

Does going Green SAVE YOU GREEN?

Editor's note: The author dedicates this article to Kevin Trotta, who has paved the way for him and many other sport turf managers in environmental stewardship. Kevin was taking responsibility for his own actions and leading the way for the past 20 years, long before most of us ever heard of the environmental issues we are facing today.

▼ **A bermudagrass field** the author sprayed at St Mary's College of Maryland with Revolver herbicide to take out the ryegrass for winter play; it also controls other grassy weeds and can reduce the amount of product you apply.

The question I get asked often is, Does going green with an Environmental Management System (EMS), is does is save money in the short or long-term? This is a loaded question and one that needs to be looked at by an environmental committee within your organization; first to determine if cost savings can be made and ultimately, if you should get started on an EMS.

The first thing the committee will do with an EMS proposal is conduct a benefits analysis and return on investments (ROI) analysis from practices. A few examples of areas that will need analyzing before determining budgetary implications of an EMS is the practice of reducing greenhouse gasses, recycling and storm water runoff. There is a chance these areas in particular could cost your operation budgets 25%-50% more per year.

The term I use for these possibilities is called unintended financial consequences (UFC). So, how can you formulate an EMS plan that works for you and is cost effective for your budget?

You might already have an environmental committee in place within your organization, but if not, it might be a great time to form one. With all the pressures of today to do more with less and the community pressures of being more sustainable, a committee will be able to bring together ideas and initiatives that build the buy-in from your senior administration and stakeholders. You can really call your "green team" anything you wish, but it's commonly known has a sustainability committee, or an environmental committee. The next thing is who should be on the committee? To have a dynamic and functional committee, there needs to be folks on the committee that can make sound decisions for the direction your complex wants to go environmentally while taking into account master planning or a direction of goals that your facility is working toward.

The folks that make these decisions for this process are typically your stakeholders. The next person at the table should be your financial person; he or she can help aid in the process of offering cost analyses for sustainability investments with an ROI, but this won't work unless the team has the right technical areas represented to provide the



▲ **Above Left:** An example of a naturalize area out of playing area. **Above right:** Spraying an iron-based, environmentally friendly herbicide on the main campus lawn at Vassar.

critical data for the analysis. Your financial representative will use the technical aspects from you and other team members from other trade departments to see if it is first feasible and second if it will work within your organization. Once this process is complete, the decisions rest on the stakeholders to see if they wish to invest in the idea(s).

So far we have three key members: a finance person that can determine cost analyses and baseline for a (ROI), the turf manager, and other trade department(s). We've also have taken the time to see if our planned efforts can work efficiently and productively and is of value to the stakeholders. Once the investment is approved, the next item to consider that can be a contributor to the success of your team and program, is to promote your EMS program through your webpage, local papers and signage throughout your facility.

So, assuming we have all the above criteria in place and we have the green light from our organization and stakeholders, where do we go from here? We kick off our solid EMS program. Luckily, the STMA has many hard working folks on the environmental committee that have already taken care of many of the components to this phase for you. The STMA Environmental Facility Report Card in particular will be of use. This report card developed has a very detail environmental property assessment for your facility environmental deficiencies or efficiencies.

THREE CONCERNS

Recycling: When we recycle we're conserving our natural resources, i.e. water, energy, timber and minerals. These ingredients are items we use every day and need to recycle so as to not deplete them for the generations of tomorrow. Most of us have a recycling program within our facility these days.

Storm water management: The first half inch of storm water runoff is the most crucial to slow down. Sheet water movement from impervious surfaces that carry unwanted nutrients to our local water sheds is the most concerning. The key is to slow down rapid storm water runoff with the first half inch of rain fall, some ideas you may want to incorporate for your facility is later discussed in a key chart with an EMS program.

Take a look at your local rain averages so can predict when most of your rainfall occurs and which are your heaviest months in your local areas. Then install precaution measures of secondary containment to avoid spills from oils, gases, pesticides, fertilizers and detergents that can be carry off from heavy rain events. Storm water runoff are sediment oil, grease and toxic chemicals from motor vehicles, pesticides and fertilizers, sewage runoff, road salts ,heavy metals from roof shingles, motor vehicles and other sources and thermal pollution from dark impervious surfaces such as streets and rooftops.

Greenhouse gas: Do you remember back in the eighth grade when your science teacher was explaining sunlight by using the term electromagnetic radiation? These are known as short solar radiation waves; like tossing a pebble in a body of water i.e. the waves are very close to each other. Now remember Newton's third law "for every action there is an equal or an opposite reaction." The incoming solar radiation that is heating up ground surface is called infrared radiation i.e. the sunlight beating down on turfgrass or trees can absorbed some of the solar radiation waves and gives a cooling effect, but when you walk barefoot on asphalt or concrete it is twice as hot and you can actually feel the heat coming off of the surface. Infrared radiation is a long wave. This is like throwing a big rock in a body of water i.e. the waves will be much further apart. These are waves of electricity that are longer than visible light, but sorter then radio wave.

