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STORM DRAIN STENCILING

A MANUAL FOR COMMUNITIES

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TNRCC

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INTRODUCTION

This manual is a how-to guide for communities interested in starting a Storm Drain Stenciling Program to reduce nonpoint source pollution. It was developed by the Texas Natural Resource Conservation Commission's CLEAN TEXAS 2000 program under a pollution prevention grant from the U.S. Environmental Protection Agency (EPA). The manual covers a range of methods for labeling storm drain inlets and offers examples of programs operating in selected Texas cities. The Texas Natural Resource Conservation Commission (TNRCC) does not endorse one labeling approach over another, and the manual does not represent a complete catalog of programs in Texas. Its purpose is to give cities and community groups the tools to launch a successful citizen-education effort to reduce dumping and protect local water supplies.

WHAT IS NONPOINT SOURCE POLLUTION?

Nonpoint source (NPS) pollution is caused when rainfall carries pollutants from a wide variety of sources into surface water or ground water. The term distinguishes pollution that is diffuse in its origins from pollution that is traceable to a single "point source," like a factory or wastewater treatment plant.

WHAT ARE NONPOINT SOURCE POLLUTANTS?

Many products and materials we use in daily life become nonpoint source pollutants when they reach a body of water. NPS pollutants can be chemicals, like pesticides and fertilizers. They can be automotive products like gasoline, motor oil, antifreeze and road salt. They might be common household items like paint and solvents. They can even be natural materials like soil, animal wastes, grass clippings and fallen leaves.

HOW DO NPS POLLUTANTS REACH WATERWAYS?

Sometimes NPS pollutants wash directly into a creek, river, lake or bay. Construction activity, for example, can send soil and debris directly into nearby creeks and streams. Agricultural activities also may generate NPS pollutants, when fertilizers, pesticides, livestock wastes and eroded soil are not managed properly and are allowed to wash directly into nearby surface waters.

In urban areas, though, the most common route for NPS pollutants is the network of storm drains that carry excess rain water away from streets and directly into waterways. NPS pollutants can be washed by rainfall from lawns and streets into the storm drains, or they can be dumped there deliberately by people who are careless about the environment or who mistakenly think the storm drains flow to a water treatment plant.

HOW DO NPS POLLUTANTS AFFECT WATER QUALITY?

Just as the nature of NPS pollutants varies widely, so do their effects on water quality. Pesticides, antifreeze and motor oil contain toxic chemicals that are harmful to humans,

animals and plants. Just one quart of motor oil can ruin the quality of 250,000 gallons of water. The phosphorus and nitrogen in fertilizers, pet and livestock wastes and decomposing leaves and grass can cause large amounts of algae to grow, which depletes the oxygen level in the water and can lead to fish kills. Animal wastes also introduce harmful bacteria and other pathogens into water supplies. Sediment from soil erosion or construction activity can reduce the clarity of water and block sunlight needed by aquatic plants and fish. Litter and debris, particularly plastic items that float, spoil the beauty of lakes, rivers and bays and can be harmful to fish and birds who mistake them for food.

WHAT IS THE STATE DOING ABOUT NONPOINT SOURCE POLLUTION?

The TNRCC receives funding each year from the EPA to support state and local programs to control and prevent nonpoint source pollution. Since 1990, the TNRCC has funded more than 60 pollution prevention and abatement projects across the state.

Grant projects target water quality problems in both surface and ground water. Some control pollution through the design, building and testing of *structural* improvements, like an artificial wetland or a new type of sedimentation basin. Others focus on *non-structural* management practices, which include such things as replanting roadside ditches with vegetation to better filter storm water runoff and mapping potential pollution sources to protect drinking water wells.

In addition to the NPS grant program, the TNRCC administers programs that encourage **voluntary citizen action** to reduce nonpoint source pollution. These include a household hazardous waste collection program; a used motor oil and filter collection program; "Texas Watch," which trains citizen volunteers to monitor local water quality; an agricultural waste pesticide collection program, which collects canceled or banned pesticides; the Texas Country Cleanup project, which organizes events in rural areas to collect empty pesticide containers, batteries, scrap tires, and used motor oil and oil filters; the Lake and River Cleanup program, which organizes volunteers to remove litter from public waters and shorelines; and the Source Water Protection Program, which assists communities in developing and implementing site-specific programs to protect drinking water.

