

Research for Storm Drain Marking Outreach Strategy

Many Rhode Island towns have included storm drain marking programs in their stormwater management plans. Consequently, we attempted to evaluate storm drain marking through research about existing programs.

Review of National Efforts

RI NEMO undertook a review of storm drain marking programs throughout the country, with the specific intention of evaluating any effectiveness data on these programs. Our review included programs mentioned in the beta-version of the U.S. EPA Digital NPS Outreach Toolbox, information collected through the NPS Information Exchange Digest listserv, as well as general internet searching of state stormwater programs. Many of the more specific details about programs came from a survey conducted by Mary Morse of the City of San Jose Watershed Protection in the fall of 2005. Unfortunately, *our review did not uncover any effectiveness evaluations*, so we are unable to draw conclusions about the overall usefulness of storm drain marking. We have included below a general review of how sample municipalities from around the country approach this task, what their objectives are, and general costs of the programs.

Details of Storm Drain Marking Programs

For many municipalities, storm drain marking programs are a requirement of their stormwater permits. However, without more detailed investigation, it was not possible to identify how the municipalities determine which storm drains need to be marked. Some indicated that they primarily mark residential areas and ignore those along major traffic areas; some municipalities indicated that they mark all drains. Some municipalities track what has been or needs to be marked using various combinations of GPS, GIS, and Excel or other spreadsheet software; a few municipalities use paper maps.

There appear to be two main methods of marking: using paint or using more permanent markers, made from plastic, ceramic, metal, or thermal-plastic. The advantages of using paint stencils are that it is relatively cheap (when evaluated on a per-marking basis), and it is easy for anyone involved in the marking program to use (e.g. children, who usually seem to constitute a significant percentage of makers). The primary disadvantage of using paint is that it washes away, contributing to some amount of pollution and necessitating the marking to be repeated. (The painted stencils last an average of between 1 and 3 years.) The advantages of using more permanent markers are that they do not contribute paint pollution and that they will last significantly longer than paint stencils (an estimate of 15 years was provided by one company). The disadvantages depend upon what type of permanent marker is used; some are affixed with glue, which does not greatly increase the difficulty for those doing the marking, but some are set in concrete or require special tools. Permanent markers are more expensive than paint stencils, although the long-run costs of both should be compared, rather than a per-marking cost. (The permanent markers designed especially for storm drains from das Manufacturing, Inc. <http://www.dasmanufacturing.com/index.html> seem to have been used in many programs.)

Municipalities vary widely in terms of who does the marking, but the two main trends are to use either municipal staff or volunteer groups (often comprising children's groups or

environmental groups). One municipality surveyed uses Community Service programs to provide labor for the marking; a few municipalities surveyed sub-contract the work.

Variations and combinations of the following seem to be the most common messages that are stenciled or attached near storm drains:

- Drains to (name of local water body)
- No dumping (sometimes a telephone number is provided for reports of illegal dumping)
- Protect our water
- Only rain down the storm drain

Varying Objectives of Storm Drain Marking Programs

One major objective of marking storm drains is to increase the public's awareness that what goes into the storm sewer is not treated and eventually makes its way to a water body, carrying pollutants and rubbish with it. The two questions that remain are: 1.) do these markers actually have an impact on public awareness of this issue, and 2.) does an increase in awareness lead to any significant behavior change that would result in improvements to storm water quality?¹ Due to the overall lack of evaluations, measuring either awareness changes or behavior changes, we must approach storm drain marking objectively. It can be a relatively easy and inexpensive method of outreach, but we want to be certain that the message is indeed being conveyed. It seems irresponsible to simply assume that the public automatically is being educated when they see a marked storm drain.

Another objective cited by some municipalities is to provide a telephone number for people to report illegal dumping. Again, we have little data about the effectiveness of this. A related objective is to decrease dumping, but there is no information about whether storm drain markings would deter someone who was already at a storm drain with the purpose of dumping.

While the objectives cited thus far attempt to influence those who read the storm drain markings, another objective is simply to educate and involve the public who participates in the marking program.

What's Happening Here in Rhode Island

Beginning in 2002, Save the Bay, in partnership with the Rhode Island Resource Recovery Corporation, has worked with school and youth groups across the state to mark storm drains. Students from Warwick, Barrington, North Kingstown, Narragansett, East Greenwich, and Smithfield have participated in storm drain marking programs in their respective towns. In addition, the towns of Coventry, East Providence, Providence, North Providence, South Kingstown, Woonsocket, Bristol, Cranston, Gloucester, Middletown, Pawtucket, Portsmouth, and Johnston have all agreed to be part of marking programs.

