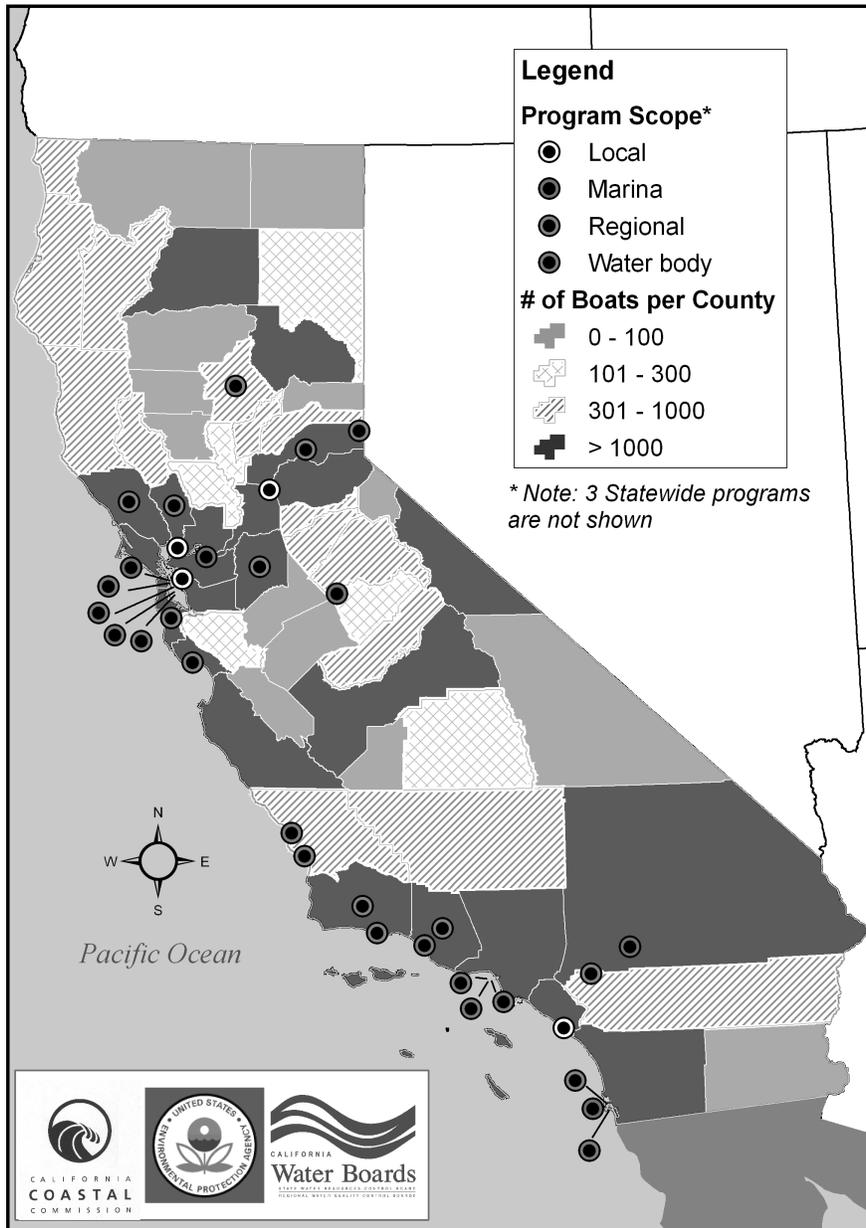
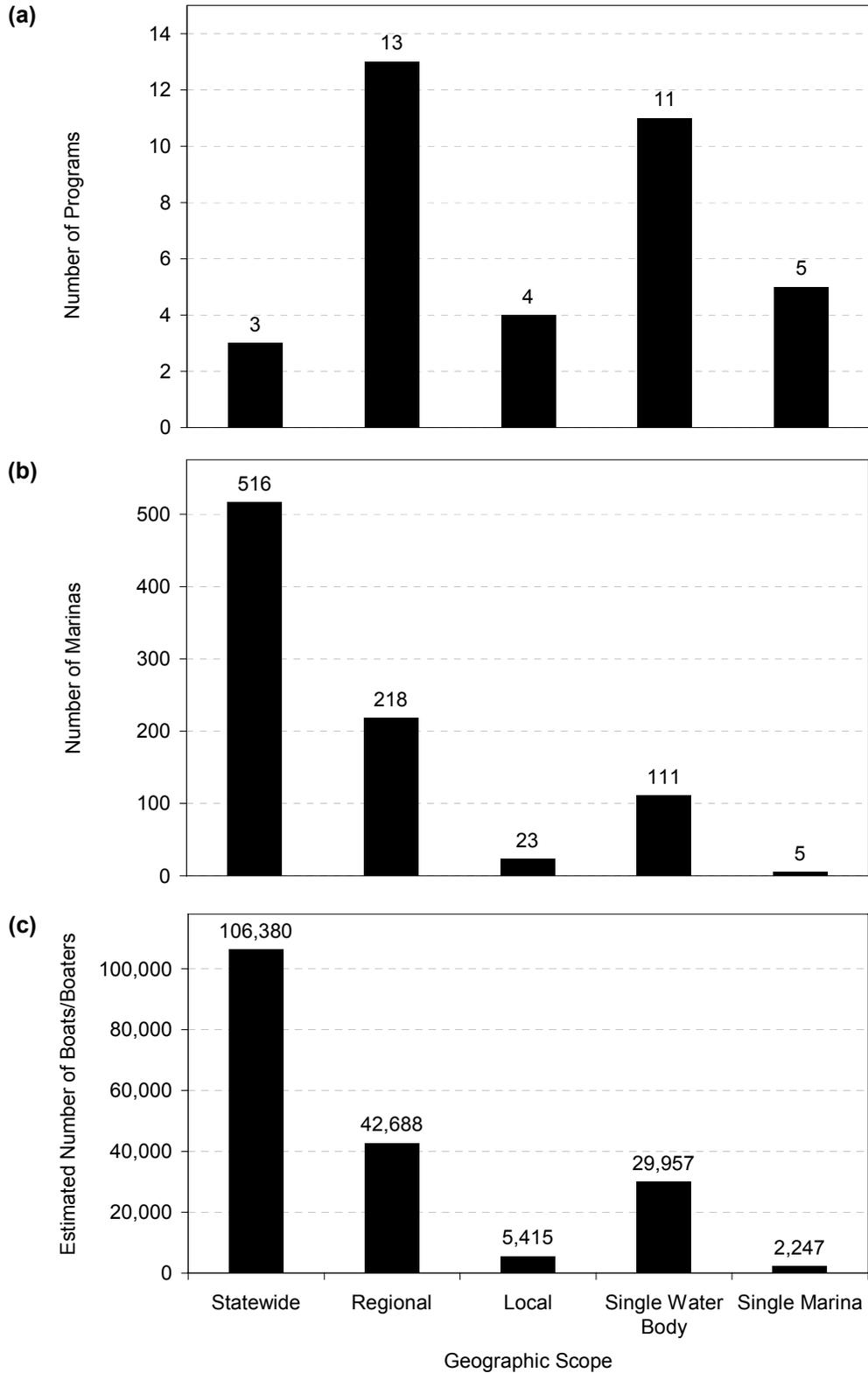


Figure 5 shows the number of education and outreach programs of different geographic scopes, as well as the number of marinas and estimated number of boaters covered by programs of each geographic scope. Three programs cover the entire state, which include 516 marinas and 106,380 boaters. There are

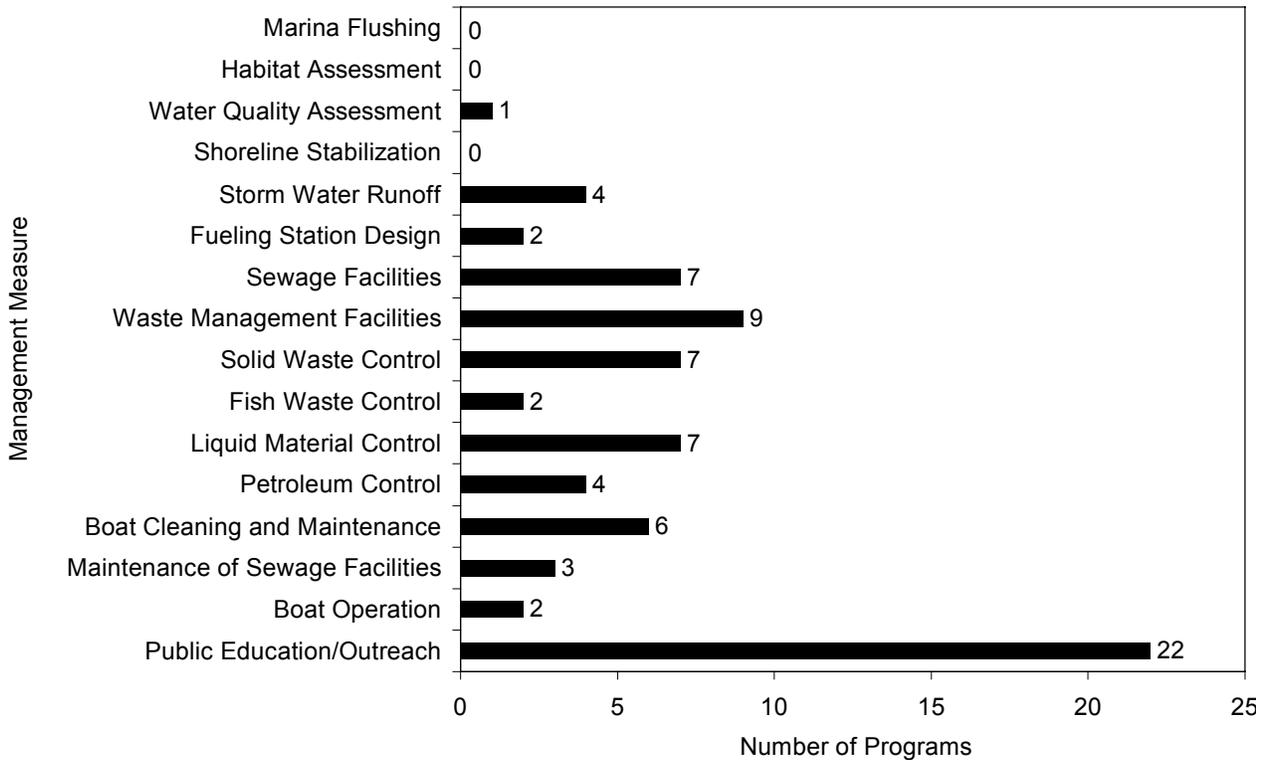
13 regional programs covering 218 marinas and 42,688 boaters. Four local programs cover 23 marinas and 5,415 boaters. Eleven programs target marinas at specific water bodies and cover 111 marinas and 29,957 boaters. Five marinas have their own programs, which collectively cover 2,247 boaters.

Based on an analysis of the materials offered by each program (where possible, as not all programs described their offerings in enough detail to make such determinations), it is evident that the programs are not comprehensive in their coverage of the 16 nonpoint source management measures (see Figure 6). As would be expected, most programs (22) offered education and outreach. Nine programs offered information on waste management facilities. Seven programs covered sewage facilities, solid waste control, and liquid materials control. Six programs provided guidance on boat cleaning and maintenance. Four programs discussed petroleum control, and two programs covered fueling station design, fish waste control, and boat operation and maintenance. Only one program discussed water quality assessment, and none of the programs touched on marina flushing, habitat assessment, or shoreline stabilization.

**Figure 5. (a) The number of education programs of different geographic scopes, and the number of (b) marinas and (c) boaters (estimated) covered by education programs of each geographic scope.**



**Figure 6. The number of programs that provide education and outreach on each of the 16 nonpoint source management measure topics.**



### **Conclusions**

The California Marinas Mapping Project data show that marinas are located throughout the state, and not just along the Pacific coast. California has numerous navigable rivers and reservoirs that offer boater recreation, and the distribution of marinas reflects the use of these water resources. The relative distribution of marinas indicates that managing pollution from marinas is a statewide issue that warrants statewide funding and programs.

The geographic distribution of clean boating education and outreach programs is uneven; for example, several programs cover the San Francisco and Santa Monica Bays, but only statewide programs cover marinas/boaters located in far northern California. In general, the programs are concentrated in the San Francisco Bay area and along the central and southern California coasts. Only a few programs cover inland areas, notably the Lake Tahoe Regional Authority’s program and several county programs.

Besides statewide programs, regional programs provide education to the most marinas and boaters, followed by water body-specific programs. Local and marina-specific programs cover only a handful of boaters relative to the other categories. The concentration of facilities and boaters in large cities and at popular water bodies shows that regional programs would be best suited to offer information to these large regional audiences. These programs can inform boaters of water quality problems unique to their region or water body, with an emphasis on measures to control sources of key pollutants of concern.

Regional programs also can provide detailed directories and listings of local environmental services more readily than state programs could.

Another advantage of regional programs is that they match the jurisdictional scale of municipal stormwater programs, which also provide education and outreach to citizens. Clean boating advocates can forge partnerships with municipal stormwater permittees to share resources and expertise.

The fact that clean boating education and outreach programs do not cover the gamut of marina- and boating-related nonpoint source management measures indicates the need for new materials and new initiatives, which can be developed at the state level and distributed regionally through existing education and outreach programs and Regional Water Quality Control Boards.

### ***Next Steps***

There are several ways in which the state can further clean boating education and outreach efforts based on the information presented above. The state can use this information to develop a set of outreach materials focusing on management measures that are underrepresented in existing programs. The state also can develop a model outreach program or a set of guidance materials that includes information about all of the management measure topics. These materials can facilitate development of local or regional clean boating programs in parts of the state that do not have them currently.

Now that education and outreach programs have been documented and compiled, the state can communicate directly with program contacts to identify common impediments to program success, such as low marina participation or funding shortfalls, and help to develop solutions through guidance or new statewide, regional, or local programs. The state also can develop a compendium of funding sources to assist education programs in securing steady and reliable funding.

The state also can continue partnering with the other agencies involved in the California Marinas Mapping Project to identify subject areas on which each agency will focus and to avoid duplicating efforts. The agencies have their own priorities, resources, and expertise that they can bring to the table to assist in developing a comprehensive clean boating message. Regular communication and development of a statewide strategy will help guide the agencies' efforts to address nonpoint source pollution from marina and recreational boating activities.

### ***Reference***

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<http://www.waterboards.ca.gov/nps/encyclopedia.html>. Last updated July 31, 2005. Accessed September 7, 2005.

# Meeting the Challenge: A Protection Message in a Restoration World

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### **Abstract**

Lake Superior remains one of the most pristine of the Great Lakes. However, because of the superiority of the environment, residents and visitors often seem unaware that they are impacting the quality of the water. The Regional Stormwater Protection Team (RSPT) was formed to identify and implement methods for teaching an effective “protection” message.

RSPT, formed in 2002 to address NPDES Phase II stormwater requirements, has 21 member organizations from both Minnesota and Wisconsin including cities, townships, and counties as well as universities, state agencies, local agencies, and the Fond du Lac Indian Reservation. RSPT is targeting a concept directed to individuals not already committed to environmental issues: The link between the individual and the water. Recognizing that awareness is the essential first step, RSPT elected to keep messages simple and emphasize the watershed concept. The approach contains two components: A general message identifying the link between residents and the water bodies and specific projects that involves individuals in protecting the water bodies.

General messages from the group are disseminated by RSPT through brochures, collectable stream cards, mailers and a series of 30-second television and radio spots. A unique regional Web site <[www.lakesuperiorstreams.org](http://www.lakesuperiorstreams.org)> provides scientific and cultural information on regional streams. This year the RSPT hosted the first watershed festival for the region.

RSPT developed a series of workshops on construction and post construction requirements. Individual member organizations shared innovative techniques used to address erosion and water retention requirements for the steep wet clay soil environment.

RSPT member organizations use specific activities to involve residents. Activities include a series of rain barrel and rain garden workshops, demonstrations gardens, and a sediment collection demonstration project. Results and activities are shared regionally and posted on the website. RSPT supports and promotes regional monitoring programs. RSPT is actively seeking methods of measuring effectiveness of the educational messages and activities in changing behavior in a protection environment.

## ***Introduction – The Protection Problem***

Despite toxic contaminant and other issues, Lake Superior remains one of the most pristine of the Great Lakes. Its headwaters provide outstanding outdoor experiences and amenities attracting both residents and tourists. However, because of the high quality of the environment, users may be unaware that their actions are impacting the quality of the water. The Regional Stormwater Protection Team (RSPT) was formed to unify efforts to convey an effective “protection” message.

At the headwaters of the Great Lakes is a Northwood’s region characterized by abundant water including numerous cold water trout streams. There are 42 named streams within the City of Duluth alone. On the Minnesota side, a steep escarpment rises some 600 feet in less than two miles. Above the

escarpment the land is dotted with wetlands. On the Wisconsin side, the land has a more gradual slope, but is also dotted with wetlands and streams. The soil of the region is shallow and clay-based. Ancient basalt outcroppings are visible throughout the region. Much of the region remains densely forested. To the visitor, the land appears almost pristine. Residents remain in the region to enjoy the deep snows of cold winter with skiing and ice fishing and the opportunities to fish, hunt, and hike throughout the year.

But, there are hidden problems. In particular, there are contaminated sediments from the industrial period in the early 1900's when the economy relied on natural resource industries such as iron mining and processing and forestry. Because of pollution, the St. Louis River has been identified as one of the Great Lakes Areas of Concern listed in Annex 2 of the Great Lakes Water Quality Agreement. Recent clean-up has made the river once again fishable and visually attractive. Active restoration projects have returned the native sturgeon to the river. However, sediment contamination has limited the usability of the river. The remains of long abandoned factories are now Brownfield and Superfund sites. The region also faces threats from increasing development, with resulting increases in velocity, temperature, and volume of stormwater runoff, and increased sediment and nutrient loads. Despite the seriousness of these problems, they are not highly visible to the average person. How do we convince the politicians, the public, and the funding agencies that action is required?

### ***Forming a Cooperative Team***

In 2002, the University of Minnesota Duluth and the City of Duluth met to discuss concerns with new Phase II National Pollution Discharge Elimination System (NPDES) Municipal Small Storm Sewer System (MS4) Stormwater Permit requirements. Out of that meeting came a planning workshop and the formation of a bi-state regional team to address outreach and education in order to comply with permit requirements, consolidate efforts, and produce an effective high quality educational program directed at protecting existing environmental assets.

