



MGG Lawn & Land Forum Workshop 10/29/18

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MGG Lawn & Land Forum Workshop 10/29/18

Executive Summary of Workshop

Mission of Forum: To document, summarize and improve the state of Integrated Pest Management (IPM) and Natural Lawn Care (NLC) policies and practices locally, regionally and nationally.

Working definition of IPM used by forum: An environmentally sensitive and cost-effective approach to pest and weed management that consolidates all available necessary techniques into a sequential program to keep pest populations at acceptable levels and to avoid adverse effects. An IPM program will utilize physical, cultural, mechanical, structural and biological controls before resorting to chemical controls.

Workshop overview: On October 29th, 2018, 55 individuals representing park and school districts, governments, landscape companies, universities and non-profits gathered to discuss the forum's working definition of IPM and share their experiences implementing IPM and NLC practices and programs. The workshop covered IPM/NLC policy and practice in seven working panels of (1) Why IPM/NLC?, (2) Sports Turf Management, (3) Weed and Pest Management, (4) Grass Selection, Soil Compaction, & Field Construction, (5) Soil Fertility, (6) Policymaking & Community Engagement & (7) Cost Factors. The following section runs through briefs of concepts, practices and strategies discussed in each working panel. For more complete information, please seek the extended notes section following this Executive Summary.

This work is supported by the USDA National Institute of Food and Agriculture, Crop Protection and Pest Management Program through the North Central IPM Center (2014-70006-22486)

Working Panel Briefs:

Why IPM/NLC: *Why would a district consider switching to an Integrated Pest Management (IPM) or Natural Lawn Care (NLC) strategy?*

Conventional lawn care products and practices contribute to many environmental and human health problems. Implementing IPM or NLC will benefit the following:

- **Young children:** studies have linked pesticide exposure to children's development of [asthma](#), [lower IQs](#) (associated with spectrum disorders like autism) and [cancer](#).
- **Water Quality:** Lawn pesticides and fertilizers [pose significant risk](#) to Milwaukee's three rivers, this workshop's host city, and waterways across the nation. Pesticides threaten invertebrates and [aquatic life](#) that form the bottom of the food pyramid for many ecosystems.
- **Innovators:** Communities and the public demand more sustainable solutions, offering an opportunity for natural lawn care and pesticide reduction.

Gaps/Topics for Further Discussion:

- Best practices to tailor natural lawn care solutions and messages to the values and interests of critical stakeholders (i.e. Making the business case).

Conclusion: The benefits that result from limiting lawn pesticide and fertilizers are many-fold and outweigh the short-term cost savings from conventional lawn care.

Sports Turf Management: *Turf fields have their own unique needs for successful maintenance. What practices enable turf to grow successfully via IPM? How can we engage coaches and athletes to be more accepting of the trade-offs associated with IPM?*

Keynote speaker Jerad Minnick covered the five basic steps to growing grass:

- **Reducing Compaction:** [Regularly aerate](#) to make the soil softer and facilitate transfer of nutrients and water.
- **Grass Selection:** Choose grass species and varieties that can best handle [wear, drought, and weed pressure](#).
- **Mowing:** Mow sports fields [high and frequently](#).
- **Irrigation:** Ensure proper drainage and irrigation to keep moisture levels between 20-25%.
- **Food:** Fertilize only after setting a data point from a [soil test](#).

Gaps/Topics for Further Discussion:

- How do we counter the message promoted by the conventional lawn care and synthetic turf industry that growing grass is “hard”?
- What avenues and mediums will best spread the word about progress in sustainable landscaping?

Conclusion: Growing grass is “easy” if the manager focuses on softening the soil to allow air, water, and nutrients to get in and out of the soil profile.

Weed and Pest Management: *This session dove deeper into the practices, strategies and products available to keep weed and pest pressure down, with limited environmental and health risk.*

Proper weed and pest control starts with passing a formal integrated pest management or natural lawn care policy that ensures consistency and transparency in the actions of the local authority and their staff. Concepts to include in that policy are:

- **Setting tolerance thresholds** for pest and weed populations.
- Using tolerance thresholds **to categorize and prioritize** the cultural, mechanical and chemical management of all fields.
- **Developing a pesticide selection protocol** for choosing the least amount of the least harmful product when tolerance thresholds are surpassed.
- **Including standards to chemical applications** to ensure non-target species, such as pollinators, avoid harm.

Gaps/Topics for Further Discussion:

- Turf and landscape management rarely factors climate change into its pest and weed management, but these changes affect the behavior and life cycles of many insects and plants. This can lead to ineffective control or accidental harm to beneficial species such as bees.

Conclusion: Reducing the environmental and health effects of weed and pest control requires the development of a framework that emphasizes cultural controls and avoids blanket-spraying of any product organic or conventional.

Grass Selection, Soil Compaction & Field Construction: *Can playing surfaces with less fertilizer, pesticides and water inputs stay in play and maintain high performance? Panelists elaborated on the cultural practices necessary to keep surfaces in play, while sticking to IPM.*

Too many times, land managers assume grass and plants need the same amount of pesticides, fertilizers and water each year. Managing without data, however, can harm grass and decrease performance. As opposed to routine fertilization or weed control, control for the following environmental conditions:

- **Soil porosity and infiltration:** Compacted and organic matter deficient soils lack pores and openings for nutrients, water and air to move freely. Aerate and incorporate compost, leaf litter and grass clippings to achieve soft soil that avoids flooding and stimulates access to nutrients.
- **Grass resilience:** Select higher quality grasses that require less water, fertilizers and pesticides and follow proper mowing, aeration and overseeding to ensure establishment.
- **Soil quality:** Rely on a [soil test](#) for information on pH, nitrogen, phosphorus, potassium and other nutrient needs, not one's gut.

Gaps/Topics for Further Discussion:

- Organic/reduced risk grub control products are sparse. Many managers, however, are experimenting with [beneficial nematodes](#).
- All panelists wanted more opportunities to demonstrate and share their sustainable landscaping successes such as conferences, marketing pilot projects or peer-to-peer learning workshops like the Forum.

Conclusion: Grass can establish and persist with limited inputs under the right management regime. As panelist Steve Stumbras said, "nature has a way of protecting itself, if you build the soil."

Soil Fertility: *Billions of microorganisms, invertebrates and living organisms interact in the soil ecosystem to create an environment favorable for grass growth.*

This panel covered best practices to build a desirable sponge-like soil structure necessary for complete fertility. Land managers that want to achieve complete fertility on fields can control for the following soil factors:

- **Organic matter/humus:** Compost, decomposing organisms, grass clippings and other organic material contains all [16 essential nutrients](#), improves soil [structure and drainage](#) and [balances the pH](#) of soils.
- **Moisture/Drainage:** Porous, well-drained soils transfer water, nutrients and air to the roots of plants.
- **Bacteria/Microorganisms:** Stimulating microbial activity with organic fertilizers, compost and other organic matter accelerates decomposition, nutrient cycling and pathogen control.

Gaps/Topics for Further Discussion:

- Are we providing adequate assistance to those managers who wish to implement NLC/IPM programs, but might not have the community, staff or leadership support for wide-sweeping changes? Where should these managers start?

Conclusions: Grass wants porous soil packed with organic matter and microbial activity. Costs for the cultural controls and organic products that help develop this soil structure continue to become more affordable.

Policymaking and Community Engagement: *What does an IPM/NLC policy actually look like? This panel covered the major components to an effective written policy, the stakeholders to implementing the policy and how to ensure implementation of the policy after passage.*

Policy and behavior change rarely happens overnight. Panelists discussed the strategies and concepts to share with decisionmakers to hasten IPM/NLC change:

- **Develop specific turf management plans for each field** so the local authority can allocate resources towards the most visited and used sites, but significantly cut management and inputs for lots not as frequently trafficked. City of Stoughton classified fields into three tiers (high quality, medium quality, and low quality) and developed a unique management plan for each tier.
- **Involve all stakeholders (sports associations, parent clubs, park staff, etc.) when writing and implementing an IPM/NLC program.** Creating Ad hoc committees or task forces for IPM/NLC that meet regularly can ensure effective implementation of the program.
- **Don't reinvent the wheel.** Use the policy, marketing and communication resources developed by other organizations such as [Midwest Grows Green](#), [Lawn to Lake](#) and [Healthy Communities Project](#).

Gaps/Topics for Future Discussion:

- Most IPM/NLC projects raise funds from either a budget increase or local fundraising. A support system needs to be developed for underfunded NLC/IPM programs to either help with fundraising or identify private foundations and grants to contribute funds to the effort.

Conclusions: A good IPM/NLC program remains transparent with all stakeholders. Educating the public, setting clear product selection protocols, involving residents in program evaluation and improvement and notifying the public of product applications can help a community understand and operate within IPM/NLC parameters.

Cost Factors: *Attendees broke into four break-out discussions to take a deeper dive in to the different factors and decisions that influence the costs of an IPM/NLC policy or program.*

The four break-out discussions were:

- **Engaging Decisionmakers:** This discussion looked at best approaches to engaging boards and/or elected officials in NLC/IPM policies. Take-away points included:
 - Programs like Midwest Grows Green can support efforts by providing more hard data regarding the costs of NLC versus conventional lawn care.
 - The many other communities making sustainable landscaping progress can serve as examples.
 - Authorities should include turf management as a subject in long-term plans.
- **Cultural Practices:** This group explored the man-power and equipment costs needed to employ good cultural practices of aeration, overseeding and mowing. Take-away points included:
 - Proper cultural management will cost-effectively grow thick and dense turfgrass.
 - NLC environmental and health benefits affect the community, district staff and environment.
 - Making the effort to get all stakeholders on board with the transition will reduce start-up and labor costs.

- **Products:** This group asked how to purchase high quality and, often, high cost organic products under tight budgets. Take-away points included:
 - Allocating the application of organic pesticide products to only playing fields and increasing cultural practices in other areas can offset initial costs.
 - Organic fertilization can reduce weed and pest pressure by improving soil health.
 - Recent negative news stories and public opinion towards pesticides can help change the mentality that broadcast spraying is necessary.
 - **Managing Community Expectations:** This discussion evaluated the communication and engagement strategies required to manage and satisfy the needs and wants of community stakeholders during a transition to NLC/IPM. Take-away points included:
 - Tailor communication and engagement plans to the stakeholders involved in field management decisions.
 - Build a strong and informed base of volunteers to engage the community in NLC/IPM.
 - Combat indecisiveness or uncertainty with consistent and coordinated communication via regular program reviews, stakeholder meetings or public hearings.
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MGG Lawn & Land Forum Workshop 10/29/18

Why IPM/NLC?

Executive Summary

Session topic: Why IPM/NLC?

Why would a district consider switching to an Integrated Pest Management (IPM) or Natural Lawn Care (NLC) policy? Panelists discussed the benefits to IPM and NLC including risks associated with conventional lawn care practices.

Panelists:

Ryan Anderson- Ryan Anderson, former Assistant Director and Communications Manager for the Midwest Pesticide Action Center and now the Community IPM Outreach Specialist for the IPM Institute of North America, Inc., leads and implements the Midwest Grows Green natural lawn care initiative. A 2016 National Academies of Sciences, Engineering, and Medicine Christine Mirzayan Science & Technology Fellow, Ryan has extensive experience advancing science-based solutions in urban and residential communities highlighted by his leadership of MPAC's Midwest Grows Green natural lawn care initiative that has recruited 25 pesticide free parks, 30 point-of-purchase retailers, and more than 600 pledges. Ryan has a Masters of Sustainable Solutions from Arizona State University and holds a dual bachelor's degree in Biology and Electronic Journalism from Butler University. In this panel, Mr. Anderson covered the environmental and health risks associated with the US lawn and garden sector and the alternatives to conventional lawn care and landscaping.

Cheryl Nenn- Cheryl Nenn has been the Riverkeeper for Milwaukee Riverkeeper for over 15 years. As the Milwaukee Riverkeeper, Cheryl patrols local waterways, identifies problems in the Milwaukee River Basin, responds to citizen concerns, reviews permits and helps find collaborative solutions to problems affecting local rivers. Cheryl serves as a spokesperson and senior scientist for the organization, and has managed dozens of projects over the years relating to water quality monitoring, river access, stormwater management, and stream restoration. Cheryl has a B.S. in Biology from the University of Illinois at Urbana-Champaign and an M.S. in Natural Resource Ecology and Management from the University of Michigan, School of Natural Resources and Environment.

