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# Lawn to Lake: Lessons Learned from a Collaborative Natural Lawn Care Program

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**Abstract:** Illinois-Indiana Sea Grant (IISG) led a multi-state, collaborative natural lawn care outreach program promoting sustainable lawn care practices at the community and household level. The programmatic goal was to improve Lake Michigan basin ecosystem health by reducing pesticide, synthetic fertilizer, and irrigation water use and runoff within the watershed through changing the practices of those responsible for the creation and upkeep of lawns. Targeted audiences were educated about the relationship between Great Lakes Basin watershed health and lawn care practices as well as trained in natural, low-input lawn care methods. The program aimed at achieving efficiency by leveraging collaborating partner resources to adapt existing materials and transfer programs across partners and states. Anticipated program impacts were estimated prior to implementation based on previous program evaluations and available research, and additional evaluations were conducted during the project period (2010–2014). Over the outreach period, over 300 landscape professionals, 400 Master Gardeners and teachers, and 2,000 homeowners were trained in natural lawn care practices. Using an evaluation transfer approach, this effort translates into an estimated reduction of 3.4 million pounds of weed and feed applied to lawns per year with associated decreases in pesticides, phosphorous, and irrigation. This paper reflects on lessons learned though the natural lawn care program evaluation experience and makes recommendations for future programming.

**Keywords:** *community outreach, extension, stormwater pollution, Great Lakes restoration, water conservation, evaluation*

Continued urbanization in the Great Lakes Basin has resulted in rising land acreage devoted to lawns, signaling the potential for increased lawn chemical loadings to the Great Lakes and associated tributaries (SOLEC 2008). Taken individually lawns may seem insignificant, yet, when considered in aggregate, they comprise an estimated one-fourth of land cover in the greater metropolitan Chicago region, rendering lawn runoff a potentially significant source of nonpoint source pollution in urban and suburban watersheds (Akbari and Rose 2001; IAGLR 2002). Lawn care itself is a fragmented activity, involving many thousands of parcels of land held in private ownership. Conventional lawn care methods are resource intensive, with approximately 89 million pounds of non-agricultural combined pesticide-fertilizer products (weed and feed) applied annually and outdoor irrigation comprising 30 percent of community water demand in summer (Grube et al. 2011; U.S. EPA 2013).

The Great Lakes are the source of drinking water for 42 million people in the U.S. and Canada. In the last 100 years, tons of toxins have been added to the limited world supply of freshwater, including from urban and suburban lawn runoff. Illinois-Indiana Sea Grant (IISG) brought together a variety of organizations to develop a unified natural lawn care outreach program funded under the U.S. EPA Great Lakes Restoration Initiative (GLRI 2010). The Great Lakes Restoration Initiative (GLRI) was launched in 2010 to address Great Lakes degradation by providing support for restoration projects. The natural lawn care outreach program aligned with the GLRI *Program I.A.9. Pollution Prevention and Toxics*

*Reduction in the Great Lakes* request for programs promoting and implementing sustainable practices at the household and community level to reduce inputs of pesticides and other potentially toxic substances into the Great Lakes Basin, including low maintenance and natural lawn care and other methods. Prevention of pesticide pollution was also in keeping with the priorities current at the time of the *Lake Michigan Lakewide Management Plan (LaMP) 2008* and the *2006-2011 EPA Strategic Plan* (U.S. EPA 2006; Lake Michigan Technical Committee 2008). Outdoor water conservation was an ancillary benefit of the program, supporting the comprehensive planning goals of the Illinois-Indiana region (CMAP 2010; NIRPC 2011).

