

**friend.** While this can be hard to deal with, as people generally want to be liked, it is more important that you are the boss. It is important that you stand up for everyone, and don't allow yourself to be taken advantage of. However, respecting everyone is essential. This doesn't mean you can't actually be friends, just be as impartial as possible to avoid accusations and unnecessary conflict.

**Take careful notes of issues.** Keeping detailed notes will allow you to see when patterns in behavior appear, as well as to follow a progressive plan of discipline. For me, this is done by keeping a file on each employee in a locked cabinet in my office. If something happens, I simply jot a note and drop it in the file. It may turn out to be nothing, but if it escalates, I have it covered. This is a great help when it comes to doing annual reviews. What you think you will remember in June is a distant memory the following April.

**Be consistent with discipline.** If you don't have a company policy/plan for discipline, create one and stick with it! An example is:

- 1st offense: coaching
- 2nd offense: written reprimand
- 3rd offense: 1 day suspension
- 4th offense: 3-day suspension
- 5th offense: termination

Each issue, from attendance to how to handle equipment, should be discussed with staff upon hiring. Rules should be well known to avoid the excuse of "I didn't know I couldn't do that".

**Always discipline in private.** While general statements can be made to the entire crew, keep actual discipline and details private. This is essential to keep respect between you and the staff. No one wants their dirty laundry broadcast on the news.

**Always remember the Golden Rule.** Treat others as you wish to be treated. This is huge. Staff will almost always respect you if you respect them. Remember that their lives don't revolve around the job. They have families, friends, pets, etc. Be aware that if someone is having a bad day, it may not be related to work. While issues need to be addressed, allow some wiggle room for when things may take a turn for the worse. Make sure to offer assistance programs if they are available through your organization. Sometimes everyone needs a little help.

**Lead by example.** You can not expect someone to do something that you yourself aren't able or willing to do. While you don't have to be Superman/Woman, you have strengths and weaknesses too, showing staff that you can do the job goes a long way to gaining respect. When staff knows what you understand and are capable of doing the jobs they do, they tend to do a better job themselves.

There are many ways to manage. Take the time to find your style, all the while remembering that people have their own way of learning, so be flexible.

And one last thing: never be afraid to ask for help. Someone you know has probably had the same staff issues you are dealing with, and will be able to help you figure it out. So join your local STMA chapter and talk to your co-workers. They are an invaluable source of information. ■

*Sarah K. Martin, CSFM, works for the City Of Phoenix, Parks and Recreation, Special Operations Division and the Reach 11 Sports Complex.*

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The screenshot shows the SportsTurf website with a navigation bar including links for Facebook, Twitter, YouTube, Email Newsletters, Article Archives, and Go Digital. The main content area features several articles and sections:

- News and Features:** Includes links for Articles and Archives, Digital Archives, News, Products, and Personnel News.
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- Other articles:** "Synthetic fields: end-of-life issues: How do you evaluate an older field? What's the next step?" and "Senior project is a Diamond in the Rough".

# 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.

**T**he question I get asked often is, Does going green with an Environmental Management System (EMS), is does it 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 naturalized area out of playing area. **Above right:** Spraying an iron-based, environmentally friendly herbicide on the main campus lawn at Vassar.



# John Mascaro's Photo Quiz

Answers from page 19

John Mascaro is President of Turf-Tec International

This photo was taken June 1 and these brown lines are bare spots are a result of spring traffic. What you are looking at is early morning tracks from where the college football team crossed over the bermudagrass practice field during spring practice to use the synthetic field located on the far side of the photo. Very early each spring morning, for an entire week, the coaching staff drove their cart across the same area. You can also see the team's footprints on the right and an area where they ran some offensive drills off to the left. The sports turf manager assumes the drills took place because he was not yet at work on the day that this took place. The sports turf manager pondered for several weeks why the bermudagrass was so worn out and how it got so thin in such a short

period of time. Then he remembered during that week they had early morning mild frosts on the ground and the constant foot and cart traffic combined with the frost eventually killed the turf. Over the next 60 days, they performed five core aerifications and weekly .25lb nitrogen fertilizations along with bi-weekly applications of a growth regulator. By the first week of August, 95% of the damage was grown over. This is a perfect example of the importance of educating coaching staff and players about the potential for frost damage during light frost events..

*Photo submitted by Jon Hall, sports turf manager at Hampden Sydney College in Virginia.*



If you would like to submit a photograph for John Mascaro's Photo Quiz please send it to John Mascaro, 1471 Capital Circle NW, Ste # 13, Tallahassee, FL 32303 call (850) 580-4026 or email to [john@turf-tec.com](mailto:john@turf-tec.com). If your photograph is selected, you will receive full credit. All photos submitted will become property of SportsTurf magazine and the Sports Turf Managers Association.

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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.