Melinda Myers- Melinda Myers is a nationally recognized gardening expert, TV/radio host, author and columnist who has written over 20 books including *Midwest Gardener's Handbook* and *Small Space Gardening*. She has over 35 years of horticulture experience, a master's degree in horticulture and was a horticulture instructor with tenure. Her professional positions include: Milwaukee County-University of Wisconsin Extension Agent, Assistant City Forester for Milwaukee and Horticulture Instructor at Milwaukee Area Technical College. She currently owns her own company where she and her team help educate and inspire professionals as well as

new and experienced gardeners through various media, outreach and presentations with an emphasis on sustainable practices. Her website is www.MelindaMyers.com

Summary of panelist presentations and discussions:

Panelists explained the importance of managing turfgrass with less inputs in the face of a changing climate, population and public opinion. Both lawn pesticides and fertilizers threaten human health, pets, pollinators and wildlife. This spells future and current problems for water quality, Milwaukee's most precious resource. Testing of Milwaukee's three rivers identified pesticides and a host of other chemicals that negatively harm aquatic life and invertebrates that provide a valuable food source for many ecosystems. Fortunately, natural lawn care's process-based approach both reduces the amount of inputs used and released by developing a "sponge-like" soil structure that retains more fertilizers, pesticides and water. By reducing water pollution, contributing to human well-being, and fitting with the public's demand for sustainable solutions and alternatives to toxic pesticides, natural lawn care offers a can't miss opportunity.

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Topics of discussion brought up by panelists

Consumption and use of lawn care products

Anderson:

- [40 million acres](#) of land dedicated to lawns alone (The largest irrigated crop).
 - [3-6 billion tons of fertilizer and 70 million pounds](#) of pesticides dedicated to maintaining lawns each year in U.S.
 - Around [\\$40 billion](#) spent on lawn care in North America each year.

Health risks associated with pesticides

Anderson:

- Of the [30 most common lawn care pesticides](#), studies have linked 19 to carcinogens, 13 to birth defects, 21 to reproductive effects, 15 to neurotoxins, 26 to liver and kidney problems and 27 to asthma triggers.
- Pesticides and toxins uniquely affect children.
 - Asthma affected [25.7 million American residents](#) in 2010- Rates increased by 6 to 15 percent annually between the years of 2002 and 2010.
 - [One study in California](#) found that children exposed to spray pesticides in their first year of life quadrupled their chance of contracting asthma.
 - Rise in [non-Hodgkins lymphoma \(NHL\)](#)
 - Multiple studies indicate that NHL risk increases with the [number of pesticides used](#).
 - The [International Agency for Research on Cancer](#) (IARC) classified glyphosate as a [probable carcinogen](#) for Non-Hodgkin's Lymphoma in 2015.
- Many factors and toxins contribute to these diseases and conditions, but we need to control those toxins that we can.
 - The high use and physical properties of pesticides increase the exposure risk.

- E.g. [One study](#) detected residue of the herbicide 2,4-D inside multiple houses, despite the product being applied outside in lawns. The herbicide can be carried by the wind, shoes and/or pets leading to exposure.

Environmental risks associated with lawn pesticides and fertilizers

Anderson:

- Pets – Bladder cancer risk in some dog breeds increases by [four to seven times](#) if exposed to spray pesticides.
- Wildlife – pesticides pose significant risk to invertebrates and [aquatic life](#) that many animals rely on for food.
 - Recent research has covered the neurotoxic effects of [neonicotinoids](#), a class of [systemic insecticides](#), on bees and other pollinators.
 - The neonicotinoid [Imidacloprid](#) is frequently found as the active ingredient for grub control products.
- Water quality – Poor soils and impervious surfaces in urban areas increase the risk of stormwater runoff that carries pesticides, fertilizers and other pollutants into waterways.
 - USGS found at least one pesticide in [every lake, river and stream they tested](#).
 - Natural lawn care builds organic matter to increase [water absorption, nutrient storage](#) and flood control.

Nenn:

- Fertilizers and pesticides are [two main runoff concerns](#) from lawns and urban landscapes for Milwaukee.
- Fertilizers and nutrient pollution:
 - The release of phosphorus fertilizers, leaves and other organic matter into the river contribute to algae blooms that consume oxygen during decomposition and can cause [hypoxia](#).
 - Fertilizers do the same thing to rivers as your lawn: It turns it green.
 - The Riverkeeper tracks phosphorous levels in the rivers and each year identifies a spike in levels during the growing months of June, July, August and September.
- Pesticides in waterways
 - The Riverkeeper recently started a testing project for [emerging contaminants](#) that includes pesticides of Atrazine and Thiabendazole.
 - Atrazine was found in the majority of water samples.
 - Plan to test for more pesticides, but costs are high.
 - Pesticides cause similar health effects to both aquatic life and humans.
 - Some east cost waterway studies are finding 10 to 20 percent of the fish with intersex organs (i.e. both male and female reproductive organs). Endocrine disruptors, such as pesticides, cause the majority of these intersex cases.

What are the current local, state and federal laws critical to the regulation and control of pesticides?

Nenn:

- The State of Wisconsin passed a [phosphorous restriction](#) for residential fertilizer in 2010.
 - The Milwaukee Riverkeeper did not find significant drops in phosphorous levels in the rivers after the restriction.

Myers:

- Myers remembers arguing that the [NR 151 phosphorous restriction law](#) was an opportunity for landscapers, “Why wouldn’t you want to test the soil and put down the right product”.
 - The conventional 5-step, 4-step programs will not access all the benefits that soil offers in the long term
 - These programs often lead to poor soil quality (low pH, inaccessible nutrients, etc.), which will dissatisfy customers in the future.

Agricultural vs. residential pesticide use: why does it matter?

Nenn:

- “You live as close to the river as the storm drain by your house”
 - Runoff from the property often goes through a storm sewer and can get to local waterways quickly.
 - Two Milwaukee rivers (Kinnickinnic and Menominee) are highly urbanized rivers that receive most of their runoff from lawns, schools and businesses.
- Nenn received a question regarding how much of the phosphorous came from fertilizer applications in residential areas versus sediment runoff and waste from industry such as water treatment plants
 - Difficult to assign numbers, but inventories do know that the amount of fertilizers from industry is low, because many industries face runoff limits.
 - The research indicates that fertilizer applications contribute significantly to phosphorous problems. Nenn believes the two areas of concern are golf courses and agriculture.
 - Comment from the audience that Wisconsin’s [NR 151 law](#) requires golf courses to conduct a soil test before applying phosphorous. The individual wanted to know if phosphorous reductions occurred after passing the law.
 - Nenn was aware of the law and has not seen a reduction of phosphorous since its passing.

Public pressure and other reasons for making the transition to NLC

Anderson:

- Number of articles and movements covering pesticide issues has increased
 - Headlined by [the recent glyphosate ruling](#) in California.
 - One member of the audience asked if the plaintiff, Mr. DeWayne Johnson, had a pesticide applicator’s license. Panelists did not know, but the IPM Institute found out that [he did not](#) after further researching the story.
 - Other recent news stories include [Neonicotinoid concerns for pollinators](#) and [dicamba drift](#).

Nenn:

- Poor water quality can have a negative effect on tourism.
 - Wisconsin raises \$12-15 billion/year in water-based tourism. Aesthetically displeasing algae, however, threatens tourism and the local economy near waterways.
 - E.g. Lake Winnebago [faced large algal blooms](#) in 2018.
- Healthy turf can prevent both erosion and flooding
 - [Sedimentation](#) can smother eggs of aquatic species, specifically for invertebrates.

Making the business case for NLC/IPM

Anderson:

- Natural lawn care provides a better option for reduction of inputs overall

- [Smart watering, mowing high and proper fertilization](#) can reduce need for these inputs in the long term and may reduce staff time if a resilient grass system is achieved.
- IPM/NLC is a process-based approach versus a product based approach
- NLC achieves reduction in [external costs](#) such as poor water quality, human health problems and carbon emissions.

Myers:

- We all want to do the right thing, but time, money and energy gets in the way.
 - Form your arguments to meet the values and interests of those individuals that control or have a stake in your community's or organization's time, money and resources.
 - Early in her career, Myers had trouble educating people about the importance of composting. However, she was able to sneak compost and soil testing into her well attended vegetable gardening courses.
- In municipal policymaking, budget cuts can work in your favor.
 - During cuts, you cannot do business the same way and have to think differently.
 - E.g. Myers worked for the City of Milwaukee Bureau of Forestry that managed more than 500 acres of turfgrass during budget cuts and reorganization (primarily on the medians and sides of boulevards).
 - Myers argued that residents rarely notice dandelions and weeds while driving, so the city can save funds by focusing on growing healthy turf, but avoiding weed control.
- Important to quantify benefits when pushing a sustainable landscaping policy
 - Project Evergreen provides resources on the [economic, environmental, and social benefits](#) of landscaping.
 - While the organization is largely supported by the green industry, the resources use independent, primarily university research to quantify the benefits.
 - A lot of this information could help form arguments for sustainable landscaping.
 - Recent research regarding the impact of [green spaces on community health](#)
 - Quality green spaces = reduced overall health costs
 - Businesses and people tend to move into communities with high quality green spaces generating more tax revenue that can go back into community improvement.
- The market for sustainable landscaping is growing
 - A host of issues and concerns drive customers to pay for sustainable, pesticide-free options. E.g. individuals concerned about protecting pollinators, food safety issues, pets, birds, etc.
 - Look for influencers in your community to spread your business such as master gardeners and local non-profits.
 - Community action groups, task forces and master gardeners always seek out speakers and presenters.
 - Stay on top of media stories and form a relationship with the local media to discuss sustainable alternatives when a story like the glyphosate trial pops up.
 - If able to secure an interview with local media, ensure they view you as reliable and credible (show up, hand them a list of questions, willingly share knowledge off the camera with reporters, etc.)
- NLC/IPM cost savings and benefits for homeowners include:
 - [Shredding leaves and mulching](#) it back into the lawn.
 - Not bagging [grass clippings](#).
 - Recycling grass clippings equals [one to two fertilizer applications](#) per year.
 - Additional benefits of adding organic matter and moisture to the soil.
 - Fertilize organically
 - [Myers said](#) that one application of organic fertilizer can reduce weeds by 50 percent.

- Myers asked if people understand weeds and whether or not people are managing landscapes based on an old belief
 - Possibly change the public conception to “if it is green and it’s growing, then it’s okay.”
 - Need to develop tolerance thresholds for weeds.
- Lack of understanding and knowledge regarding turf and turf management.

Issues briefly covered and to address in future sessions

What is the half-life or decomposition life of phosphorus in soil once applied?

Anderson

- The half-life will depend on the product
 - Synthetic vs. organic, slow release vs. fast release

Myers

- The soil and plant environment will, also, influence half life as nutrients such as potassium and phosphorous tend to bind to the soil.
 - [pH determines the availability](#) of nutrients to plants.
 - Clay soils hold nutrients better than sandy soils
 - Turf and other plantings can hold soil in place and reduce runoff

Nenn

- Nutrients, also, bind to river sediment. So phosphorous can affect the system in the future even if residents stop using these products tomorrow.



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Sports Turf Management

Executive Summary

Session topic: Sports Turf Management

IPM for sports turf is an entirely different ballgame than managing regular lawns. Turf fields have their own unique needs for successful maintenance. What practices enable turf to grow successfully via IPM? How can we engage coaches and athletes to be more accepting of the trade-offs associated with IPM?

Keynote Speaker:

Jerad Minnick- Jerad Minnick founded the Natural Grass Advisory Group (NGAG) as the first and only independent natural grass testing and support firm in the USA. Minnick, a former sports field manager, brings his on-field experiences to his clients and into the classroom. Jerad's work is dedicated to better ways of maintaining high traffic natural grass fields and growing the natural grass industry overall. Minnick holds a BS in Plant Science/ Turfgrass Management from the University of Missouri. His management career began as the Manager of Grounds for the Kansas City Royals. Minnick also built Sporting Kansas City's entire field maintenance department as their first Director of Grounds and served as Director of Grounds and Environmental Management for the 22 field, 160 acre Maryland SoccerPlex outside Washington, DC. During that time at SoccerPlex, Minnick's management staff re-defined what is possible for high traffic natural grass fields. Those new possibilities for natural grass fields are what drives him still today.

Summary of panelist presentation and discussion:

Grass is not complicated, it wants to grow. In his presentation, Minnick shifted the focus to five basic steps to growing grass: reducing compaction, grass selection, mowing, irrigation and food. Minnick's Natural Grass Advisory Group observed that heavy foot traffic and soil compaction on sporting fields, specifically in the middle, caused 85 percent of problems on their fields. Aerating highly trafficked fields at least once a month softens the soil to facilitate the cycling of air, water and nutrients in and out of the turfgrass system. This soft soil environment greatly increases the success of establishing high-quality turfgrass varieties that will outcompete weeds and pests under the proper mowing, irrigation and organic fertilization.