Twenty one communities and agencies came together to form the Regional Stormwater Protection Team (RSPT). Membership includes all regional MS4 communities, the Universities, the Fond du Lac Reservation, and local agencies.

### **Members of RSPT:**

City of Duluth, MN  
 City of Hermantown, MN  
 City of Proctor, MN  
 City of Superior, WI  
 Duluth Township  
 Midway Township  
 Rice Lake Township  
 South St. Louis Soil and Water Conservation District  
 Minnesota Department of Transportation  
 St Louis River Citizens Action Committee  
 Fond du Lac Reservation

University of Minnesota Duluth  
*Minnesota Sea Grant*  
*Natural Resources Research Institute*  
*Facilities Management*  
 University of Wisconsin Superior  
 Non Point Education for Municipal Officials  
 Wisconsin Department of Natural Resources  
 Western Lake Superior Sanitary District  
 Minnesota Pollution Control Agency

### ***Components of the RSPT Program***

Once established, RSPT moved rapidly to identify an appropriate name, establish a mission statement, determine direction, and seek funding. The name Regional Stormwater Protection Team was selected both for the simple and positive acronym, RSPT, and for the central theme of "protection."

RSPT members identified a mission that reflected the regional approach:

*To provide coordinated educational messages and technical assistance in storm water pollution prevention to citizens and businesses.*

The twenty-one member organizations signed a memorandum of understanding to support the joint efforts and established a general format and schedule for meetings.

RSPT member organizations range from townships with populations of less than 1,000 up to the largest organization, the City of Duluth, with a population of 87,000. Because of the challenges of location, size, and budget in our small communities, the success of RSPT depends largely on successful grant writing. One on-going challenge is convincing granting organizations that funding protection is equally as important as restoration efforts and deserves continuing support. To date the RSPT team has received just over \$100,000 in grant funding through Minnesota's Lake Superior Coastal Program. The RSPT is collaborating with the University of Minnesota (Natural Resources Research Institute and Sea Grant) and the Western Lake Superior Sanitary District on projects seeking funding of close to \$1,000,000.

The RSPT Board is composed of busy people, with diverse talents and knowledge. The board has engineers, scientists, city managers, project managers, agency representatives, and elected officials. From the beginning, the group has recognized that time is at a premium, so meetings are kept short and much of the work is done by very small committees. RSPT is committed to producing high quality products as efficiently as possible.

### ***Identifying the Message***

RSPT first met in workshop format to brainstorm a direction for the regional efforts. Out of the brainstorming process came a list of 22 messages that members felt were important to the region. From the list one message was universally supported – *the need to link individual activities to water quality*. Members also recognized that the region is in a protection mode and faces a difficult challenge to change behaviors where problems are minimally visible. RSPT elected to stress the watershed concept as the link among communities in designing the message of our program.

RSPT outreach approach:

- Protection is the major goal.
- Messages are:
  - ▷ Watershed,
  - ▷ Individual responsibility, and
  - ▷ Understanding of link with the water.
- People are an important component of the equation.

RSPT identified a two-layered approach for its message. First, the broad organization would design a message and produce a media campaign to remove barriers to awareness of the public's role in protecting our waters. Secondly, these messages would be reinforced on a local level with targeted public-involvement projects lead by RSPT members. All project results and methods are shared within the whole RSPT community.

## *Logo Development*



A logo was developed for the organization through a competition for art students at the local universities. The winning logo is a simple multicolored design that reflects the layers of earth and water. The release of the logo and announcement of the formation of the organization were widely publicized as a first step in increasing public awareness.

## *Message Development and Media Campaign*

The message committee of the RSPT identified three primary messages to be conveyed in the awareness campaign.

All residents live in a watershed. All regional watersheds ultimately flow to Lake Superior.

The identified regional stormwater issues include: sediment (and attached nutrients), temperature, water volumes and water velocity.

There are many simple things individuals can do to protect the environment.

All messages begin with “Another watershed moment brought to you by the Regional Stormwater Protection Team,” and end with, “It all comes down to your water.”

For the media campaign RSPT has developed three 30-second animated television spots featuring identifiable animated characters. Because the natural beauty of the region is used as background in numerous media presentations, RSPT members felt the animation would be more likely to attract audience attention. Voiceovers from the televised spots are used for radio advertising. Spring advertising targets sediment problems, while fall messages target leaf and yard waste. The public messages can be found at <[www.lakesuperiorstreams.org](http://www.lakesuperiorstreams.org)>.

Other printed materials, including brochures and mailers prepared by RSPT, utilize the animated characters to increase the recognition of the message materials. For public events, a series of tattoos were produced to attract children. On a more hands-on basis, Rex, the spokesman dog, makes appearances and hands out “doggy bags” to members of the public. Communities in the region have adopted the animated characters to use in local stormwater related messages.

## *Campaign Events*

The overall campaign also includes more targeted public events.

### **Watershed Festival**

This summer, RSPT held its first watershed festival. The event, held at a local shopping mall, targeted families. It was designed to reach a more general audience than most regional environmental events. The organizers encouraged participation from local vendors who offer products such as mulching lawn mowers, ‘pooper scoopers,’ pervious building materials, and native plant landscaping. An exit survey indicated that 45% of those in attendance had never attended an environmental event prior to this one. To attract families, the event featured a nationally known environmental performer. The performer was brought in two days before the event and gave five additional performances in local schools.

RSPT members also participate in community fairs and the regional home show. RSPT uses gifts such as tattoos, prize drawings for environmental products, and information sheets to involve visitors in

stormwater issues. A book of regional watershed maps is provided to help attendees determine in which sub-watershed they live.

### **Workshops**

RSPT has organized a series of workshops for the construction industry that provide information on construction permitting requirements and the cost and effectiveness of water quality friendly alternatives. These workshops, for the first time, are bringing the regional communities together in a consolidated effort to reach the construction industry. One observed effect of these workshops has been increased informal communication between communities. A series of luncheon meetings sponsored by the South St. Louis Soil and Water Conservation District (SWCD) have been organized to provide information on innovative construction techniques. The meetings have strong regional support and are providing a networking tool for the construction industry and community engineers and planning officials. Information on the workshops is posted on the regional Web site.

### **Website**

RSPT also recognizes the importance of the Internet as a communication tool. The organization is supporting the Web site <[www.lakesuperiorstreams.org](http://www.lakesuperiorstreams.org)> in order to provide in-depth information on regional water quality issues. The website provides real time monitoring data from five regional streams as well as data and links for monitoring activities on other streams and the St. Louis River. Using innovative visualization and animation techniques, the site allows users the opportunity to observe easily interpretable graphs of variations in water quality, seasonally, or following rain events, and to compare the data to other streams at the same time or to the same stream at other seasons or years. Data can be color mapped or plotted at time scales from 12 hours to 60 days to explore different phenomena. Data are available in formats that can be downloaded for students and teachers to view off-line or download into slideshows. GIS maps are also available.

The site allows users to review NPDES permit information or to learn about environmentally friendly construction and home practices. The site features streams of the region with attractive photographs, information about trails, and how the watersheds stretch beyond municipal boundaries. An *Understanding* section includes primers on stream ecology, water quality parameters and impacts, aquatic organisms, and other related topics. Since 2002, the Web site has “grown” from the City of Duluth to include adjacent MS4 townships, communities, Superior, WI, and now the north shore of Lake Superior to Canada, including data from two north shore streams. The website has been closely integrated with other regional extension and education watershed projects including Project Northland NEMO, the St. Louis RiverWatch (<http://lakesuperiorstreams.org/citizen/riverwatch.html>), and View from the Lake ([http://www.seagrants.umn.edu/seiche/2004/09/gaining\\_a\\_superior\\_perspective.html](http://www.seagrants.umn.edu/seiche/2004/09/gaining_a_superior_perspective.html)).

Through the Web site, RSPT hopes to consolidate information on regional permitting and highlight effective stormwater management techniques. The site is designed to be a tool for the general public, the education community, and the construction and development industry. Effectiveness is being evaluated through both feedback to the site, targeted surveys, and the number of page requests (approximately 250,000 monthly). Essential to the success of the Web site is promoting the site address on all publications and information from regional member organizations.

### ***Member Projects***

The second component of the RSPT program is to use targeted member activities to reinforce RSPT messages. The smallest member organizations are limited by budgets and staff in the level of activity they can engage in related to stormwater education, but have teamed with larger members to seek funding and perform activities. A school in one of the townships is now home to a rain garden

constructed through the combined efforts of the township, the students, residents and the South St. Louis SWCD. The challenge for these hands-on projects in small communities is a combination of seeking out expertise and finding funding. RSPT provides links to bring groups together.

### **Hands-On Workshops**

The City of Superior received a small grant from the Duluth Superior Community Foundation to do a rain barrel workshop. They have since expanded this workshop into a broad regional effort. Twenty-eight rain barrel workshops have been conducted over the past 15 months. City staff has demonstrated at fairs, exhibitions, the Watershed Festival, and for individual organizations. To date they have distributed over 425 rain barrels. Attendees at their events can make their own rain barrel and are provided with all the parts to assemble the finished product for a materials fee of \$40. Each demonstration provides an opportunity to insert a protection message for the region.

As with many activities, the rain barrel workshops helped launch other activities. Duluth has held a drawing for a rain barrel at the regional home show for the past three years. At the first event, less than 300 people entered the drawing. This spring over 700 entered the drawing and over 100 instruction sheets for making rain barrels were distributed.

The Minnesota Pollution Control Agency received grant funding to initiate a rain barrel for burn barrel exchange that has proved extremely popular with the general public, while providing hands-on messages about both air pollution and water quality.

### **Rain Garden Demonstration Projects**

The City of Superior created six rain gardens on their wastewater treatment plant grounds, which are accessible to the public at all times (and they do get visitors!). The gardens were funded by the Great Lakes Commission. The gardens are used to demonstrate different ways to integrate a rain garden into a landscape using various water sources. They have held two rain garden workshops that each attracted 15-20 people. Participants were taught how to build their own rain garden and helped to plant two of the facility's gardens. The City of Superior gave tours of the rain gardens to five private groups, 13 school classes, and two local garden clubs. This fall, they will teach 6<sup>th</sup> graders at Superior Middle School about stormwater by helping them build rain gardens on their campus. Rain gardens are becoming more popular in Superior, and a showcase rain garden has been built on the tourist-rich area of Barker's Island, complete with educational signs donated by the City of Superior.

The University of Minnesota Duluth has just completed construction of a large rain garden to treat stormwater from several parking lots. The completed project will have educational signage to explain its purpose and utility. Also, the South St. Louis SWCD is working with a local community school to plant a rain garden to treat runoff from their recently paved parking area. This project required extensive volunteer help and had strong community and township support. Students, the local township, and residents all put in time and money to help complete the project.

### ***Other Public Involvement Activities***

Activities such as the rain barrel program and the rain gardens have been well-received in the garden oriented population; however a significant component of the local population is not touched by these activities. This group remains a challenge for removing the awareness barrier.

### **Sediment Demonstration Project**

Duluth, in partnership with the South St Louis SWCD, is currently involved in a sediment removal demonstration program funded by the Great Lakes Basin Program for Soil Erosion and Sediment Control. Because of heavy winter snows, significant sand is applied to local streets. The traditional

spring paradigm is to rake (or shovel!) the material from lawns and driveways back to the street. Consequently, much of the material ends up in regional creeks and ultimately Lake Superior.

The sand clean-up project targeted two neighborhoods, both near local streams, to assist in clean-up of winter road sand. Neighborhoods were sent letters explaining the project, then a team of young people from the Minnesota Conservation Corps visited the residents to enlist their support and link their activities to the local creek. Over 48% of the neighbors agreed to participate and were provided with labeled buckets to gather the sand material. In one neighborhood, door-to-door collection occurred. In the other, a dump site was established and neighbors were encouraged to take materials to the site. From approximately 500 homes participating, 25 cubic yards of material was collected. As the result of a press release explaining this project, Duluth received calls from residents in neighborhoods all over the city interested in collecting and disposing of sediment. Four additional collection sites were set up and advertised. Due to feedback and participation rates, city officials were convinced that this program was worth continuing city-wide.

This fall, a second phase of the project started enlisting resident assistance to adopt and maintain catch basins during fall leaf dropping. To measure the effectiveness of commitment, the project will target one of the neighborhoods involved in spring sand collection. We hope that folks who participated in the sand clean-up will perceive themselves as “stream protectors” and will support and participate in catch-basin adoption.

### **Storm Drain Stenciling And Stamps**

Regional members are now using storm drain concrete stamps on new road construction. A local metal shop developed a pattern that can be used in any regional community. Despite engineering concerns that contractors would reject the project or charge for having to use the stamps, the stamping projects have been well received. Contractors request the stamps and take considerable pride in their appearance. The stamps serve as a good prompt for appropriate road erosion control practices during construction.

Member organizations also work with schools to place decals or paint stencils on storm drains near schools. In all activities with children, brief presentations are given prior to activities. The City of Duluth has found the use of aerial photographs of the school and neighborhoods helpful in getting children and adults to better understand the links between their activities and Lake Superior. Power point presentations overlaying streams and storm drain systems on aerial photographs are extremely effective in tracing the link between catch basins and the lake.

The City of Superior worked with 324 students from local schools to stencil 637 storm drains with marking paint. Since that 2001 effort, some of the stencils have worn off. The city will conduct a second stenciling effort in Fall 2005 with grant funds from the Wisconsin Coastal Management Program.

### **Collectable Stream Cards**

In support of the approach of increasing awareness, the City of Duluth is producing a series of collectable cards describing the streams within the city limits. These cards are packaged in sets of ten. Each card has pictures of a stream, a map, and features natural history facts about stream communities. The cards have proved extremely popular, not only with the target grade school audience, but with adults and former residents of the region. This year the Duluth Library utilized the cards as rewards for summer reading. Sets of cards are only provided to groups that listen to programs about the streams, and thus provide an opportunity to get the message across.

### ***What Works? What Have We Learned?***

Awareness and action are best achieved when the audience is brought into the process or project. The popularity of the Duluth Stream Cards, the high participation rate in the sediment demonstration project,

and the on-going success of the rain barrel workshops demonstrate the buy-in for activities where actual involvement, reward items, and visual change occur.

Communities working together are more efficient. By using a regional approach, even relatively small urban areas can do effective high quality programs. There is “more bang for the buck” as a group. Care must be taken to ensure that the group has identified a uniform message.

Children can be an effective means to reaching adults. Classroom visits, field demonstrations, and one-on-one discussions with children help to spread the protection message to their parents. A coloring contest for the Watershed Festival brought 86 families to the event to submit their child’s entry. Protection messages, accompanied by small souvenirs that children take home, can encourage family involvement. Duluth staff has received several verbal accounts of families who have begun visiting streams as a group activity using the stream cards as a guide.

The formation of a regional team has significantly increased networking across communities and among agencies. Following each RSPT meeting, members remain and engage in conversations about other concerns. The e-mail list and mailing lists are now links for intergovernmental communications about activities. Communities are beginning to better utilize the resources of the University System for valid scientific and research support.

A simple, non-aggressive, positive message is better received. RSPT has worked hard to maintain a people-oriented, active approach to water quality protection messages. To date, this approach has made the group acceptable to a public that is often suspicious of the “green” organizations.

The low-key message of linking human behavior to the water is effective and non-offensive. Increased numbers of calls reporting stream concerns and increased invitations to speak at local business and non-profit organizations support the effectiveness of this method. Giving suggestions of active, positive behaviors strengthens our campaign.

### ***What Are the Problems? What Does Not Work?***

Funding for protection is a problem. There is no concrete “on-the-ground” results to show for efforts with protection as a goal as there would be for restoration. Thus, these projects are less appealing to funding sources as visible, identifiable results are not also available. Although over time it has been repeatedly demonstrated that protection is a cheaper approach than restoration, the visible results of restoration often receive priority in funding. In addition, protection is on-going. Funding agencies are frequently unwilling to support on-going efforts. Thus, each grant cycle requires creative changes to get funding even when the already operative process is working. It is not unusual for the population to question why funds are being put toward water quality issues where there appears to be no problem. For small communities, the burden of justifying a funding budget to the politicians and the public is an on-going challenge.

Designing appropriate evaluation tools is also a challenge. The effectiveness of an awareness campaign is hard to measure. Smaller projects that involve individual activity can easily be evaluated, but projects that maintain or improve a high quality system cannot be evaluated in the short-term. In addition, there are few tools readily available for evaluating a protection message.

Protection in almost all its forms is a low priority. Funds, staffing, and equipment allocation for protection are almost always on the budget bubble. Only mandatory permit requirements or agency mission ensure that funding for these activities remains in the budget.

Without visible issues, convincing residents that there is a problem remains a challenge. It is hard for residents to imagine what they do has an impact on water quality if there is no visible consequence.

Demands on staff almost always conflict with needed efforts. In small communities with limited resources, finding time to do the job well is an on-going challenge. Keeping up the energy of our membership is one of the most difficult long-term challenges.

## ***Conclusion***

Meeting the challenge of protection of high quality resources is a problem faced by many of the smaller urban areas brought in to the Phase II NPDES stormwater permitting program. By consolidating efforts and sharing messages and results, a more professional, stronger program can be developed. The program must combine messages with hands-on activities on a community level to encourage involvement. Essential to the success of the program is removing the barrier of awareness of residents and visitors alike; their individual activities can and do impact the environment. The effectiveness of this effort is difficult to measure and can perhaps be best measured by the priority that the public and political forces direct toward water quality protection in both individual practices and decision making.

# Minnesota Water – Let’s Keep It Clean: A Stormwater Education Collaboration for the Twin Cities Metro, Minnesota

## Ron Struss

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### Abstract

This manuscript describes two NPDES Phase II educational programs and reviews different approaches to how construction site erosion and sedimentation control education can be implemented. In addition, some lessons learned from implementing these two program approaches are presented and discussed.

This manuscript draws on the University of Minnesota Erosion and Sediment Control Certification Program, which is currently required education for contractors working on County State Aid and Minnesota Department of Transportation projects. States in addition to Minnesota have similar programs and are compared, along with the national Certified Professional in Erosion and Sediment Control (CPESC) program.

The second NPDES education program presented is the Stormwater Management for Construction Impacts "Stormwater-Basics-for-Builders" project. This is a construction site erosion and sediment control education effort led by the Builder Association of the Twin Cities with support from the Minnesota Pollution Control Agency, construction organizations, and technical and education entities including the University of Minnesota.

