

POLLUTION PREVENTION FACT SHEET: LANDSCAPING AND LAWN CARE

Description

This management measure seeks to control the stormwater impacts of landscaping and lawn care practices through education and outreach on methods that reduce nutrient loadings and the amount of stormwater runoff generated from lawns. Research has indicated that nutrient runoff from lawns has the potential to cause eutrophication in streams, lakes, and estuaries (Schueler, 1995a). Nutrient loads generated by suburban lawns can be significant, and recent research has shown that lawns produce more surface runoff than previously thought (CWP, 1999a). For more information see, *Nutrient Movement from the Lawn to the Stream*, Article 4 in *The Practice of Watershed Protection*. Pesticide runoff (see the Pollution Prevention Fact Sheet on Pest Control) can contribute pollutants that contaminate drinking water supplies and are toxic to both humans and aquatic organisms.

Landscaping and lawn care are a big business in the United States. It has been estimated that there are 25 to 30 million acres of turf and lawn in the United States (Roberts and Roberts, 1989 and Lawn and Landscape Institute, 1999). To put this statistic in perspective, consider that if lawns were classified as a crop, they would rank as the fifth largest one in the country on the basis of area, after corn, soybeans, wheat, and hay (USDA, 1992). In terms of fertilizer inputs, nutrients are applied to lawns at about the same application rates as those used for row crops (Barth, 1995a). The urban lawn is also estimated to receive an annual input of five to seven pounds of pesticides per acre (Schueler, 1995b). For more information see, *Urban Pesticides: From the Lawn to the Stream*, Article 5 in *The Practice of Watershed Protection*.

Not many residents understand that lawn fertilizer can cause water quality problems – overall less than one fourth of residents rated it as a water quality concern (Syferd, 1995 and Assing, 1994), although ratings were as high as 60% for residents that lived adjacent to lakes (Morris and Traxler, 1996 and MCSR, 1997). Interestingly, in one Minnesota survey, only 21% of homeowners felt their own lawn contributed to water quality problems, while over twice as many felt their neighbor's lawn did (MCSR, 1997). Unlike farmers, suburban and rural landowners are often ignorant of the actual nutrient needs of their lawns. According to surveys, only 10 to 20% of lawn owners take the trouble to take soil tests to determine whether fertilization is even needed (CWP, 1999b). The majority of lawn owners are not aware of the phosphorus or nitrogen content of the fertilizer they apply (Morris and Traxler, 1996) or that mulching grass clippings into lawns can reduce or eliminate the need to fertilize. Informing residents and lawn care professionals on methods to reduce fertilizer and pesticide application, limit water use,

and avoid land disturbance can help alleviate the potential impacts of a major contributor of nonpoint source pollution in residential communities.

Applicability

Lawn care and landscaping are done in all parts of the country, in all types of climates, and in every type of community from rural to urban. Lawn fertilization is among the most widespread watershed practices that homeowners engage in. In a survey of resident attitudes in the Chesapeake Bay, 89% of residents owned a yard, and of these, about fifty percent applied fertilizer every year (Swann, 1999). The average rate of fertilization in ten other resident surveys was even higher, at 78%, although this could reflect the fact that these surveys were biased towards predominantly suburban neighborhoods, or excluded non-lawn owners (Table 1). Because lawn care and landscaping are such common practices, education programs for both residents and lawn care professionals on reducing the stormwater impacts of these practices are an excellent way to improve local water quality. For more information see *Understanding Watershed Behavior*, Article 126 in *The Practice of Watershed Protection*.