¹ According to a survey conducted in 2001 by the Public Research Institute at San Francisco State University, awareness that dumping used oil affects drinking water did not impact dumping behavior. Approximately 20% of both surveyed populations (those who were aware and those who were not) improperly disposed of their used oil.

These school groups contact Save the Bay to express interest in marking, and Save the Bay contacts the Town to put the group in touch with the appropriate authority. Save the Bay has been able to provide the supplies for marking, although in 2006, the grant providing the money for supplies ran out. Save the Bay has a Storm Drain Marking kit available with two flyers about storm drain pollution and organizing a storm drain marking project. Their storm drain marking program involves door-to-door visits in addition to the marking.

In their experience, the das Manufacturing markers have not lasted as long as paint stenciling.

In addition to Save the Bay's work, some private groups such as the Rhode Island Chapter of the Surfrider Foundation have placed some stencils at storm drains throughout the state.

Save the Bay expressed a willingness to continue to work with groups and towns, provided that supplies could be paid for by the towns. They also expressed a willingness to facilitate an evaluation effort of marking programs.

Proposed Approach

The proposed approach is to make the local schools aware of the opportunity to participate in a stormdrain marking activity. Interested groups would then contact Save the Bay directly. Save the Bay will make appropriate contacts with the municipality to obtain financial support to the marking efforts. The Save the Bay program includes both an in-classroom and field component targeting students in the 5-6th grades. This approach will be cost effective for the municipalities and require a minimal amount of coordination by the municipality.

Example of instructions for organizing a storm drain stenciling day:



HOW DO YOU ORGANIZE A STORM DRAIN STENCILING ACTIVITY?

1.0 IDENTIFY ACTIVE

PARTICIPANTS AND RECRUIT VOLUNTEERS (SERVICE ORGANIZATIONS, CIVIC GROUPS, YOUTH GROUPS, 4-H CLUBS, SCOUTS WATERSHED ASSOCIATIONS, AND NEIGHBORHOOD ASSOCIATIONS).

2.0 IDENTIFY NEIGHBORHOOD OR LOCATION TO CONDUCT ACTIVITY.

3.0 OBTAIN WRITTEN PERMISSION FROM THE LOCAL PUBLIC WORKS DEPARTMENT.

4.0 OBTAIN INFORMATION ON THE IMPACTS OF STORMWATER RUNOFF.

5.0 DEVELOP EDUCATIONAL MATERIALS TO EDUCATE RESIDENTS AND COMMUNITY ABOUT THE PROJECT AND STORMWATER IMPACTS.

6.0 DESIGN COMMUNITY

EDUCATION CAMPAIGN (MAY INCLUDE PRESS RELEASES, SPONSORED EVENTS,



RADIO AND TELEVISION PUBLIC SERVICE ANNOUNCEMENTS, EDUCATIONAL MATERIALS, FLIERS, AND/OR DOOR HANGERS).

7.0 ASK LOCAL BUSINESSES AND CIVIC GROUPS TO DONATE SUPPLIES, PUBLICIZE THE EVENT, OR RECRUIT VOLUNTEERS.

8.0 OBTAIN NECESSARY MATERIALS FOR PROJECT (SEE MATERIALS CHECKLIST).

9.0 PLAN TO BE SAFE. ARRANGE TO HAVE SAFETY VESTS, TRAFFIC CONES, AND, IF



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Example document on how to do storm drain stenciling using Paint stencil:

STORM DRAIN STENCILING

TIPS FOR EVENT:

CALL VOLUNTEERS BEFORE EVENT TO REMIND AND THANK THEM FOR THEIR HELP.

WEAR OLD CLOTHES AND GLOVES.

DEVELOP TEAMS OF 4-6 PEOPLE.



1.0 1 PERSON TO WATCH TRAFFIC

2.0 2 PEOPLE TO STENCIL

3.0 2 PEOPLE TO GO DOOR-TO-DOOR TO EDUCATE RESIDENTS

4.0 ROTATE ROLES

EACH TEAM SHOULD HAVE AT LEAST TWO STENCILS WHICH YOU CAN ALTERNATE USING.

EXPECT IT TO TAKE 15-30 MINUTES PER STORM DRAIN, INCLUDING PREPARATION AND DRYING TIME.

BE CAREFUL NOT TO SPLATTER PAINT OR TIP OVER THE PAINT CONTAINER.

DO NOT PAINT STORM DRAINS BLOCKED BY CARS OR NEAR PRIVATE PROPERTY THAT CAN BE DAMAGED BY THE PAINT.