## Introduction

Based on a history of collaborative water resource education, Twin Cities Metro Area stormwater education media campaigns have been delivered, on and off, since 1999. The campaigns have focused on largely the same messages:

- Streets are connected to lakes, rivers, and wetlands by storm sewers.
- Phosphorus is the nutrient that turns lakes and rivers green with algae.
- Clean streets mean clean water – rake up leaves, sweep grass clippings, pick up pet waste, and use phosphorus-free lawn fertilizer.

The campaigns have been delivered by a sub-committee of Metro WaterShed Partners, a collaboration of 40 organizations and agencies in the Twin Cities Metro Area, and are based on these concepts:

- Public outreach stormwater messages are largely the same; it makes sense to pool efforts.
- Placing messages in the Twin Cities media market is expensive; it makes sense to pool resources.
- Media campaigns are not to be stand-alone efforts; they need to be augmented by locally delivered messages and activities to achieve behavior change.
- Media campaigns will both 1) place messages in metro area media, and 2) make ready-to-use materials available to local units of government for their stormwater education efforts.

Three different media campaigns have been conducted since 1999. Of note is the shift from regional and state funding in 1999 and 2003-2004 to funding by MS4s in 2005.

Campaign	Budget	Funding	Products	Consultant	Evaluation
1999 Think Clean Water	\$200K	Regional gov't	Print ads, radio ads, grocery bags, etc. Resource book for MS4s	Yes	Formal – telephone survey
2003-04 MN Water – Let’s Keep it Clean	\$140K	Regional, state, &	Print, radio, TV Resource website for	Yes	Pending - on website

		fed gov't	MS4s		effectiveness
2005 MN Water – Let's Keep it Clean	\$39K	MS4s	Print, radio, TV Resource website for MS4s	No	Informal – web visits

Television outreach noted in the 2003-2004 and 2005 campaigns was not in the form of paid ads, but a collaborative of KARE 11 TV, StormCenter, and Metro WaterShed Partners with funding coming from a \$30,000 U.S. Forest Service Grant. The goal of the program was to have one water related story per week over a year; the goal was 50% met. However, what was shared was of quality and reached millions.

***Observations and conclusions on the Twin Cities stormwater media campaigns:***

- **Collaboration is not a problem:** Water resource educators on the consultant, city, county, watershed, state, and federal levels in the Twin Cities metro area see the benefits in collaboration and are willing to share efforts.
- **Message selection is not a problem:** There has been good consensus on a phosphorous runoff reduction message.
- **Consultants do help:** Media consultants are expensive, but they assist in focusing efforts and creating high impact products. There is the need to be a smart consumer of media consultant services; otherwise, it is possible to be overcharged or provided products that are easiest for the firm to produce. One option is to hire one consultant for strategy development and another for product development and placement.
- **Pay attention to detail:** The more care and attention a campaign is given, the greater its potential for longevity and impact. Designate a program coordinator with adequate hours to provide timely contacts with MS4 staff and the media to extend the value of the work done.
- **Evaluation is necessary:** Impact evaluation is expensive, and results can be debatable. That being said, the longer a campaign continues without evaluation the more it operates on guesswork and the less anchored it becomes.
- **Local seems better:** An evaluation result of the 1999 campaign is that local newsletters and local newspapers had more visibility and influence than metro-wide forms of media.
- **Web site is a no-brainer:** Making stormwater education resources available to MS4 staff via a Web site is much more logical than through other venues such as CDs or three-ring binders.
- **Funding is difficult:** Effective media campaigns in the Twin Cities market require an excess of \$200,000 per year. Raising that money for a stormwater education campaign is difficult. Grant fund sources rarely are interested in long-term programs and Minnesota MS4s do not pay permit fees that can be tapped into. Collecting funds from individual MS4s, the current mode of funding, is difficult, time consuming, and not equitable when only a few fund a program that benefits many.
- **Outreach is low priority of MS4s:** Stormwater education is a permit requirement, and MS4s agree to its need, but for many it remains a low priority. In a 15% sampling of MS4 cities, 100% of interviewed staff said having a stormwater education resources Web site for MS4s is a good idea. But after receiving five e-mail notices about the site, only 44% were aware of it and only 30% had used materials from it.
- **Media outreach is not for the weak of heart:** *"I know half my advertising dollars are wasted - I just don't know which half!"* is an oft quoted marketing saying and it is true. Large amounts of money are spent with no assurance of impact.

## *Twin Cities Metro Area – The “lay of the water”*

Minnesota’s Twin Cities Metro Area is an area of lakes – Minneapolis’ moniker is “A City of Lakes.” It is also an area of rivers – three main rivers, the Mississippi, Minnesota, and St. Croix converge in the metro area, and trout streams still survive, albeit tenaciously, within its borders. Water makes up a large part of the Twin Cities psyche, and for the state of Minnesota for that matter—the birthplace of water skiing and the state with the highest per capita holders of fishing licenses.

It is an area of watershed management organizations. A 1982 law divided the metro area into 37 watershed management organizations, 14 of which are organized as watershed districts with taxing and regulatory authority. The larger watershed districts have annual budgets of \$4 million with education budgets in the \$250,000 to \$400,000 range.

It is an area of MS4s, local units of government that are required to implement Storm Water Pollution Prevention Plans under permits with the Phase II Stormwater Program. There are 121 cities and townships, six counties, and three watershed districts involved with the program. The area’s two core cities, Minneapolis and St. Paul, have permits under the Phase I Stormwater Program. Half of the state’s population of five million lives in the seven counties that comprise the metro area.

Finally, it is an area with a history of educational collaboration. Metro WaterShed Partners, a collaboration of 40 water education agencies and organizations, has been in operation since 1996. The group meets monthly to network and educate themselves and to work on joint efforts, including the stormwater education outreach programs shared in this paper. Typically monthly meeting attendance is twenty. More information can be found at the following Web site: <<http://cgee.hamline.edu/watershed/Partners/>>.

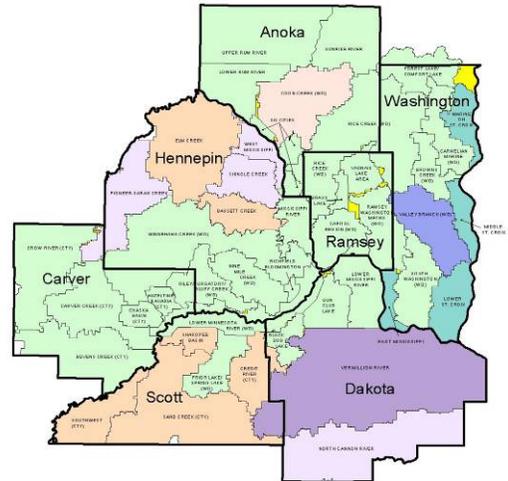
The Minnesota Pollution Control Agency, the EPA delegate in Minnesota, participates in Metro WaterShed Partners and supports its collaborative projects with funding and staff, but due to limited staff has not taken leadership in stormwater education.

In short, the Twin Cities is an area that:

- Is identified by water,
- Manages water by watershed units, some with taxing and regulatory powers,
- Has a history of regional collaboration on water education,
- Has 130 MS4s, and
- Has limited state agency leadership in stormwater education.

The vision for regional stormwater education starts with Metro WaterShed Partners.

**Metro WaterShed Partners cuts its teeth on regional outreach with a series of interactive displays:** After its formation in 1996, Metro WaterShed Partners quickly undertook collaborative stormwater education projects. The first was a series of stormwater education displays developed by the Science Museum of Minnesota with a \$100,000 Metropolitan Council regional government grant.



Displays were completed in 1997 and are still in use by groups across the metro area on a loan basis. Included is a “What is Your WaterShed Address” puzzle map, a “Your Street Flow to the River” storm drain exhibit, and “What is a Watershed” simulated rainfall model that compares natural and urban watersheds. An interactive computer kiosk unit was added in 1998. An evaluation of display effectiveness showed that 92% of people educated with the display could correctly identify a watershed.

**1999 “Think Clean Water” media campaign**

The next public outreach undertaken by Metro WaterShed Partners was the “Think Clean Water” media campaign in 1999. The campaign was funded by a \$200,000 Metropolitan Council regional government grant, and shared two main messages:



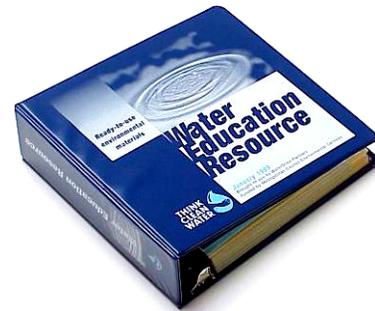
- 1) Keep leaves, grass clippings and fertilizer off streets and driveways, and,
- 2) Use a lawn fertilizer with a “middle number” of 3 or lower (3% P<sub>2</sub>O<sub>5</sub>).
- 3) It was not the intent that a media campaign in itself would change public behavior. Rather, it was designed to be an awareness-raising tool to mutually support clean water messages delivered on local and personal level by cities and watershed organizations.

A subcommittee of Metro WaterShed Partners members steered the effort, comprised of:

- Dakota County Environmental Education
- Center for Global Environmental Education, Hamline University
- Metropolitan Council, Regional Government
- Minneapolis Park & Recreation Board
- MN Department of Agriculture
- MN Board of Water and Soil Resources
- MN Department of Natural Resources
- MN Pollution Control Agency
- Ramsey Washington Metro Watershed District
- St. Paul Neighborhood Energy Consortium
- University of Minnesota Extension

A media consultant, The Poll Group, was hired to provide creative and media relations expertise. Elements of the campaign included:

Campaign development costs – Poll Group Consultants	\$20,000+
Newspaper ads, 3X week / 2 weeks in daily papers, 1X week / 4 weeks in weekly papers	\$42,000+
Grocery foods bag message – 5 million printed	\$12,000
Radio ads – two 30-second spots during mid-April to mid-May. Frequency?	\$30,000
Refrigerator magnets 22,000	\$7,000
Publications distributed at popular Twin Cities garden center chain	\$1,000
Water Education Resource stormwater education resource guide – 362 distributed	\$8,000
Press releases to local press	\$0
Workshops for city and watershed educators	\$1,000+
Evaluation – 610 telephone surveys in 6/99	\$10,000
<b>TOTAL</b>	<b>\$200,000</b>



**Informal observations:**

- Print ads were not striking and difficult to spot on the page even when looking for them.
- Slogan, “Think Clean Water” is not action-oriented.

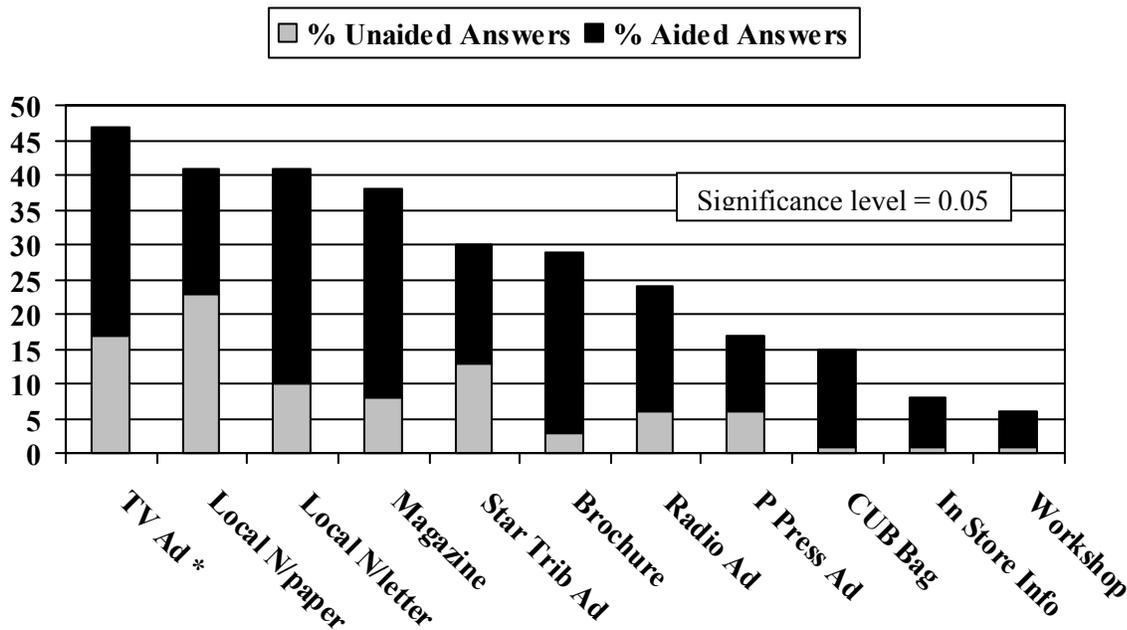
**Formal evaluation:**

Telephone survey was made by Rockwood Research, New Brighton, MN, a firm no longer in business. Six hundred and ten (610) calls were made during June 1999, providing a significance level of 5%.

**Have you heard or read anything about the campaign’s messages in the past year?**

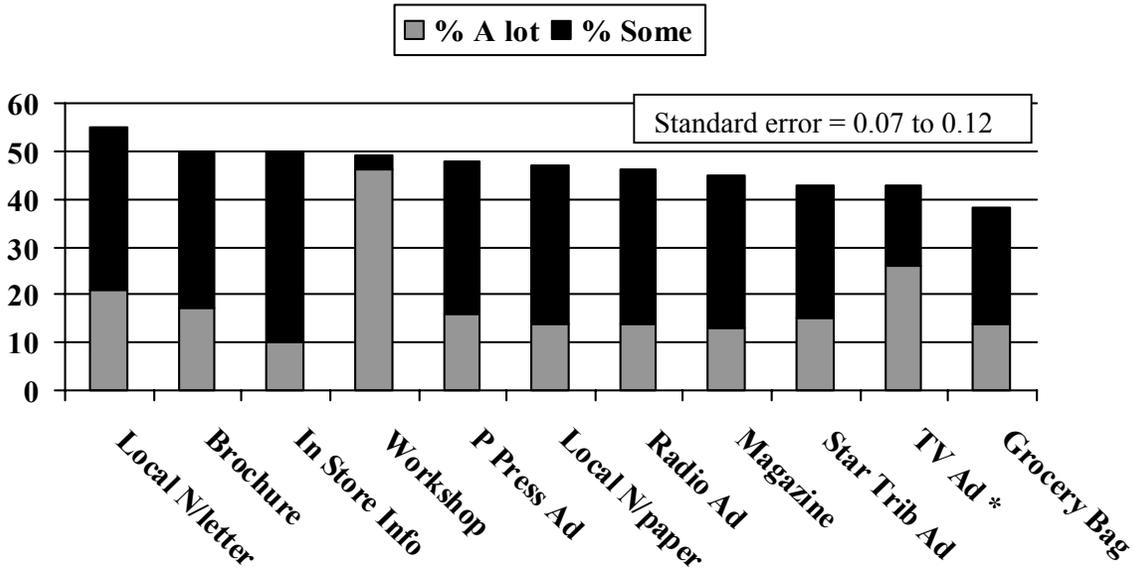
	Yes	No	Don't Know	Refused to Answer
Using low phosphorus fertilizer	57%	38%	4%	1%
Keeping leaves out of the street	49%	49%	2%	1%

**Where have you heard or read messages about these issues?**

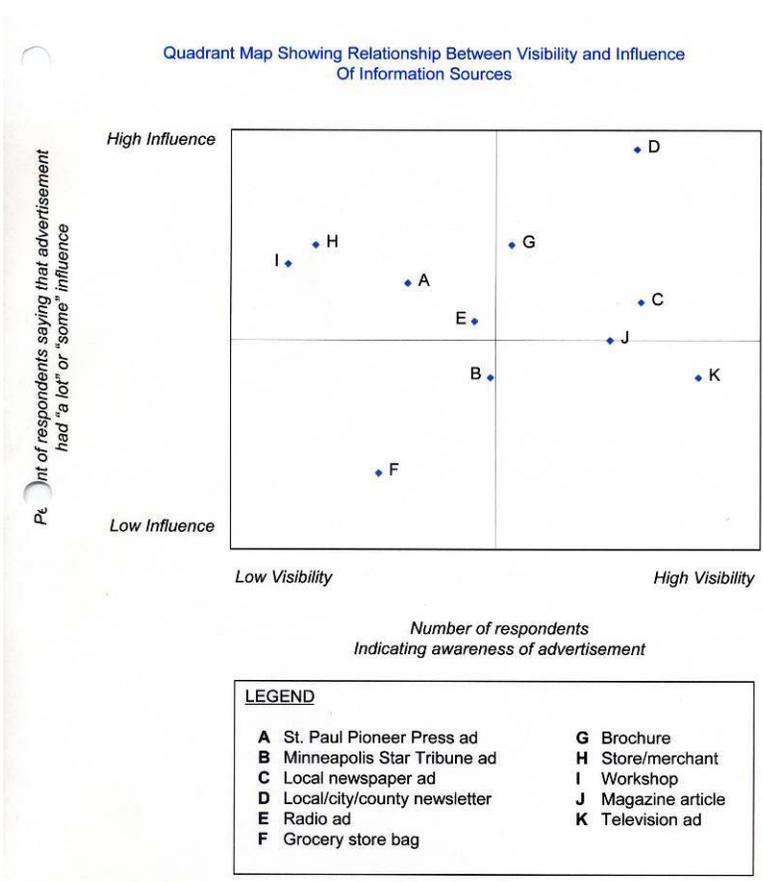


\* **Note:** Television ads were not a component of the campaign. Although television coverage of these issues could have occurred during the campaign period, no specific incidences were recalled.

If you have heard or read a message in here, how much influence did it have on your yard care



\* Television ads were not a component of the campaign. Although television coverage of these issues could have occurred during the campaign period, no specific incidences were recalled.



**Observations and conclusions on evaluation results:**

- Although the media campaign did not include television, television was rated the highest in visibility, even ranking second highest in the number of unaided answers to the question “Where have you heard or read messages about these issues?” One explanation is that television coverage on these issues occurred during the campaign time period through efforts separate from the campaign. That is a possibility, although no specific news story or feature was remembered by subcommittee members. Another explanation is that peoples’ recall is imperfect, which casts doubt on the other results in the survey.
- The survey depended on self-reporting. Discrepancies exist between what people say they think and do and what they actually think and do.