The natural lawn care program partners included Illinois-Indiana Sea Grant (IISG), Chicago Metropolitan Agency for Planning (CMAP), Lake Champlain Sea Grant (LCSG), Midwest Pesticide Action Center (MPAC), Northwestern Indiana Planning Commission (NIRPC), Purdue University, and University of Illinois-Extension (UIE). The program name, *Lawn to Lake*, was adopted from a collaboration of partners in Vermont and New York who came together to address the impacts of lawn care on Lake Champlain Basin water quality (Lawn to Lake 2015). A work plan and associated plan for programmatic evaluation was developed by each collaborating organization, leveraging previously successful strategies and existing resources of partners. The program evaluation component was important to the funding and partnering organizations for many reasons, ranging from demonstrating impact and tracking program progress, to facilitating reporting. This paper provides background on natural lawn care, describes the program and evaluation plan as implemented from 2010-2014, and reflects on lessons learned, which will benefit those engaged in similar outreach programming and evaluation efforts.

## Background on Natural Lawn Care

Although lawn care behavior varies greatly between states, neighborhoods, and residents, nationwide studies of consumer lawn care behavior have found that 77% of households apply herbicide, 64% of households fertilize their lawn and 79% of households irrigate their lawn (Khachatryan et al. 2014; Polsky et al. 2014; Sewell et al. 2010). Excess lawn watering leads to greater amounts of runoff that can carry lawn care pesticides and nutrients into nearby bodies of water (U.S. EPA 2003). Combined pesticide-fertilizer product (weed and feed) ingredients vary by manufacturer, but typically contain a formulation of nutrients (nitrogen, phosphate, potassium) and some combination of broadcast herbicides, such as 2,4-D (2,4-dichlorophenoxyacetic acid); mecoprop or MCPP (2-(2-methyl-4-chlorophenoxy) propionic acid); or dicamba (3,6-dichloro-o-anisic acid) (Colorado State University Extension 2014; University of Illinois Extension 2015).

While many watershed management practitioners have noted the difficulty in quantifying the contribution of lawn runoff to receiving waterbodies, nutrients contained in lawn fertilizers can contribute to water quality deterioration (Law et al. 2004; IEPA 2015). When it rains, pesticides and fertilizers run off lawns into storm drains, and then into water bodies (U.S. EPA 2003). High nutrient concentrations in water may cause excessive algae growth that blocks sunlight, and, when algae die, they decompose in a process that removes oxygen from the water. Fish and other aquatic organisms cannot exist in water with low dissolved oxygen levels, leading ultimately to a depleted or dead water body via a process called eutrophication (Correll 1998). The U.S. EPA estimates that 40-60% of nitrogen applied to lawns as fertilizer runs off-site, carried by surface and groundwater (U.S. EPA 2010b).

During intense rain storms, up to 90% of the pesticide applied to a lawn is lost to stormwater via overland flow, and up to 2% of applied pesticides have been found to leach into groundwater (Schueler and Swann 2000). The United States Geological Survey (USGS 1999) found one or more pesticides in every tested surface water body and one-third of all major groundwater aquifers – both sources often used for drinking water (Scott et al. 2006). While the epidemiological research regarding the human health impacts of lawn care pesticides is inconclusive, there is an emerging consensus within the research and regulatory community that health concerns are sufficient to warrant a precautionary approach to

pesticide use (Toronto Public Health 2002). This recommendation, taken in tandem with research linking lawn care pesticides to toxic impacts on aquatic ecosystems, birds and beneficial insects, and soil microorganisms, has led to increased interest in reducing or eliminating lawn pesticide use (Bounds 2007). In Canada, local pesticide bans increased in popularity after a 2001 Supreme Court decision upholding the authority of municipalities to regulate pesticides, which fed into a larger nation-wide momentum and resulted in a national ban on cosmetic uses of weed and feed (Angelo 2013; Cole et al. 2011).

While conventional lawn care is defined by a product-oriented approach centered on the application of synthetic fertilizer and pesticide products, natural lawn care reduces or eliminates the use of these products by focusing on a set of cultural practices aimed toward improving soil health. Soil supports a living ecosystem of organic matter, with healthier soil better able to support plant life and retain water (USDA 2015). Foundational natural lawn care practices include proper selection of grass type, higher mowing, proper fertilization and irrigation, core aeration, topdressing, overseeding, and organic weed and insect management (Osborne 2009).