CHOOSE A RAIN DATE IN ADVANCED. IN ORDER FOR THE PAINT TO DRY, IT MUST BE AT LEAST 50 DEGREES FAHRENHEIT AND THE PAVEMENT MUST BE DRY.

HAND OUT REFRESHMENTS DURING AND AFTER THE EVENT.

HAVE FUN!!!



HOW TO STENCIL:

5.0 REMOVE DEBRIS WITH WIRE BRUSH AND BROOM.

6.0 LAY STENCIL ON STREET OR SIDEWALK NEXT TO STORM DRAIN.

7.0 TAPE THE STENCIL FIRMLY IN PLACE.

8.0 PLACE A CARDBOARD BARRIER AROUND STENCIL TO PREVENT OVER-SPRAY. IN ADDITION, PLACE A CARDBOARD BARRIER BETWEEN THE SPRAY AND PERSONAL PROPERTY.

9.0 IF USING SPRAY PAINT, SHAKE THE CAN AND HOLD IT ABOUT SIX TO EIGHT INCHES FROM THE STENCIL.



10.0 USE A SERIES OF SHORT BACK AND FORTH MOTIONS TO SPRAY ONE LINE AT A TIME UNTIL THE LETTERS ARE UNIFORMLY COVERED.

11.0 DO NOT USE TOO MUCH PAINT AS IT WILL RUN UNDERNEATH AND BLUR THE LETTERS.

12.0 WHEN FINISHED CAREFULLY LIFT THE STENCIL UP OFF THE STREET.

13.0 TAPE A WET PAINT SIGN ONTO THE STENCIL AND MOVE ONTO THE NEXT DRAIN.

14.0 AFTER THE PAINT IS DRY, REMOVE THE "WET PAINT" SIGNS FROM ALL THE STORM DRAINS.

15.0 AFTER FINISHING STENCILING



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Example instructions from Save the Bay on using sticky medallion:

Equipment List

- Storm drain markers and epoxy adhesive
- Plastic/surgical gloves
- Town/city authorization letter
- Hand/whisk brooms
- Street map
- Copies of Save The Bay's brochure on Managing Storm Drain Pollution
- Trash bags
- Scotch tape and/or rubber bands
- First aid kit
- Anti-bacterial wipes and paper towels
- Attendance sheet
- Camera
- Cell phone

Day of the Storm Drain Marking Project

1. Split the students into two teams with one adult to supervise each group. Hand out the map with the location of the storm drains.
2. Demonstrate how to clean the curb and mark a storm drain.
3. Remind the students to avoid standing in the street when applying the markers.
4. Distribute the Managing Storm Drain Pollution brochures to homes in the area of your storm drain marking project. It is ILLEGAL to place pamphlets in mailboxes or mail slots. Place the brochure inside a storm door or under the edge of a doormat, attach it to the door handle with rubber bands or tape it to the mailbox.
5. Pick up the trash at each storm drain and along the streets of your marking route.
6. Remind the students to stay off the street and not to pick up broken glass or any sharp objects.

Save The Bay
100 Save The Bay Drive
Providence, RI 02905
401-272-3540
www.savebay.org

Give this fish a Home



- *How to Organize a Storm Drain Marking Project*

SAVE THE BAY.
NARRAGANSETT BAY

Project Preparation

1. Choose a neighborhood in which to do the storm drain marking.
2. Map the storm drains in the area of the project. Either contact your town's Department of Public Works (DPW) to determine if they have storm drain maps or visually locate the storm drains in your project area. Choose town roads that are not heavily traveled and plan to mark the storm drains during low traffic hours (Saturday morning or weekday afternoons). If you are interested in marking a storm drain on private or federally- or state-owned property (for example, a state park), get permission from the property owner or the government agency.
3. Pick up markers from Save The Bay. Contact Save The Bay at 401-272-3540, ext. 130 to let us know the number of markers you will need and when you plan to pick them up.
4. Download the Managing Storm Drain Pollution brochure from our Web site, www.savebay.org and make copies to hand out to each home in the neighborhood of the storm drain marking project.
5. Break your group into two teams of students. Provide each team with a map of the project area with the location of the storm drains and the streets where the brochures will be handed out. One team can clean and mark the storm drains while the other team hands out the brochures to neighboring homes. The teams can switch half way through the project so that each student has the opportunity to mark a storm drain.