| Table 1. Lawn Care Practices - A Comparison of 11 Homeowner Surveys | | | | |
|--|--------------------|----------------------|-----------------------|-----------------------------------|
| Study | Respondents | % Fertilizing | % Soil Testing | Other Notes |
| Chesapeake Bay <i>Swann, 1999</i> | 656 | 50% | 16% | 1.73 times/year |
| Maryland <i>Smith, 1994</i> | 100 | 88% | 15% | 58% grass cycle |
| Maryland <i>Kroll and Murphy, 1994</i> | 403 | 87% * | na | |
| Virginia, <i>Aveni, 1998</i> | 100 | 79% | > 20% | |
| Maryland, <i>HGIC, 1996</i> | 164 | 73% | na | 2.1 times/year |
| Michigan, <i>De Young, 1997</i> | 432 | 75% | 9% | 1.9 times/year 69% grass cycle |
| Minnesota <i>Morris and Traxler, 1996</i> | 981 | 75% | 12% | 2.1 times/year 40% grass cycle |
| Minnesota, <i>Dindorf, 1992</i> | 136 | 85% | 18% | 78% grass cycle |

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|--|-----|-----|----|-----------------------------------|
| Wisconsin, <i>Kroupa, 1995</i> | 204 | 54% | na | 2.4 times/year |
| Washington, <i>Hardwick, 1997</i> | 406 | 67% | na | |
| Florida, <i>Knox et al., 1995</i> | 659 | 82% | na | 3.2 times/year 59% grass cycle |
| * Fertilization rates were significantly lower in small urban lots (less than 2500 square feet); survey results from these smaller lots were excluded from this table. na = not asked | | | | |

Design Considerations

Education programs that seek to change the impacts of fertilizer, pesticide and herbicide use on receiving water quality should first consider creating training programs for those involved in the lawn care industry. Nationally, lawn care companies are used by 7 to 50% of consumers, depending on household income and lot size. Lawn care companies can exercise considerable authority over which practices are applied to the lawns they tend, as long as they still produce a sharp looking lawn. For example, 94% of lawn care companies reported that they had authority to change practices, and that about 60% of their customers were “somewhat receptive to new ideas” according to a Florida study (Israel *et al*, 1995). De Young (1997) also found that suburban Michigan residents expressed a high level of trust in their lawn care company.

Local governments that want to influence lawn care companies must have an active program that supports those companies that employ techniques to limit fertilizer and pesticide use to the minimum necessary to maintain a green lawn. One way to do this is through providing promotional opportunities. One example is the State of Virginia Water Quality Improvement program that includes the chance for lawn care professionals to enter into an agreement to use more environmentally friendly lawn care practices. In exchange, the lawn care company can use their participation in the program as a promotional tool (VA DCR, 1999). Providing certification for representatives from lawn care companies for attending training workshops put on by cooperative extension offices can also be an effective promotional tool.

Training for employees of lawn and garden centers is another important tool in spreading the message regarding lawn care and pollution control. Study after study indicate that product labels and store attendants are the primary and almost exclusive source of lawn care information for the average consumer who takes care of their own lawn. The Florida Yards and Neighbors program has worked with 19 stores of a large national hardware and garden chain to educate store employees and incorporate messages regarding fertilizer use and pesticide reduction (NRDC, 1999). Often the key strategy to implementing a program like this is to substitute watershed friendly products for those that are not, and to

offer training for the store attendants to pass on to consumers at the point of sale on how to use, and perhaps more importantly, how not to abuse or overuse such products.

A recent CWP survey of 50 nutrient education programs provides a number of tips to program managers on making outreach programs more effective. The results of the study showed that there were a number of important considerations for increasing the recall and implementation of pollution prevention messages. Table 2 provides some tips that appear to work the best at relaying pollution prevention messages and changing pollution-producing behaviors.