Proponents of natural lawn care point to the improved environmental outcomes resulting from making the switch from conventional to natural lawn care (Tukey 2007). Natural lawn care not only reduces the need for pesticide and synthetic fertilizer application, but also reduces the amount of irrigation necessary for lawn maintenance. Of the 26 billion gallons of water consumed daily in the United States, approximately 7.8 billion gallons (30%) is devoted to outdoor uses and, of that, as much as 50% is estimated to be wasted due to inefficient watering practices (U.S. EPA 2004). Land cover estimates find that if lawns are considered in relation to agricultural crops, lawns would comprise the largest irrigated "crop" in the United States (Milesi et al. 2005). The Harvard Yard Soils Restoration Project found irrigation requirements on lawns that used natural lawn care were reduced by 30-50% over conventionally maintained ones (Harvard Facilities Operations Maintenance 2009). Mowing higher allows for improved root systems, sufficient photosynthetic tissue system development, and increased evaporative cooling (Bonos and Murphy 1999). Compost topdressing and organic soil amendments incorporate organic matter into soil, increasing the soil water-holding capacity and infiltration, which improves turfgrass drought resiliency. Additions of organic matter to the soil decrease soil compaction (bulk density), which increases soil porosity and hydraulic conductivity, enabling greater water storage from rain events, raising the infiltration rate and decreasing water runoff (Johnson et al. 2006; Johnson et al. 2009; Wischmeier and Mannering 1969). Reducing or eliminating synthetic fertilizer application reduces water use as indicated by evapotranspiration (ET), the total amount of water either evaporated or actively transpired from a plant (Krogman 1966; Feldhake et al. 1983; Barton et al. 2009; McGroary et al. 2011).

## Program Description and Evaluation Design

The program area was the heavily urbanized greater Chicago metropolitan region containing a population of over 9 million people. Program partners created a logic model using the National Oceanic and Atmospheric Administration (NOAA) Assessment, Design, Development, Implementation and Evaluation (ADDIE) framework (NOAA 2009). Efficiency in program design was achieved by transfer of existing materials (needs assessments, program evaluations, factsheets, brochures, manuals, logos, websites, project themes, research data) from existing partner programs, including: *Natural Lawn Care Training for Professional Landscapers and Municipalities* (Midwest Pesticide Action Center, previously Safer Pest Control Project); *Lawn to Lake/Don't "P" on Your Lawn* (Lake Champlain Sea Grant); Extension's *Lawn Talk* website (University of Illinois Extension) and *Protect our Water and Environmental Resources* (Illinois Indiana Sea Grant/Purdue University). Selected logic model components including the inputs and activities occurring over the project period, program participants, and objectives are shown in Table 1. Measurable program participation metrics were assigned to the program objectives for five activity areas, including: branding and messaging,

**Table 1.** Selected Natural Lawn Care Program Logic Model Components.

| Inputs (What we invest) | Participants (Who we reach) | Activities (What we will do) | Objectives |
|---|---|---|---|
| 1. Staff expertise/time of program partners (Illinois-Indiana Sea Grant, Lake Champlain Sea Grant, Midwest Pesticide Action Center (previously Safer Pest Control Project), Purdue University, University of Illinois Extension.).<br>2. Volunteer program partners resources.<br>3. Facilities for trainings.<br>4. Technology equipment (laptops, projectors, internet/web technology, video).<br>5. Materials which include handout materials, pamphlets, evaluation forms, etc.<br>6. Results of previous research.<br>7. Funding. | 1. Residents.<br>2. Landscape professionals.<br>3. Master Gardeners/ Naturalists (UI Extension).<br>4. Municipal government.<br>5. Retailers.<br>6. Conservation and resource management groups.<br>7. Community partners. | 1. *Branding and Messaging.* Design a program logo and create consistent outreach messaging.<br>2. *Develop Outreach Materials.* Update existing web-sites and materials using program logo and leveraging existing material from partners.<br>3. *Training for Targeted Audiences.* Conduct training workshops for targeted audiences, including: (a) landscape professionals and municipalities, (b) Extension's Master Gardener and Master Naturalists, (c) schools, and (d) homeowners.<br>4. *Retailer Outreach.* Conduct a direct outreach program to lawn product retailers to promote natural lawn care product availability.<br>5. *Pilot Grounds Care Program.* Develop and implement a pilot grounds care program. | 1. Program logo and themes for use in outreach.<br>2. Website hits will increase by ten percent.<br>3. (a) Total of five workshops directly reaching 330 landscape professionals.(b) Total of six Master Gardener training workshops reaching a total of 180 volunteers. (c) Three workshops for school grounds keepers reaching 60 school staff. Total of eight teacher trainings (d) Three educational series for homeowners trainings, reaching a total of 200 homeowners.<br>4. 40 retail program participants.<br>5. Implement a pilot program in 3 communities. |