This panel was sponsored by [Southeast Wisconsin Watersheds Trust](#)

Topics of discussion brought up by panelists

Factors that impact the quality of sports turf

Minnick:

- Minnick stressed that "Grass wants to grow"

- Contrary to popular opinion, grass fields are not “overplayed”, we just don’t maintain them properly for the most part.
- Soil compaction caused 85 percent of the problems that the Natural Grass Advisory Group consulted.
- Minnick tracks foot traffic of games via remote sensing to determine compacted areas
 - For soccer, most of the game occurs in a diamond around the middle of the field. Rarely do players travel to the corners.
 - For football, 70 percent of the game is played on 35 percent of the field. Most players stay in the hash-marks.

Turf management strategies (i.e. NLC, IPM, Reduced-Risk)

Minnick:

- Turfgrass management needs to return to the basics of growing grass, not conventional management’s focus on the pesticides and fertilizers.
 - Minnick turfgrass management strategy asks, “how do we grow the healthiest, strongest turfgrass possible?”
- The Natural Grass Advisor Group (NGAG) follows similar practices to [precision agriculture](#) for turfgrass management.
 - Thousands of articles on precision agriculture, only one on [precision turfgrass management](#).
 - Majority of turfgrass management ignore the vast amount of data available.
 - “If you don’t have a data point, you’re guessing.” Turfgrass management guesses frequently in Minnick’s opinion.
 - I.e. You do not have to aerate an entire field, just the areas with the most compaction/stress. Minnick uses satellite images to identify most compacted areas.
- Grass is not complicated, Minnick simplified turfgrass management to five easy steps:
 - *Compaction*- Most sports fields grow on hard, native soils.
 - Managers should aerate as much as they need to make the soil softer.
 - *Grass Selection*- Find the best cultivar for “this situation and high traffic”
 - *Mowing*- Mow based on preferences of the grass seed.
 - E.g. A high quality Kentucky Bluegrass cultivar excels and spreads rapidly with regular mowing (at least twice a week).
 - *Irrigation*- Track the moisture [with a meter](#) and try to keep the soil at 20 to 25 percent moisture.
 - *Food*- Take a [soil test](#) to determine fertilizer needs.
 - Minnick evaluates the fertilizers he will use after evaluating the other factors. This contrasts to the status quo of considering fertilizer needs first.
 - Turf roots will not receive fertilizer nutrients in compacted, dry or water-logged soil.

Soil Compaction

Audience Questions:

- What works better, pulling soil plugs up or punching holes in the ground?
- How well does NGAG’s programs and strategies work on clay soils?
- What machinery works best in conjunction with topdressing?

Minnick:

- NGAG’s secret for effective turfgrass management= Make the soil soft
 - Get air, water and nutrients in and out of the turfgrass system. Need an exchange.

- Two types of aeration:
 - *Surface Aeration*- Aeration one to four inches on the top.
 - Promotes strong root mass on top and provides air to the top microbes.
 - Works best when densely aligned (i.e. two by two inch spacing for the holes, which will open about 8 percent of the surface).
 - Standard surface aerators used by school and park district only open 1 percent of the soil.
 - Switching aeration to [slicing](#) can achieve the 8 percent goal (see page 71 on resource).
 - *Decompaction Aeration*- Otherwise referred to as [deep-tine aeration](#), breaks the soil profile 8-12 inches below ground.
- Minnick recommends aerating or slicing a sports field at least once a month for high traffic areas.
 - Not the whole field, the middle of the field that receives the most foot traffic.
- For the question of plugs vs no plugs: Minnick says to pull plugs on sand-based fields, but NGAG's data indicates that it does not make a difference for native soil fields.
 - General rule of thumb: Removal is best, because it allows more air.
 - Do not completely remove cores, however. Break up the cores and return them to the ground after pulling them up.
- For the clay soil question: Most of NGAG's fields grow on clay soils. Decompaction and aeration play a prominent role for breaking up clay soils, need to use a decompaction aerifier.
 - Use the aeration to mix in organic matter of grass clippings, leaf litter and mulch back in to the soil.
 - Minnick has found success in using [Humic acid](#) to improve the biological activity and [cation exchange capacity](#) of clay soils. However, research and work with Humic acid is still relatively new.
- For the question about best practices for topdressing: Minnick recommends the following:
 - Top-dress with high quality organic fertilizer.
 - Applying organic fertilizer with a high microbiological diversity on "soft" soil may dismiss the need for compost top-dressing altogether.
 - When compost is necessary, Minnick typically puts it down before aeration and then works it into the soil.
 - Do not want to leave a layer on top, because that could create further compaction problems.

Grass Selection

Minnick:

- Plant breeders work on new varieties of grass every day to tolerate foot traffic, drought, cold, and weed pressure with less inputs.
 - [Bermuda grass](#) is the most competitive grass and stress tolerant, but a warm-weather type.
 - Minnick hopes to push a cold-tolerant Bermuda grass variety into the Midwest soon.
- Minnick overseeds whenever he can.
 - Likes to overseed during compost topdressing. Seed first, then put a light layer of compost on top.
 - Try to cut the seed an inch into the soil, no deeper, to allow the first root to tap into the soil.

Benefits realized from implementing IPM and NLC

Minnick:

- By concentrating on the five aforementioned factors, a turf manager can avoid the top three complaints about natural grass fields:
 - *Hard surfaces*- NLC/IPM reduces soil compaction
 - *Flooded fields*- NLC/IPM builds-up organic matter and drainage systems to keep fields in play.
 - *Safety*- The soft soil creates better shock-absorption for natural fields than synthetic fields.
 - Shock pads for artificial turf costs upwards of \$300,000

Challenges to effective IPM or NLC

Minnick:

- Many companies that sell conventional pesticide and fertilizer products, synthetic turf and landscaping services want managers to think natural grass is difficult to grow, when it is easy
 - Artificial turf companies have found a market in portraying natural grass as difficult and harmful to the environment and public health.
 - 130,000 sports fields across the United States, 24,000 are now artificial
 - Artificial turf requires nearly \$1 million in initial investment and additional costs for the chemicals to maintain the turf.

Research, technical assistance and/or tools needed to overcome challenges

- The market for natural grass landscaping continues to grow.
 - Brightview, the largest landscaping company in the nation, just went public and was valued at \$2 billion. The company only accounts for 2.9 percent of the industry.
- How do we spread the word about the potential for sustainable landscaping management?



MGG Lawn & Land Forum Workshop 10/29/18

Weed and Pest Management

Executive Summary

Session topic: Weed and Pest Management

This session dove deeper into the practices, strategies and products available to keep weed and pest pressure down, while reducing environmental and human health risk.

Panelists:

Dr. Thomas Green- Dr. Thomas Green co-founded and directs the IPM Institute of North America, a rapidly growing independent 501(c)3 non-profit formed in 1998 to improve sustainability in agriculture and communities through market-based mechanisms based in Integrated Pest Management (IPM) and other sustainable practices. He, also, served as a director of the Entomological Foundation from 2009 to 2015, and as vice-president and president from 2011-2014. He was awarded the Foundation's Medal of Honor in 2015. He has been a member of the Entomological Society of America since 1983, and has served on the Presidential Committee on Science Policy and the Presidential Committee on Awards. He served on the Wisconsin Pollinator Protection Plan stakeholder development committee and currently serves on the Minnesota Pollinator health and Crop Production Task Force. Dr. Green is a Certified Crop Advisor and an USDA NRCS-certified Technical Service Provider. He holds a Ph.D. in entomology from the University of Massachusetts and has authored or co-authored more than 100 publications and presented at more than 250 professional and industry events.

Brett Hebert- As Director of Public Works for the City of Stoughton, Brett Hebert oversees city's streets, parks, fleet and forestry divisions. Brett has a bachelor's degree in Public Administration and is a certified water and wastewater operator. Brett has been in the public works arena for over 18 years starting as a seasonal parks maintenance employee for the City of Beloit while in college. After college, Brett was hired full time with the City of Beloit within the Forestry Division where he helped to manage over 30,000 trees within the urban forest. Shortly thereafter, Brett was promoted to Public Works Supervisor for the City of Beloit where he served in that capacity until 2016 when he was hired as the Director of Public Works for the City of Stoughton. Brett and his staff have been on the cutting edge of implementing Integrated Pest Management (IPM) practice in a municipal setting. Brett and his staff worked with local stakeholders to draft a turf management policy that utilizes IPM practices. This policy has proven effective at managing turf within an urban setting while simultaneously reducing reliance on chemical pesticides.

Charlie Koenen- Consummate teacher and serial entrepreneur, Charlie Koenen leads BeeVangelists whose mission is to advocate and educate on the plight of pollinators. Educated in Industrial Design, and beekeeping for more than 15 years, he invented a beekeeping system for safer, friendly interaction with bees, particularly in urban spaces. He maintains hives throughout greater Milwaukee, preaching about

bees and developing programs to encourage greater interaction with the community. Hives are placed in golf course, city parks, community gardens, at places of worship, restaurants, schools and universities, ecology centers and corporate campuses. He's launched programs to empower stigmatized portions of our population to learn beekeeping and find "healing from the hives".

Summary of panelist presentations and discussions: This panel explored how local authorities can most responsibly and effectively respond to the risks and public concerns of synthetic lawn pesticides. For turf management, authorities want to address the pesticide risk concerns of residents while still providing the services that taxpayers fund (i.e. playable sports fields). Formalizing and communicating IPM and NLC policies will best assist with meeting these competing expectations. Most importantly, authorities should be transparent about the weed and pest control products used by developing a pesticide selection protocol and notifying residents of upcoming applications. For selection of pesticides, managers should not expect a one-to-one organic or reduced-risk product substitution for conventional weed and pest control. Cultural controls need to accommodate these safer alternative products. Finally, the panel encouraged managers to modify the timing, concentration and type of pesticide product applied to avoid harm to humans and non-target species such as bees and pollinators.

This panel was sponsored by [Milorganite](#)

Topics of discussion brought up by panelists

The Importance and Meaning of IPM/NLC

Green:

- Integrated Pest Management (IPM) focuses on the processes to monitor and control pests and weeds across the whole system. IPM does not deal solely with killing insects or weeds.
- Many companies take the time to improve their pest and weed control practices across their supply chains in response to customers requesting more sustainable practices.
 - Research shows that companies lose their market share if they do not have a sustainability program.
 - For the food and beverage sector, many customers want to consume products free of potential toxins.

Hebert:

- Hebert considers IPM as using all the pest and weed control tools in the toolbox to manage turfgrass.
 - Stoughton's IPM policy allows for use of weed and pest control products, but only for targeted applications and not blanket spraying.
- Primary goal of the City of Stoughton's policy is to phase out pesticides over time.
 - A contractor handles all pesticide applications for the City of Stoughton, but adheres to Stoughton's IPM policy and accepts that the City might not need their services in the future.

Koenen:

- By taking a systemic approach, IPM and NLC factors the effects of land management on non-target species such as bees and pollinators, that conventional pest management approaches often do not.
 - Bees and other insects have provided pollination services since the dinosaurs and society has just now started to value these services.

- Colony Collapse Disorder (CCD) results from actions that prevent a bee hive from self-preserving in the long-term. Often this entails diminishing the amount and quality of honey that bees rely on to survive winters.
 - Modern agricultural practices of coating seeds with insecticides such as neonicotinoids threaten bees more than contact or granular pesticides, because bees bring the products home to their colonies and the honey they eat over the winter.
 - Urban areas can create more valuable habitat and forage for bees than farmland.
 - Farms, especially conventionally managed farms, harvest land to bare, green deserts and need to preserve that land with toxic pesticides, herbicides, and fungicides to keep it bare. This kills the other 22,000 bee species that try to reside in farmland.
 - Urban areas that plant a diversity of flowers and trees and that apply less pesticides create desirable habitats for bees.
- Daytime pesticide applications threaten all bees that frequently forage during the day.

IPM/NLC Practices

Green:

- While the industry has created and improved more natural products, product substitution of a synthetic with a natural or organic product will not work without proper cultural controls
 - These controls include soil testing, adding organic matter, growing grass where grass will grow, choosing the right grass cultivar or plant for the right location, mowing high, aerating, overseeding, deep irrigation and mulching areas with no grass (tree rings, flower beds, etc.).