WHAT IS STORM DRAIN STENCILING AND WHY IS IT NECESSARY?

Many people mistakenly believe storm drain inlets empty to water treatment facilities, so they pour chemicals or sweep debris directly into storm drains. This dumping greatly increases the level of nonpoint source pollutants (leaves, soil, litter, fertilizers, pesticides, street residues) already present in urban storm water runoff and can contribute substantially to a decline in water quality.

More communities are working to reduce nonpoint source pollution by labeling storm drain inlets with messages warning citizens not to dump polluting materials. These storm drain stenciling projects usually are conducted by volunteer groups in cooperation with local authorities. The stenciled messages–usually a simple phrase like "No Dumping! Protect

Our Water"–remind would-be dumpers and passersby that the storm drains connect to local water bodies and that dumping pollutes those waters.

In recent years, as states and local governments have learned more about how nonpoint source pollution degrades water quality, storm drain stenciling efforts have sprung up in communities across the country. The Center for Marine Conservation (CMC), a nationwide environmental organization dedicated to protecting marine life, estimates that 97 groups in 33 states and Canada now are involved in storm drain stenciling. In 1992, the CMC launched its "Million Points of Blight" campaign to educate people about the connection between storm drains and local waterways and to involve them in stenciling efforts. Today, the CMC acts as a clearinghouse for information on storm drain stenciling, referring interested organizations to existing community programs or providing instructions on how to start new programs. The CMC's headquarters in Virginia can be reached at 804/851-6734.

WHAT ARE THE BASICS OF STORM DRAIN STENCILING?

This section describes a range of storm drain stenciling approaches. Projects vary widely from community to community in terms of the materials used, the message conveyed and the physical placement of the message.

MATERIALS

Most communities use stencils and paint to label storm drains. The city of Houston uses a single stencil to imprint its slogan, "You Dump It, You Drink It. No Waste Here," directly onto the concrete above the inlet. Some communities use a two-phase stenciling process. They first paint a rectangular area white to create a background for the message. When this layer is dry, they stencil the message on top of it in a contrasting color. Corpus Christi, for example, uses white paint for the background and green paint for the message "No Dumping! Drains to Bay."

The most commonly used stencils are made of Mylar, a flexible plastic material that can be cleaned and reused many times. Stencils also can be made from cardboard, aluminum or other metal.

Paint (or ink) can be sprayed on or applied by brush or roller. Spray paint is quickest and probably the easiest to apply neatly. However, cities that do not meet federal air-quality standards ("non-attainment areas") may wish to avoid spray paints, since many contain air-polluting propellants. Houston (a non-attainment area) uses rollers and ink pads for this reason. Many Texas cities use special "environmentally friendly" paint that contains no heavy metals and is low in volatile organic compounds (VOCs). Empty steel aerosol cans and paint cans can be recycled in many communities.

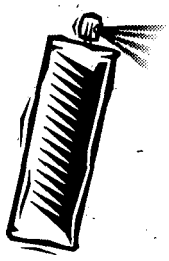
Not all communities use stencils and paint to label their storm drains. Some have opted for permanent signs made of aluminum, ceramic, plastic or other durable materials. The city of Plano uses a 6" x 6" ceramic tile. Fort Worth uses a 4" x 8" aluminum plaque. These signs last longer than stenciled messages (Plano expects its tiles to last five to 10 years) and they require only glue to affix them to storm drain inlets. This ease of application is particularly important when volunteers provide much of the labor.

Many city officials prefer the permanent signs because they are neater than stencils, which sometimes look smeared and may be hard to read from a distance. Plano now requires contractors who build storm drains to place the city's storm drain tiles on new and replacement storm drains. On the down side, permanent signs can be more expensive than painted stencils. Ceramic tiles cost $5 to $6 each. A Mylar stencil, by contrast, costs about 45 cents per linear inch and can be used for 25 to 500 stencilings, depending on whether paint is sprayed on or applied with a brush or roller. In addition, tiles or plaques can be dislodged by pedestrian traffic if they are disturbed before the glue dries.