How to Mark a Storm Drain

6. Choose a rain date. **IN ORDER FOR THE PROJECT TO BE SUCCESSFUL, IT MUST BE AT LEAST 50 DEGREES FAHRENHEIT AND THE PAVEMENT/CURBING MUST BE DRY.**
7. Have each student's parent or legal guardian fill out and sign the Project Permission Slip.
8. Mail, fax or email the Press Information Form to Save The Bay at least 2 days before the date of your project so that we can send out a press release to encourage local coverage of your project.
9. Make arrangements for the proper disposal of trash that you collect during the storm drain marking project. Either dispose of the trash with your own trash or contact your town's Department of Public Works to determine if they can pick it up.

Always mark and clean the storm drain from the sidewalk and NOT the street.

- Brush or sweep the curb to remove dirt and debris. The surface of the curb must be clean, dry and free of loose debris. Remove any foreign material like old paint and oil because this will affect the adhesion of the epoxy.
- (Figure 1) Apply the epoxy from the squeeze tube along the outside edge of the marker and a dot of epoxy in the middle of the storm drain marker. (Start 1/8 inch from the outside edge and apply an even bead around the entire edge.)

SAFETY NOTE: *Wear plastic gloves.*

If epoxy comes in contact with skin, wash with soap and water. Press the tip of the epoxy tube against the back of the marker before removing it to avoid creating a messy string of epoxy.

- (Figure 2) Place the marker on the curb. Push down hard in the center of the marker with a twisting motion forcing the epoxy out from the edge. It is important that the entire edge of the marker is sealed to the application surface.

SAFETY NOTE: *Avoid contacting the outer edge of the marker with your hand when applying it to a curb. Failure to do so can cause epoxy to contact your hand and be transferred to the front of the marker.*

(Figure 1)



(Figure 2)





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Save the Bay – flyer to hand out to residents when marking storm drains:

What You Can Do

- Dispose of used motor oil at a community oil recycling facility. Call your town's Department of Public Works for the location. 
- Don't throw trash down street drains. Dispose of waste and litter properly. Storm drains are not trash cans.
- Use non-hazardous household products in your home. Visit Rhode Island Resource Recovery Corporation's Web site at www.rirc.org for a list of safe and effective alternative cleaning products. Dispose of household hazardous waste for free at the Rhode Island Resource Recovery's EcoDepot located at 65 Shun Pike in Johnston. Call 401-942-1430, ext. 241 to schedule an appointment.
- Don't sweep grass clippings, sand or pet waste into storm drains. 
- Use organic fertilizers on your lawn.
- Report polluters to the Rhode Island Department of Environmental Management's 24-hour Hotline: 401-222-3070.
- Participate in a cleanup or volunteer for Save The Bay. For more information, please visit our Web site at www.savebay.org

Illustrations courtesy of Robert Seiberling Designs

What is Hazardous in Your Home?

The following is a list of items that you might have in your home that should be disposed of at Rhode Island Resource Recovery Corporation's EcoDepot:

- Batteries: automotive and rechargeable nickel cadmium batteries (no alkaline batteries)
- Gasoline
- Oil-based paints
- Fluorescent light bulbs and lamps
- Pool chemicals
- Propane tanks
- Lawn chemicals, fertilizers and weed killers
- Turpentine
- Antifreeze
- Paint thinners, strippers, varnishes and stains
- Charcoal lighter fluid
- Drain clog dissolvers
- Flea dips, sprays, and collars
- Motor oil and filters
- Household pest and rat poisons
- Rug and upholstery cleaners

Save The Bay
100 Save The Bay Drive
Providence, RI 02905
401-272-3540
www.savebay.org

Have you seen this Fish?

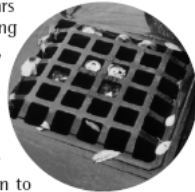


- Managing Storm Drain Pollution

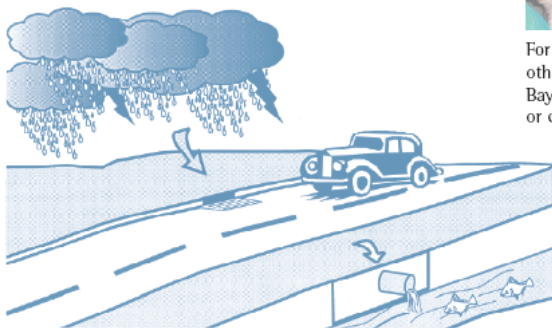
SAVE THE BAY.
NARRAGANSETT BAY

You Can Stop Bay Pollution!