Hebert:

- Hebert practices aeration, overseeding, soil sampling, mowing no lower than three inches and adding soil amendments to adjust the pH.
- Stoughton ensures it meets the following conditions for times when pesticide spraying occurs:
 - Calm day
 - No rain in forecast for at least 24 hours
 - Typically do not treat near waterways
 - Avoid over treating by following manufacturer application rates.
- Stoughton prioritizes notifying the community of an upcoming application with the following practices:
 - Recreation league user groups, City Council and City Leadership receive an email notification at least 14 days before an application.
 - Both the City website and Facebook page release a notification 14 days prior.
 - All safety data sheets are available on the website.
 - The city posts signs every 75 feet and keeps them posted 48 hours after application.
- Recordkeeping & evaluation:
 - Staff record all turf management practices for the exception of mowing.
 - Leadership review the efficacy of all turf treatments in the fall and identify improvements to the IPM program for the ensuing year.

Koenen:

- Koenen has found that bringing bees into an area will attract other pollinators.
 - Koenen brought bees to an apple orchard slated to be cut down due to low productivity. In four years time, the orchard overproduced due to the bee introduction.
- Koenen wanted to see if he could maintain bee hives on some of the most manicured lawns in Milwaukee: golf courses. Bees can thrive on golf courses with the following IPM/NLC practices:

- Spraying during the night instead of the day when bees do not forage.
- Cut down clover and flowers of weeds before an application, so bees do not travel to sections that receive pest and weed control.
- For the courses that have residential neighbors, Koenen encourages golf courses to educate their neighbors about IPM and pollinator protection to avoid blanket spraying that can harm bees.

Prioritizing Fields and Setting Tolerance Thresholds for Weeds and Pests

Hebert:

- Hebert's community of Stoughton needed to find a compromise between competing interests of individuals that found weeds acceptable and those who did not.
- Stoughton's compromise involved passing an [Integrated Pest Management policy](#) that set tolerance thresholds for weeds and established the Pesticide-Free Veteran's Park.
- The policy divides turfgrass management plans for parks and grounds based on the weed pressure thresholds. The three different management plan groups are:
 - *Class A Parks & Grounds*- Grounds with a weed pressure threshold below 15%. This includes all athletic fields and destination parks and grounds such as City Hall and the Business Park Entrance.
 - *Class B Parks & Grounds*- Grounds with a weed pressure threshold between 16-30%. This includes frequently traveled park spaces, but not to the degree of Class A parks and grounds.
 - *Class C Parks & Grounds*- Outlier grounds and natural spaces with a weed pressure threshold between 31-50%.

Koenen:

- Educating the public about the history of lawns could help increase tolerance thresholds for weeds and pests.
 - Pristine, green and weed-free lawns were never a desirable outcome before World War II.
 - "Does everything need to be green? Does everything need to look like a golf course?"

Pest and Weed Monitoring

Hebert:

- To ensure Stoughton follows the IPM policy, staff stress data collection
 - Weed assessment conducted twice per year, once in the spring and fall.
 - Stoughton divides its larger parks (e.g. [Racetrack Park](#)) into sections for the weed assessments to ensure targeted, not blanket, spraying.
 - E.g. Stoughton outlined 20 individual sections of [Racetrack Park](#) for assessment

Educating staff on IPM/NLC

Hebert:

- Stoughton benefitted from having a well-trained, enthusiastic turf manager on staff to help with the changes in cultural practices.

Alternative Pest Management Products Available

Questions from Audience:

- How effective has the Tenacity product worked? And is it a non-synthetic.
- Effectiveness of [Corn Gluten Meal](#)?

Green:

- The University of Wisconsin [developed a resource](#) of organic and reduced risk products. Dr. Green stressed the following products from the list:
 - *Organic:*
 - [Finalsan Pro](#)- Glyphosate replacement, non-selective herbicidal soap that will kill both weeds and grass.
 - *Reduced-Risk Pesticides:*
 - [Tenacity](#)- 2,4-D replacement, selective broadleaf herbicide, Mesotrione is the active ingredient. Controls for crabgrass, ground ivy, dandelions and clover.
 - Use on mature turfgrass varieties of Kentucky bluegrass and perennial ryegrass, avoid use on fine fescue.
 - In response to the audience question, [Chip Osborne](#) uses Tenacity over [Fiesta](#) and finds it more effective in controlling weeds.
 - Osborne has also moved away from corn gluten for weed control.

Hebert:

- Stoughton applies the following selection criteria for pesticides they use on grounds:
 - Low or reduced-risk products [listed by the EPA](#)
 - Products with a short half-life (>30 days)
 - Products that will not inhibit seeding
 - Products with a low potential for leaching
- Tenacity is Stoughton's preferred weed control product.

Benefits Realized from Implementing IPM/NLC

Green:

- Certification programs such as LEED include [points for sustainable landscaping](#).

Koenen:

- Koenen's bee introduction projects for golf courses informed superintendents about how their weed and pest control practices affected non-target species.
 - As customers gradually started to embrace the bees, many of the superintendents started to ask how they can manage greens with limited harm to the bees.

Challenges to Effective IPM or NLC Management

Koenen:

- The changing and unpredictable climate challenges conventional beekeepers who stick to yearly calendars for management.
 - Spring, summer, fall and winter do not always start at the same time each. Thus, bees will not forage at the same time each year.
 - These changing seasons and climate, also, can cause problems for pest managers that want to avoid exposure for bees.

Research, technical assistance, and tools needed or available to overcome challenges

Green:

- IPM Institute developed a free, online training resource for School IPM called [The Pest Defense for Healthy Schools](#)
 - The training includes courses built for nine key groups in schools of facility managers, maintenance staff, administrative staff, teachers, food service staff, custodial staff, landscape and grounds staff, school nurses, and pest management providers and technicians.
- Chip Osborne of [Osborne Organics](#) provides regular consultations for Organic Lawn Care planning and, also, leads the [Organic Landscape Association](#) that provides resources and training.
- Dr. Green was one of many who added input to the “[Pest Prevention by Design](#)” guidebook for buildings developed by the [San Francisco Department of the Environment](#). The group plans to develop a guidebook for landscapes in 2019.

Issues briefly covered and to address in future sessions

Bees!

Koenen:

- [22,000 different types of bees](#) in the world. All provide pollination. Only one is the honeybee.
 - The other bees are often overlooked, because they don’t produce honey and live solitary. Yet, they contribute significant value to ecosystems.
- Evolution has made the bee a perfect mediator for plant reproduction
 - When bees flap their wings it generates an electric-static charge that holds pollen in the fur.
- The honeybee colony is unique in that the colony acts as one to achieve self-preservation, mimicking the mind and intelligence of a human being.
 - A disruption from the outside world will have an immediate effect on the hive.
- Koenen received a question about where to buy bees in Milwaukee
 - “Buy bees where you can buy them”
 - Koenen believes that the industry has overcomplicated purchasing bees by concentrating on the breeds, genetics and varieties of bees.
 - Survival of the bee largely depends on the beekeeper, not the type of bee. Buy bees and do not fear learning from your mistakes (e.g. losing colonies in the first year).
 - Koenen sources his bees from [Heritage Honeybee](#) in Sullivan, Wisconsin. But he recommends only going for the “high quality” bees when you feel experienced enough as a beekeeper.
 - Milwaukee experienced a 90% loss of bees in 2018 due to weather and climate (i.e. a snowstorm in April). Even the locally-sourced, high-quality bees struggle with the fluxes in weather.

Pesticide Preemption

- One audience participant inquired about preemption in Wisconsin and how it influenced private companies and landscape contractors.
 - Many states include a clause in their pesticide regulation laws that [preempt or restrict local authorities](#) such as municipalities from regulating pesticides further than the state.
 - Both Wisconsin and [Illinois](#) have explicit preemption language in their pesticide regulation laws.



MGG Lawn & Land Forum Workshop 10/29/18

Grass Selection, Soil Compaction & Field Construction

Executive Summary

Session topic: Grass Selection, Soil Compaction & Field Construction

The big question: Can playing surfaces with less fertilizer, pesticide, and water inputs stay in play and maintain high performance? Panelists covered the cultural practices they implemented to keep surfaces in play, while sticking to IPM.

Keynote Speaker:

Jerad Minnick- Jerad Minnick founded the Natural Grass Advisory Group (NGAG) as the first and only independent natural grass testing and support firm in the USA. Minnick, a former sports field manager, brings his on-field experiences to his clients and into the classroom. Jerad's work is dedicated to better ways of maintaining high traffic natural grass fields and growing the natural grass industry overall. Minnick holds a BS in Plant Science/ Turfgrass Management from the University of Missouri. His management career began as the Manager of Grounds for the Kansas City Royals. Minnick also built Sporting Kansas City's entire field maintenance department as their first Director of Grounds and served as Director of Grounds and Environmental Management for the 22 field, 160 acre Maryland SoccerPlex outside Washington, DC. During that time at SoccerPlex, Minnick's management staff re-defined what is possible for high traffic natural grass fields. Those new possibilities for natural grass fields are what drives him still today.

Steve Stumbras- As a partner in Purple Cow Organics LLC, Steve works to spread the message that soil quality is the fundamental factor affecting agricultural production, an improved environment, enhanced nutrient density and ultimately personal health. As a managing partner of the Madison Golf and Development Group, and former President of The Golf Course Owners of Wisconsin association, Steve was involved as his company took on the innovative approach of feeding their golf course fairways, tees and roughs with plant-based compost; achieving 100% turf fertility from this completely organic source. Steve works closely with a wide range of sports facilities to expand the implementation of these safe and sound maintenance programs.

Kristi Solberg- Kristi Solberg is the Park Maintenance Manager with the Park Ridge Park District. Kristi joined the Park Ridge team in November of 2015. With previous experience and passion in the Green Industry, Kristi has developed a new look to Park Ridge's maintenance practices.

Summary of panelist presentations and discussions:

Decisions result from "guesswork" frequently in conventional sports field management. In his second presentation, Minnick stressed the importance of using soil tests to establish data points for fertility, compaction and drainage, then acting accordingly. The two other panelists, Steve Stumbras and Kristi

Solberg, briefly covered their successful efforts to apply many of Minnick’s principles into sporting fields. All panelists clearly demonstrated that sports fields can succeed with limited or no pesticides under proper mowing, aeration, overseeding, irrigation and fertilization.

This panel was sponsored by [Natural Grass Advisory Group](#)

Topics of discussion brought up by panelists

Factors that impact the quality of sports turf

Stumbras:

- “Nature has a way of protecting itself, if you build the soil”
- Fungi and [mycorrhizae](#) serve as “giant straws” to [transport nutrients to the plant](#).
- Soil Fertility- Driven by dead things and invisible things
 - Dead things- Plants and Animals
 - Invisible things- Microbes
- The atmosphere located near each acre of soil holds 32,000 tons of Nitrogen that only biological activity can access.
 - The biological activity, temperature and oxygen determines how effectively the soil can produce plant accessible nitrogen.
- “The link between geology and fertility is biology”
 - Why managers should avoid pesticides that can harm the biology.

Minnick

- “We want to give grass enough to grow, but still be strong and durable”
 - i.e. Fertilize in lean quantities.
- Infiltration and soil porosity. Grass prefers sandy, organic-matter rich soils.

NLC/IPM Planning and Scheduling

Stumbras:

- Aeration= Weekly
- Topdressing= Seasonally
- Overseeding= Once every three years in September

Solberg:

- Solberg exercises 10 different turf management programs for the 21 sports fields under her supervision.
- Management on all fields start with a soil test to determine soil and turf needs and make management decisions from there.
 - Solberg never uses blanket applications of pesticides or fertilizers. Always relies on soil tests.
 - E.g. Solberg uses soil tests to determine the [need for gypsum](#).
 - Solberg aims to apply 250 lbs of gypsum per acre twice in the spring and twice in the fall. Each application occurs before a forecasted rain to water in the product.
 - [Gypsum \(calcium sulfate\)](#) stimulates calcium and nutrient accessibility to plants by controlling calcium inhibitors of bicarbonates and chlorine
 - Solberg uses [Advanced Turf Solutions](#) for soil tests.
- Park Ridge Park District’s (PRPD) other NLC/IPM programs include:

- Increasing the frequency of mowing to two to three times per week.
 - Proper mowing decreases weed pressure, promotes root growth, reduces rain-outs and increases tolerance to wear and tear.
- Overseeding in the spring.
 - PRPD missed seeding in Spring 2018 due to late snow, but overseeded gaps and problem areas in the fall. Fields performed well despite missing a year.
- Frequent aeration once grass grew enough to mow.
- Fertilizing organically.
- Some weeding and grub control.