Disregarding the television anomaly and concerns about self-reporting, the subcommittee drew the following conclusions from the survey:

- Local delivery provided more impact: Local weekly community newspapers had high visibility and high reported influence on behavior. This may be because weekly community newspapers stay in the residence longer and concern issues that are closer to “home.”
- Workshops have low visibility, but high reported influence on those who attend.

***2003-2004 “Minnesota Water – Let’s Keep it Clean” media campaign***

Following the 1999 “Think Clean Water” campaign, a year passed with no collaborative stormwater media campaign. This occurred because of “people being busy,” a lack of a long-range strategy for program funding and delivery, and no one organization or individual having program responsibility.

In October 2001, a meeting was held to discuss the potential of continuing a Twin Cities Metro Area stormwater education media campaign. Strong support was given, and in the same month a grant request for \$180,000 was submitted to Metropolitan Council for a “Metro Think Clean Water Communications Campaign II” program. Metropolitan Council is the regional unit of government that funded the initial \$200,000 “Think Clean Water Campaign.” Metropolitan Council balked as no other financial sponsor for the program was included, and they felt the program needed to achieve broader financial support.

In October 2002, a second grant request was submitted to Metropolitan Council, this one for \$101,000 with a \$75,000 parallel grant coming from the Minnesota Office of Environmental Assistance, a state agency. An additional \$20,000 parallel grant funds was secured from the Minnesota Pollution Control Agency. In the end, an \$140,000 program was funded with \$50,000 from Metropolitan Council, \$40,000 from the Minnesota Office of Environmental Assistance, and \$20,000 from the Minnesota Pollution Control Agency. A subsequent \$30,000 grant from the U.S. Forest Service, USDA funded the KARE11 / StormCenter “Water for Life” project to feature stormwater stories on television news and weather.

Once again an activity of Metro WaterShed Partner’s, the program’s subcommittee involved the following members:

- City of Plymouth
- City of St. Paul
- Metropolitan Council Environmental Services
- Minneapolis Parks and Recreation Board
- Minnesota Department of Agriculture



- Minnesota Office of Environmental Assistance
- Minnesota Pollution Control Agency
- Ramsey Washington Metro Watershed District
- University of Minnesota Extension Service
- US Forest Service, USDA

Elements of the campaign included:

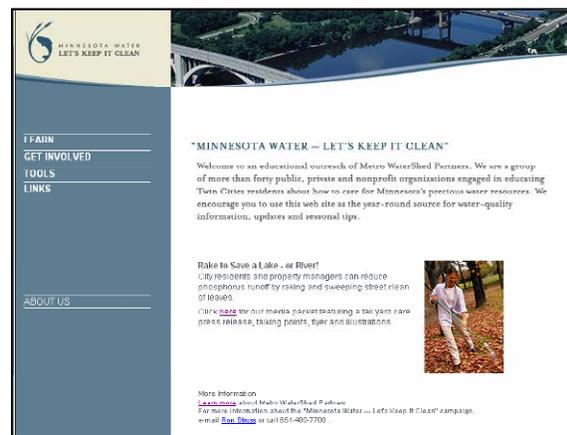
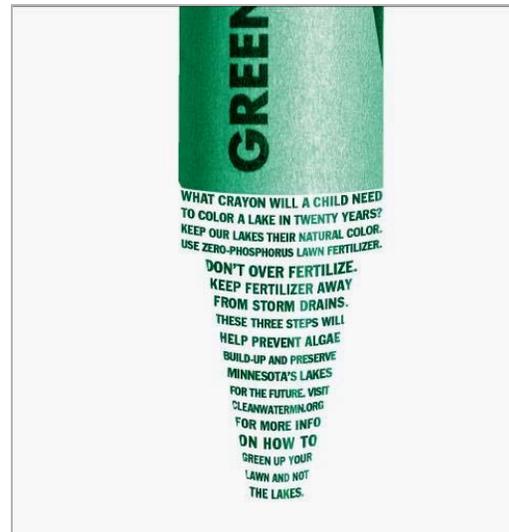
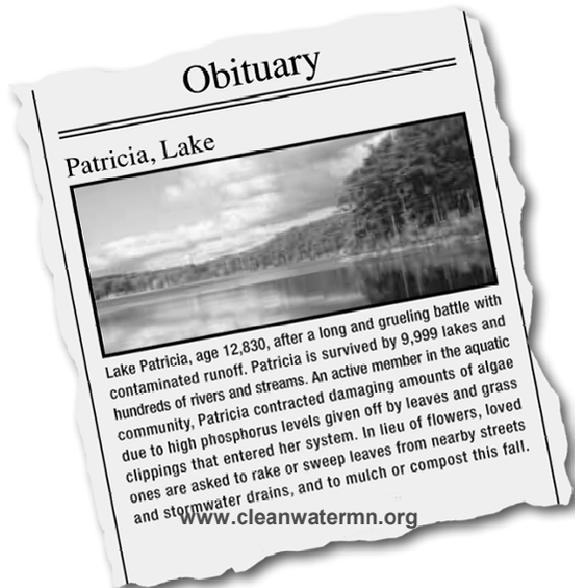
**Request for Proposals/ Selection Process for Media Consultant:**

Fourteen RFPs went to firms with a history of environmental and behavioral change campaigns. Eleven responded and three were interviewed. Periscope Inc., a full service media consultant firm in Minneapolis, was selected.

**Product development and delivery:**

<b>Message determination, campaign theme, and logo development:</b> Decision to replace “Think Clean Water” theme and logo with “Minnesota Water – Let’s Keep it Clean”	\$76,420 consultant contract
<b>Fall 2003 “Lake Obituary” ad:</b> Ad encouraging raking streets clean of leaves. Minneapolis Star Tribune (3X), and Pioneer Press (2X). \$1,500 ad placement cost.	
<b>Fall 2003 media releases to major outlets:</b> “This Rake Can Save a Lake” kits to key outlets (actual rake with message attached).	
<b>Fall 2003 media coverage of the “Lake Obituary” ad:</b> TV 5 Minneapolis and Great Lakes Public Radio. “Earned media” - no placement cost.	
<b>Spring 2004 “Green Crayon Ad”:</b> Ad encouraging use of phosphorus-free fertilizer. Eleven community papers for two weeks. \$2,224 ad placement cost.	
<b>Spring 2004 “Algae World” Radios ads:</b> Ad encouraging use of phosphorus-free fertilizer and sweeping of grass clippings. 274 spots over three mainline stations. 30% reach of target audience. \$16,000 placement cost.	
<b>www.CleanwaterMN.org website:</b> Designed to be a stormwater education resource site to assist MS4s in their public education efforts. Also developed public content pages. \$15,000 development cost.	
<b>Clean water stories on KARE 11 TV:</b> Year-long “Water for Life” project started with largest TV station in metro area. Commitment to one water related story a week. Collaborative with StormCenter, KARE 11 and Metro WaterShed Partners, with the U.S. Forest Service providing a \$30,000 grant.	\$30,000
<b>Workshops:</b> 2004 turf grass management training for landscape professionals, and stormwater education programming workshops for city and watershed staff.	\$1,500
<b>Evaluation:</b> On www.cleanwatermn.org website effectiveness	\$4,000
<b>Staff support:</b> 25% FTE program coordinator, 10% administrative support (website)	\$28,080

Formal evaluation on the www.cleanwatermn.org Web site will occur before January 2005 using the services of the University of Minnesota Technology Usability Lab. Informal evaluation has been done by tracking Web site visits following the placement of outreach products. A description of this is given in the next section.



**2005 “Minnesota Water – Let’s Keep it Clean” media campaign**

At the end of Spring, 2004, grant funding was depleted for all but program evaluation work. An appeal to MS4s, cities, counties, and watershed districts was made to gain support to continue the “Minnesota Water – Let’s Keep it Clean” program. To date, \$39,000 has been provided by six cities, four watershed organizations, and one county.

The work team is comprised of contributing MS4s and other key stormwater education contacts:

- Bassett Creek Watershed District
- City of Andover
- City of Eden Prairie
- City of Farmington
- City of Minneapolis
- City of Plymouth
- City of St. Paul
- City of Woodbury
- Minnehaha Watershed District

- Mississippi Watershed Organization
- MN Department of Agriculture
- MN Pollution Control Agency
- Ramsey Washington Metro Watershed District
- Rice Creek Watershed District
- UM Extension Service
- Capitol Region Watershed District

University of Minnesota Extension Service has concluded project coordination responsibility and the program is operating as a self-directed group, with shared leadership responsibilities.

The program is now working without the support of a media consultant. For the time being, the program is extending and building on the materials that were provided by Periscope, Inc. during the 2003-2004 campaign.

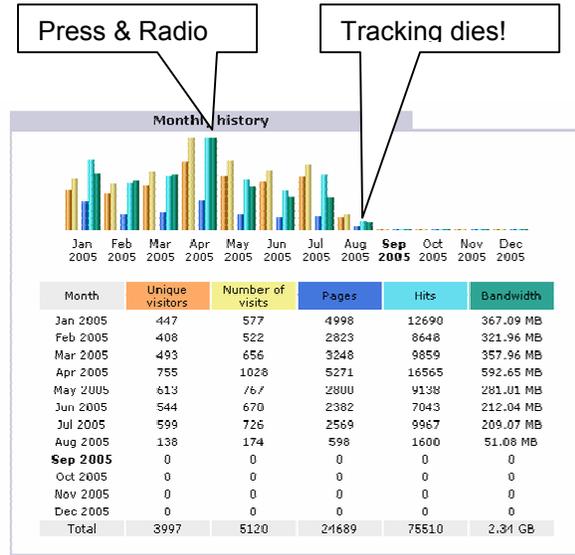
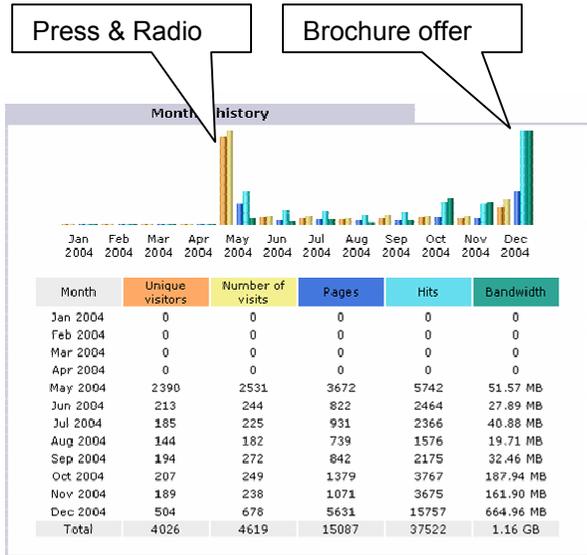
Accomplished work under the MS4 funded approach is:

<b>Spring 2005 “Green Crayon Ad”:</b> Ad encouraging use of phosphorus free fertilizer. Minneapolis Star Tribune (6X), and Pioneer Press (3X). \$10,610 ad placement cost.	\$10,610
<b>Spring 2005 Radio Sponsorships:</b> 34 sponsorship spots 15 seconds long encouraging the used of phosphorus free fertilizer. \$4,800 ad placement cost.	\$4,800
<b>Summer 2005 Neighborhood Night Out Event Packets:</b> 600 storm drain awareness info sheets with offer for speaker for neighborhood events. No requests were made. \$723 printing & placement.	\$723
<b>Summer 2005 WCCO Radio State Fair Bag Stuffers:</b> 90,000 brochures encouraging sweeping of grass clippings and raking of leaves from street. \$4,015 printing & placement	\$4,015
<b>Fall 2005 Radio Ads: WCCO radio,</b> 112 ads last wk Sept. / first wk Oct 24% reach of over 25 yr olds. \$14,800 ad placement cost.	\$14,800
<b>Spring 2005 Media Packets on <a href="http://www.cleanwatermn.org">www.cleanwatermn.org</a> website:</b> Media packets designed for MS4 use were made available in April on lawn fertilization, lawn mowing, and car washing. Fall yard care tips were added in August. \$6,000 annual website support.	\$6,000

Evaluation has been done by tracking visits to the [www.cleanwatermn.org](http://www.cleanwatermn.org) Web site. All outreach products direct people to this resource for further information.

Initially, discernable increases in website visits occurred during media campaigns. Increases from later campaigns have been less pronounced – see examples below. Explanations are speculative; one being individuals prone to visiting the site did so in the earlier campaigns and have not returned subsequently.

Moreover, a failure in Web site data recording starting August 9, 2005 prevented an impact measurement of the 90,000 clean water flyers distributed at the Minnesota State Fair.

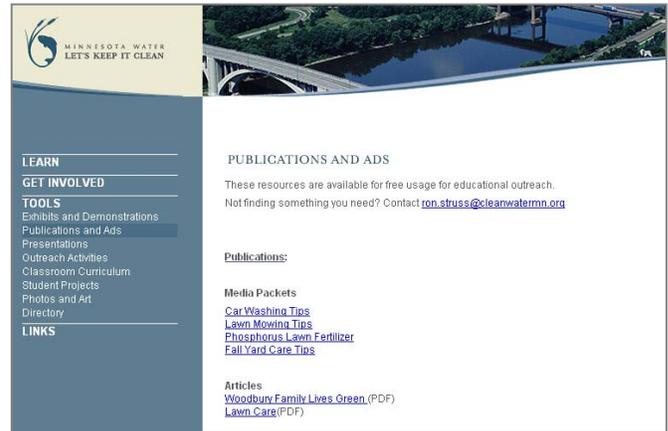


**Media packets**

Media packets were added in Spring 2005 on three topics and since then a Fall 2005 packet has been added. Each packet typically has a press release, talking points, bill stuffer flyer, publication, and illustrations.

**Evaluation of website use by MS4s**

A formal evaluation of www.cleanwatermn.org Web site usability by the target audience of MS4 staff is planned before January 2006 utilizing the services of the University of Minnesota Technology Usability Lab. Meanwhile, a telephone survey of 18 MS4 staff was made in September 2005, a 15% sample size of the individuals who have received regular e-mail notices of the Web site’s resources. Results were:



Are you aware of the website?	Yes – 44%, No – 56%
If no, is the idea of a stormwater education resource site a good one?	Yes – 100%
If aware, have you visited?	Yes – 100%
If you visited, have you made use of materials you found there?	Yes – 63%, No – 37%

Obvious issues are that less than half of MS4 staff contacted are aware of the Web site, although everyone thought the concept was a good idea. Of the ones who have visited the Web site, over half have used resources from it. The website obviously needs to be marketed more – although five e-mails have gone out on its existence. How earnestly MS4s are seeking stormwater education resources remains in question—it could be a low priority within their operations.

***2006 “Minnesota Water – Let’s Keep it Clean” – plans for beyond***

Letters of request for 2006 program support have gone out to MS4s. The level of 2006 campaign activity will be based on the level of support received.

The work team is continuing on a “self directed team” basis, dividing up administrative and creative responsibilities among themselves.

## Collaborative Approaches to Stormwater Education: Ours to Protect Regional Partnership

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*Detroit, Michigan*

### Abstract

With over 170 communities in Southeast Michigan affected by the federal Phase II Stormwater Regulations, continued concern by the public about the quality of our water resources, and with increasing fiscal stress being experienced by local government, the need for intergovernmental cooperation has never been greater. In response, SEMCOG formed the Southeast Michigan Partners for Clean Water, comprised of representatives from various communities and professional organizations throughout a seven county region with approximately five million people.

The partnership effectively leverages resources by coordinating stormwater public education activities and applying consistent messages. In addition to leveraging resources, the “Our Water. Our Future. Ours to Protect.—Seven Simple Steps to Clean Water” campaign is designed to improve the environment by engaging the region’s citizens in water quality “friendly” actions.

The partnership developed a variety of outreach tools such as written materials, print media, a survey, and public service announcements. Each tool focuses on how personal practices affect water quality. The partnership also coordinates activities and events that support distribution of the campaign messages, including Water Week 2005, river crossing sign installation, and a regional water quality survey.

### ***Introduction***

This manuscript will highlight some of the activities partners have successfully incorporated into their Phase II public education plans. One activity involved working with a local newspaper to print a water quality campaign advertisement every week during summer months. Another activity involved installation of 50 river crossing signs throughout a community. A third activity involved using the “Seven Simple Steps” campaign resources and survey results as a means for additional leveraging with other organizations enabling a focus on local concerns and interests.

### ***Background***

Pollution of Southeast Michigan waterways continues to concern the public and local governments. In many parts of the region, the public’s ability to recreate in lakes and streams is limited by water pollution.

A recent SEMCOG survey found that only 31 percent of respondents were satisfied with the quality of the region’s lakes and streams. However, this survey also found that the public is willing to take action to protect water resources. Almost 75 percent of those surveyed said they would be willing to do such things as recycle hazardous wastes and change fertilizer and car washing practices.

SEMCOG is the designated Areawide Water Quality Planning Agency in Southeast Michigan under the Federal Clean Water Act. In 1978, SEMCOG published the Water Quality Management Plan for Southeast Michigan. The plan was updated in 1999 to address current water quality issues and needs. The revised plan focuses on restoration and maintenance of designated uses for surface waters and advocates for an inter-municipal approach for protecting water quality. One of the goals of the plan is to

provide educational programs for Southeast Michigan stakeholders, including programs that advocate voluntary pollution prevention actions and stewardship of our water resources by the public, government, and business. Implementing a regional education campaign is a key component in implementing the Water Quality Plan.

In addition to the public's concern about water resources and requirements of the Water Quality Plan for Southeast Michigan, local governments are involved in restoring water resources in order to protect public health, safety, and welfare and comply with state and federal laws. Over 160 communities in Southeast Michigan are impacted by the federal Phase II Storm Water Regulations, which require these communities to obtain a permit for their stormwater management. The regulations encourage land use practices that are consistent with water resource protection and include an educational component to teach the public about how they can take action to reduce water pollution.

### ***The Southeast Michigan Partners for Clean Water***

With the federal Phase II Stormwater requirements affecting many communities that are SEMCOG members, SEMCOG established the Southeast Michigan Partners for Clean Water to coordinate stormwater public education activities to help save local dollars and to send consistent messages. These messages are intended to be action-oriented, with the primary goals of protecting water resources and meeting permit requirements. The Southeast Michigan Partners for Clean Water includes representatives from various counties, communities, watershed councils, the private sector, and water quality professionals in Southeast Michigan.