CONTENT OF THE MESSAGE

Nearly all signs and stencils used on storm drain inlets discourage deliberate dumping. Some communities focus on a particular material such as motor oil while others warn against the dumping of chemicals.

Regardless of the materials, the most important idea to get across is that storm drains lead to open waterways. Often communities will specify which water body the inlet drains to, saying for example, "drains to creek" or "drains to lake." Some even name the river, lake or bay. The following are examples of possible messages:



NO DUMPING. DRAINS TO WATER SOURCE.

NO DUMPING. DRAINS TO BAY
(CREEK, STREAM, RIVER, LAKE, OCEAN).

DON'T DUMP. DRAINS TO CREEK
(STREAM, RIVER, LAKE, BAY, OCEAN).

DON'T DUMP. PROTECT OUR WATER.

YOU DUMP IT, YOU DRINK IT. NO WASTE HERE.

SI USTED LO TIRA, USTED LO TOMA.

DUMP NO WASTE. DRAINS TO BAY.
(CREEK, STREAM, RIVER, LAKE, OCEAN)

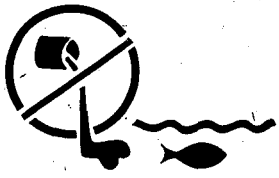
NO OIL OR CHEMICALS. DRAINS TO BAY.

DO NOT DUMP. FLOWS TO BAY
(CREEK, STREAM, RIVER, LAKE, OCEAN).

DO NOT DUMP. FLOWS TO TRINITY RIVER.

NO OILS OR CHEMICALS

DRAINS TO BAY
(Bay City)



(North Central Texas COG)

NO DUMPING

DRAINS TO RIVER
(Houston-Galveston Area COG)

Communities often combine words and pictures to convey their message. The graphic portion may reinforce the verbal message by depicting the pathway from storm drain to water body in some stylized fashion. Graphics also may refer to some topic of local interest. For instance, Houston uses a picture of a shrimp on one of its stencils to remind passersby that the Galveston Bay shrimping industry can be hurt by pollutants dumped in Houston. Fort Worth superimposes its anti-dumping message against the silhouette of a largemouth bass, one of the most popular game fish in the southern United States. Others use pictures of windsurfers or sailboats to remind people that dumping pollutants affects the recreational value of local waterways.

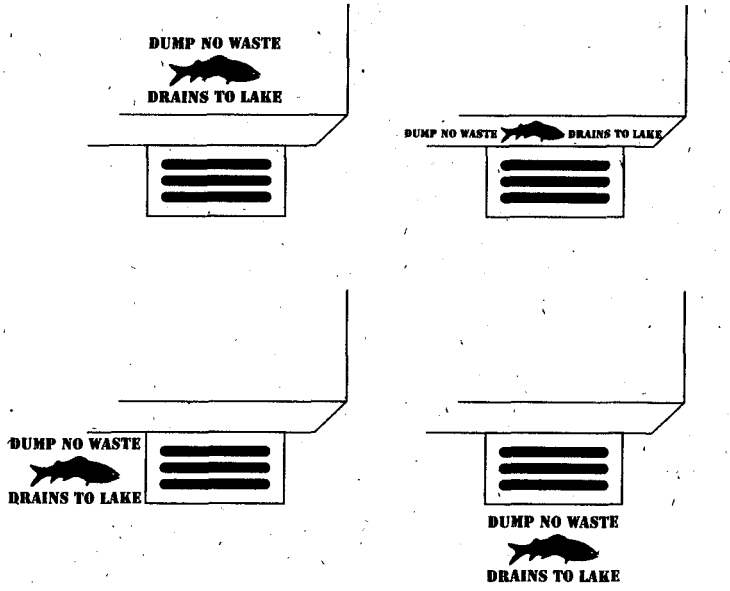
Communities with large numbers of Spanish speakers may wish to develop signs or stencils in both English and Spanish. Houston has done this with its "You Dump It, You Drink It" message. Some communities opt for a simpler approach, using a graphic alone, without words. The North Central Texas Council of Governments offers cities such a stencil. It shows an oil can in a circle with a slash through it.

PLACEMENT OF THE MESSAGE

Messages may be positioned in several ways. Some are placed flat against the sidewalk surface just above the storm drain inlet. Others are placed on the curb facing the street. Still others are located on the street itself, either just upstream of the storm drain or on the street in front of the drain. However, messages placed on the street may wear out sooner. (See Figure 1.)