The word infrared means below the color of red and red has the strongest wave length that the human eye can see, but infrareds cannot be seen with the human eye. Infrared heat cameras can locate warm objects at night like buildings, motors of cars, warm blooded mammals by the heat they give off. This type of radiation wave shoots back into outer space aiding in the earths cooling process much like greenhouses do with its window open allowing hot air to escape into outer space. The earth has natural insulation called the atmosphere that is made up of several gases i.e. water vapor, fluorinated gases, and carbon dioxide, methane, and nitrous oxide and aerosol gases. A good analogy to give you a visual is that it's like the dust in the air from the sunlight beaming its rays through your widow, now imagine all those dust particles were gases in the atmosphere, this is what keeps us warm and provides ideal temperature for all thing to live and grow on earth. The problem is when the infrared radiation is bouncing off the earth; some of it is getting trapped in our atmosphere which could result in prolonged hot weather events.



▲ **Top:** Storm water used for sports turf. **Bottom:** The grounds crew pre-treating campus roads with a salt brine.



▲ **Top Left:** Crew member applying fine fescue under all of our shade trees. **Bottom Left:** Vassar crew member applying compost on beach that is used for recreation sports and events. **Right:** This is a rain garden to capture the runoff from the field in background a St Mary's College of Maryland.

According to the EPA, the main greenhouse gas pollution abundances is carbon dioxide is from electricity, transportation and agricultural. We can reduce this from being efficient with our energy and fossil fuels and of course turfgrass and trees in landscapes will aid with the cooling effects.

PROPERTY ASSESSMENT/EVALUATION

Once you have your areas of environmental concern that your green team wants to address for your facility, develop an assessment program through a detailed plan of your complex assessment report. You can start by breaking down each part of your property described below.

Inventory Program:

■ Exterior landscape. How many acres of athletic fields and common lawns do you have and what cultivar of turfgrass do you have? How many different types of trees and shrubs do you have and are they inventoried?

■ Exterior paving: How many areas or square feet of sidewalks, parking lots and roadways do you have?

■ Interior. How many buildings do have, including your grounds shop within your complex and what type fuel source do they use? Inventory all vending machines, bathrooms, unoccupied rooms, and naturally lighted hallways and every incandescent light bulb that can be changed out with an LED light.

Turfgrass Program. Dr. Dave Minner from Iowa State has three classifications of lawn maintenance examples he used to develop programs on a budget for stakeholders and sports turf managers. I love this concept because you can let the stakeholders know exactly what to expect without any repercussions or the sports turf managers because the bar is already set for the facility expectations. The three examples:

High End turfgrass program. This is high-level maintenance and will require multiple pesticides, topdressing, fertilizing and overseeding applications and aeration. The cost could range from \$0.10 - \$0.15 a square foot based on the expectations of your facility.

Medium program. This is a good quality turfgrass program; however, it is based on a strict budget with minimum applications of pesticides and fertilizers.

Low End program. This program is basically mow and grow with no pesticides and fertilizer applications.

You should already know which one you belong to. So, what environmental concerns or local community issues are you facing? Again, keep in mind nutrient and heavy metals runoff off from fertilizers and pesticides (depending on what type of products you are using) and lastly the amount of greenhouse gas you're producing from your equipment to maintain it are factors.

Using safer alternatives like KeyPlex, phosphites and microbial soil products in your rotation for disease control or just by themselves can aid in a ROI for turfgrass program. You might want to consider some of the new improved zoysia and Bermuda cultivars, if you are in or just a little north of the transition zone. If your first frost date is after your fall season of play, installing a warm-season grass for your athletic field or common areas might be a good decision. Your ROI could save money from fewer pesticides comparable to cool season turfgrass cultivars. Your EMS could showcase reduced amounts of nutrients and metals from storm water runoff. Also, showcasing your integrated pest management (IPM) efforts along with ET irrigation; using a weather station for efficient timing of pesticide application and water conservation could add to your EMS program.

Having naturalized areas could reduce costs from \$.04 - \$.10 a

square foot, based on your program per year for equipment, fuel, pesticides and fertilizer cost.

Fiestas (Fe) for broadleaf weed control or liquid corn gluten for pre-emergent control are costly and have to be repeated a couple of times to get maximum control. Have a program using 100% organic fertilizer works well and gives you the biggest bang for the buck, but it does require a lot of product due to its low N-P-K percentages. All of these products will have less environmental impacts on our ecological system and watershed, but do not come cheap and will definitely not have a comparable ROI compared to conventional pesticides and synthetic fertilizers; however, is a great tool for your EMS.

STORM WATER MANAGEMENT

Recycling storm water is a sustainable way of managing your storm water runoff that is collected from your facility drainage collecting systems. Collecting and reusing rainwater and recycling it for supplemental irrigation and gray water for washing equipment and toilet water can bring an ROI with thousands of gallons saved from the water meter.

Vassar College started using salt brine this past winter to pretreat our campus roads to reduce the amount of rock salt we using that could cause harm to our local watershed. We went with a 2-1 mixture of dissolving calcium choroid pellets to a gallon of water to make our salt brine. We found a great savings last winter from doing this and a 30% reduction on rock salt.