The Southeast Michigan Partners for Clean Water also decided that delivery of the messages would be most effective using a two-pronged approach. Region-wide public education would be one level of distribution of the messages. This effort would be most effective for dealing with broader distribution mechanisms, such as regional media outlets, and could be used to develop materials that would be utilized at both the regional and local level. The second part of the delivery system would be done locally. The messages would be delivered through brochures, newsletters, workshops, river crossing signage, print ads, and local media. This would allow the overall key messages to be tailored to an individual community's issues and concerns.

### ***“Our Water. Our Future. Ours to Protect.—Seven Simple Steps to Clean Water” Public Education Campaign***

This public education campaign was initiated to assist the 160 communities in Southeast Michigan that are impacted by the federal Phase II Stormwater Regulations, which require these communities to obtain a permit for their stormwater management. The regulations encourage land use practices that are consistent with water resource protection and include an educational component to teach the public about how they can take action to reduce water pollution.

This low-cost, regional education campaign to clean and protect Southeast Michigan's water resources and meet federal regulations is highly effective and cost-efficient. The advantages of regional cooperation are the development of a single set of key messages for the general public that are delivered and reinforced at both the regional and local level. Utilizing a single campaign region-wide has saved time and money for local units of government by providing economies of scale in the production of print materials and promotional items. The result is two-fold—the campaign meets federal water quality requirements and educates citizens on how to improve water quality.

The “Seven Simple Steps to Clean Water” were officially launched on Earth Day 2004 and include activities that citizens can do to help protect water resources. The Seven Simple Steps to Clean Water are:

- 1) Help keep pollution out of storm drains,
- 2) Fertilize caringly and sparingly,
- 3) Carefully store and dispose of household cleaners, chemicals, and oils,
- 4) Clean up after your pet,
- 5) Practice good car care,
- 6) Choose earth friendly landscaping, and
- 7) Save water.

Each of the seven tips was released with a poster and tip card (illustrating the concept and outlining several specific tips on how to accomplish the step), a newsletter article, and a print advertisement. Other materials developed for the overall campaign include: displays, “giveaway” items such as a children’s activity sheet, magnets, and water bottles, and a Web site that has garnered approximately 5,000 hits per month.

With regard to media coverage, the “Our Water. Our Future. Ours to Protect.” campaign successfully partnered with various local media in providing print, radio, and television coverage of the regional campaign. Seven public service announcements were also developed and have aired on various networks within Southeast Michigan.

### ***A Collaborative Approach to Stormwater Education***

The Southeast Michigan Partners for Clean Water (Partnership) used a five-stage social marketing process to deliver the messages of the “Our Water. Our Future. Ours to Protect” public education campaign. More specifically, this marketing process involved planning, message and material development, pre-testing, implementation, and an evaluation phase.

#### **Stage I: Planning**

The planning stage of this process forms the foundation upon which the rest of a given program can develop. It is critical at this stage to perform research on the target audience; do they understand what the issue or problem at hand is, and what are their attitudes and behaviors associated with the issue?

The partnership, having similar goals to protect water quality and also meet federal Phase II Stormwater Regulations, implemented the planning stage through the development of a statistically significant regional survey that was performed in 2004. The purpose of the survey was to perform research on the campaign’s target audience, with the primary goal of determining the public’s awareness about their water resources and their willingness to engage in activities to help protect these resources. Collaboration among the partnership allowed for the leveraging of resources, which in turn made the survey more financially feasible to all of its members.

Overall, the survey revealed that residents in Southeast Michigan are concerned with the quality of the region’s rivers and lakes. 64% think that the quality of the rivers, lakes, and streams in their communities is the same or worse than in the past. Additionally, although concerned with the quality of these resources, residents continue to value and use the resource(s) through numerous recreational activities.

## **Stage II: Message and Material Development**

The second stage of the process involves message and material development, which includes identifying channels, developing the key message(s), and creatively writing the message(s). Because there are typically numerous distribution channels, it is important to select the most effective and efficient way in which to reach your audience. The term “effective” can relate to the way you convey your message to attract attention and inspire change. The term “efficient” can refer to reaching the most audience for the amount of money expended. It is therefore beneficial to use multiple channels because messages are more likely to be remembered through increased frequency. Commercials and billboards, while effective, provide only a small amount of information. On the contrary, Web sites and brochures and other print materials provide the opportunity for more in-depth information sharing.

In order to promote the “Our Water. Our Future. Ours to Protect.—Seven Simple Steps to Clean Water” public outreach campaign, a variety of information channels were utilized. At the regional level, these channels have included posters, information cards, a Web site, television public service announcements, and major newspapers. At the community level, the channels involved direct mail, billboards, radio, local television, point of purchase materials, newsletters, and community newspapers. The results of the campaign survey revealed that community newspapers, television, major newspapers, and municipal newsletters were the preferred means of receiving environmental information for residents in Southeast Michigan.

In order to develop the messages of the Seven Simple Steps campaign as described earlier, it was important to prioritize and narrow the messages to ensure efficiency of message delivery. With regard to this effort, the Partnership prioritized and chose the campaign topics based on the following: 1) Does the topic relate to nonpoint source pollution? 2) Does the topic help to address the federal Phase II Stormwater Regulations? and 3) Does the topic affect most of the region? Once the messages have been chosen, they need to be creatively executed, again, to ensure efficiency and consistency of message and message delivery.

## **Stage III: Pre-testing**

The third stage in the social marketing process involves pre-testing. There are numerous ways in which to conduct pre-testing, including focus groups. It is important to note that this can be costly. The key components of this stage include: ensuring that the message(s) is understood, that the materials developed are appealing to the public, and that there are no details that might subvert the message(s). The “Ours to Protect” campaign, having limited funding, relied primarily on the partnership’s input and individual “intercept” surveys.

## **Stage IV: Implementation**

The implementation phase is the stage in which the messages reach the target audience, so it is important to take time to plan each necessary step in the process. There are different mechanisms through which to disseminate a program’s messages and materials to the audience. One approach is to create a distribution plan. This involves determining distribution timing, distribution channels, what quantities of materials are necessary, and inventory measures. Many of the implementation elements of the “Ours to Protect” campaign have already been reviewed in this manuscript. One other component of the “Ours to Protect” implementation phase was the development of a calendar of messages. The calendar, which was developed by the partnership, was also shared with local governments in an attempt to coordinate the distribution of the messages throughout the region.

### **Stage V: Evaluation**

The final stage in the process is evaluation. Why evaluate an outreach program? The evaluation stage helps gauge the effectiveness of the program and should be seen as an opportunity to prove that the program is making an impact. Evaluation also helps to set a baseline and can serve as a guide for making necessary changes to a program. Challenges to the evaluation process include lack of resources to conduct the information gathering and unrealistic expectations of how quickly messages are heard and behaviors or attitudes are changed. In the future, the Southeast Michigan Partners for Clean Water will conduct another survey to determine how Southeast Michigan residents view their water resources. These results can then be compared to the results of the first survey to help determine what, if any, changes need to be made to the “Ours to Protect” public outreach efforts.

### ***Conclusions***

In order to continue the successful promotion of the “Our Water. Our Future. Ours to Protect—Seven Simple Steps to Clean Water” campaign, SEMCOG and the Southeast Michigan Partners for Clean Water will continue to notify local governments, the media, and the public about the calendar of messages for the Seven Simple Steps to Clean Water topics. The topics will be revisited by the partnership on a seasonal basis. The partnership will also continue to incorporate the campaign’s messages in local initiatives and events.

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# Using Research to Improve the Effectiveness of Communications

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## **Abstract**

This manuscript will address how to effectively communicate with the public in our non-point source pollution control programs. It addresses the science behind effective communications beginning with how new ideas are diffused through society, how we evaluate ideas and how we are sold or buy into new ideas. It will also discuss the reasons audiences are segmented and what the basis is for segmentation. Finally, it covers what market research to conduct and how to conduct it so that communications are most effective.

## ***Introduction***

As part of our programs to reduce stormwater runoff and non-point source pollution, we will be communicating with the public with the intention to change their behavior. But we are scientists, not advertising experts or public relations specialists, so there is a good chance that our efforts will be unproductive and perhaps even counter productive. However, if we approach our communications responsibilities as a science, it is more likely that our effectiveness will match our intentions.

This manuscript will cover the science behind improving communications, including:

### Diffusion of Innovations (or Ideas) Theory

- 1) How new ideas or innovations spread through social systems.
- 2) How we evaluate ideas and innovations.
- 3) What is required for us to buy or buy-in and act on ideas and innovations?

### The Rationale for Targeting Communications

- 1) Tailoring messages to the audience's beliefs and attitudes and the three demographics that predict beliefs and attitudes,
- 2) Understanding what you can change and accepting what you cannot: How values shape views, and
- 3) Social diffusion theory and selecting a target audience.

### How to Use Market Research to Improve Your Communications

- 1) Secondary research,
- 2) Primary research methods, and
- 3) What you can do yourself and what you cannot.

## A. Diffusion of Innovations Theory

Innovations and ideas sometimes spread like wildfire, sometimes they spread slowly, and in other cases they disappear for a time only to reappear later.

Diffusion of Innovations Theory explains the manner in which a new idea, technology or technique, or a new use of an old one, migrates from creation to use. According to Diffusion of Innovations Theory, technological innovation is communicated through particular channels, over time, among the members of a social system according to a system.

There are three parts of the theory:

- 1) How ideas are diffused among us,
- 2) The criteria we use to evaluate ideas and innovations, and
- 3) How ideas are “sold and bought.”

### Diffusing Ideas

When a new idea or behavior is adopted by 15 to 20 % of an audience, it has critical mass to spread on its own. Before then, it will die.

Ideas rarely instantly gain mass acceptance. More often they gain acceptance of a few important and influential members of a community, and then spread to others. The acceptance of an idea moves through a hierarchy as follows:

- 1) **Innovators.** These are the folks that are always first to take on a new idea. They are best thought of as the risk takers, willing to give something new a try simply because it is new and that is their nature. Typically innovators are well educated, of high social status, and upwardly mobile. However, not all those that fit these characteristics are innovators.
- 2) **Early Adopters.** These folks are next to try an idea and do so because they are decisive, quick to see the merits of an idea, and not afraid of risk.
- 3) **Early Majority.** This group is cautious and will wait for cues from Innovators and Early Adopters. They are risk averse, deliberate, and will carefully seek and evaluate information. They want to see results first.
- 4) **Late Majority.** This group is skeptical; they resist change and are conservative. They will wait until their turn. They are also the largest of all the segments.
- 5) **Laggards.** This group is very set in their ways and deliberately resistant to change. Acceptance will come to them very slowly no matter what is done to attempt to influence them.

### How this Applies to Communications

Think about your communications reaching different groups at different stages of a communications effort. Recognize that time is required to reach each group at a time when the communication will be received and acted upon.

- First, engage the folks that readily come to your ideas. These are the evangelists and radicals. They act as change agents that bring new ideas to the attention of Early Adopters.
- Next, engage civic or opinion leaders that can lead the three other laggard groups. Early Adopters will be found in civic organizations. They are used to taking action and leading others.
- Third, remember that real change takes time. Be patient. Be in it for the long haul. Understand the importance of early gains and slow conversion.

## How We Evaluate Ideas

Of course, one idea is not necessarily as attractive as another. Some ideas go nowhere, some spread rapidly. It has been said that a bad idea dies under its own weight and good idea is impossible to kill.

Some of the persuasiveness of an idea is dependent on the idea, but another part is dependent upon the expression of the idea. To get the most out of an idea, it is important to think about how we process ideas. Here are some of the steps we consciously or unconsciously take to evaluate an idea:

- **Complexity of the Idea.** How complex and difficult to understand is the idea?
- **Compatibility of Idea with Existing Perceptions, Attitudes and Beliefs.** Is it compatible with what we already think or know?
- **Value of the Idea.** If different than what I already know, is it better?
- **Ease of Testing the Idea.** Can I readily try out or test this idea, and what is my risk?
- **Seeing Results.** Will I see results, and how quickly?

## How this Applies to Communications

To understand how these questions work, it is useful to think about them relative to our issue, communicating the importance of non-point source pollution.

**Complexity of the Idea:** First, the words "Non-point source pollution" need to be excised from our public communications vocabulary. Aside from the term, it is a concept that is relatively easy to understand. Storm runoff can be seen as pollution, especially if it can be visually communicated. Advertisements in California that feature "rubber ducks" show how a single duck becomes a sea of ducks as runoff accumulates. However, without this kind of graphic presentation, the key point of accumulation or CONCENTRATION is missed.

**Compatibility of Idea with Existing Perceptions, Attitudes, and Beliefs.** The idea that stormwater pollution is a major source of pollution does not necessarily fit with what many know; it may be at odds with current beliefs. Many believe that industrial polluters are the primary source of pollution. Runoff as pollution makes sense, but is different than what many have come to believe. In addition, acceptance of this idea requires personal responsibility and action rather than relying on government to act. This is an additional hurdle to overcome.

**Value of the Idea.** If controlling or preventing pollution is important to an individual, then acting on non-point source pollution would also be important. The idea will have value to those who value a clean environment, and little value to those who do not.

**Ease of Testing the Idea.** It is easy to see pollution in runoff. All that is required is looking at what is carried off in the rain and to see what rain-swollen rivers look like. Thus, testing readily reinforces the idea.

**Seeing Results.** Unfortunately, complete control of runoff is a major challenge, and visible change may come slow. Measurements of improvements in water quality and publicity of those measurements would help.

## The Process of Selling and Buying Ideas

A purchase of a product or buy-in of an idea is rarely made purely on impulse. Even so-called impulse purchases are made with knowledge and influenced by expectations. How many times have you bought something you knew nothing about?

Our purchases are almost always guided through a series of steps. An easy way to think about this is what is called the A-I-D-A Model (See Table 1). Since effective communications must influence the buying or buy-in process, this model should be used to guide your communication.

**Table 1. The A-I-D-A Communications Model**

<b>A</b> is for Awareness	An individual must first be made aware of a product or idea before they will consider it.
Your first challenge as a communicator is to get the word out and expose your audience to your product or idea multiple times. Repetition of your idea in one media or reaching the target audience through multiple mediums is key.	
<b>I</b> is for Interest	An idea or product must generate enough interest to gain attention.
The next communication challenge is to cut through the clutter to create enough perceived value so that attention is gained. The product or idea must be compelling or must be communicated in a compelling way.	
<b>D</b> is for Desire	An idea or product or the presentation of the idea or product must have enough benefit to overcome inertia and create a reason for action.
It is not enough for a product or idea to simply be important or interesting. Individuals need to be compelled to change what they are doing now. Tangible or intangible benefits must be demonstrated.	
<b>A</b> is for Action	Faced with the opportunity to act, communications reinforce the appropriate action.
There is often a lag or disconnect between a desire and action. And individuals will generally face a decision or make a choice at a different time than when they were exposed to the message. Effective communications reinforce the choice at the time the decision is made.	

### **How this Applies to Communications**

Plan a campaign that over time will systemically hit each of the letters, or think about messages that will affect as many of the points of A-I-D-A as possible. Remember that overall awareness of an issue comes first, but benefits must be clear and communication at the point of decision is also helpful.

### ***B. Targeting your Audience***

Have you ever seen an advertisement and wondered who on earth that ad could possibly be intended to reach?

If an ad does not resonate with you, the ad could be:

- Intended for someone else,
- Poorly executed, in that it does not reach the intended audience, or
- Not properly targeted.

Effective advertising **REQUIRES** that the right message reach the right individual or groups of like individuals. Both the messaging and targeting can be based on science, the science of segmentation.

One of the more common mistakes in communications is to develop a communication based on what we think or what we think would work best on us. This is a mistake for two reasons. First, many people do not think or act as we do and second, those folks that do not think and act as we do may be the more important target.

Research can identify what individuals think and how they act, and research can identify groups of people with similar thinking and behaviors. We all think we are different or unique, but we usually share the way we think with others in a peer group. The science of segmentation is based on grouping individuals with similar thinking and behaviors.

### **Characteristics that Define our Thinking and Actions**

It turns out that our differences and similarities in how we think and act can be largely, but not completely, described by three characteristics:

- 1) **When we were born.** The experiences of our youth define our adult attitudes, beliefs and behaviors. Those that grew up during World War II think of the military differently than those who grew up in the 60's and differently than those that grew up during the World Trade Center destruction.
- 2) **Our Education/Income.** The amount of education affects how we perceive the world. Those that did not graduate high school have been exposed to different ideas, people and experiences than those who graduated college. We share thinking and ideas among those with similar experiences. This is also true for income since income is highly correlated with education.
- 3) **Where we were born.** Common values predominate in similar geographic areas. If we grew up on a farm in the Midwest, the prevailing community values there will have a unique imprint on us. This imprint will be different than for those that grew up in a city in the Northeast.

### **The Values and Beliefs that Drive Thinking and Action**

When we were born, where we were born and our education can be used to describe how we think and act, but they do not determine how we think and act. It is our values that determine this. Values reflect our underlying beliefs and once established, are relatively fixed and unchanging. We can be counted on to act consistently with our values.

These values can be revealed by our comments in focus groups and determined by our responses to survey questions. Ironically, a Canadian named Michael Adams has done some of the most innovative and compelling research on values. By comparing what Canadians believe, he provides insights into what Americans believe. He uses two scales or dimensions to simplify our understanding of values:

#### ***1. Authority - Individuality.***

Some of us have grown up in a world where the belief in and respect for authority prevails. Rules are set by those that are wise and we are responsible for following those rules. Failure to do so is at our own peril, that is, we live with the long-term consequences of failing to follow the rules.

Others have been brought up in a world where individuality reigns. We question everything and arrive at our own conclusions. Here experimentation is common and failure is readily forgiven.

Of course, most of us are somewhere between these two extremes, and yet we can still be described by our position somewhere on this continuum.