| Table 2. Tips For Creating More Effective Resident Lawn Care Outreach Programs |
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| <p>Tip 1: <i>Develop a stronger connection between the yard, the street, the storm and the stream.</i></p> <p>Outreach techniques should continually stress the link between lawn care and the undesirable water quality it helps to create (e.g., algae blooms, sedimentation).</p> |
| <p>Tip 2: <i>Form regional media campaigns.</i></p> <p>Since most communities operate on small budgets, they should consider pooling their resources together to develop regional media campaigns that can use the outreach techniques that are proven to reach and influence residents. In particular, regional campaigns allow communities to hire the professionals needed to create and deliver a strong message through the media. Also, the campaign approach allows a community to employ a combination of media, such as radio, television, and print, to reach a wider segment of the population. It is important to keep in mind that since no single outreach technique will be recalled by more than 30% of the population at large, several different outreach techniques will be needed in an effective media campaign.</p> |
| <p>Tip 3: <i>Use television wisely.</i></p> <p>Television is the most influential medium for influencing the public, but careful choices need to be made on the form of television that is used. The CWP survey found that community cable access channels are much less effective than commercial or public television channels. Program managers should consider using cable network channels targeted for specific audiences, and develop thematic shows that capture interest of the home, garden and lawn crowd (e.g., shows along the lines of “Gardening by the Yard”). Well produced public service announcements on commercial television are also a sensible investment.</p> |
| <p>Tip 4: <i>Keep messages simple and funny.</i></p> <p>Watershed education should not be preachy, complex, or depressing. Indeed, the most effective outreach techniques combine a simple and direct message with a dash of humor.</p> |
| <p>Tip 5: <i>Make information packets small, slick and durable.</i></p> <p>Educators continually struggle about how to impart the detailed information to residents on how to practice good lawn care behaviors, without losing their interest. The trick is to avoid a ponderous and boring handbook that looks great to a bureaucrat but ends up lining a bird cage. One solution is to create small, colorful and durable packets that contain the key essentials about lawn care behaviors, and direct contact information to get better advice. These packets can be stuck on the refrigerator, the kitchen drawer or the workbench for handy reference when the impulse for better lawn care behavior strikes.</p> |

Tip 6: *Understand the demographics of your watershed.*

Knowing the unique demographics of a watershed allows a program manager to determine what outreach techniques are likely to work for that particular area. For example, if some residents speak English as a second language, a certain percentage of outreach materials should be produced in their native language. Similarly, watershed managers should consider more direct channels to send watershed messages to reach particular groups such as through church leader or ethnic specific newspapers and television channels.

Pollution prevention programs may also wish to incorporate a much stronger message that promotes a low or zero input lawn. It seems appropriate that watershed education programs strongly advocate no chemical fertilization, reduced turf area and the use of native plants adapted to the ecoregion (Barth, 1995b). This message provides a balance to the pro-fertilization message that is so effectively marketed by the lawn care industry. For more information see, *Toward a Low Input Lawn*, Article 130 in *The Practice of Watershed Protection*.

A final note is that program managers need to incorporate some method for evaluating the effectiveness of their programs at reaching residents. Many programs use “before and after” market surveys to provide information on the level of understanding of residents and the percentage of residents that implement good lawn care practices. These surveys provide insights on what outreach techniques work best for a community and the level of behavior change that can be expected.

Limitations

The overriding public desire for green lawns is probably the biggest impediment to limiting pollution from this source. For example, when residents were asked their opinions on over thirty statements about lawns in a Michigan survey, the most favorable overall response was to the statement “a green attractive lawn is an important asset in a neighborhood” (De Young, 1997). Nationally, homeowners spend about 27 billion dollars each year to maintain their own yard or pay someone else to do it (PLCAA, 1999). In terms of labor, a majority of homeowners spend more than an hour a week taking care of the lawn (Aveni, 1994, De Young, 1997). Convincing residents that a nice green lawn can be achieved without using large amounts of chemicals and fertilizers is difficult when conventional lawn care techniques are often seen as more effective, less time-consuming, and more convenient. For more information see, *Homeowner Survey Reveals Lawn Management Practices in Virginia*, Article 131 in *The Practice of Watershed Protection*.