Trees help tremendously with erosion control, uptaking storm water runoff, and also from the photosynthesis process carbon/oxygen exchange. But it can also come with a costly price for certain sections of your property, if your trees are near power lines, buildings, parking lots etc. Trees can have a place for any sports turf manager's property, but they can also be in the wrong place, causing potentially hazardous conditions to life and property. I am not biased against trees or say they're not a great tool for your EMS system, but the facts show that from 1992-2007 the national average of fatal accidents related to tree maintenance is at 80 deaths per year. The national average cost from property tree damage from storm events is more than \$1 million a year; I don't think turfgrass causes that much destruction and yes, I know am going to pay for that comment (lol).

Trees placed strategically on your complex can be a suitable tool for your EMS, but does add maintenance. The average cost to maintain a tree has several variables, but let's just say that an average tree costs \$300 for maintenance and the canopy takes up 2,500 square feet. Using this example, the average cost is \$.12 a square foot, but you also have to add in additional indirect costs for items such as for shade tolerant grass seed cultivars and additional fertilizer cost for your turfgrass budget per tree.

Calculating storm water runoff from non-pervious surfaces can be challenging, and is influenced by several factors like pave surfaces or soil profile. A website by the State University of New York College (SUNY) of Environmental Science and Forestry University has one of the best storm water calculating tools. One topic is shows is that the capturing of 75%-85% of storm water runoff by installing rain gardens could help prevent flooding, high pressure currents in streams from downpour and reducing environmental problems for storm sewer systems.

Two details from that website: The first is that it calculates the percentage of storm water that is infiltrated within your athletic fields and common lawns areas, based off of your soil analyses and square feet. It also shows how much percentage of storm water runoff you are generating. The second tool is the amount of impervious surface you have in square feet and the amount of storm water runoff you might have from your site's roof tops, parking lots, sidewalks, tennis courts, roadways, etc.

Rain gardens do not bring in an ROI. In fact, they cost more than lawns do per square foot. The average cubic yard of mulch costs \$18 and there are 25.96 of cubic feet in one yard of mulch. National prices of mulch per yard vary, so let's do \$18 per yard as an average divided into 25.96 equals \$.069 a cubic feet at 1.5 inches deep. Now take your labor hours for weeding and watering the perennials, shrubs and trees that make up your plants for your rain garden during drought years and your labor hours will show as a deficiency.

GREENHOUSE GAS REDUCTIONS

Energy performance is becoming the buzz phrase for the last decade because it brings a substantial ROI with it. There can be short- and long-term goals for your infrastructure to reduce your energy consumption for your EMS and have a tremendous yearly savings from your energy bill. With all of us having to do more with less these days, this is the first place you could start. I put together a list of ideas that you may want to apply:

Lighting. Motion sensors for bathrooms, unoccupied rooms and vending machines lights; replace LED lights and exit sign from your currents system and installing dimmer switches for areas of your buildings hallways, entranceways and offices that produce enough sunlight for safety.

Insulation. Windows, doors, pipes and water heaters.

Heating. Regulated thermostats, waste oil heaters for shops (if you don't produce enough oil, have your commonality drop their waste oil off for you to showcase your sustainable efforts).

To manage the amount of emissions we generate into the atmosphere from our equipment, Tier 1 was introduced back in 1996 for diesel engines over 50HP and in 1998 for diesel engines less than 50HP. Tier 2 and 3 were introduced in 2000-2008 with even tougher regulations. The toughest regulation was passed under the name of Tier 4 in 2004 and later was phased in around 2008 – present, with the goal of all new manufactured diesel engines to have a reduction of 90% nitric oxide and nitrogen dioxide (NOx) and particulate matter. This is costing the manufacturing companies a lot of money to be in compliance and in return we the consumers are paying for these costly changes being mandated by the government agencies.

RECYCLING

Trash. You can reduce your trash bill and save a small percentage from going with single stream recycling, if your waste removal contractor offers it. This also reduces the amount of greenhouse gas from less carbon dioxide from garbage trucks traveling to pick up waste from your facility and the methane gas generated in land fields. The only thing single stream does not allow is food or wood, but some food



Kevin Trotta



Dean Graves, CGCS, left, and Dr. Dave Minner, two of the author's mentors

waste products could serve as a nitrogen source and the wood could serve as a carbon source for making your own compost to aid in your less desirable soil profiles for your complex.

Metal. The average cost of metal these days is \$.10 a pound. I recycle all my metal and take it to the local scrap yard a few times a year and have a cookout for the crew to show appreciation and aid as a motivation tool. You can be surprised by how much scrap metal you can accumulate.

Yard waste. This type of waste can aid for your composting efforts and reduces the need to burn.

Take your entire EMS plan and add up all your ROI'S and UFC

on 1, 5 and 10-year programs with short and long term goals. The cost savings could help with extra funding an area that your facility might be currently having deficiencies in or maybe it can roll over in a budget for new equipment or capital expenses etc. With your committee try to forecast your potential savings by comparing your monthly expenses from all of your facility budgets and determining what the savings could be used for to strengthen your company's goals and objectives. ■

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