#### ***2. Survival - Fulfillment.***

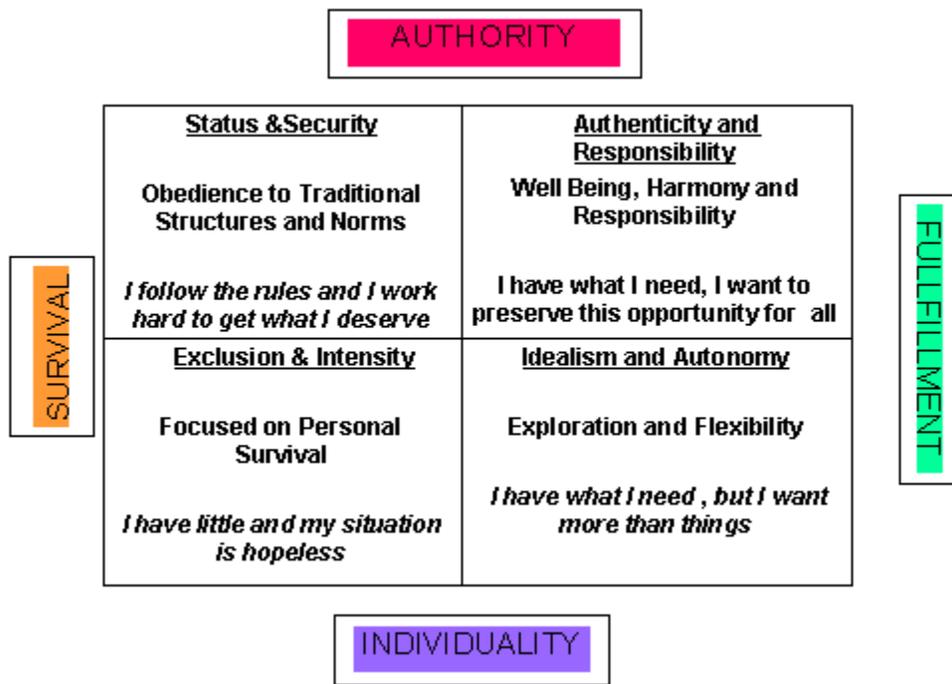
It is obvious that those that are fighting for survival will have different values than those who are not. If one is running out of food, then stealing can be readily justified. If one is physically threatened, then an aggressive response is likely. If one is continually threatened, then a predisposition to violence is the norm. While these values may seem to us to be the exception, there is in fact a sizeable portion of our population where a survival mentality prevails.

At the other end of the continuum is fulfillment, which is the luxury of those who worry little about being hungry or threatened. This segment can focus its attention on its quality of life. They are more interested in personal growth, well being, and improving society at large.

To understand these extremes, compare these two situations. A recent college graduate, after four years of an expensive education in a sheltered environment, sets out to “find” his or herself, while an inner-city youth that never graduated, has few prospects for a job, and lives in a crime infested public housing project struggles to live. These two groups are so far apart in their values that they are likely to be unable to even communicate.

These two continuums can be presented in a simple matrix that further enlightens and describes value groups.

**Figure 1. Value Groups Matrix**



**How this Applies to Communications**

When interpreting respondents’ comments, think about the respondents’ age, education, and where they have lived. This will provide clues about the segment that these comments represent. Simple analysis of census data can tell you how many of a segment there are.

Think about how you will reach and what you will communicate to various segments. Our basic values drive our thinking and behavior. Matching communications to values will make you more successful. If your target audience is a group that is respectful of authority, tell them what to do and reinforce penalties for not doing so. If your target audience is experimental, tell them what they can do and why this is important. If you audience is well off and on the fulfillment side of the continuum, stress the greater good of their actions and the need for personal responsibility. If your target audience is poor and in survival mode, do not expect them to do more than is in their direct self interest.

## ***C. Using Market Research***

Market research that you commission, conduct yourself, or glean from other sources is a key to understanding your audience. Understanding your audience is a key to communicating the right messages and targeting the right segments. You need to know the following:

- 1) Who your audience is,
- 2) What they think and do now (Perceptions, attitudes and behaviors),
- 3) What might motivate your audience or target to change?, and
- 4) Where they get their news and information.

Beginning a communications project with market research provides tangible benefits. It can suggest how to correctly target your campaigns, as well as identify audience behaviors and barriers to change. Used before you begin your communications, it can make you more successful and avoid wasted time and money.

Market research can also be used to track results and identify necessary course corrections. It can do the following:

- 1) Measure and reinforce success,
- 2) Identify when to move on to another target audience and message, and
- 3) Identify what is going right and what is going wrong.

### **Secondary Research**

Secondary research is the place to start. This research consists of collecting facts about your audience that are already published in reports or databases.

Secondary research can help you determine the following:

- 1) Who makes up your target audiences,
- 2) What binds your audiences together and how they are similar (Demographics)? and
- 3) The potential size of the audience(s).

### ***A Low Cost - No Cost Idea***

The Census Bureau <[www.census.gov/](http://www.census.gov/)> is the mother of all free sources and provides detailed demographic information for specific communities.

### ***Secondary Research: Pros and Cons***

Pros

- Often free or low cost
- The Internet makes resources readily accessible

Cons

- Usually provides just the facts, little interpretation, and no interpretation for your specific situation.
- Does not usually provide relevant information about your audiences' choices and behaviors, motivators, and barriers.

### **Primary Market Research**

Primary market research consists of two types:

- 1) Qualitative Research: What people think and why.
- 2) Quantitative Research: How many think or act in a certain way.

### ***Primary Research: Quantitative Research***

Surveys are a type of quantitative research designed to collect specific data from a specific audience. Surveys can be conducted via email, ordinary mail, in person (such as at an outdoor location), or on the telephone.

### ***Quantitative Research Process***

Identify the audience or sample to be surveyed.

Develop survey questions that fit the audience and provide the desired information.

Obtain sample that will be surveyed.

Field the survey.

Analyze and report the data.

Survey questions are critical.

- 1) Test them among an impartial audience to be sure they make sense.
- 2) Avoid profession speak or jargon.
- 3) Follow these basic question rules:
  - a. One question per question,
  - b. Allow all possible answers,
  - c. Provide logical and mutually exclusive options, and
  - d. Build on themes and topics from the prior question.

### Quantitative Research - Pros and Cons

#### *Pros*

- Quantitative research can precisely identify relevant attitudes, perceptions, and behaviors.
- If random and properly executed, data can be extrapolated to all the members of a population.

#### *Cons*

- Requires considerable time and effort.
- Its accuracy and representativeness is based on the way it is conducted. A poorly conducted survey can be misleading.
- Cost can be high (especially if all project facets are hired out).

#### *Quantitative Research Costs*

Cost varies based on:

- The methodology: telephone, mail, e-mail, or in person intercept;
- The number of responses;
- The level of reporting;
- The cost of sample such as mail, phone, or email lists; and
- Who conducts the survey and analyzes results—professional, or amateur?

**Table 2. Quantitative Research Costs**

<b>Method</b>	<b>Cost Range</b>
Telephone	\$8,000 (200 surveys, \$40 interview) - \$20,000 (400 surveys \$50 per interview)
Mail	\$5,000 (100 surveys with simple report) - \$15,000 (400 surveys with full report)
Email	\$3,000 (In-house list) - \$15,000 (Purchased list)
In-person	\$2,500 (25 interviews, simple report) - \$10,000 (100 interviews, full report)

### ***A Low Cost - No Cost Idea***

Conduct in person intercepts at a location where a specific segment is likely to be. Check on awareness, interest and desire to act in the survey questions. Ask for comments on materials. Conduct the research again at different locations that will have different audiences.

### **Primary Research: Qualitative Research**

#### ***Focus Groups***

Surveys reveal what people are doing and what they believe; focus groups reveal why people do what they do and believe what they believe.

The term “focus group” is sometimes loosely applied to any group discussion, but to a researcher it refers to a specific approach to gathering information in a controlled way. Focus groups are normally conducted among a group of 8-10 individuals with some common background. Open-ended questions are posed by a trained moderator to generate a free flowing discussion that reveals how people think and why this is so. Part of the science of focus groups lies in interpreting this discussion. It is most relevant to identify common ideas and themes and the rationales expressed for these.

#### ***Qualitative Research Process***

- 1) Recruit and qualify participants using a telephone screener questionnaire.
- 2) Develop a discussion guide (script).
  - Includes a discussion of a topic area. Allows testing of ideas and messages, etc.
  - Helps discussion leader stay on track.
- 3) Coordinate location, facilities, and logistics.
  - Conduct groups near the respondents you wish to understand.
  - Plan for 8-10 pre-screened participants in each group.
  - If possible, choose a professional location with one-way glass to separate clients and participants.
  - Video record to capture words and body language.
  - Provide participants with an incentive (cash) to be sure attendance is high.
  - Provide food and beverages to help participants feel important, comfortable, and welcome.
- 4) Conduct the groups.
  - Moderator introduces him/herself and the topic.
  - Discussion moves from general to specific.
  - Session sponsors sit in adjoining room to observe.
  - Video/audio taping transcribed provides accurate record.
- 5) Report on the groups.
  - Identify common themes or ideas.
  - Provide verbatim comments as examples.

#### ***Focus Group Pros and Cons***

##### **Pros**

- Participants often offer the reasons behind their opinions and behaviors.
- In-depth discussion of a topic can provide insights that may not be learned otherwise.
- Great for testing messages.

##### **Cons**

- Groups are difficult to conduct correctly.
- Group logistics can be complicated.
- Conducting focus groups can be costly.

**Table 3. Focus Group Costs**

<b>Type</b>	<b>Cost</b>
National Firm	\$4,000 - \$6,000 per group
Local Firm	\$2,500 - \$5,000 per group

***A Low Cost - No Cost Idea***

Public Meetings and group discussions, while not focus groups, can provide useful information, particularly if some of the techniques of focus groups are used.

- 1) Develop a discussion guide with open-ended questions.
- 2) Purposely recruit participants to match demographic groups or different target audiences. Conduct separate groups with different audiences.
- 3) Use a skilled moderator; sit in the audience to listen.
- 4) Hold meeting in your own facility/partner facility.
- 5) Videotape meeting yourself/partner.

Improving and using listening skills with your target audience in one-on-one meetings and in-group meetings can be a useful way to more objective and completely gather information. Be sure to do the following:

- 1) Ask open ended questions,
- 2) Probe for more details,
- 3) Do not interject or bias responses, and
- 4) When interpreting responses, think about the age, education, and place the respondent lives or grew up.

***Final Thoughts***

- Understand who you are trying to reach and what motivates them.
- Remember - different groups will respond to different messages and be reached in different ways.

# Participatory Planning Tools for Achieving Nonpoint Source and Stormwater Pollution Goals

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## Abstract

Some of today's most pressing environmental problems, such as nonpoint source pollution, urban sprawl, habitat destruction, and vehicle emissions, are rooted in the country's cultural fabric. The need to resolve these problems has led to more holistic culturally and behaviorally based approaches to environmental protection. Values held individually and as a group contribute to the quality of community life. Expression of values through social and cultural practices can create a "sense of community." Many of these values are directly related to the "place" in which people live, thus creating a strong "sense of place." When we look below the surface to understand what people care about and what motivates them to form partnerships to take action, we find substantial material upon which to build our environmental protection efforts.

Decision makers and community leaders are gaining a greater understanding of the complexity of environmental issues and the role that individuals and communities play in creating solutions to problems. Evidence points to the fact that we can no longer look to experts and scientists to provide us with all of the so-called "answers." Instead, experts are looking to communities and individuals to provide information, input and otherwise assist in the environmental decision making process through the use of participatory processes.

As described in this conference's literature: "*Quite simply, our messages must be brought before the public, and understood and endorsed by them, before they are motivated to change.*" We suggest that in order to affect the public and bring about change, environmental professionals must first understand the values and cultural context of a given population and engage them in meaningful ways to not only understand the problem, but also to help identify and implement the solutions. This paper will provide a rationale for taking a participatory planning approach to achieve nonpoint source and stormwater pollution goals.

## Introduction

Some of today's most pressing environmental problems, such as nonpoint source pollution, urban sprawl, habitat destruction, and vehicle emissions are rooted in the cultural fabric of the country. The need to resolve these problems has led to more holistic cultural and behaviorally based approaches to environmental protection. Values held individually and as a group contribute to the quality of community life. Expression of values through social and cultural practices can create a "sense of community." Many of these values are directly related to the "place" in which people live, thus creating a strong "sense of place." When we look "below the surface" to understand what people care about and what motivates them to form partnerships to take action, we find substantial material upon which to build our environmental protection efforts.

Decision makers and community leaders are gaining a greater understanding of the complexity of environmental issues and the role that individuals and communities play in creating solutions to problems. Evidence points to the fact that we can no longer only look to experts and scientists to provide us with the so-called "answers." Instead, experts are looking to communities and individuals to provide information, input, and otherwise assist in the environmental decision making process through the use of participatory processes.

As described in the conference literature: “Quite simply, our messages must be brought before the public, and understood and endorsed by them, before they are motivated to change.” We suggest that in order to affect the public and bring about change, environmental professionals must first understand the values and cultural context of a given population and engage them in meaningful ways to not only understand the problem, but to help identify and implement the solutions. This paper will provide a rationale for taking a participatory planning approach to achieve nonpoint source and stormwater pollution goals.

### ***Communicating Our Message***

Given the magnitude of our missions, we often rely on broad survey work and general media outlets to communicate our message to the largest audience possible. For instance, the March 2005 Gallup Poll revealed that 66% of Americans are worried about the quality of the environment. More specifically, 35% worry “a great deal” and 31% worry “a fair amount.” What does this really tell us? If we dig deeper, we can see that individual values and attitudes can vary according to a person’s cultural or social group. For example, the same Gallup Poll found that 43% of non-whites are concerned about the quality of the environment and 31% of whites are concerned about the issue; 20% of Republicans worry “a great deal” and 47% of Democrats worry “a great deal”; 40% who seldom or never attend church worry “a great deal” and 28% who attend church weekly worry “a great deal.” How does this new level of detail help us to create educational messages that will really change behavior?

A report reflecting an accumulation of 10 years of The National Environmental Education & Training Foundation and Roper Starch Worldwide (NEETF/Roper) studies (Coyle, 2004) suggests that while media plays a big role in delivering environmental messages, it may not be the best means of delivery. According to the report, 83% of children get the majority of their environmental information from the media, and for most adults the media is the only source of environmental information. However, communication via the media is limited and one-way. There are few, if any, easy opportunities to ask questions, give feedback about the information, or to discuss the relevance of the information to one’s own life. The media can create misconceptions about the issues and generally leave people unattached to the implications of the information on their lives.

Furthermore, due to format, the media generally presents information about environmental issues in segments that are too short to convey full explanations of the issues. As a result, environmental information displayed by the media tends to be oversimplified, shallow, and may fail to establish cause and effect. As an example, even though chlorofluorocarbons (CFCs) were completely banned from aerosol spray cans in American markets in 1978, 32% of Americans in 1998 still thought that spray cans were the only source of CFCs in America. The public awareness campaign to make people aware of the ban and of the other sources of CFCs only reached a small percentage of the population and the misconception persisted. Another example from the same survey found that nearly half of Americans in 1998 thought that the leading cause of water pollution was factories. Pollution running off the land (the leading problem) was not identified by four of five Americans.

Data like these suggest that nonpoint source pollution, stormwater problems, and their solutions are concepts that are not well understood by the general public. Also it suggests that we need to know and understand more about people’s knowledge and behavior about pollution. We can learn more by engaging people in a participatory process of understanding themselves, understanding the causes and effects of pollution issues in their communities, and engaging them in the process of identifying actions that can be taken by the community itself to solve the problems.

### ***Diffusion of Innovations: A Model for Understanding Change***

The value of participatory processes in getting people to adopt our ideas and program for pollution prevention is supported by the diffusion of innovations model (Rogers, 1995). The model is a well established framework for understanding how new ideas or concepts, or innovations, pass through and are adopted by a community. An innovation can be an idea, a practice, or an object that is perceived as new, even though it might not necessarily be new.

The key elements of the diffusion of innovations model are word-of-mouth and peer-to-peer communication, which happen among different segments of a community that Roger's labeled adopter categories. People are placed into an adopter category based on when they are most likely to adopt an innovation. Furthermore, the model describes adopters in terms of "ideal types," or common traits. An "ideal type" is a conceptualization based on observations of reality. Innovators and Early Adopters are the first to try out and adopt a given innovation. These adopters help to establish the norms that then guide the rest of their community. The Early and the Late Majorities represent the majority of the population. And finally, there are the Laggards, or those who are reluctant or slow to adopt the innovation.

The diffusion of innovation process occurs on an "S" shaped curve. The curve is defined by the five categories of adopters which help to illustrate how an innovation is passed through different segments of a community. The diffusion process gains momentum once the innovation has reached a rate of about 10% to 20% adoption from the Innovators and Early Adopters. After this point it can be hard to stop the adoption process. A period of rapid growth occurs when the early majority accepts the innovation and peer-to-peer networks are activated within the community. The process of diffusion begins to slow once the adoption rate reaches 50% when the Late Majority adopts the innovation, meaning that enough members of the community have adopted the innovation to make further adoption self-sustaining. The process and, in turn, the curve can appear steeper or flatter, depending on the innovation and speed by which it spreads through a community and each member decides whether to accept or reject it.

The diffusion of innovations model shows us that if we are to enter the mainstream with solutions to nonpoint source pollution, we must first reach the Innovators and Early Adopters, ideally through word-of-mouth and peer-to-peer networks to solidify a base from which future adoption can grow. Research conducted by The NEETF/Roper (2004) supports this idea by encouraging us to focus on "Influential Americans" or the 10% of Americans who are active leaders in their communities; these people are very often Innovators and Early Adopters.

### ***The Cultural Context of Nonpoint Source and Stormwater Issues***

The diffusion of innovations model is a theory and process that can be applied to the adoption of pollution prevention behavior. But, how do you actually put this theory into practice, especially when each individual and community has their/its own set of values, communication networks, and numerous cultural factors that influence behavior? We suggest the need to approach nonpoint source pollution and stormwater education with a targeted, peer-to-peer approach that is based on an understanding of individual values and the cultural context of a community.

Culture consists of many elements, such as shared and distinct values, beliefs, attitudes, behaviors, and assumptions that people have about themselves and others. A community's culture includes its institutions, customs, and communication patterns that are created to meet the needs of its people. Broadly, it can include language and speech patterns, everyday behavior, social etiquette, religion, education, laws, morals, values, and exchange of goods and services. Culture includes values of right or

good conduct such as ideas of justice, freedom, sanctity of life, and responsibility to future generations. And, similar to community, both a broad cultural framework and various subcultures might exist in any one place.

A society's culture is expressed through the social structure that links people together. Social structure includes social process, which is defined by the way individuals or groups interact, communicate, and fulfill personal and communal needs and wants. Social roles and status help define what people do and their relative social position, respectively; roles and status can change over time or with different situations. Social organizations/institutions link people together by combining culture, social process, and social roles. So, understanding the formal and informal networks people use for communicating can be key to identifying local leaders. Studying artistic expression in art and music can reveal how people interpret the meaning of their lives and whether it relates to environmental issues. Understanding the role of a public library or a scout troop can be important to designing education and awareness programs. Thus, the complex and dynamic fabric of a community becomes the means by which pollution prevention can be accomplished.