Minnick

- Strongly supports soil testing once a year.
 - Most fertilizer and seed companies will provide a soil test for free to districts.
- Minnick focuses on the estimated nitrogen released by the organic matter.
 - The relatively new [Solvita soil tests](#) factor in biological, chemical and physical traits of the soil as opposed to solely the nitrogen found.
 - A Kentucky bluegrass plant best grows when receiving .1 to .2 lbs of nitrogen per week.
 - Higher than .2 can cause the plant to grow too fast resulting in thinner cell walls.
 - Grass grown in compacted soils, however, require more supplemental nitrogen.
- Focus soil testing, aeration, mowing and other cultural management on the middle of the playing field that experiences the most foot traffic.
- Minnick referred to [Woods End Laboratories, Inc.](#) as the provider he works with for [Solvita tests](#) and others.

Sustainable construction and field types

Minnick:

- The goals of field construction:
 - [Surface grading](#)- Ensure that both water moves and the field remains safe to play.
 - E.g. A two percent slope on football fields benefits drainage, but negatively affects playability.
 - [Decrease compaction potential](#)- adjusting the soil profile (e.g. adding sand), adding organic matter of compost and installing stability fibers (e.g. [plastic](#), [coconut husks](#), and [almond shells](#))
 - Screen the soil- Many new construction projects bring in rocks and debris that degrade the quality and structure of the soil.
 - [Irrigation](#)- If spending a lot of funds on the field, the district or manager should install an effective irrigation system to complement that investment.
 - Many companies will design irrigation systems for free.
 - [Drainage](#)- Ensure infiltration, do not assume that water will infiltrate based on initial conditions (e.g. many sand fields require a drainage system to most effectively operate).

Grass Selection

Solberg:

- Solberg chooses high-quality seed mixes of perennial ryegrass and Kentucky bluegrass.
- Uses [SEEDA-vator](#) to apply

Minnick:

- Use the proper variety of seeds for the right situation.
 - Get the best grass variety that money can buy.
- Minnick avoids fescue-dominant turfgrass varieties, because it does not spread laterally and exhibits less tolerance for foot traffic.
 - Seed companies have developed perennial ryegrass and Kentucky bluegrass cultivars with more or similar drought tolerance to fescues.
 - Many Kentucky bluegrass mixes can establish across a sporting field within two months.

Mowing

Solberg:

- Solberg mows at 2 ½ inches in the spring and summer.
- She increases the height to 3 inches in the fall, because soccer and football affiliates are more lenient.

Reducing Soil Compaction

Stumbras:

- Will aerate 12 times per year on sports fields.
 - Frequently aerates when the soil contains [a lot of moisture](#).

Solberg:

- PRPD uses both a [deep tine aerator](#) and slicer
 - PRPD uses the [slicer](#) once every two to three weeks to achieve deeper holes that encourage lateral growth for Kentucky bluegrass.
 - The deep tine aerator, while slow, helps break up soil with a lot of clay, rocks and/or construction debris found on PRPD parks, specifically recently constructed parks.

Minnick:

- For the most part, well aerated soils will not need much or any fertilization
- Adjust the frequency and locations of aeration based on soil compaction across the sports fields.
 - Focus on the middle of the field that is often 30 percent more compacted than the exterior.
 - An aerifier run on 8 percent of the sporting field surface will reduce compaction by 10 to 15 percent. Managers can save time by running the aerifier twice over the middle and avoiding the other spots.
- Any aeration is better than nothing. Lots of cost savings available with aeration whether a manager does a double pass aeration to avoid a future aeration or spends minimal funds to change a simple core aerator to a slicer to open more of the ground.
- Woods End Laboratories has developed a test similar to Solvita that measures the carbon dioxide released by the soil (i.e. biological activity). Minnick has started to use this test to identify compacted areas by focusing on areas with low surface CO₂ that indicate poor microbiology life.

Soil Fertility: Organic vs. Conventional Products

Stumbras:

- Has been able to feed soccer, football, and rugby fields with 100 percent organic products of fertilizers and compost.
- For compost, apply ¼ inch per application.
 - Companies have equipment available for purchase or rent to spread compost.

- [Wet lime spreaders](#) work well for compost.

Solberg:

- Park Ridge Park District (PRPD) implements four different fertilization programs on sports fields. Each is either organic or organic-based.
 - Solberg uses both granular and liquid fertilizers.
- Solberg piloted a [MWRD Biosolid fertilization program](#) for two fields in 2017
 - The fields tolerated the dry months the best and had the lowest weed pressure of all Solberg's fields.

Weed and Pest Control

Solberg:

- Solberg's district has moved from blanket, boom spraying to spot-spraying for weeds since she started in 2017.
- Solberg experimented with [beneficial nematodes](#) for grub control on a five acre field and reported no issues with grubs.
 - Applied the product in June and followed with a second application 7 to 10 days after.

Benefits realized from implementing IPM and NLC

Comments from Audience-

- How much less pesticides are being used by implementing the cultural practices covered in the presentations?

Stumbras:

- Adding organic matter improves both the water infiltration and retention of soil
 - For retention, increasing the [organic matter percentage of soil by 1%](#) can increase its water holding capacity by 16,500 gallons per acre-foot.
 - For infiltration, the structure of organic matter allows for [more pores than many soils](#), such as clay, to increase infiltration.
- Organically managed grazing grass achieved a greener color and could receive more grazings per year than conventionally managed lots.

Solberg:

- For the question regarding how much less pesticides are being used, Solberg did not have specifics, but could say that the district spent less in 2018 for weed killer, staff time and other resources.
 - Solberg rarely needed to spray for weeds in 2018 due to her focus on cultural controls. Did not apply any product in the fall of 2018.

Minnick:

- Minnick does not use weed killer on fields maintained regularly.

Challenges to effective IPM or NLC and how to overcome them

Solberg:

- Many districts do not have the staff or machinery to implement the necessary NLC/IPM practices

- E.g. PRPD struggled with mowing two to three times per week. Solberg decided to contract for the mowing of 10 parks and found success with cost savings and grass quality. Staff mows all other fields.
- If facing initial pushback, experiment with the practices where you can demonstrate to staff and colleagues that IPM and NLC actually works.
 - Solberg benefitted from having a lot of personal freedom in her decisions, but made sure others saw what she did to gain support for her pesticide reduction efforts.

Minnick:

- Grub control continues to be an issue for many of Minnick’s fields.
 - Some Kentucky bluegrass cultivars grow vigorously and durably to resist grub pressure.
- Minnick finds it challenging to demonstrate to decision-makers that “more doesn’t necessarily mean great” for fertilization of turfgrass. Need to continue to have sessions and research that shows that grass can excel with less.

Issues briefly covered and to address in future sessions

How to manage weeds on areas with no turfgrass (e.g. baseball diamonds)

Solberg:

- Uses mechanical controls such as the teeth of the ballfield rake or a tractor pull behind to rip up the roots and heads of the weeds.

Minnick:

- Minnick finds that the mechanical controls Solberg mentioned are more cost-effective than chemical controls.
- Also, Minnick recommends considering grass infields, so the plant and soil life is established. A manager will not have to replace the dirt each year.



MGG Lawn & Land Forum Workshop 10/29/18

Soil Fertility

Executive Summary

Session topic: Soil Fertility

Billions of microorganisms, invertebrates and living organisms interact in the soil ecosystem to create an environment favorable for grass growth. Our panelists examined the cultural practices and policies to implement that promote strong plant and root growth.

Panelists:

Carl Gorra- Carl received a degree in Resource Management from the University of Montana and has been fortunate to work in the green industry his entire career. Carl has worked for the Morton Arboretum, the Friendship Park Conservatory, and the Mt. Prospect Golf Course, and is currently the Operations Manager for the Naperville District Parks and Fleet Divisions. Carl takes great pride in continually learning and implementing ways of operating that are environmentally friendly, efficient and provide lasting results. For his contribution to this panel, Gorra investigated the shifting public perceptions of organic materials as fertilizers, along with his own experiences using natural lawn care practices in sports turf and parkland management.

Melinda Myers- Melinda Myers is a nationally recognized gardening expert, TV/radio host, author and columnist who has written over 20 books including *Midwest Gardener's Handbook* and *Small Space Gardening*. She has over 35 years of horticulture experience, a master's degree in horticulture and was a horticulture instructor with tenure. Her professional positions include: Milwaukee County-University of Wisconsin Extension Agent, Assistant City Forester for Milwaukee and Horticulture Instructor at Milwaukee Area Technical College. She currently owns her own company where she and her team help educate and inspire professionals as well as new and experienced gardeners through various media, outreach and presentations with an emphasis on sustainable practices. Her website is www.MelindaMyers.com

Steve Stumbras- As a partner in Purple Cow Organics LLC, Steve works to spread the message that soil quality is the fundamental factor affecting agricultural production, an improved environment, enhanced nutrient density and ultimately personal health. As a managing partner of the Madison Golf and Development Group, and former President of The Golf Course Owners of Wisconsin association, Steve was involved as his company took on the innovative approach of feeding their golf course fairways, tees and roughs with plant-based compost; achieving 100% turf fertility from this completely organic source. Steve works closely with a wide range of sports facilities to expand the implementation of these safe and sound maintenance programs.

Summary of panelist presentations and discussions: Panelist Steve Stumbras best summarized this panel in a sentence, "soil has a way of taking care of the plants that live on it, if it has the resources it needs." Soil functions most effectively with a sponge-like structure that holds water and nutrients, but still enables free flow of these resources to turfgrass and plant roots. Factors that help

achieve this structure include location, amount of humus, soil moisture, drainage and the microbiology. Synthetic fertilizers and products add minimal benefits to these soil characteristics. Meanwhile, organic fertilizers and other organic matter resources such as compost, grass clippings and leaves contribute significant value to each characteristic except location. Today, incorporating organic products into turf management programs is not cost-prohibitive as in the past. The cost of products, while still more expensive than conventional, have decreased. Implementing good cultural controls reduces the need for blanket pesticide and fertilizer spraying. Finally, decreasing management of outlier park areas allows authorities to reallocate their time and funds to priority parks and grounds.

This panel was sponsored by [The Sanctuary Products](#)

Topics of discussion brought up by panelists

Definition of Organic

Gorra:

- Gorra defines organic fertilizers as anything that has an origin of plant or animal base.

The importance and characteristics of the soil microbiome/ecosystem

Gorra:

- Without bacteria and [microbial health](#), the soil is functionless.
 - An acre of soil contains five to ten tons of microbes. These microbes form the foundation of what many refer to as the [soil microbiome](#).
 - Microbes cycle nutrients, facilitate root growth and detoxify the soil. Notable organisms and their contributions to turfgrass and soil health include
 - [Azotobacter](#) – These bacteria fix nitrogen gas in to plant-accessible ammonium.
 - [Bacillus](#) – These bacteria produce chemicals that have insecticidal benefits, antimicrobial compounds that inhibit plant pathogens and emissions that promote plant growth.
 - [Rhizobia](#)- These bacteria work in tandem with legumes to fix nitrogen for turfgrass roots.

Myers:

- Myers presented on how to “keep water where it falls” with proper landscape management.
 - An easy sell, in Myers’ view, given that Milwaukee and the Midwest faced a wet year with more floods than usual.
- Researchers discovered an anti-depressant bacterium, [Mycobacterium vaccae](#), in the soil that activate the same serotonin-releasing neurons targeted by Prozac in mice.

Stumbras:

- Soil is 25% air, 25% water, 45% minerals and the rest organic matter.
 - The biology/microbiome transitions the 45% minerals from “rock” form to “fertility” form.