Potential dumpers will see the message in any of these locations. The decision about where to place the message also should take into account who *else* will see it. Signs facing the street will be seen more easily by motorists; signs aligned with the sidewalk or with the street itself are more likely to be seen by pedestrians. It's important that even those who would not dump motor oil down a storm drain be exposed to the stenciled messages. Because the signs raise awareness about the connection between storm drains and water bodies, they help deter littering, overfertilizing and other practices that contribute to nonpoint source pollution.

Figure 1



NOTE: Many storm drain inlets are on curbs.

HOW DO STORM DRAIN STENCILING PROGRAMS OPERATE?

Storm drain stenciling programs are carried out in a variety of ways. In some cases, cities use their own public works staff to do all labeling. The city of Hurst, Texas, (population

30,000) took this approach and has labeled all 1,200 of its storm drain inlets. Plano has used its own crews to place 1,200 ceramic tiles, and Fort Worth has done most of its storm drain labeling in-house as well. Some cities feel that having their own crews do the work produces better results and eliminates liability and safety concerns. Recently, though, Fort Worth sponsored a neighborhood association to label some drains. Both Fort Worth and Plano plan to work with volunteer groups in the future.

A more common arrangement for storm drain stenciling programs is for volunteer groups to provide the labor and the city to provide supplies, safety equipment and other forms of support.

This public-private partnership may be initiated by either side. If a civic association or local environmental group initiates the project, it must be sure to obtain the support and cooperation of local authorities. Storm drains are city property and local ordinances or policies may prohibit marking them without permission. Most cities also will want certain safety measures in place before volunteers set to work.

SAFETY

Since stenciling projects take place on city streets, volunteer safety is of utmost importance. The city may wish to designate lower-traffic residential areas as targets for volunteer stenciling and provide safety equipment and training. Most programs require that stenciling be done in teams, with at least one person designated to watch for traffic. Adult supervision is needed when the volunteers are school children or members of a youth group. Most cities also require participating volunteers (or their parents) to sign a waiver of liability. (See Appendix A for examples of waivers.)

THE CITY'S ROLE

In many cities, the public works or water quality department will designate a person to coordinate stenciling projects by volunteer groups. Coordination may mean any of the following:

- Providing stenciling kits containing all materials and tools needed to carry out a stenciling project. (See Appendix B for examples of the contents of kits.)
- Furnishing a list of locations or a map of storm drains to be stenciled.
- Training volunteers on safety procedures and on the technique for using stencils or affixing signs.
- Providing safety equipment: traffic cones, safety vests, masks and/or goggles (if spray paint is used) and gloves (if glue is used).
- Providing incentives and rewards for volunteers (badges, T-shirts, certificates).
- Providing pollutant tracking forms to collect data on serious instances of dumping.

WORKING WITH VOLUNTEERS

Since most storm drain stenciling programs depend heavily on volunteer labor, organizers or coordinators must be skilled in the art of recruiting, training, managing and recognizing volunteers. This section focuses on how to work successfully with volunteers.

RECRUITING VOLUNTEERS

Cities can spread the word about storm drain stenciling to volunteer organizations through many channels. The North Central Texas Council of Governments distributed a pamphlet on the program to area service organizations. Cities can mail information on the program to civic groups, youth groups, schools, environmental clubs, chambers of commerce or volunteer centers. The city of Houston distributed a brochure to local organizations, placed articles in local magazines and took out newspaper ads to publicize its program. Houston and Corpus Christi both included information about storm drain stenciling in an environmental insert placed in the local newspaper. Program coordinators can make presentations at community meetings and encourage word-of-mouth communications about the program. The city of Plano developed a public service announcement about its program.

Most volunteer groups do their storm drain stenciling projects on a Saturday morning. The program has been popular with Girl Scouts, Boy Scouts, 4-H clubs, environmental clubs, church youth groups, neighborhood associations, grade school classes and a wide range of civic and service organizations.

TRAINING VOLUNTEERS

Before participating in a stenciling project, volunteers need training in three areas: technique, safety and information tracking.