To strengthen the cultural context approach, the work of Derksen & Gartrell (1993) suggests the need to align individual values with cultural context in order to accomplish behavior change. For instance, an individual may hold very specific values, but their behavior may be more reflective of their cultural context. As an example, if a person values recycling, but does not have a place to recycle, they may not recycle. However, if the cultural context, provided by their community, offers a place to recycle, the individual's values and cultural context align to strengthen the possibility of the desired behavior.

### ***Participatory Community Cultural Assessments***

Participatory community cultural assessments can provide insight into the complexity of human and community life, as well as engage individuals and communities in understanding and planning pollution prevention strategies. The process allows people to share their individual values within a community setting with the intention of influencing social norms around pollution prevention, thus creating a supportive cultural context for pollution prevention behavior.

The U.S. Environmental Protection Agency's *Community Culture and the Environment: A Guide to Understanding a Sense of Place (Guide)* is a tool for conducting community cultural assessments. The *Guide* outlines a flexible, step-by-step process for building a picture of community cultural preferences and priorities by identifying local values, beliefs, and behaviors as they relate to community life and the surrounding natural environment. It introduces concepts of "community" and "culture," and the *Guide's* social science premise. It presents reasons for conducting a community cultural assessment, steps on how to proceed in an assessment project, community characteristics to investigate, participatory methods for learning more about community values and other social factors, techniques for building partnerships, and guidance on ways to use the results from your assessment. It also includes easy-to-use worksheets and community assessment stories from around the country. The primary emphasis is that involving individuals in community processes that elucidate their values, beliefs, and perceptions about pollution problems will enable them to work together to understand the problems, find solutions, and find community resources to implement their solutions. Since 2003, more than 10,000 copies of the *Guide* have been distributed to governmental agencies, non-governmental organizations, academic institutions, public libraries, citizens, and businesses. Workshops have been delivered nationwide with many focusing on pollution prevention behavior. The *Guide* (EPA 842-B-01-003) can be obtained free of charge at [ncepiwo@one.net](mailto:ncepiwo@one.net) or found at <http://www.epa.gov/ecocommunity/tools/community.pdf>.

## ***Conclusion***

To restate, we suggest that in order to affect the public and bring about change, environmental professionals must first understand the values and culture of a given population and engage them in meaningful ways in understanding the problem, and identifying and implementing the solutions. The diffusion of innovations model and some basic social science concepts and methods support the idea that participatory planning processes will significantly influence how people respond to, participate in, and sustain behavior that prevents nonpoint source and stormwater pollution.

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# Implementation of Private Parcel Best Management Practices at Lake Tahoe

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## Abstract

The Lake Tahoe Environmental Improvement Program (EIP) is a comprehensive approach to restore the 63 sub-watersheds of the Lake Tahoe Basin. The Tahoe Regional Planning Agency's Best Management Practice (BMP) Retrofit program represents private sector contributions to the EIP program, with approximately 37,150 private parcels remaining to be retrofitted with Best Management Practices. The effectiveness of EIP and Capital Improvement Projects (CIP) will be greatly enhanced within specific watersheds and neighborhoods when private property owners participate in controlling erosion and stormwater runoff with BMPs. The Erosion Control Team has the lead role in administering the Tahoe Regional Planning Agency's BMP Retrofit Program (EIP Project #16) for all developed properties within the Tahoe Basin. The Erosion Control Team is responsible for the BMP Retrofit Program including initial compliance and long-term maintenance and monitoring. The outreach program developed by the Erosion Control Team involves a multi-faceted plan that reaches not only property owners, but contractors, architects, engineers, landscapers, realtors and even the next generation of Tahoe residents. Components of the Erosion Control Team BMP outreach target several key audiences.

- Property Owners: Tri-fold residential brochure "Saving Lake Tahoe in Your Backyard," a commercial booklet "Clean Water is Everyone's Business," development and distribution of the award-winning "Home Landscaping Guide for Lake Tahoe and Vicinity," development and promotion of the Lake Friendly Business program, a series of newspaper articles documenting the BMP process, appearances on the weekly "Tahoe Report" on Network Television Stations, neighborhood and community workshops, speaking engagements at home owner association and civic group meetings, and demonstration homes.
- Contractors and BMP Designers: Annual BMP Workshop for BMP Professionals, individual on-site consultations, and publication of "How to Install BMPs on the Developed Property in the Lake Tahoe Basin."
- Tahoe Community: Development of a BMP Addendum that requires the seller to disclose the status of BMPs before transferring property, and educational community events such as Earth Day and FireFest.
- The Next Generation: Over 40 school presentations each year to elementary and middle school children, and student-designed field projects.

Through the innovative public outreach efforts of the Erosion Control Team, over 9,000 Tahoe property owners have voluntarily requested Best Management Practice Evaluations on their developed properties. This has resulted in nearly 5,000 Certificates of BMP Completion being issued in the Tahoe Basin, and the capture and treatment of an estimated 200,000 cubic feet of urban runoff material that would have otherwise entered Lake Tahoe unabated.

## *The Nonpoint Source Pollution Challenge at Lake Tahoe*

Lake Tahoe is an imperiled natural treasure unparalleled in its beauty and geomorphology, known throughout the world for its unique and pristine environment. The combination of a relatively small watershed area and a low nutrient ecosystem has resulted in an oligotrophic alpine lake with remarkable clarity. On a still day, one can see to a depth of over seventy feet into the lake. Lake Tahoe is designated as an Outstanding National Resource Water (ONRW) under the U.S. EPA Water Quality Standards

Program and the Clean Water Act. With this designation, Lake Tahoe is provided the highest level of protection under the anti-degradation policy and no further degradation is permitted.

Unfortunately, Lake Tahoe's remarkable clarity is threatened in large part by a phenomenon called "cultural eutrophication," a term used by Dr. Charles Goldman of the University of California at Davis's Tahoe Research Group. "Cultural eutrophication," as described by Dr. Goldman, is Lake Tahoe's environmental response to the increased input of nutrients and sediment that result from human activity and development (Tahoe Research Group, Goldman et. al, 1982). This phenomenon, which results in air and water quality pollution, is causing a decline in Lake Tahoe's clarity of over one foot per year.

Since the 1960 Winter Olympics were held at the Squaw Valley Ski Resort, people from all over the world have been attracted to Lake Tahoe and have built homes and communities to enjoy all the recreational opportunities that Lake Tahoe has to offer. Approximating 500 miles in size, the Lake Tahoe basin currently has about 60,000 residents with large swells of tourists arriving on weekends and holidays. Activities such as urban development disturb the natural watershed, alter the natural hydrologic cycle, and increase erosion rates. As impervious surfaces, such as roads and parking lots, increase with development, pollutants accumulate and become entrained in stormwater runoff every time it rains or when snow melts. Increased erosion rates and stormwater runoff add nutrients and sediment to surface waters and ultimately to Lake Tahoe, significantly contributing to an increase in algal productivity and a loss of water clarity (Tahoe Research Group, Reuter et. al., 1986). Algal growth in Lake Tahoe has increased nearly 300 percent since 1968, and lake clarity has decreased by over 30 feet (Tahoe Research Group, 2000).

More recently, it has been determined by the Tahoe Research Group that Lake Tahoe's clarity loss is attributable not only to algal growth resulting from increased nutrient and sediment inputs, but also to the long-term suspension of fine inorganic particles (less than 10 microns) that enter Lake Tahoe through stormwater runoff, snow melt, and atmospheric deposition (Lake Tahoe Optical Model, Goldman, Reuter et. al, 2004). These particles stay suspended in the water column for an extended period of time, refracting light. Therefore, the most recent science indicates that the top two pollutants of concern for Lake Tahoe are nutrients and fine sediment particles. These pollutants are the focus of stormwater management efforts in the Lake Tahoe Basin.

### ***Addressing the Nonpoint Source Pollution Problem at Lake Tahoe***

In order to address the environmental challenges at Lake Tahoe, the Lake Tahoe Environmental Improvement Program (EIP) was developed cooperatively by many agencies, with the Tahoe Regional Planning Agency leading the effort. The EIP is a collaborative program that coordinates local, county, state and federal projects and monies to improve watershed function through various erosion control and water quality improvement projects. EIP projects encompass stormwater retention and treatment for major roadways, source control projects such as road-cut stabilization and curb and gutter installations, and other projects that yield environmental benefits.

Success of the Environmental Improvement Program is dependent in large part on the successful implementation of erosion control and water quality improvement measures, or Best Management Practices, on private parcels. Source control and infiltration of stormwater runoff through BMP implementation on private parcels greatly improves functionality of public EIP projects. The installation of BMPs on all properties is considered an important step in achieving long-term water quality improvements and represents the private sector contribution to the Environmental Improvement Program. Therefore, the Tahoe Regional Planning Agency adopted an ordinance requiring that all developed properties in the basin implement BMPs, and created the BMP Retrofit Program. Typical BMPs required include vegetating and mulching all bare soil, paving driveways, infiltrating water from impervious surfaces and stabilizing or retaining steep slopes and loose soils. The ordinance applies to

both new and existing development. In 1998, the Tahoe Regional Planning Agency's Erosion Control Team (ECT) was formed in order to facilitate the implementation of the BMP Retrofit Program.

The Erosion Control Team (ECT), funded through Clean Water Act grants and the states of California and Nevada, has a mission to educate property owners about the importance of Best Management Practices installation, as well as to facilitate the installation of appropriate BMPs on individual parcels. In order to achieve the goal of BMP implementation on almost 37,000 properties by the year 2008 as dictated in the Tahoe Regional Planning Agency's Regional Plan, the ECT realized that the majority of properties would need to come into compliance voluntarily without direct compliance procedures. To accomplish this, the ECT enlisted the assistance of partnering agencies with similar water quality and conservation goals.

In 1998, TRPA formed an interagency task force comprised of the Erosion Control Team, the Tahoe Resource Conservation District (TRCD), the Nevada Tahoe Conservation District (NTCD), University of Nevada Cooperative Extension (UNCE), and the Natural Resource Conservation Service (NRCS) to implement the BMP Retrofit Program in the Lake Tahoe Basin. This collaborative task force works together to educate property owners about water quality issues and BMPs at Lake Tahoe to increase implementation of BMPs. The task force divided the tasks related to implementing the BMP Retrofit Program as follows:

- The Erosion Control Team is responsible for interpreting TRPA Code and determining policy, facilitating implementation of BMPs on commercial, industrial, multi-family, and lakefront properties, and code enforcement;
- The Resource Conservation Districts are responsible for facilitating implementation of BMPs on single-family residences;
- The Natural Resource Conservation Service is responsible for providing technical assistance and funding through the Conservation Districts; and
- The University of Nevada Cooperative Extension is responsible for assisting in creating and publishing peer-reviewed educational materials, as well as facilitating educational trainings and seminars.

The BMP Retrofit Partners developed an outreach strategy in order to achieve community buy-in for the BMP Retrofit Program. By becoming aware of the nonpoint source pollution problem at Lake Tahoe and by knowing they can be part of the solution, property owners are more likely to install BMPs on their own properties.

### ***BMP Retrofit Outreach Strategy Development***

The following indicates the model by which the ECT and our partnering agencies developed the outreach strategy for the BMP Retrofit Program. It has been referred to as the Ready, Aim, Shoot, Assess if target was hit, Aim, Shoot model:

- 1) Determine target audiences;
- 2) Determine the most appropriate avenue to reach target audiences by performing surveys;
- 3) Develop various outreach materials using multiple material types and outreach vehicles, keeping in mind the most appropriate avenues based on survey;
- 4) Assess outreach success by performing second survey;
- 5) Hit them with the message, hit them again, and when they are sick of hearing it: hit them again!
- 6) Continue to assess the success of various outreach materials and vehicles with target audiences.

### ***Determining Target Audience and Outreach Avenue***

The first two main steps of the outreach strategy were to identify target audiences and determine how best to reach them. Because the BMP Retrofit Program and TRPA's ordinance requires BMP implementation on all private property, we began by targeting property owners specifically. Over seventy percent of the homes at Lake Tahoe are second homes, therefore, reaching absentee property owners is challenging. Recent information from tax assessor databases is utilized to develop mailing databases for direct mailings to the owner's primary residence. Unfortunately, because property turnover at Lake Tahoe is high, these mailing databases need regular updates to ensure that property owners are reached at their primary residence.

Outreach surveys directed at our target audience, Lake Tahoe property owners, were performed in 1999 and 2005. The surveys have shown that the majority of property owners receive information about Lake Tahoe foremost by word of mouth, followed by local media such as newspaper and television, followed by direct mailings. Because word of mouth was the most utilized way to get information and is often the least accurate source of information, the Erosion Control Team realized that we need to fight the rumor mill, develop a strong customer service ethic, help property owners overcome obstacles to implementing BMPs, and provide incentives. By providing exceptional customer service and by dispelling rumors immediately, we have been successful in building a strong relationship with a skeptical audience. We continually receive "referrals" from satisfied property owners who were happy with their treatment and the prompt response from the Erosion Control Team. This type of outreach is more difficult to directly impact, but we have found that by having a strong presence in the community, by trying to help people overcome obstacles in implementing BMPs, and by providing as many incentives as possible to ease the burden on property owners, we have been successful with the intangible "word of mouth" type of outreach.

Because property turnover is relatively high at Lake Tahoe, we decided to develop relationships with the realty community to maximize outreach for the BMP Retrofit Program. By educating and creating strong relationships with local realtors, as well as mandating disclosure of BMP status for every property sold, the Erosion Control Team established a reliable way to distribute information about BMPs to new homeowners. While the relationship between the realty community and our regulatory agency was tenuous at first, the ECT met with various realtor associations around Lake Tahoe, listened to their concerns, brainstormed possible solutions to problems, and provided exceptional customer service to realtors. As a result, many realtors have become allies in our nonpoint source program and in many cases are proponents of our BMP campaign to their customers.

### ***Developing Outreach Materials and Training Programs***

Because nonpoint source issues are not usually well understood without proper education, the Erosion Control Team focused on creating clear, concise outreach materials. ECT staff developed the language for a brochure titled "Saving Lake Tahoe in Your Backyard," which was directly mailed to the primary residence of all Lake Tahoe property owners. The brochure's message was tooled and retooled several times to maximize simplicity and to clearly delineate what we were asking property owners to accomplish. In order to ensure that the brochure was not full of confusing "bureau-speak," lay people were asked to read it and evaluate the material for clarity and understanding. The brochure included the nonpoint source problem statement, the solution statement (i.e. implementation of BMPs), and clear steps of how homeowners could implement BMPs.

The ECT contracted with a graphic design firm so that the new outreach materials would be professional and eye-catching. Additionally, we approached J.T. Ravize, a photographer famous for his breathtaking pictures of Lake Tahoe, and asked for permission to use some of his amazing photographs in our materials. Having the common goal of saving Lake Tahoe, J.T. graciously agreed and his beautiful pictures adorn many of our outreach materials. This new, eye-catching and simplified format became the template for future outreach materials.

The ECT ensured that all following outreach materials followed a similar visual format as the “Saving Lake Tahoe in Your Backyard” brochure to make sure that the outreach campaign was easily associated with the BMP Retrofit Program. Next, we contracted with the same graphic design firm to design another brochure titled “Clean Water is Everyone’s Business: A Commercial and Industrial Property Owner’s Guide to Improving Lake Tahoe’s Clarity.” This brochure describes the types of BMPs needed for commercial and industrial properties, including good housekeeping practices. After attempting to take pictures of BMPs for the brochure, it was determined that we needed an illustrator to draw diagrams of complex BMPs like underground treatment systems. Our graphic design firm provided the service. Finally, the ECT had the firm design posters based on both the residential and commercial brochures. Our posters are hanging in many realty offices around Lake Tahoe!

The outreach materials developed by the ECT are deliberately designed to be short and simple. To fill the need for more in-depth information about BMPs and other property management issues, the *Home Landscaping Guide for Lake Tahoe and Vicinity* was created by one of our BMP Retrofit Partners, the University of Nevada Cooperative Extension. This 150-page guide provides homeowners with a clear overview of BMPs, as well as information on landscape design, fertilizer use, fire prevention, and pest control. Additionally, it contains the TRPA approved list of native and adapted plants. The BMP Retrofit Partners use this resource extensively when facilitating implementation of BMPs at Lake Tahoe. The guide has been so widely accepted by Tahoe residents that it is often requested at community events and workshops.

As the outreach program gained momentum and the demand for qualified BMP installers grew, the ECT and our partners took steps to help community contractors meet this need. For six years now, the BMP Retrofit Partners have offered an all-day educational BMP Workshop. The workshop has engaged local business people in the BMP process and has helped to ensure proper installation of BMPs throughout the Lake Tahoe basin. The workshops provide a step-by-step instruction to contractors on BMP installation and help to keep the contracting community abreast of the latest technologies and requirements. The workshop also has curriculum for engineers and architects designing BMPs on how to meet TRPA’s ordinances, as well as for landscapers and property maintenance companies on how to maintain BMPs for longevity. Workshop participants receive a copy of the educational manual titled *How to Install BMPs in the Lake Tahoe Basin*, developed by the ECT and our partners, which has been peer reviewed and published by the University of Nevada.

The annual BMP workshop introduces new contractors to the business opportunities created by the BMP Retrofit Program. By creating an economic opportunity for local business, the Erosion Control Team has introduced sustainability into the BMP Retrofit program. It is not uncommon to see advertisements in newspapers purchased by local contractors alerting homeowners that they are required to implement BMPs and billing themselves as BMP specialists.

An additional incentive for commercial property owners to implement BMPs is the Lake Friendly Business Program, created by the ECT in 2005. Businesses who implement BMPs on their property receive decals to display in their windows, as well as special recognition from the Tahoe Regional Planning Agency. Because there is a strong environmental ethos at Lake Tahoe, many businesses are eager to show patrons that they are doing their part to protect Lake Tahoe. In the future, the program will be expanded to include other environmentally responsible elements.