Soil microbiome/ecosystem needs

Gorra:

- Gorra cited a graphic from 1935 that explores the six characteristics or needs to ensure complete fertility
- The graphic first covers the three primary [Food Elements](#) of Nitrogen, phosphorus, potassium

- Nitrogen promotes dark green leafy growth. Limited nitrogen leads to small stunted growth and a light green color. Too much nitrogen can stress the plant.
 - Organic fertilizers with high concentrations of nitrogen include blood meal, feather meal, Milorganite, guano, corn gluten meal, and fish pellets.
- Phosphorus stimulates both flower and root growth.
 - Phosphorus based organic fertilizers include bone meal, fish pellets, and guano.
- Potassium regulates many metabolic processes of the plant such as photosynthesis.
 - Potassium based organic fertilizers include wood ash, greensand, and kelp meal.
- In the lower middle section of the graphic, it states “soil conditioned to hold water properly which permits a steady supply of a weak food solution” and “Food elements are useless, unless in solution and available for plant use.”
 - Gorra stated that both statements promote building soil with the properties of a sponge that holds water and nutrients, but still allows for those elements to move to plant roots.
- To achieve the sponge-like structure and “complete fertility”, the graphic mentions five additional characteristics or “links” to track and manage:
 - Location- Environmental conditions of the location will influence nutrient uptake (e.g. a field in a flood plain, likely will not drain well)
 - Humus- [Humus or organic matter](#) creates a “sponge-like”, living soil to retain nutrients and water. Created by bacteria, another link in the graphic.
 - Moisture- Without moisture, the soil cannot transfer nutrients to the roots of plants
 - Drainage- If the water drains too quickly or infiltrates too slowly, nutrients will not get in contact with roots.
 - Bacteria- Bacteria are essential in creating and maintaining desirable soil structure/texture

Threats to the soil microbiome/ecosystem

Audience Questions/Comments:

- Do pre-emergent herbicides harm the microbiology from the soil

Gorra:

- Salt-based, synthetic fertilizers can destroy the structure of the soil over time by inhibiting soil bacteria from doing their jobs, resulting in the need for more frequent fertilization
 - Creates a cycle of dependency
- From Gorra’s understanding, many synthetic pesticides and herbicides will harm the soil microbiology.

Myers:

- Many times managers inherit poor quality or highly compacted soil that limits infiltration. Examples include:
 - The City of Milwaukee graded many of its boulevards and properties.
 - Soils near many newly built homes are either not native or highly compacted due to construction traffic.

Practices to build soil matter and improve soil quality

Gorra:

- If using organic fertilizers over synthetic, the cultural practices remain the same:
 - Mowing- For athletic fields managers should mow a minimum of two times per week.
 - [Aeration](#)- Gorra aerates at least three to four times a year on sporting fields. Never reached a “too much” threshold for aeration.

- Gorra does not break down the plugs from aeration, since he times aeration before and after heavy use (e.g. football season), so athletes can cleat-in the plugs.
- If he needs to break down plugs, Gorra will aerate in the morning and run over the plugs in the afternoon with a chain-link fence, drag-mat, or verticutter.
- Gorra reduces the cultural controls for general use parks.
- Planted certain varieties of clover in a median where turf had undergone stress
 - The clover grows 8 to 10 inches tall so they cannot survive the mowing height of turf
 - Messaged it as a “pollinator garden” for its ability to bring in wildlife.

Myers:

- Grow native plants in spaces that do not need turfgrass. The deep root systems of natives break through heavy clay and create channels for water to go down.
- Trees, also, slow and capture rainwater to facilitate infiltration.
- Emphasize soil preparation
 - “If you do not have data points, you are only working off you gut.”
 - Soil tests help reduce uncertainty and will often provide recommendations on next steps. Extension services available to answer further soil fertility questions.
 - A colleague of Myers’ requires soil preparation for every project he does. His landscapes excel even in drought periods thanks to his concentration on soil preparation and amendments.

Stumbras:

- In response to an audience question regarding where to begin with school grounds poorly managed in the past, Stumbras recommended to start with a soil test.

Equipment and products needed to treat the soil

Gorra:

- For sporting fields, NPD uses a variety of organic fertilizers
 - Gorra compost topdresses after the last aeration in the beginning of November
 - 1/8” to ¼” of composted grass clippings and leaves.
 - Has used biosolids as an alternative, works just as effectively.
 - For organic fertilization, Gorra uses a 16-0-4 organic based fertilizer. Primarily organic, but coated with some synthetic material to get a “boost”.
 - NPD pays a \$1000 a ton for the product, which is about a \$100 a ton more than the synthetic fertilizers they source.
- Regardless of the fertilizer used, the maintenance regime and equipment remains the same
 - Gorra uses a vegetable-oil powered tractor to spread organic fertilizers
 - The NPD “high-tech” aerating machine holds drill bits that penetrate the soil, take out cores, and backfill with calcite clay.
 - “Low-tech” aerating machine is a drive behind trailer that cores out plugs.
 - Simple and dependable
- For weed control, NPD uses two applications of [Fiesta](#) on athletic fields on a 21 day time interval

- While costs exceed synthetic, NPD offsets that by choosing highly trafficked or visible areas for control over less trafficked areas
 - Gorra avoids applications in tree corridors, grass near parking lots and areas 20 feet off athletic fields.

Myers:

- Topdressing
 - Spreading 1-2 inches of compost topdressing over turf and perennials once every other year provides most of the nutrients plants' need.
- Myers suggests mulching with organic materials for weed suppression on plant beds, tree rings and non turfgrass spaces.
 - [Organic mulch materials include](#) leaves, straw, hay, wood shavings, etc.
- Myers uses [Milorganite](#) frequently for her projects.
 - Milorganite offers a high organic matter content product ([85% organic matter](#)) that a homeowner can easily handle and apply.
 - Myers said most organic fertilizers, however, are easy to apply and work just as effectively as Milorganite.
- [A University of Minnesota horticulturist](#) observed success with corn gluten meal after three to four years of use.
 - Timing is very important, however, for the [application of corn gluten](#).

Stumbras:

- For compost, managers need to understand that [not all compost is the same](#). When purchasing compost focus on three factors:
 - The [carbon to nitrogen ratio](#).
 - The [trace minerals](#) of calcium, iron, boron, copper, etc.
 - The [maturity and microbiology of the compost](#).
- Regarding certification and evaluation programs for compost quality, Stumbras recommends referring to the [Organic Materials Review Institute](#) over other resources.

Benefits realized from organic fertilizers and organic matter

Gorra:

- Organic and synthetic fertilizers work in very different ways, and results depend on the expectations of the manager. Gorra compared fertilizers to how humans get nutrients from their diet:
 - Synthetic or mined forms of nitrogen, phosphorus and potassium are the vitamins or pills. They contain more concentrated nutrients and provide fast-acting growth, but do not “feed the soil” and contribute to the other vital components of complete fertility (humus, drainage, bacteria, etc.)
 - Organics are the fruits and vegetables. In addition to supplying nutrients, they provide a multitude of benefits to the soil microbiome.
- The plants might not notice the difference between organic and synthetic fertilizers, but the soil does.
- Costs of organic fertilizers remain comparable to traditional fertilizer costs for Naperville Park District (NPD) sports fields
 - NPD applies organics at lower rates than synthetics due to the additional benefits to soil health.

- Even after periods of high traffic (Rib Fest and large sporting events), NPD's turf has been able to recover and Gorra attributes that to their focus on soil quality and cultural practices.
 - Never had to re-sod parks after high traffic, for the exception of one case after Rib Fest where they aerated too much and that caused a lot of rutting.
 - Due to his cultural practices, Gorra has kept his fields in play after major events by only applying half of the suggested nitrogen amount (suggested 4 lbs N per sporting field).
 - E.g. RibFest brings in 100,000 people over a couple of days. Gorra has been able to recover his fields within 4 to 8 weeks. Never would allow that amount of foot pressure on synthetically grown turf.
 - Now stops aerating a couple of weeks before a big event.
- Thanks to Gorra's work at Knoch Park and community pressure from Non-Toxic Naperville, the NPD has expanded its sustainable/organic parks initiative to [eight parks and 76 acres](#).

Myers:

- Improving the soil with organic matter and compost opens up the soil so water infiltrates down instead of quickly running off into storm drains and waterways. This ultimately increases the [water holding capacity](#) of soil.
- Other benefits of [composting](#) include:
 - Reduced fertilizer need [by 50%](#)
 - Fewer pest and disease problems for plants grown with compost.

Challenges to achieving desirable soil quality

Gorra:

- Managers will need time for the cultural practices of aeration, mowing and fertilization.
 - Not just staff time, but time to ensure equipment operates properly. Gorra's high-end machines, such as the calcite clay aerating machine, require a lot of tune-ups and fixes.
- In addition to the time it takes to aerate and upkeep the machines, other barriers to following a regular aeration schedule include:
 - Dry conditions- aeration not as effective on poorly irrigated lawns.
 - Negative perception of the manager or authority- Many managers fear to aerate because the practice can be destructive to the fields and leaves "debris" on the surface.
- Change perception about different organic products and principles
 - Bacteria not always bad, but beneficial for soil
 - Negative perceptions related to digested products such as biosolids.
 - Is clover a weed?
 - Grass seed companies used to incorporate clover in lawn mixes pre- 1940's due to its nitrogen-fixing properties.
 - Americans started to negatively perceive clover following the discovery of the herbicide [2, 4-Dichlorophenoxyacetic acid](#) (2, 4-D) by World War II scientists seeking chemical warfare agents. The chemical was never used in warfare during World War II, but the scientists did discover that 2,4-D selectively controlled for broadleaf weeds. Later, the US incorporated 2,4-D in [Agent Orange](#) during the Vietnam War.
- "Pick your battles": choose which areas of turf really need to be weed-free, and which don't
 - Base your management practices and weed thresholds on the complaints you receive from residents.

Myers:

- Compost costs money to collect, haul, store and deliver to park grounds.
- Many customers lack the necessary patience for restoring soil quality.
- Landscapers need to ensure that they do not transport invasive species such as [Asian Jumping Worms](#) when applying soil amendments like compost.

Stumbras:

- For Asian Jumping Worms, Stumbras recommends purchasing [thermophilic compost](#) that reach high enough temperatures to kill pathogens, weed seeds and worms.

Research, technical assistance, and/or tools needed to overcome challenges

Gorra:

- If interested in NLC, but only able to gradually introduce these concepts, Gorra recommends to “figure out what you are doing and then do it better”.
 - Analyze the authority’s assets and determine the necessary equipment and staff training necessary to apply the practices you wish to implement.
 - When Gorra started at NPD, he discovered the district was only mowing once every 10 days. His change to more frequent mowing steered the district in the right direction without doing anything drastic. Gorra was, also, able to increase the amount of aerators the district owned from one to eight.

Myers:

- Develop specifications to ensure high soil quality.
 - E.g. City of Milwaukee created specifications for sod installation to avoid “drop-it and run” situations where the newly placed sod never has a chance to establish and excel.
- Find local, reliable sources for compost.
- Before and after picture examples of successful turf and soil restoration projects with NLC, organic and IPM practices likely offer the best solution to the patience barrier.

Stumbras:

- Soil has a way of taking care of the plants that live on it, if it has the resources it needs.
 - Annual, step-by-step planning and improvement of soil fertility, disease suppression and weed control will cost-effectively achieve a resilient soil structure in the long-term.



MGG Lawn & Land Forum Workshop November 13th Policymaking and Community Engagement

Executive Summary

Session topic: Policymaking and Community Engagement

What does an IPM/NLC policy look like? This panel covered the major components to an effective written policy (thresholds, recordkeeping, protocols for choosing strategies/products, etc.), the stakeholders to involve in writing passing and implementing the policy, and how to ensure implementation of the policy after passage.

Panelists:

Ryan Anderson- Ryan Anderson, former Assistant Director and Communications Manager for the Midwest Pesticide Action Center and now the Community IPM Outreach Specialist for the IPM Institute of North America, Inc., leads and implements the Midwest Grows Green natural lawn care initiative. A 2016 National Academies of Sciences, Engineering, and Medicine Christine Mirzayan Science & Technology Fellow, Ryan has extensive experience advancing science-based solutions in urban and residential communities highlighted by his leadership of MPAC's Midwest Grows Green natural lawn care initiative that has recruited 25 pesticide free parks, 30 point-of-purchase retailers and more than 600 pledges. Ryan has a Masters of Sustainable Solutions from Arizona State University and holds a dual bachelor's degree in Biology and Electronic Journalism from Butler University. In this panel, Mr. Anderson covered the environmental and health risks associated with the US lawn and garden sector and the alternatives to conventional lawn care and landscaping.

Allison Neubauer- Since 2013, Allison Neubauer, Sea Grant Educator, has worked on a variety of education and outreach projects at Illinois-Indiana Sea Grant—ranging from conducting aquatic invasive species workshops for educators, designing informational signage about Great Lakes research for the public and staffing booths to inform communities about proper disposal of their unwanted medication. She has a background in environmental science and geography, and a passion for finding the best ways to communicate important water related issues to promote good stewardship of our natural resources.

Amy Joyce- Amy Joyce is Co-Founder/Director of Healthy Communities Project, a local advocacy group dedicated to residential and municipal pesticide reduction and organic turf management education. Since 2001, Amy has partnered with the Village of Whitefish Bay to create pesticide-free green spaces at Buckley, Cahill, School House and Klode Parks. She has trained with organic turf expert Mr. Chip Osborne of Osborne Organics, and has organized several training seminars for land care professionals in the region. She has also



designed several large scale organic management projects for both the Village and School District of Whitefish Bay.