outreach material development, training workshops for targeted audiences, retail outreach, and pilot community grounds care program.

The primary focus of the evaluation effort was tracking participation in project activities to ensure proper management of project resources, keeping the project on track, and assessing percent completion rates for project reporting. For example, attendance of the in-person training workshops for landscape professionals, school grounds-keepers and municipalities; train-the-trainers; and homeowners was tracked, as well as the number of participating retailers and communities over the project performance period. A secondary evaluation objective was measurement of program effectiveness in achieving the stated outcomes. The outcome components of the natural lawn care program logic model are shown in Table 2. The outreach team worked to create a program aligning short-term learning outcomes with medium-term behavior changes, with the aim of achieving the long-term impact of reduced pesticide and nutrient

**Table 2.** Natural Lawn Care Program Logic Model Outcomes.

| **Learning** (*Short-term*) | **Behavior** (*Medium-term*) | **Impacts** (*Long-term*) |
|---|---|---|
| 1. Program participants will have increased understanding of the connection between lawn and landscape care practices and water quality.<br>2. Program participants will have increased knowledge of:<br>• *watersheds and urban water cycle*<br>• *soil health*<br>• *composting*<br>• *fertilizer ingredients (weed and feed pesticide and nutrient content)*<br>• *natural lawn care best management practices*<br>• *rain-friendly gardening practices* | 1. Residents will be able to practice sustainable lawn and landscape care practices.<br>2. Trained professional landscapers will use natural lawn care principles at client sites.<br>3. Master Gardeners pledge to implement a sustainable lawn/landscapes project within one year.<br>4. Master Gardeners reach residents though volunteer work.<br>5. Teachers and informal educators will use the EnviroScape® model in the classroom and at educational events.<br>6. Retailers will carry consumer education materials. | 1. Reduced application of pesticides/herbicides to lawns (reduced contaminant concentrations in runoff).<br>2. Reduced application of phosphorous/nitrogen containing fertilizers to lawns (reduced phosphorous/nitrogen concentrations in runoff).<br>3. Reduction in lawn irrigation. |

lawn runoff into the Great Lakes Basin.

Short-term knowledge outcomes were measured by administering a pre-workshop survey to establish baseline participant knowledge, attitude, and skills. An immediate post-workshop survey assessed gains in these areas over the duration of the workshop. In the case of professionals and schools workshops, self-reported behavior change after an extended period (between 6 to 12 months) was measured. It is important to note that the planned evaluation effort did not include observational monitoring of program participants (i.e., field observations of actual weed and feed applications) or actual pesticide and nutrient monitoring in the program watershed(s). At the outset of the program and evaluation design, it was recognized that it would be prohibitively expensive to measure actual quantities of combined weed and feed applications and the associated watershed loading reductions in pesticides and nutrients before and after the project. Pollution prevented was therefore extrapolated from participation counts, supplementary evaluations, and existing research.