Have you ever wondered where all the water goes during a rainstorm? The water washes off streets and disappears into storm drains carrying pollutants including oil, trash, gasoline, and pet waste. From the storm (street) drains, the rain runoff empties into the nearest river or stream and continues on to Narragansett Bay. Even if you live miles from the shore, what washes down a drain on your street can end up in Narragansett Bay.



Many people use storm drains as trash cans, dumping oil, paints and other hazardous materials into them. Even small amounts of these materials can pollute the Bay. In fact, just one quart of oil can cause an oil slick the size of two football fields! In Rhode Island and Massachusetts it is against the law to dump anything into a storm drain.



The Storm Drain Marking Project

Save the Bay, in partnership with the Rhode Island Resource Recovery Corporation and school and youth groups from around the state, are marking storm drains in your neighborhood. The Storm Drain Marking Program involves children in an educational activity that is designed to teach people about the connection between storm drains and the water quality of Narragansett Bay and its rivers. Look for students in your neighborhood marking the messages "Don't Dump! Drains to Bay" or "Don't Dump! Drains to River".



For more information on the program or other volunteer opportunities at Save The Bay, visit our Web site at www.savebay.org or call 401-272-3540, ext.130.

Facts About Storm Drain Pollution

FACT: In 1996, the North Cape oil spill was responsible for leaking 828,000 gallons of oil into Rhode Island coastal waters. Each year billions of gallons of untreated sewage and rain runoff pour into the Bay and its rivers, polluting our waters, closing our shell fishing grounds, and fouling our beaches. Each year the amount of oil that runs off into the Bay from parking lots and roads is equal to half the amount of oil spilled during the North Cape oil spill!



FACT: Antifreeze is poisonous in its concentrated form to people, fish, birds and pets. Save used antifreeze and any other household hazardous waste and dispose of it at Rhode Island Resource Recovery Corporation's EcoDepot.

FACT: Soap suds from washing your car, rinse water from painting, pet waste, pesticides, plastics and yard waste can all end up polluting the Bay when disposed of in a street drain.

Save The Bay is a nonprofit membership organization.

SAVE THE BAY.
NARRAGANSETT BAY

Example of documentation of storm-drain marking activity:

STORM DRAIN DATA CARD

TOWN

STREET

NUMBER OF STORM DRAINS
STENCILED

NUMBER OF PARTICIPANTS

DATE(S) STORM DRAINS STENCILED

NAME OF ORGANIZATION

CONTACT PERSON

MAILING ADDRESS

DAYTIME PHONE

OBSERVATIONS

Please mark the number of items found within five feet of each side of the storm drains you stencil by making check marks in the area below:

NON-POINT SOURCE POLLUTANTS

GRASS CLIPPINGS _____

LEAVES _____

MOTOR OIL _____

PAINT _____

PET WASTES _____

STREET LITTER/ PLASTICS, INCLUDING:

BEVERAGE BOTTLES _____

BEVERAGE CANS _____

CAPS/LIDS _____

CIGARETTE BUTTS _____

CLOTHING/SCRAPS _____

FAST FOOD WRAPPERS _____

FOAM PLASTICS PIECES _____

NEWSPAPER/MAGAZINES _____

PAPER BAGS _____

PLASTIC BAGS/WRAPPERS _____

PLASTIC OR FOAM CUPS _____

PLASTIC PIECES _____

SIX-PACK HOLDERS _____

STRAWS _____

OTHER _____

LAND USE

Please indicate the number of storm drains marked in the following areas:

RESIDENTIAL AREA _____

SHOPPING CENTER/PARKING LOT _____

GOLF COURSE _____

BUSINESS DISTRICT _____

SERVICE STATION _____

FARMLAND _____

OTHER (PLEASE INDICATE)

STORM DRAIN LOCATION

Please indicate the location of the storm drains you stencil below and on the street map.

EXAMPLE:

STREET: Hymann Street **NUMBER OF STORM DRAINS STENCILED**
8.

BETWEEN Rose Avenue **&** Wilbur
Lane **STREET NAME** **STREET NAME**

STREET: _____ **NUMBER OF STORM DRAINS STENCILED**
_____.

BETWEEN _____ **&**
_____ **STREET NAME** **STREET NAME**

STREET: _____ **NUMBER OF STORM DRAINS STENCILED**
_____.

BETWEEN _____ **&**
_____ **STREET NAME** **STREET NAME**

STREET: _____ **NUMBER OF STORM DRAINS STENCILED**
_____.

BETWEEN _____ **&**
_____ **STREET NAME** **STREET NAME**

TOTAL NUMBER OF STORM DRAINS STENCILED: _____.