Summary of panelist presentations and discussions: Policy and behavior change requires determination, vigilance and, most importantly, patience. To overcome the inertia to change, Anderson pinpointed six NLC/IPM strategies to prioritize in a turf management program. As Amy Joyce demonstrated, however, implementing these changes in a community or local authority often take years. The most effective NLC/IPM programs exercise transparency and flexibility by incorporating the needs and values of all stakeholders that use and manage the greenspace. Fortunately, programs such as Midwest Grows Green and IL-IN Sea Grant's Lawn-to-Lake Program offer insight, tools and resources to designing and organizing these programs.

This panel was sponsored by [Milwaukee Riverkeeper](#)

Topics of discussion brought up by panelists

Elements of a good IPM/NLC program

Anderson:

- Anderson covered six tips to include in an IPM/NLC program. They were
 1. Set tolerance thresholds (percent weed cover, percent disease/insect damage)
 2. Prioritize fields
 3. Increase aeration
 4. Follow the aeration with an overseed, topdress, or fertilization
 5. Establish a pesticide protocol
 6. Invest in [eco-lawns](#)

Joyce:

- Write specific turf management plans for each green space.
 - No two green spaces are the same.
- Ensure the policy is fair and equitable
 - Joyce found that many of the sporting associations used the fields 80 percent of the time, but only paid for 20 percent of the services in Whitefish Bay.
- Includes all stakeholders in an Ad Hoc Committee of sports associations, parent clubs, non-profits and district officials for reviewing, monitoring, and evaluating the policy and program.

Benefits to establishing a formal IPM/NLC policy or protocol

Anderson:

- Policies avoid ambiguity for how to handle pest or weed management situations or issues
 - Clear guidelines significantly reduce accidents and overuse of products when handling, storing, mixing and disposing them.

- Policies increase transparency between your organization and your clients.

Joyce:

- Joyce first engaged with sustainable landscaping after a close family member developed Non-Hodgkin's Lymphoma, passed away relatively quickly and the family member's doctor inquired about exposure to lawn care chemicals.
 - After, Joyce started noticing the high volume of lawn care application signs in urban Wisconsin, which alarmed her as she rarely saw signs in her rural hometown in Michigan.
- Joyce's current village of Whitefish Bay did not have a formal IPM policy or a licensed pesticide applicator on staff. This led to overuse and misuse of pesticides and herbicides on Whitefish Bay parks.
 - Examples of misuse include Joyce's car being soaked one time during an herbicide application on the median of a road and Joyce observing an applicator hosing pesticide product on a sidewalk that noticeably ran onto the roadways.
- Pesticides have widespread impacts for Public Health, Food/Soil Systems Health and Environmental Health.
- Before the Whitefish Bay IPM/NLC policy, weed and pest control actions were very segmented.
 - Examples include private ball clubs having the ability to apply their own pesticides to Village playing fields, a parent club received permission from the school district to apply a residentially banned pesticide to a park, and TruGreen spraying a park while more than 250 kids played.
 - Joyce did not believe anyone performed these actions intentionally, but they resulted from a lack of communication and standardized policies.

Selecting the most cost-effective, risk averse pest and weed control strategy

Anderson:

- When chemical control is the only reasonable and effective option for pest and weed control, the district should set a protocol for selecting the least amount of the least harmful product, similar to the following:
 - Avoid products with high acute toxicity (EPA label of "danger" or "warning")
 - Avoid products that have possible, probable, known, or likely carcinogens, reproductive toxicants, endocrine disruptors, or nervous system toxicity
 - Avoid products where the soil half-life of all ingredients lasts longer than 30 days (see [Oregon State University Pesticide Database](#))
 - Train staff for application, storage, and disposal of lawn care products
 - Designate an IPM coordinator to determine necessary actions for a pest/weed problem
- Example: River Forest passed a [formal IPM policy in 2016](#) that uses language from Midwest Grows Green IPM/NLC templates.

Approaches to setting tolerance thresholds

Anderson:

- Tolerance thresholds are the density of weeds or pests that a manager can tolerate without having to control for it.

- *Example:* Carl Gorra from Naperville Park District has identified areas in his parks that do not need to be weed free (e.g. tree corridors, greenspace by parking lots, outlier areas from sporting fields).
- Gorra does not apply any product for these outlier areas, pesticides or fertilizers, to conserve and redirect resources and time for more important areas.

Prioritizing fields and planning

Anderson:

- Anderson recommended using weed and pest tolerance thresholds to prioritize management of fields and parks.
 - *Example:* Brett Hebert, the Director of Public Works for the City of Stoughton, tiered his fields and parks into three groups based on tolerance thresholds. The three tiers were:
 - *Tier 1 Fields:* The City will not control for weeds at the site unless weed pressure exceeds 15 percent. Tier 1 sites include destination parks and high use sports fields.
 - *Tier 2 Fields:* The city will not control for weeds at the site unless pressure exceeds 30%. Tier 2 sites include parks frequently trafficked, but not to the degree of Tier 1 fields.
 - *Tier 3 Fields:* Limited or no control for weeds, unless the persistence of invasive species. Tier 3 sites are mostly natural areas and the [Pesticide-Free Veteran's Park](#).

Practices to include in an IPM/NLC policy and program

Anderson:

- Reducing soil compaction stimulates turfgrass root growth and eliminates favorable conditions for many weeds. Plenty of real-world examples demonstrate the importance of aeration, including:
 - Jerad Minnick of the [Natural Grass Advisory Group](#) finding that the majority of the turfgrass problems his organization sees can be attributed to soil compaction.
 - High density of dandelions observed on the highly foot-trafficked areas at Riverdale Park District's pesticide-free parks (Football field, baseball diamond, etc.).
- Anderson recommended aerating sports fields a minimum of three times per year.
 - Prioritize aeration in the spring and fall.
 - *Example:* Kristi Solberg from Park Ridge Park District slices her playing fields once every two to three weeks to reduce compaction.
- Following scheduled aerations, the NLC/IPM policy or program should ensure it continues to build a dense, continuous turfgrass system, which offers the best defense against weeds. Steps to highlight in the policy includes topdressing fields with compost, grass clippings, or leaf mulch, fertilizing organically and overseeding.
 - *Example:* Jeff Swano, owner of Dig Right In Landscaping, Inc. mixes in overseed with compost in the services he provides to homeowner. The overseed fills gaps and thickens the lawn. Meanwhile, the compost stimulates the soil organisms to feed the new grass seed and increases the absorptive capacity of the soil.

Steps for passing and implementing IPM/NLC strategies

Joyce:

- Joyce organized a strong, vocal and grassroots group called the Healthy Communities Project (HCP) in 2002 to push for IPM/NLC change in Whitefish Bay.
- HCP motivated the Village of Whitefish Bay to implement a three-year natural lawn care pilot project at Klode Park in 2006 following a significant amount of advocacy, meetings and information dissemination with board members and Village officials.
- Joyce and HCP recognized that their advocacy and policy work would need to continue further than the pilot project to ensure Whitefish Bay remained on course to reduce their lawn chemical use. Engagement efforts, policy changes and monitoring that followed the pilot project comprised:
 - Developing an automatic notification system of pesticide applications a week in advance with both the village and school district
 - Creation of the Environmental Advisory Committee to oversee the Village’s IPM program.
 - Joyce led a full school district assessment of weed and pest control.
 - Development of an Ad Hoc Green Space Committee after the Village of Whitefish Bay, in 2012, decided to overturn many of the pesticide reduction policies previously passed.
 - Joyce identifies the Green Space Committee as the turning point since it involved all the important stakeholders from sporting associations, village officials, garden club and HCP.
- In 2013, after further public outcry, Joyce and HCP shifted the message and framing of “Pesticides vs. No Pesticides” to demonstrating what proper green space management entailed.
 - The Village had not done the necessary turf management on the intensively used Klode Park to offset the wear and tear. Joyce identified this space as an opportunity to both reinvigorate the green space and demonstrate natural lawn care through the implementation of the Klode Sustainability Project.
 - HCP raised \$5,000 and received board approval in 2015 to start the project.
- To ensure the full implementation of the Klode Sustainability Project, Joyce first ensured that all land managers were properly trained.
 - Joyce trained herself with [Chip Osborne](#)
 - Joyce now shares her expertise by teaching organic gardening, residential and landscape turf care classes.
 - Joyce has, also, motivated municipal grounds crews and school district grounds crews to attend sustainable landscaping conferences, workshops and trainings.

Managing expectations of residents

Anderson:

- Managing community expectations during the transition to NLC/IPM requires the combined effort of businesses, advocates, educational institutions, nonprofits and park and school districts.
- MPAC’s leverages all the needed actors to manage expectations through its [Midwest Grows Green Initiative](#) by spreading the NLC message in three critical areas where lawns influence our lives:
 - [Point of Purchase](#) – MGG assists hardware stores, garden centers and other landscaping stores with eco-labeling their lawn care products.
 - Case study: Greater Chicago had [21 participating retailers](#) in 2018.

- [Pesticide-free Parks](#) – MGG works with park and school districts to demonstrate the NLC/IPM approach to the community.
 - Districts select a site for place-based natural lawn care education that involves signage, posters, press releases and other outreach.
 - Case Study: [Maine Park](#) in Park Ridge, IL
- [Community Engagement](#) – Press releases, newsletters, outreach materials and events
 - Case Study: [Chicago Grows Green Week](#) from May 11th to May 19th involved eight natural lawn care and sustainable landscaping demonstrations in seven days to spotlight pesticide reduction progress across Chicago. Reached more than 70,000 individuals.
 - [Midwest Grows Green Pledge](#) – CGG Week and all MGG work primarily drives individuals to the [Midwest Grows Green Pledge](#) that encourages individuals to commit to reducing or eliminating their use of synthetic pesticides and fertilizers. Includes an associated newsletter that equips homeowners to make the transition to NLC.

Neubauer:

- [Lawn to Lake program](#) (L2L)– Primary goal to inform homeowners and communities how actions done on land affects watersheds
 - Offer resources that encourage the adoption of sustainable lawn and landscape practices.
- L2L highlights simple positive steps and principles that everyone can take to achieve as sustainable lawn. The seven principles stressed are (1) Right plant, right place, (2) Fertilize appropriately, (3) Manage lawn pests responsibly, (4) Water efficiently, (5) Compost, (6) Attract wildlife and (7) Reduce storm water runoff.
 - *Example:* L2L’s [“Don’t ‘P’ on your lawn”](#) educated the public on dangers of phosphorus pollution.
- L2L resources match the diverse needs, interests and backgrounds of homeowners, landscapers, businesses and local authorities:
 - [Lawn to Lake Guidebook](#) – Background information on the science behind these principles
 - [The Lawn to Lakes website](#) contains concise brochures and factsheets.
 - [Materials for retailers](#)
- L2L Community outreach events include interactive and hands-on activities that leave a lasting impression. The audiences that L2L connected with in 2018 include:
 - Schools and families:
 - Case Study: L2L attended BugFest hosted by Fox Valley Park District in August 2018. While the event targeted kids, L2L had access to parents and talked to more than 200 individuals.
 - Train the Trainer:
 - Case Study: The University of Illinois Extension offers [Master Gardener trainings and courses](#) across the state. The reach of L2L expands two-fold by offering sustainable landscaping resources and training to this network of Master Gardeners, because Gardeners must voluntarily share their knowledge to the public to complete the course.
 - Used an enviroscape model of a watershed’s topography to simulate storm events, pesticide runoff, and other environmental problems.

Joyce:

- HCP’s work benefitted significantly from the green/climate change advocacy movement, which drew attention to issues such as pesticides.

- Before the green movement, Whitefish Bay would observe a trend where a pesticide misuse incident would occur leading to public outcry and then taper for a couple of years before returning.
- Joyce found that the public concern for the Klode project and NLC disappear over the years of implementation. She attributes this to shifting the message to “let’s just take care of the greenspace.”
- If talking with park and school district boards, ensure that you understand the issues and basics to have high-level conversations with decision-makers.

Challenges in the implementation and improvement of IPM/NLC

Joyce:

- Costs and raising funds
 - Joyce needed to identify and ask for funds from anyone willing to donate.
 - The Village of Whitefish Bay invested only \$1,000 a year in TruGreen services to manage a 5.7 acre Klode Park. HCP needed to figure out how to reallocate those funds and raise more to accomplish a long-term sustainable turf management project.
 - To refine the turfgrass management plan, Joyce pulled all the stakeholders together and secured donations to expand the Klode Park turf management budget, a commitment from the garden club to hand weed garden beds and seeding and compost services from school district staff and machines.
- Village and/or School District inexperience with turf management.
 - “Bring something to the party”- Joyce helped both her Village and School District plan for turf management on her own accord. She cautioned to not assume that your local district knows what they are doing.
- Advocacy work is hard and change does not happen overnight.
 - Stay persistent with advocacy, monitoring and community engagement.