## Natural Lawn Care Program Results

The *Lawn to Lake* logo was adopted from the Lake Champlain Basin Program (lawntolake.org) and used to brand outreach materials. In addition, the program team identified the major thematic topic areas and messaging to be presented in program outreach materials for consistent outreach messaging (Table 3). Project partners identified five topic areas: watersheds, compost, lawns and alternatives, right plant/right place, and rain-friendly landscaping. The primary program message and the associated desired behavior change were identified for each topic area. Outreach and training workshop materials were adapted and branded. Materials included tabling display and handouts (bookmarks, cards, pencils, brochures); websites (*Lawn Talk* English and Spanish versions, Lawntogreatlakes.org); professional and municipal workshop binders; save the dates and press releases; train-the-trainer power points and brochures; fact sheets and brochures for homeowner outreach; retail outreach materials including rack cards and

**Table 3.** Natural Lawn Care Program Topic Areas and Messaging.

| Topic | Program Messaging | Associated Behavior |
|---|---|---|
| **Watersheds** | • What you put on your lawn ends up in the lake/local waters/ groundwater aquifers<br>• We all live in a watershed/we all live downstream | • Use fewer lawn chemicals (pesticides)<br>• Reduce water runoff by retaining water on site. (rain gardens, rain barrels) |
| **Compost** | • Living soil – soil comes first<br>• Save money by leaving clippings on the lawn | • Use compost, compost tea, natural fertilizers<br>• Soil test |
| **Lawns and alternatives** | • Recognize the function of your yard/landscape<br>• Landscapes provide ecosystem services<br>• Healthy landscapes are healthier for people and the environment. | • Natural Lawn Care Practices<br>• Landscape design and planning<br>• Incorporate lawn alternatives |
| **Right plant, right place** | • Different plants have different needs | • Choose appropriate grass type and plants for your site |
| **Rain-friendly landscaping** | • Rainwater is a resource | • Reduce water runoff by retaining water on site. (rain gardens, rain barrels) |

posters; and pilot community manuals. The latest version of the UI Extension website went live July 2012, revised to include information on natural and organic lawn care. The *Lawn Talk* website received a total of 49,679 hits over the project period, an 8% increase from the comparable pre-grant period.

Over 300 participants from professional lawn care companies, municipalities, school maintenance staffs, and others attended natural lawn care workshops during the project period (March 2011 to April 2014). A combined analysis of administered pre-and immediate post-surveys found that an average of 92% of respondents found the workshops to be very or mostly relevant to their needs and interests; 96% found the information presented to be useful in their lawn care and landscaping jobs. Respondents rated the workshops as good (48%) to excellent (46%), and the majority (81%) said they were better prepared to implement low input lawn care practices on client sites as a result of workshop attendance. The broader sustained impact of the workshops on participants was assessed by analysis of post-workshop resurveys conducted 8 months after the workshops. The results of these assessments need to be interpreted with caution, not only due to very low response rates across the resurveys, but also because the surveys collect self-reported behavior. Participants reported a 22% increased use of organic fertilizer on managed grounds

(from 57.7% to 80%); 26% were more likely to base fertilizer use choices on the results of a soil test (from 34.1% to 60%); 36% were more likely to follow the instructions on the container for fertilizer application and 40% more likely to follow label instructions for pesticide application (from 34.1% to 70% and from 39.5% to 80% respectively).

Over 400 Master Gardeners, teachers, and informal educators were reached, representing over 10% of the Master Gardeners in Illinois. Upon completion of the workshops, Master Gardeners, informal educators, and teachers were able to borrow EnviroScape® models for use in the classroom and at educational events. In the first year of the program, six models were placed across the project region for informal educator use. As a result, more than 1,000 people annually learned about the connection between healthy lawns and healthy lakes. UIE budget cuts and resulting staffing changes limited the evaluation capacity of the train-the-trainer component to participation counts and the baseline data collected though the Master Gardener volunteer reporting system.

The retail component of the program reached 36 retailers who agreed to have store information placed on the website retailer map promoting natural lawn care products and to carry P-free fertilizer options. In the first year of the outreach program, the Illinois Phosphorous Law (Illinois HB 6099 2010) restricting applications of phosphorous-containing fertilizer was passed. As a result, synthetic fertilizer products containing phosphorous have been greatly reduced in the supply chain in the past half-decade. For this reason, it was not possible to evaluate the impact of the program outreach on retail product availability independently of other supply chain effects.