Effectiveness

The effectiveness of pollution prevention programs designed to educate residents on lawn care and landscaping practices have not been well documented to date. However, the

need for such programs is evident. Source area monitoring in Marquette, Michigan found that nitrogen and phosphorus concentrations in residential lawn runoff were 5 to 10 times higher than any other source area (CWP, 1999b). This confirms earlier Wisconsin research findings that residential lawns yielded the highest phosphorus concentrations of twelve urban pollutant sources examined (Bannerman *et al*, 1993).

A critical step in crafting an education program is to select the right outreach techniques to send the lawn care message. From the results of a number of market surveys, two outreach techniques have shown some promise in actually changing behavior – media campaigns and intensive training. *Media campaigns* typically use a mix of radio, TV, direct mail, and signs to broadcast a general watershed message to a large audience. *Intensive training* use workshops, consultation and guidebooks to send a much more complex message to a smaller and more interested audience. Intensive training requires a more substantial time commitment - often several hours to a few days.

From evaluations of several market surveys, it appears that both media campaigns and intensive training can each produce up to a 10 to 20% improvement in selected watershed behaviors among their respective target populations. A combination of both outreach techniques is probably needed in most watersheds, as each complements the other. For example, media campaigns cost just a few cents per watershed resident reached, while intensive training can cost several dollars for each resident that is actually influenced. Media campaigns are generally better at increasing awareness, and sending messages about negative watershed behaviors. Intensive training, on the other hand, is superior at changing individual practices in the home, lawn, and garden.

Cost

The cost of creating and maintaining a program that addresses lawn care and landscaping practices and water quality varies depending on the intensity of the effort and what outreach techniques are selected. Media campaigns often require a greater amount of money to create, but are also most likely to reach the largest proportion of the community. Intensive training campaigns may not require as large a creation cost, but often require more staff time. Production costs for materials such as flyers and brochures is often inexpensive (\$0.10 to \$0.50 per brochure), and soil kits and testing may be done through a local university to reduce expense. Many cooperative extension offices have already produced materials on lawn care and landscaping techniques to protect water quality and program managers may save money by utilizing these available resources.

An example of a program that educates residents on better lawn care practices is The Water-Wise Gardener Program of the Prince William County, Virginia Cooperative Extension service. Through the changes in behavior of over 700 participants, an estimated aggregate reduction in fertilizer application of 20 tons has been realized in the county over five years. The program operates on an average annual budget of

approximately \$30,000 and requires the yearly time of 1.5 staff persons. Expense is deferred by the use of Master Gardener volunteers who act as consultants for volunteer lawns where lawn care practices have been implemented. The program has recently been developed into a regional model that has been applied in several other Virginia counties.

References

- Assing, J. 1994. *Survey of public attitudes -- February and July, 1994*. Russian Hill Associates. Alameda County Urban Runoff Clean Water Program. San Francisco CA. 84 pp.
- Aveni, M. 1994. Homeowner survey reveals lawn management practices in Virginia. Technical Note 26. *Watershed Protection Techniques*. 1(2):85-86.
- Aveni, M. 1998. *Water-wise gardener program: summary report*. Unpublished data. Virginia Cooperative Extension. Prince William County, VA.
- Bannerman, R., D. Owens, R. Dodds, and N. Hornewer. 1993. Sources of Pollutants in Wisconsin Stormwater. *Water Science & Technology*. (28):3-5 pp. 241-259.
- Barth, C. 1995a. Nutrients: from the Lawn to the Stream. *Watershed Protection Techniques*. 2(1): 239-246.
- Barth, C. 1995b. Toward a Low Input Lawn. *Watershed Protection Techniques*. 2(1): 254-264.
- Bowers, Keith J. 1994. A Call for the End of Landscaping. *Watershed Protection Techniques*. 1(3): 112-113.
- Center for Watershed Protection (CWP). 1999a. The Compaction of Urban Soils. Technical Note 107. *Watershed Protection Techniques*. 3(2).
- Center for Watershed Protection (CWP). 1999b. On Watershed Education. *Watershed Protection Techniques*. 3(3): 671-678.