Research, technical assistance and/or tools needed to overcome challenges

Neubauer:

- IL-IN Sea Grant has rebranded the Lawn to Lake program and will refresh materials for 2019. Some new plans include:
 - Localizing fact sheets to include pollution data, sustainable landscaping programs and services and other unique information for each watershed in Illinois.
 - Grant partnership with the University of Illinois Extension to hold market research surveys and focus groups to improve and tailor L2L resources.

Joyce:

- Created her own Organic Turf Management Tool Kit that includes reputable research and resources on the environmental and health effects of pesticides, best practices for NLC, tips for identifying important stakeholders in the community, funding opportunities and an overview of proper recordkeeping, surveying and adjustments.

Issues briefly covered and to address in future sessions

Eco-Lawns

Anderson:

- Eco-lawns present the next solution to low-impact landscapes by using microclover as its base. The clover cycles and fixes nitrogen so the lawn manager can use less pesticides, fertilizers, and water to maintain.
 - MGG Plans to install eco-lawns at [GlennArt Farm](#) in the Chicago Austin neighborhood and Riverdale Park District's Cooper Park in 2019.

How do we incorporate and value the pesticide reduction goals of urban land management in Natural Space Management without taking a critical tool away (i.e. herbicides for invasive plant control)?

Audience:

- Charlie Koenen talked about how he works with City Councilors to both write the policies and then ensure reasonable exemptions are made for trained professionals (e.g. beehive location placements in Milwaukee).

Joyce:

- Views the question as comparing apples and oranges. Management is different for natural spaces, but would recommend adhering to the IPM protocol.
 - The natural area manager should communicate clearly needs for these tools if a municipality passes a blanket policy that restricts necessary herbicides for invasive control.
- The individual that asked this question clarified that it referred to a specific problem with Whitefish Bay's pesticide restriction policy that did not allow him to establish a native prairie by standard protocol.
 - Joyce, a member of the Whitefish Bay Garden Club that established the policy, knew about the issue that he referred to and thought it was a manner of clearing up the policy for natural areas.
 - For the Emerald-Ash Borer control, Joyce recommended to the Village to switch from imidacloprid, a neonic, to the less systemic insecticide of [ArborJet](#)

Anderson:

- Highly recommends exercising transparency for the products applied in natural spaces
 - Anderson worked with the City of Evanston to develop a report that covered all the pesticides used across the City. This report improved community understanding of the ubiquitous use of these products and clarified that the City and other local organizations value protocols and policies when making application decisions.
- Does not have expertise in natural spaces, but offered an alternative to glyphosate in [FinalSan](#) for turf management. More costly and not as effective, but natural and low-risk.

Do some authorities in Wisconsin call and/or encourage the reduction of pesticides by private users

Joyce:

- [Preemption](#) in Wisconsin prohibits local authorities from enforcing stricter regulations of private pesticide use than the State. Best option is to implement NLC on public properties and educate the public.

MGG Lawn & Land Forum Workshop November 13th Cost Factors

Executive Summary

Session topic: Cost Factors

Attendees broke into four break-out discussions to take a deeper dive in to the different factors and decisions that influence the costs of an IPM/NLC policy or program. The four groups were:

- *Engaging Decisionmakers*- For many, the boards or elected officials of park districts, school districts and municipalities make the decisions to pursue natural lawn care or IPM. This break-out discussion looked at best approaches to engaging boards and/or elected officials in NLC and IPM policies. Dr. Tom Green provided the case study of his work with schools.
- *Cultural Practices*- Employing good cultural practices of aeration, overseeding and mowing will grow strong, resilient turfgrass to control and outcompete weeds and pests. However, what does the man-power and equipment costs look like for good cultural practices? Kristi Solberg provided the case study of her work with the Park Ridge Park District.
- *Products*- For the most part, organic products are more expensive than conventional. This discussion covered options to incorporate organic products under tight budgets. Carl Gorra provided the case study of his work with Naperville Park District.
- *Managing Community Expectations*- As service providers for residents and communities, park and school districts have an inherent responsibility to satisfy the needs and wants of these stakeholders. However, a transition to natural lawn care does not happen overnight and the risk of weed or pest outbreaks is a possibility. This break-out discussion covered the strategies to manage these public expectations, so the district avoids the social and economical costs of applying a pesticide or fertilizer product. Amy Joyce provided the case study of her work with Whitefish Bay.

Break-out Discussion Procedure: Each discussion began with a practitioner who briefly shared with the group the cost decisions for a case study relating to the discussion's topic. After the case study presentation and the group had time to ask the practitioner questions, the discussion leader for each group broadened the scope by developing a Strengths, Weaknesses, Opportunities and Threats Analysis ([SWOT Analysis](#)) for the topic. The leader recorded the SWOT analysis for their respective groups and presented the analysis to all attendees at the end of the session. Please see the full SWOT Analyses in the section following the Executive Summary

Take-away points: When presenting the SWOT analysis from their break-out discussion groups to all attendees, the discussion leaders were asked to share three take-away points. See below for the take-away points for each group:

- **Engaging Decisionmakers**
 1. Non-profits and programs similar to Midwest Grows Green (MGG) can support efforts to engage decisionmakers in NLC by compiling and providing more hard data, specifically as it refers to costs of NLC versus conventional lawn care.
 2. Advocates should emphasize that NLC does not necessarily reinvent the wheel in their conversations with decisionmakers. Many others are making progress with sustainable landscaping and can serve as examples.
 3. Local authorities frequently place turf management as a line item in their annual budgets, but rarely include it in their long-term planning. This needs to change to allow for NLC programs.

- **Cultural Practices**
 1. Ensuring proper cultural practices of mowing, aeration, soil testing and overseeding can grow thick and dense turfgrass cost-effectively.
 2. The benefits or risks avoided from switching to NLC practices affect the community, district staff, and environment.
 3. Start-up and labor costs can decrease if the authority allocates time to getting all stakeholders on board with the transition (i.e. staff, sports associations, residents, etc.)

- **Products**
 1. Spraying only the play areas of fields and increasing cultural practices in other areas and parkways can offset the high initial cost of quality organic pesticide products.
 2. Feeding the soil with quality organic fertilizers increases the health of the soil and reduces weed and other invader presence.
 3. Advocates can leverage recent trends in public opinion and objection to toxic pesticides, such as RoundUp, to help change the common mentality that routine, broadcast spraying is necessary.

- **Managing Community Expectations**
 1. Develop an understanding of the stakeholders involved in the management of park and school land, the money or assets they contribute to management and the values they view as most important to uphold. Use this understanding to create a targeted communication plan.
 2. Build a strong and informed base of volunteers to educate the community.
 3. Combat indecisiveness or uncertainty by improving communication both internally and externally. Often institutions do not know all the landscape management practices that they or their neighbors apply, especially with large communities or organizations. Holding reports, stakeholder meetings or public hearings can help ensure the “left hand knows what the right hand is doing.”

This work was sponsored by the [IPM Institute of North America, Inc.](#)

SWOT Analysis

Engaging Decisionmakers

Strengths:

- Individuals at all levels, institutions and communities work to make positive changes and can help move NLC policies and practices forward.
- Plenty of NLC examples from other cities, parks and schools implementing IPM/NLC.
- NLC, IPM and sustainability is focused on working smarter, not necessarily harder.

Weaknesses:

- Majority of park districts, school districts and municipalities work under tight budget constraints
 - E.g. Despite inflation, Milwaukee County Park's budget is [less than 80 percent](#) of what it was in the 1980s.
 - Local authorities tend to approve the budgets on a year by year basis, preventing the long-term planning necessary for NLC and IPM
- For many institutions and communities, an internal inertia exists against sustainable landscaping.

Opportunities

- Do not need to reinvent the wheel- plenty of resources and examples of BMP's available for NLC and IPM.
- Organic and NLC tools and products are becoming more readily available and affordable.
- Public opinion and perception towards toxic and conventional products is changing
 - Recent glyphosate trails and neonicotinoid news triggered passionate responses from the public.
 - Market research indicates that younger generations are more environmentally-conscious than older generations.
- Practitioners and researchers have realized NLC and IPM cost savings in [three to five years](#).

Threats

- Costs for organic products remain high despite reducing in price over the past decade.
- Geographical context- Many communities in the Midwest live near farms where pesticides are used ubiquitously and frequently.
- Cultural context- weed-free, green lawns are ingrained in the majority of communities.
 - One attendee shared a story that a resident applied a weed control product for a park district without charging the district to keep the space "presentable".
- Advertising for conventional products and practices continues to be pervasive.

Cultural Practices

Strengths:

- Once management achieves high turf and soil quality, costs significantly reduce
 - Soil tests are affordable and provide a lot of essential information to accomplishing desired soil quality characteristics.
 - Thick and dense turfgrass plots eliminate a lot of favorable conditions for weeds and pests.
- Equipment, such as propane mowers, have become cheap and affordable.
 - While not all organics can be treated the same, an organic fertilizer with high energy content (32-3-0, 16-0-12) will remain as effective as traditional products and not need more applications

Weaknesses:

- High start-up costs, especially for areas previously dependent on conventional products and practices.
- Increasing cultural practices requires more labor.
 - Need to train staff in these technical practices of aerating, overseeding and composting.
- Organic or reduced risk herbicides often take more applications for effective control.
 - E.g. Fiesta recommends applying the product twice within a three week period for optimal results.

Opportunities

- A lot of land for pilot projects and experimenting (40 million acres of turfgrass in the US)
- Communities and local authorities are starting to share their NLC/IPM experiences and ask for help from their neighbors.
- Opportunities to engage and educate younger generations (i.e. in schools)
- Grass can successfully grow under NLC controls and practices even on non-optimal soil types.

Threats

- “Big Chemical” company interests still seem to control the dialogue for turf management.
- Need to receive initial buy-in from employees
 - Keep it easy when sharing information and practices for NLC and IPM.

Products

Strengths:

- Small cost difference between organic and synthetic fertilizers
- Healthy, resilient grass will result from nurturing healthy soil.

Weaknesses:

- Many authorities face staff turnover, retention and shortage problems.

Opportunities:

- Recent trends in public opinion and news stories
 - The public response to such stories as RoundUp and its link to non-hodgkin’s lymphoma puts pesticide issues to the forefront of the public dialogue and facilitates opportunities for change.
- Offset high initial cost of quality organic products by picking and choosing battles.
 - Focus on play areas.
 - Increase mowing and other cultural practices at sites outside of play areas to offset costs of spraying every inch of the park.
 - Only use spot spraying.
- By maintaining and feeding healthy soil the manager can avoid the need for herbicide, grub control, and synthetic fertilizer.
- Organic fertilizers are only ~\$100 more than synthetic, conventional products.

Threats:

- Change the perception the frequent, broadcast weed control spraying is necessary
- High initial cost for organic pesticide products

Managing Community Expectations

Strengths:

- Building strong partnerships will reduce costs.
- Certain NLC practices such as selecting better turfgrass varieties will reduce water, pesticide and fertilizer needs.

Weaknesses:

- Effective community engagement can be a time and energy suck.
- Many neighborhoods face turnover in leadership creating a challenge to preserve knowledge and directives.
- A lot of community engagement strategies rely on unpaid volunteers
 - E.g. Whitefish Bay depends on efforts from its garden club to help with management of pesticide free parks. This model may not be sustainable over time.

Opportunities:

- Dig deeper for intersectionality and collaboration within and outside institutions.
- Partner with institutions that credit or value volunteering (e.g. service hours at schools)
- Keep detailed and accessible records and resources for continuing IPM/NLC efforts.
 - Website or online database of products and practices applied.
- Emphasize issues that the community values in communications and outreach
 - Discuss how pesticide reduction protects bees and other pollinators.
- Encourage local authorities to participate in trade association workshops/conferences, present their practices in front of the community and other professional development opportunities.

Threats:

- Terms and buzzwords can confuse community members
 - E.g. Many people believe that the word “pesticide” only refers to products that kill or repel insects. These individuals will often believe that they practice “Pesticide-free” lawn care, even if they apply herbicides.
- The individuals that want pristine, weed-free lawns are often the loudest when it comes to landscape management discourse.
- In some communities, the population pushing for pesticide-free land care is aging (e.g. Whitefish Bay Garden Club).