The pilot community grounds care program was developed via a participatory agency stakeholder process led by the Northwestern Indiana Regional Planning Commission (NIRPC). The result was a comprehensive outreach strategy for communities in the NIRPC planning region that included: information booths at environmentally themed events, e-mail blasts, outdoor banners, newspaper articles, a *Lawn to Lake Guidebook for Illinois and Indiana*, and community presentations.

A transfer of evaluation results was undertaken to approximate the long-term programmatic impact. Estimates were obtained by taking the number of program participants and extrapolating to the estimated amount of reductions in combined fertilizer-pesticide product (weed and feed) applications. In considering the estimates, it is critically important to note two things. First, preliminary estimates use best available information and assumptions to provide a rough estimate of expected impacts. In actuality, lawn care behavior, including the frequency of application, rates of application, and pesticides used, is highly variable by location, season, weather, and other factors. Second, the estimates are based on reported behavior and not actual biological loadings of pesticides and nutrients in the watershed. Due to the scarcity of research examining pesticide and nutrient losses from urban soils into the watershed, estimates of reduced pesticide and nutrient loadings to waters were not attempted for the impact assessment (Carey et al. 2012).

As location-specific information on lawn acreage and product use was not available, data from previous research were used to estimate the impact of a typical combined fertilizer-pesticide product when applied to an average size lawn at recommended application rates. Average lawn sizes were based on a best-available comprehensive 1995 study estimating a national average lawn size of 0.20/acre (Vinlove and Torla 1995). The estimates assumed an average combined fertilizer-pesticide product application frequency of twice per year, an average product pesticide content of 0.8%, a minimum 140 lbs/acre single application rate for weed and feed, which translates into 1.12 lbs of pesticide/acre/application. The actual pesticide content of a typical combined fertilizer-pesticide product includes 2,4-dichlorophenoxyacetic acid (0.61%), (+)-(R)-2-(2 methyl-4-chlorophenoxy) propionic acid (0.15%), Dicamba: 3,6-dichloro-o-anisic acid (0.05%) (Homziak, J. personal communication March 9, 2009; and Kostelnick, M. personal communication March 9, 2010).

The associated water savings were also estimated using a quantitative relationship between nitrogen application and turfgrass evapotranspiration to represent the effect of

**Table 4.** Estimated Impacts of the Lawn to Lake Program.

| | Landscape professionals, municipalities, and schools | Master Gardeners and teachers | Homeowners |
|---|---|---|---|
| **Outreach** | 7 workshops<br>304 attendees | 20 workshops<br>432 attendees | 30 workshops<br>2,005 attendees |
| **Residents reached** | 80,560 | 40,780 | 2,005 |
| **Lawn care acres impacted** *(based on Vinlove, F.K. & Torla, R.F. (1995); Master Gardener program data)* | 16,110 | 8,150 | 320 |
| **Estimated weed and feed reduction (lbs/year)** *(sources Homziak, J.; and Kostelnick, M. via March 9, 2009 conversations; SPCP data)* | 2.2 million | 1.1 million | 43,308 |
| **Pesticides (lbs/year)** | 16,310 | 8,260 | 325 |
| **Phosphorous (lbs/year)** | 108,760 | 55,050 | 2,165 |
| **Estimated water savings (gallons/year)** | 662 million | 335 million | 13 million |

fertilizer level on lawn water use (Krogman 1966; Feldhake et al. 1983; and Ebdon 1999). The recommended amount of nitrogen for the Midwest region is about 1 pound per 1,000 square feet each year (Bigelow et al. 2013). A homeowner using a typical combined fertilizer-pesticide (weed and feed) product applies nearly twice that amount: about 1.9 pounds N per 1,000 square feet every year, based on 28% N content of typical weed and feed product and two applications per year (Homziak, J. personal communication May 29, 2012). Reducing the residential fertilizer application to the recommended amount could save nearly 9,000 gallons of water a year for an average sized lawn.