### ***Benefits of Utilizing Partnerships to Increase Outreach***

The ECT realized early on in the implementation of the BMP Retrofit Program that the only way to be successful in our endeavors would be to create a multi-agency, multi-partnership outreach program. We have created partnerships and relationships with other agencies with similar missions, contractors, engineers, landscapers, property managers, and realtors. The establishment of these partnerships has been beneficial in many ways. First, the inclusion of multiple agencies has expanded the funding sources and resources available to the program. For example, NRCS graciously reprinted many copies of the residential brochure when the first run was gone. Secondly, the BMP Retrofit Program reaches a larger audience by “piggybacking” on partnering agencies’ outreach messages. This has included network television spots through the University of Nevada Cooperative Extension’s weekly Tahoe Report, as well as the incorporation of the BMP Retrofit Program into the NRCS and Conservation Districts Backyard Conservation Programs.

A third benefit comes in the form of increased credibility in the community. Property owners are much more likely to buy into the BMP Retrofit Program when they are getting a consistent message from multiple sources. A typical property owner may get a brochure in the mail from TRPA, be visited by conservation district staff, and receive literature published the University of Nevada Cooperative Extension. Having a multi-agency task force also assists in reaching homeowners who may be reluctant to work with a regulatory agency such as TRPA, but are more receptive to a non-regulatory agency such as the conservation districts. Finally, having publications such as the educational manual peer reviewed and published as a University of Nevada official document lends professional and educational credibility to the content.

### ***Challenges of Utilizing Partnerships to Increase Outreach***

While working with partners to increase outreach provides many benefits, it is not without challenges. One of the greatest hurdles to overcome is keeping the message clear and consistent. When multiple agencies, many with seasonal employees, are involved in a program where it is difficult to keep everyone on the same page, it is challenging to deliver the same high level of service to the public. In many instances this has resulted in a “shopping” phenomenon. This occurs when a property owner or a realtor requests information from one agency and if they do receive an answer they do not like, or do not receive assistance immediately, they will request the same information from another agency. This has resulted in a loss of efficiency and occasionally the dissemination of conflicting information. To minimize this problem the ECT and other BMP Retrofit Partners are continually working to define roles within the partnership and meet regularly to discuss issues of consistency. Additionally, in 2005, the partners are incorporating a Quality Control/Quality Assurance program.

A second issue the ECT has encountered is publishing ephemeral information that subsequently changes. While having a common, easily recognizable brochure for all agencies to use for the BMP Retrofit Program has been a boon, keeping contact information current in all publications and the most current brochures in circulation has been challenging. Looking back, it would have been the best course of action to establish unchanging 800 numbers for all agencies involved.

Consistency also becomes a problem when other coordinating agencies not in the BMP Retrofit Partnership, such as the fire departments and local building departments, are involved in a peripheral fashion, i.e. including BMPs in defensible space brochures and as a requirement for new permits. For the last twenty years property owners in the Lake Tahoe were told to remove vegetation and pine needles from their property by the fire districts, and now they were being told to vegetate and mulch all bare soils by the BMP Retrofit Program. The Erosion Control Team did not initially realize how ingrained

this message was. Finding acceptable compromises between fire safety and erosion control has involved effort on both sides, as well as extensive cross training.

Implementing the BMP Retrofit Program is a large task and the ECT is continually looking for new resources to help facilitate the implementation of BMPs on private parcels. As of 2005, over 10,000 property owners have voluntarily requested BMP site evaluations and over 6,000 properties have implemented BMPs. Several million dollars have been invested by the private sector in water quality improvements. By utilizing partnerships to increase outreach and dissemination of information about the BMP Retrofit Program, we intend to be successful in the full implementation of water quality improvements at Lake Tahoe.

## Street Smarts: City, County, and Watershed District Staff Learn Together Through Public Works Forum

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### Louise Watson

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#### Abstract

Street management is an important part of the nonpoint source pollution control strategy. Although street management is not a watershed district responsibility, the Ramsey-Washington Metro Watershed District (the “District”) has addressed street management issues together its Public Works Forum.

The Public Works Forum (the “Forum”) is comprised of MS4 coordinators, public works directors and staff as well as community education, planning and administrative staff. The key role of the District has been to provide a watershed basis for street management efforts and to encourage a long-term vision that supports the vital role of public works in reducing nonpoint source pollution. Another important role of the District has been in researching technical issues such as street sweeping practices, winter road management practices and related pollution problems, and presenting the research results to the Forum for their evaluation. It was important to identify the current norm for street management practices, so the Watershed District conducted a survey on current street sweeping practices nationwide to compare to local practices.

The value of the Forum to its members is three-fold. First there is value in learning the culture and jargon of a field of practice. Second, public works staff can educate the non-public works staff about the public works perspectives. Third, there is value in the shared progressive process of defining a technical standard of practice that is balanced with public works operations reality. Such standards, once discussed and evaluated adequately by Forum participants, can be proposed and implemented with far greater confidence than proposals for change by single individuals.

The Forum identifies education needs related to addressing public works and MS4 permit issues, target audiences, messages and barriers, and collaborates as appropriate. The Forum is currently struggling with the issues related to “setting the bar” higher with regard to water quality BMPs within public works operations. At the June 2005 Forum, members expressed concern that there is a long list of issues beyond street sweeping yet to be addressed and sorted out. The Forum continues to evolve to meet its own needs both formally and informally and to encourage behavior change, new skills and new programs where needed.

### ***Background***

The Ramsey-Washington Metro Watershed District (the “District”) covers over 50 square miles of urban and suburban land east of downtown St. Paul, Minnesota. The District’s residential streets, driveways/sidewalks, freeway, and railroad rights-of-way combined contribute over 50 percent of the District’s total phosphorus loadings. This fact requires the District to increase in these areas infiltration, filtration, bioinfiltration, disconnection from drainageways, pollution prevention/ good housekeeping, and public education.

It is within this working environment that the Public Works Forum (the “Forum”) was developed. District literature reviews of street pollution issues needed a reality check by street management practitioners; we found them and engaged them.

### ***Program Description***

The Ramsey-Washington Public Works Forum was created in January 2003 at the District’s annual local government workshop as an informal discussion group to continue meeting monthly to discuss local

government operational impacts on water quality and similar issues looming with the state's impending NPDES Phase II Municipal Separate Storm Sewer System (MS4) permit program soon to affect us all. In addition, potential collaboration on programs identified in Storm Water Pollution Prevention Plans (SWPPPs) could be explored. Although the Forum has never made any formal policy recommendation to officials of the represented MS4 permittees, the educational value of the discussions have been useful to those who are regular Forum attendees. These discussions have resulted in numerous decisions about operations practices and Forum functions.

Meetings are planned by the Ramsey-Washington Metro Watershed District. The Forum coordinator is Louise Watson, who is the Watershed District's Planning and Education Coordinator. Past president of the Minnesota Public Works Association, Joel Schilling, has served as a consultant to the Forum coordinator. Monthly Forum agendas and miscellaneous communications are emailed to 32 staff of all 10 cities, the two counties within the District and other interested entities such as other watershed districts and Minnesota Department of Transportation (MNDOT). The average Forum, however, includes one or two staff from six to seven cities; at times one county may also be represented.

The typical agenda includes an update on the status of permit guidance documents, permit procedures, deadlines, implementation expectations, and the legal challenges to the state's MS4 permit program and coordination of SWPPP programs. A speaker presents the main topic of the meeting followed by Forum discussion and ideas for the next Forum topic.

Specific public works water quality-related issues addressed by the Forum include:

- Street sweeping as it affects stormwater quality and budget planning.
- Winter road snow and ice control practices as they affect stormwater quality and overall street management efficiencies across seasons.
- Inventory, documentation, and analysis of data for stormwater system maintenance planning purposes
- Pond maintenance issues, including:
  - ▷ Natural vs. man-made (ownership and maintenance responsibility),
  - ▷ Fencing (legal concerns, pond design),
  - ▷ Policies and/or ordinances (maintenance responsibility),
  - ▷ Buffers (width, plantings, maintenance),
  - ▷ Dredging (permits, criteria for frequency, spoils disposal, toxics handling),
  - ▷ Easements vs. outlots (legal / maintenance concerns, old vs. new pond design),
  - ▷ Weed and algae control (resident complaints), and
  - ▷ Maintenance design (design for access and maintenance).
- Leaf fall management,
- Illicit discharge detection and elimination,
- West Nile Virus,
- Staff education needs, including:
  - ▷ The MS4 Permit 6 Minimum Control Measures,
  - ▷ Stormwater ordinances,
  - ▷ Crew trainings, and
  - ▷ Officials education.
- Public education needs, including:
  - ▷ Integrating stormwater education into public works information in city newsletters, cable programs, and public education events, and
  - ▷ Useful existing media products.

## *Accomplishments*

The highest value of the Forum is the educational value to all who attend, and the increased potential of collaboration spinning off from Forum meetings. A secondary value of the Forum that is hard to measure is in the spinoff education that occurs as Forum members influence others in their work or personal circles of influence. The District strongly urges cities to thoroughly educate all their staff, officials, and volunteers on stormwater pollution prevention, as they are a substantial subset of the general public—at least 2,000 people.

Forum accomplishments vary in scale, but are all significant.

- 1) Public works staff reviewed and commented on the District’s policy recommendations from a 1999 literature review of year-round street management practices regarding stormwater quality protection. Comments set the overall agenda for future Forum meetings:
  - Make sure any changes result in environmental improvement.
  - Find information for examining such questions as:
    - ▷ Will stormwater costs go higher than sewer costs eventually?
    - ▷ What other hidden costs exist like the cost of handling sand seven times?
    - ▷ Should we treat upper watersheds or at the “end-of-pipe?”
    - ▷ How can current practices be improved quickly or over time?
  - Reach agreement on standards of service for specific water resource drainage areas.
  - Justify new areas of concern and new levels of service with good data.
  - Use the Forum to address street sweeping unknowns such as best equipment to use and rely on the District to determine particle size minimum and frequency of street sweeping needed for specific watersheds.
  - Continue public education for increased grass clippings and leaf fall management.
  - Improve operator use of equipment and calibration practices.
- 2) Seven out of ten cities consistently attend Forum meetings. Recently the meeting location options broadened by a hosting offer by one city public works department, setting precedence for others to step forward to host future Forum meetings.
- 3) Roles are being defined. The District role is being defined as the watershed management expert and the source for data needed to substantiate water quality criteria for public works actions. A subsequent District role is to research technical issues for review and discussion at the Forum. A third role of the District has evolved as the champion of public works operations and maintenance capacity to significantly improve stormwater quality. The role of public works in street, parks, and sewer system maintenance has become an everyday consideration by the District. Each serves as a technical advisor to the other.
- 4) The Forum provided the following trainings:

<b>Staff</b>	<b>Training Course</b>
16	Salt Application & Pollution Prevention overview—May 2003, followed by application rate chart training in June.
11	Sediment & Erosion Control Ordinance Revision—December 2003
80	Construction Site Erosion & Sediment Control Certification—February 2004
11	Local Construction Site Erosion & Sediment Control Ordinance Revision—March 2004
37	Illicit Discharge Detection & Elimination—September 2004
14	Salt Application & Pollution Prevention—November 2004

- 5) Public works staff have increased mutual support of education activities through festivals, open houses and strategic placement of an educational computer kiosk. Furthermore, as a result of a

Forum discussion recently, one city with one year of experience in new anti-icing practices offered to help another city just starting new anti-icing BMPs, noting that staff training requires a major paradigm shift with strong encouragement from experienced operators.

- 6) In May 2005 the Forum's consultant updated the District's 1999 street sweeping literature review, added a nation-wide survey of practices, and added a set of policy recommendations for Forum consideration. It is obvious from the following conclusions and recommendations how essential the Public Works Forum is as a reviewer and potential change agent for increased watershed friendly public works practices. The study concluded:

- High-efficiency sweepers and/or tandem operations remove up to 70% of total solids from the streets.
- Street sweeping is an important component of an integrated BMP program.
- Sweeping is cost-effective and prolongs BMP efficiency and maintenance.

The study recommended:

- Encourage and support the acquisition and use of technologically advanced, high-efficiency street sweepers (vacuum or newer technology) by local governments.
- Recommend local governments to revise street sweeping operations programs and adopt the proposed street sweeping frequencies according to land use as specified by the study:
  - ▷ 9-16 per year on arterials, commercial, and heavy industrial areas.
  - ▷ 6-9 per year in light industrial, residential areas, and hot spot areas.
  - ▷ Biweekly – twice weekly in central business districts.
- Work with local governments to further examine leaf collection and disposal.
- Recommend local governments to identify existing street sweeping operational programs as a high priority for keeping materials out of municipal separate storm sewer systems and improving water quality.
- Establish a Water Quality Incentive Grant Program for \$750,000 - \$1 million for local government purchase of high-efficiency sweepers.

The Forum responded to the 2005 Street Sweeping Study with the following comments. These comments show how important it is to work together on such issues.

- Street sweepers are traditional equipment so will be relatively easy to upgrade some over time. Labor must shift from another duty to more street sweeping; is that smart?
- Examine data comparing labor costs for street sweeping, catch basin cleaning, and pond dredging.
- The District must specify exactly where and how much street sweeping should increase to meet District water quality goals.

### ***Problems Experienced***

Available time and staff are common problems. Lack of training tools that address local government operations and maintenance impacts of water quality was a problem that is slowly being addressed nationwide by various entities. Confusion created by the state's MS4 permit program was not anticipated, but did become the issue which drew Forum members together. The following list demonstrates such problems experienced by the Forum.

- 1) District staff lack experience in the public works world. Learning "the jargon" and the culture of a field of practice takes considerable commitment of time.
- 2) City staff turnover hurts attendance and continuity. Some meeting attendance problems stem from staff turnover. However, for a variety of other reasons, the majority of those emailed monthly do not choose to attend meetings.

- 3) As with many committees, participants often lack time needed to devote to preparation and follow-up between monthly meetings.
- 4) Forum attendees may have initially expected to find answers to their questions at Forum meetings, however the value in attending is in learning what others are doing and independently determining what is pertinent for each participant's government unit.
- 5) Staff training needs called for in MS4 permits were difficult to meet. District staff do not have the expertise to train, therefore Forum members used the internet search functions to find existing tools to use or modify. Lack of time to search and lack of expertise to evaluate training tools was a problem.
- 6) The District was initially interested in focusing on water quality issues but found that the cities needed to focus on NPDES permit deadlines and were looking for District guidance on the process. Confusion caused by lack of guidance from the state MS4 Permit Program and by lawsuits over the MS4 Permit Program used up valuable time and energy of Forum participants.

### ***Recommendations for Public Works Forum Start-Ups***

#### **I. Do Your Homework**

- 1) Visit public works Web sites in your region to learn more about them.
- 2) Search SWPPP permits of all pertinent MS4 permittees in your region to assess collaboration needs.
- 3) Hire a consultant with experience in public works and watershed management to guide you through this process to optimize communication and planning.
- 4) Identify where your interests, goals, and infrastructure intersect with public works interests, goals, and infrastructure. Together list some general collaboration goals, learning objectives, timeframes for meeting these objectives, speakers, and topics for meeting these objectives.
- 5) Identify where you cannot connect the dots; list questions about where you are fuzzy on details. Ask your public works folks the questions. Have them explain, show, and include you in a work task so you get the feel for what they do and how they do it.
- 6) Together with public works staff and your consultant, identify public works level of knowledge about the water quality world and your knowledge level about the public works world.

#### **II. Start Your Forum**

- 1) Agree on the coordinating entity and staff person.
  - Consider the watershed management organization as an organizing agent for member municipalities and counties.
  - Consider developing a listserv for communications or a web page on the coordinating entity's Web site.
- 2) List monthly topics, themes, and learning objectives for the entire year; modify monthly with Forum and consultant input.
- 3) Acquire a professional note-taker to assist the coordinator's learning process. Good notes will document decisions and capture vocabulary and field-of-practice nuances you will miss.
- 4) Decide on a standard agenda, time, frequency, and location for Forum meetings.
- 5) Determine Forum follow-up expectations:
  - Documenting of collaboration and field practice changes influenced by your Forum.
  - Communicating between meetings: what and frequency.
  - Sharing progress on activities, partnerships, problems, and successes.

### III. Report Progress to Officials

- 1) Provide an annual report for use in the SWPPPs of Forum members.
- 2) Consider a field day of demos and tours for local government officials, department administrators, and program supervisors to provide a face-to-face learning day about the efficiencies possible through partnerships between public works and watershed management organizations.
- 3) Survey Forum participants to evaluate the Forum activities.

### *The Forum Model is a District Methodology*

District policy prefers participatory education and social-pressure motivated behavior change versus regulatory enforcement. If reasonable voluntary change in practices does not occur in a reasonable timeframe, then authoritative regulatory enforcement must be applied. The District values collaborative implementation, and collaboration requires good communication to determine common goals and ways to share implementation. The Public Works Forum demonstrates such policy and is testing the idea that the District regulatory authority will have secondary importance compared to the power of the Forum to improve stormwater management practices through Forum discussions and peer pressures.

A major goal of the District's Public Involvement and Education program is to see public involvement and education sustained by those who become involved in District program efforts. The District considers that there is added value to any project that becomes sustained by its own members. It is hoped that the practice of exchanging information among public works staff and the District continues simply because it is a valued practice that becomes a way of doing business by all those involved. In order for that to happen, leadership must develop from among the participants. For example, interest has been expressed by one Forum member in providing professional assistance to many public works programs and their cities to promote the important role of public works in watershed management goals.

**Program Design for Sustained Effort** — It can take years for a behavior change to become a habit. Seven program design features are used by District staff to sustain efforts over the long term and keep participants growing in knowledge, skills, and commitment. The seven program design features are listed below. For more information on general use of these features contact Louise Watson at Ramsey-Washington Metro Watershed District.

**Focus:** Finding common values, goals, and issues is an outcome of most Forum meetings.

**Multiple Aspects:** Varied topics and levels of expertise needed at Forum meetings attracts a large pool of city staff contacts over time.

**Technical Aspects** attracts those interested in improved BMPs for stormwater pollution control.

**Relevance:** The Forum is the vehicle for creating District policy that makes sense to affected parties.

**Empowerment and Teamwork:** It is more important for Forum discussion participants to affect change in their own operations and maintenance than it is for the District to create a list of policies that then need to be enforced.

**Learner to Mentor:** Forum discussions can influence training tools and content for public works crews.

**Institutional Support:** Institutional change is more powerful than individual change, but it is the individual Forum participants who can help push for change.

## CONFERENCE ATTENDEES

4<sup>th</sup> National Conference

# Nonpoint Source and Stormwater Pollution Education Programs

October 17-20, 2005 \* Holiday Inn Chicago Mart Plaza \* Chicago, Illinois

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