TECHNIQUE

Instructions on how to stencil a storm drain vary with the materials the city uses. Spray painting requires a different technique than rolling or brushing paint onto a stencil. Most projects have certain elements in common as listed below.

- First, the area to be labeled must be cleaned with a wire brush.
- Volunteers are warned against applying too much paint, which can make a stencil unreadable.
- Wait a few minutes before the stencil is removed to avoid paint smearing.
- Volunteers are advised to wear old clothes.

Appendix C contains sample stenciling instructions.

SAFETY

Storm drain stenciling is normally conducted in teams of two or more people. The following are common safety guidelines.

- Groups of young people must have an adult supervise each team.
- One person on each team is assigned to watch for traffic.
- All participants should wear safety vests provided by the sponsoring city.
- If spray paint is used for stenciling, participants also should wear goggles or masks.
- If glue is used to affix permanent signs, participants should wear rubber gloves.
- If volunteers are working in the street, they must use traffic cones and/or barricades provided by the city.

Sample safety instructions are included in Appendix D.

INFORMATION TRACKING

Storm drain stenciling projects provide cities with valuable information about nonpoint source pollution. Cities typically have thousands of storm drain inlets in their jurisdictions and public works staffs cannot inspect them all. Most cities ask participants in storm drain stenciling projects to note storm drains that are clogged with debris or show obvious signs of dumping. This enables city crews to target cleanup efforts. Volunteers should be instructed on what kinds of pollutants to look for and how to fill out data cards.

Volunteers also should list the locations of all storm drains labeled during the project, so the city can keep track. Sample data cards are included in Appendix E. Regardless of whether tracking forms are used, it is a good idea to assemble the participants after the event to talk about what they have found. Their reactions and impressions can help organizers improve future stenciling projects.

RECOGNIZING VOLUNTEERS

For any volunteer project to be successful, volunteers must feel they have done something worthwhile. Communities active in storm drain stenciling have developed a variety of ways to recognize volunteers. The following are a few examples:

- Provide each participant with a certificate of appreciation and/or letter of thanks signed by the mayor. (See Appendix F for a sample certificate.)
- Distribute T-shirts, hats, badges or other gifts to each participant after the event. The city of Austin distributes plastic water bottles to participants *before* the event so they can have a supply of water while they're working. "I helped curb pollution" is the message on the bottles.
- Hold a picnic or small party after the event, with refreshments donated by a local business.
- Provide free coupons for pizza, hamburgers, ice cream or movies donated by local merchants.
- Take pictures of stenciling teams before, during and after the event to create a pictorial record of volunteers' activity.

STENCILING AS AN EDUCATIONAL TOOL

A storm drain stenciling project affords many opportunities for public education. The labeled storm drains themselves become public education tools, reminding potential polluters, motorists, pedestrians and area residents that storm water runoff flows to area water bodies. The knowledge that whatever enters a storm drain enters the nearby creek, river or lake makes people more conscientious about littering, overfertilizing, sweeping grass clippings into the gutter and other practices that aggravate nonpoint source pollution.

Corpus Christi and other cities have volunteers distribute door hangers in the targeted neighborhoods to notify residents that storm drain stenciling is taking place. The hangers also explain the purpose of the project and offer tips on how citizens can reduce nonpoint source pollution. (See Appendix G for a sample door hanger and brochure.)

Cities or community groups can notify daily and weekly newspapers to get advance coverage of the planned stenciling event. A news release issued for the day of the event can

draw TV and/or daily newspaper coverage. (See Appendix H for sample news release.) Newspapers may choose to cover the event itself as an environmental feature story to further heighten public awareness. Public service announcements (PSAs) distributed before the event also will help reinforce the message. Sample PSAs may be found in Appendix I.

It is important to remember that to be effective a city does not have to stencil every storm drain. Large cities have thousands of inlets and it would be impractical to cover all of them. In fact, to do so might defeat the public education purpose because if people see the message on every drain, it may cease to register with them.

It is also important to view storm drain stenciling as one part of a larger educational campaign to reduce nonpoint source pollution. For the message on a storm drain to sink in, people need to hear it explained in other forums. Cities may want to develop TV, radio and print ads or public service announcements to reinforce the idea that storm drains lead to local waterways and that dumping pollutes those waters. Community groups could approach a local television station about producing and running a free PSA on storm drains and nonpoint source pollution. One reason the Texas Department of Transportation's "Don't Mess With Texas" anti-littering campaign succeeded was that the department conveyed its message through TV and radio ads and reinforced the slogan by printing it on the trash barrels located along the highways.