The resulting estimated impacts for the natural lawn care outreach project were updated using participant counts and available outcome metrics from the program evaluation. Outreach to primary user groups resulted in an estimated reduction of 3.4 million pounds of weed and feed applied to lawns per year with associated decreases in pesticides, phosphorous, and irrigation (Table 4). The estimated program impacts from evaluation and research transfer must be interpreted with caution. Lawn care behavior is widely acknowledged to be complex and spatially varied (Cole et al. 2011; Martin et al. 2015). Actual lawn chemical amounts contained in runoff is highly variable and dependent on many factors such as soil type, lawn maturity, grass type and health, and the frequency and intensity of rainfall. There is significant opportunity to improve on outcome evaluation by undertaking more research, data collection, and modeling, as well as estimating the resulting economic and environmental values of prevented pollution.

## Conclusion, Lessons Learned, and Recommendations

Overall, program design was effective in meeting the stated program participation objectives. The program trained over 300 landscape professionals,

400 Master Gardeners and teachers, and 2,000 homeowners in natural lawn care practices, in addition to working with 36 retail outlets. The program partners believe that the success in meeting targeted objectives is in large part due to the systems perspective used in its development, which cultivated not only the demand for natural lawn care products and practices among homeowners, but also the capacity of lawn care service and lawn product retailers to meet this demand. The program logic model also served to unify multiple partnering agency strategic objectives towards meeting the goals of the natural lawn care program, and provide a useful building block for similar outreach efforts.

The key to building on project successes is to address the barriers to adoption of natural lawn care practices identified by the program participants in the evaluation surveys. Barriers reported are: lack of information and training; high costs of starting a natural lawn care program; and the perception that natural lawn care practices do not deliver acceptable results. The lack of information and training can be addressed by incorporating natural lawn care into ongoing Extension efforts, such as: updating and maintaining the information resources available online (both English and Spanish language) to commercial lawn care firms and retailers; developing an Extension-led planning program in collaboration with trained staff from municipalities and schools that will assist others in the region to transition to recommended practices; and incorporating natural lawn care training into Pesticide Applicators Certification training programs.

One third of workshop participants perceived high costs as a barrier to the implementation of a natural lawn care program and half noted the perceived non-reliability of natural lawn care practices as a concern. These findings may be due to the fact that cost savings generally are only realized in the long run, after a transition period that can involve higher initial cost outlays (performing core aeration, over seeding) combined with reduced lawn aesthetic during the period of transitioning a lawn from conventional to natural. The latter issue illustrates the extent of resistance to adoption of natural lawn care practices and underscores the need for publicly-visible natural lawn care demonstration sites combined with messaging campaigns educating the community about what to expect for lawn aesthetics.

To address cost issues, Extension-led cooperative research is needed to develop options that can improve the financial feasibility of practices, including analyzing and identifying the actual costs and returns of different practices, comparing costs and returns of conventional versus natural lawn care practices, and researching how recommended practices may be modified to reduce costs and/or enhance revenue. Another possibility is to explore incentive programs to offset costs incurred during the transition period. Social marketing and related social science research is also desirable to better design and craft effective messages for commercial firms to use with their clients. This is especially important where there is an increased cost associated with implementing recommended practices, a cost that has to be passed on to the customer or reflected in a higher demand on the municipal or school budget.

The most prevalent concern revealed in the evaluation responses (the perceived non-reliability of natural lawn care practices to deliver a high quality, visually appealing lawn) can also be addressed by future Extension-industry research. Working with collaborators in municipalities, schools, and commercial firms, Extension turf researchers can design programs to compare lawn health and appearance outcomes of conventional and natural practices. Ideally, this can be combined with research on the costs and profitability of various practices, as well as a deeper exploration of the environmental impact of specific cultivation practices. Taken together, continued natural lawn care program research and evaluation can advance outreach to improve Great Lakes Basin watershed health.

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