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Urban Filter Strips: A New Practice for Nutrient and Sediment Credit for the Chesapeake Bay TMDL

The US EPA Chesapeake Bay Program recently approved recommendations of an Expert Panel to adopt pollutant load reduction credits for a new best management practice (BMP), urban filter strips. The six Chesapeake Bay States and District of Columbia may now submit “acres of urban land treated by urban filter strips” as part of their progress towards meeting their load allocation for the Bay total maximum daily load. This practice may be applied to new development, redevelopment or as a retrofit.

The load reduction credits for urban filter strips are presented in Table 1 and, unlike other urban BMPs, urban filter strips may receive credit as a runoff reduction or stormwater treatment practice depending on its design. Historically, urban filter strips were designed to capture sediment along roadways but recent engineering design approaches include features to more effectively reduce the volume of stormwater runoff and associated nutrients as well. Their relatively small areas make them effective practices to treat runoff from parking lots, roadways and other small impervious areas (i.e., less than 5,000 ft²), but they may also accept runoff from pervious areas.

Table 1. Recommended nutrient and sediment removal efficiencies for urban filter strips as a runoff reduction and stormwater treatment practice

Major Practice Function	Total Nitrogen¹	Total Phosphorus²	Total Sediment²
Runoff Reduction	20%	54%	56%
Stormwater Treatment	n/a	n/a	22%

¹ TN removal is based on particulate-N only and assumes that particulate N removed is not converted to nitrate and leached to groundwater. No credit is provided for dissolved N.

² The percent pollutant removal is estimated using the 0.5” rainfall depth capture for the TP and TS performance adjustor curves provided in SPS EP (2013a).

Urban filter strips are structural BMPs designed as stable vegetated areas on flat to gently sloping land (Figure 1). Stormwater runoff entering the urban filter strip must be in the form of sheetflow and at a non-erosive rate for the site-specific soil conditions to receive credit. A level spreader or other flow diversion device is needed where concentrated flow conditions exist prior to entering the filter strip. They are designed as conveyance treatment systems and rely on infiltration into the underlying soils to reduce runoff volume and physical pollutant removal through settling and filtration.

A major highlight of the Expert Panel recommendations is design ratios that recommend a specified filter strip length to impervious flow of 0.2 for stormwater treatment urban filter strips and 0.4 for runoff reduction urban filter strips. The design ratio method was used by the Expert Panel to standardize the sizing of urban filter strips since the engineering design methods that use runoff volume or storage to size runoff reduction or infiltrating BMPs are not applicable to urban filter strips. Additional qualifying conditions for urban filter strips as a stormwater treatment and runoff reduction practice can be found in the Expert Panel's report available on the Center's [Online Watershed Library](#), as well as the [Chesapeake Stat](#) website. For more information on this project, contact Neely Law at nll@cwp.org.



Figure 1. Example urban filter strip (Photo courtesy of Ryan Winston, North Carolina State University).

The Inside Scoop on Picking up Pet Waste in Frederick, Maryland

Dog poop is a ubiquitous and messy problem in urban and suburban communities. Many cities and towns across the country coordinate outreach programs focused on educating dog owners about why and how they should pick up after their pets. These campaigns are not usually designed to address the specific barriers and benefits of the target audience, which would require finding out why some dog owners don't pick up their dog's poop. The identification of barriers and benefits is part of a social marketing approach that uses marketing strategies to influence the behaviors of a target audience for the common or public good. The application of social marketing to environmental problems is an emerging area of interest in the Chesapeake Bay watershed. The Center and Water Words that Work (WWTW) is working with the City of Frederick, Maryland on a social marketing project to help develop a more effective pet waste program.

The City of Frederick is located in western Maryland and is the second largest incorporated city in the state. With an average of 1.47 dogs per dog-owning household (as estimated by the Humane Society), there could be more than 12,000 dogs citywide. Assuming each dog produces an average of 0.75 pounds of waste per day, this works out to about 9,200 pounds of dog waste each day, which contributes to the overload of bacteria in the City's Carroll Creek and phosphorus problems in the Monocacy River basin.

The City has earned the reputation for being dog-friendly, as many downtown businesses provide water bowls outside their shops and even allow leashed pups into their store. The City also hosts an annual popular event called the "Dog Days of Summer" and there is a dog park located in the heart of downtown near Carroll Creek. To raise awareness of the importance of responsible pet ownership, the City's recent efforts to reduce pet waste include providing a Scoop the Poop pledge which dog owners can sign to promise to always clean up after their dogs. Pledge signers can take the pledge to City offices to receive a free pet waste bag dispenser and are also recognized on the City's website. To date, 114 dog owners have signed the pledge.

The purpose of the study is to help the City design a more effective outreach program to increase the number of dog owners who clean up after their pets, and be able to better measure the effectiveness of the program. The scope of work includes a formal assessment of the target audience, message creation, and a social marketing plan that can be

implemented by the City with future funding. Initial results from the target audience assessment are summarized below.

The Center began by reviewing other pet waste programs from across the country to see what we could learn from these initiatives. These programs used a variety of media, including videos, brochures, yard signs, billboards, websites, and pledge forms. Our research will further delve into which of these methods is most effective to reach the target audience. For the programs reviewed, the two most commonly identified barriers to picking up pet waste identified by dog owners were:

- Not wanting to pick it up due to the mess and smell
- Thinking one pile left won't add to the problem

Next, WWTW conducted test panels to evaluate the impact of different outreach messages from pet waste programs. The panels found that, when it comes to videos, shorter ones (e.g. 30 seconds) can effectively relay the key message (or desired behavior) and hold the audience's attention.

To help determine what works and does not work with the City's current Scoop the Poop pledge form, the Center's partner WWTW solicited input on the pledge from a focus group comprised of dog owners in Maryland. The focus group found that the message is fundamentally sound, but the pledge lacks visual punch. Another finding was that the panelists viewed themselves as responsible pet owners but are not confident that others will do their part, so they don't think that signing a pledge will make a difference. Given this, some suggestions to strengthen the City's pledge are to offer additional rationales for signing the pledge (e.g., disapproval from neighbors, damage to lawns, risk of disease) that may be more motivating to the target audience than environmental protection alone and to identify some stronger incentives and disincentives to picking up pet waste (e.g., reminders about fines and pet waste regulations or providing greater public recognition for those who sign the pledge form). None of the panel members reported that providing a free pet waste bag was a particularly meaningful incentive.

The next steps are to conduct a telephone survey with a subset of the target audience to determine who picks up their dog's poop and why or why not in order to inform the development of improved messaging for the City's outreach. To learn more about this project, contact Neely Law at nll@cwpc.org. This work is funded through a grant from the Chesapeake Bay Trust.

News from the Center

We are finally finished unpacking and have settled into our new office!



(before)

If you didn't know, the Center recently moved to a smaller office where staff alternate between using shared office space and telecommuting in order to make more efficient use of our resources, reduce commuting time for staff, and reduce our carbon footprint. This quasi-virtual office setup also allows us to expand geographically as we now have the technology for employees to work from any location.

Our new space is much nicer than the old one and as a bonus the deli downstairs has wonderful coffee, pastries, salad rolls and banh mi.



(after)

The Center's new address is 3290 North Ridge Road, Suite 290, Ellicott City, MD 21043. Some of the staff phone extensions have changed, so please listen to the recording when you call the main number to hear the new staff directory. Stop by and see us if you are in the neighborhood!