The city of Houston used "You Dump It, You Drink It" as one of its storm drain messages in part because the slogan had already been used in a joint city/TNRCC public education effort to encourage motor oil recycling. The TNRCC can make available to any interested community a television PSA, radio scripts and print ads featuring this slogan (call 512/239-3159).

ASSESSING THE EFFECTIVENESS OF STORM DRAIN STENCILING

By raising public awareness of nonpoint source pollution, storm drain stenciling programs should discourage practices that generate nonpoint source pollutants. As with any public education project, however, it is difficult to precisely measure the effect storm drain stenciling programs have on human behavior. Nor is it easy to measure reductions in certain components of nonpoint source pollution, which by definition is diffuse in origin.

Some cities attempt to assess the effectiveness of storm drain stenciling programs by periodically examining water samples from targeted storm drain *outfalls* (places where storm drains empty into a body of water). If the storm drains leading to a particular outfall have been labeled, and if the level of pollutants from that outfall declines over time, one can assume the labeling has had some deterrent effect.

The city of Fort Worth plans to track pollutant levels at 600 storm drain outfalls over the next five years to determine whether storm drain labeling and other pollution prevention efforts have improved water quality in local creeks. The city of Plano is now collecting baseline water quality data from targeted outfalls and will take periodic samples to measure program results in the future.

Monitoring outfalls is time-consuming, and periodic testing for component NPS pollutants can be expensive. Some cities infer success from increases in the volume of used

motor oil delivered to used-oil recycling centers. Others measure success in terms of how many drains are stenciled and the number of requests received by volunteer groups to participate in the program. They can also take into consideration the number of cleanups conducted by the city as a result of reports made by volunteers.

Citizen groups can be trained to monitor water quality in local waterways through the TNRCC's *Texas Watch* program.

TEXAS WATCH

The TNRCC's Texas Watch program educates individuals about the causes and effects of pollution by training citizen groups to monitor water quality. Currently, there are more than 300 volunteer monitoring groups in Texas. Each volunteer undergoes training in sampling techniques approved for the Texas Watch program by EPA.

In addition to training citizens in water quality monitoring, Texas Watch seeks to improve communications and resolve conflicts by coordinating partnerships among citizens, businesses, industry, and local and regional authorities.

Texas Watch is an ideal project for science clubs, Boy Scouts, service organizations and citizens interested in preserving water quality in their communities. Since volunteer monitoring efforts are targeted to locations not monitored by the TNRCC field staff, data collected by Texas Watch volunteers is extremely useful to the TNRCC. It helps fill in gaps in the agency's knowledge of local water quality and thereby assists the agency in making environmental decisions.

PROFILES OF FIVE TEXAS PROGRAMS

CORPUS CHRISTI

Message: Do Not Dump. Drains to Bay.
Graphic: Windsurfer, fish
Method: Aluminum stencil; message spray painted in green paint against a white background
Program Start Date: October 1993

Corpus Christi has stenciled about 800 storm drains out of a total of 13,000. The city relies entirely on volunteers to do the stenciling. It coordinates 10 to 12 volunteer stenciling projects each year, working with organizations such as the Girl Scouts and Boy Scouts, the AT&T Telephone Pioneers, the Southwestern Bell Telephone Pioneers and local environmental science clubs.

The city uses metal stencils and spray paint to print the message "Do Not Dump. Drains to Bay" in green letters against a white background. Graphics include a fish and a windsurfer. The stencils cost approximately $100 each and are paid for through the water department's operating funds. The city has six stenciling kits available for volunteers and provides door hangers for distribution to residents of the neighborhood where stenciling takes place.

Before each event, the city's project coordinator provides volunteer training, which includes an orientation to the program, directions on how to use the stencils and instruction on safety procedures. After the event, each volunteer is given a T-shirt, designed especially for the storm drain stenciling program, and the volunteer group receives a framed certificate of appreciation.

In addition to the stenciling kits, the city provides volunteer groups with safety vests, traffic cones and a traffic flag.