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

### 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 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 at 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 accents 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 ROIS 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. ■

*Kevin Mercer, LICM, CSFM, is grounds manager at Vassar College, Poughkeepsie, NY.*

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# Snow & ice removal: *are you up to the challenge?*

**T**he removal of snow and ice during winter months in North America can be some of the most difficult and stressful work many of you will manage throughout the year. Challenges to this work include managing a crew or number of crews, large storms with significant snow and/or ice, fatigue from long hours, and hazardous conditions for both employees and patrons/visitors to the location. Finally, you may be asked to tackle these problems all while staying within or below budgeted constraints. Even with budget considerations, snow and ice management at your facility must be examined with the overall goal in mind; maintaining a safe environment for pedestrians and vehicles, allowing people to go about their daily lives and limiting risk for your employer.

Before going head on with a storm, a number of items should be evaluated to ensure you are making informed decisions that will work with your budget and with the desired outcomes specified above.

## IN-HOUSE VS. CONTRACTED WORK

You may have already made the decision to do all the work in-house, not subbing work out to professional snow and ice management companies. Either way, there are some pros and cons by each method, and some things you should take into account:

### In-House

Pros:

- More control over crews/timing of removal
- Possible cost savings, but only if your crews are properly trained

- No outsourcing of risk to a third party
- No contracts to sign with a third party
- No bidding procedures

Cons:

- You must have proper equipment, and more importantly back-up equipment in case of equipment failure
  - Purchasing of de-icing or anti-icing materials must be made in advance for at least portions of the season, ensuring you do not run out mid-storm
  - Implementation; you must coordinate one or more crews, ensuring you are adhering to all state and federal laws governing this type of work
  - Training; you are responsible for proper training and planning for snow and ice events
  - Potential of property damage that your employer will be responsible for repairing
  - You will be responsible for monitoring the weather and determining the needed staff/equipment is prepared
  - Added risk if safe conditions are not provided for patrons of the grounds (exposure to slip and fall claims)

### Working with a contractor

Pros:

- You are hiring a specialist to do the work, so you don't need to be the expert. Questions to ask include; is the contractor a Certified Snow Professional? Are they a member of the Snow & Ice Management Association?





■ Long term may result in possible cost savings for the organization if you form a strong relationship with a solid, dependable contractor. Locking in a good contractor for a 2- or 3-year contract with defined costs will make budgeting for snow & ice much easier.

■ Risk management; if you hire and sign a contract that defines the relationship between you and the contractor, it will outline specific guidelines of who is responsible for what, meaning a certain degree of risk will be passed to the contractor. This could be a key factor in cases of slip and fall claims or property damage claims.

Cons:

■ Loss of some control

■ Hiring/bidding process can be time consuming

■ Costs can be high depending on pricing structures, amount of winter weather, etc.

■ If or when you decide to outsource all or portions of your snow removal operations to a contractor, you should always require a formal bid, a defined contract agreeable/amended by both you and the contractor, and proof of all insurances including general liability insurance.

Working through a winter storm will be one of the most difficult events you'll manage throughout the year. A large winter storm bringing significant snow or ice will result in long hours, fatigue, equipment breakdowns, and potentially hazardous situations for the people on your grounds. Add to that the desired level of service that most individuals are accustomed to in our culture, and you are faced with removing snow and ice in the most efficient and cleanly method possible in order to perform and meet your defined goals.

## EQUIPMENT

Matching equipment to the work load is critical. First and foremost, you always need to be prepared for equipment failure; there is nothing worse than being stuck in the middle of a large storm and losing one or more of the tools you need to get the job done. Generally, the equipment used for snow and ice removal includes: Pick-up trucks; skid steers/compact equipment; ATVs; and front end loaders/large equipment.

The snow plow manufacturing industry has made significant advances in construction and design of plows, and now in general the following plows, along with proper techniques, can help you make your operation more efficient:

**Straight Plows.** When you have a straight plow, angle the blade away from the building as you make your first pass. Subsequent passes should be made away from the building and toward the outer perimeter. The general rule is to never angle your blade towards a building. The goal is to get the snow as far away from the buildings as possible.

**V-Plows.** Use a V-position to make an initial break through. This position is also effective for hard packed snow, ice and deep drifts. Set the blade in the straight position or angled position for general, wide path plowing or stacking. Use the scoop position for clean-up and carrying snow with minimum spillage.

**Pushers/Box/Containment Plows.** When using a snow pusher, be sure it's attached according to the manufacturer's specifications. These specs are designed to provide the best performance, wear tolerance and safety. A snow pusher on a loader, backhoe, skid-steer or compact utility

tractor can quickly and efficiently move large volumes of snow. Snow pushers contain snow and don't create as much of a windrow, which eliminates the need for repeated plowing of the same area to clean up spillage. By using the loader's lifting capabilities, snow pushers can be used to stack huge piles of snow. And, by removing the snow pusher attachment you're left with a loader capable of loading trucks in case the snow must be hauled away.

## DE-ICING AND ANTI-ICING

Historically, snow and ice removal has been achieved with over-use of chemicals and the use of shovels, plows, and other equipment. In recent times, granular materials have become a popular and effective method for maintaining safe conditions during and after a storm. A quick review of current terminology provides a simple breakdown of the options that are currently available on the market:

De-icing is the reactive application of ice control products to driving or walking surfaces, to melt existing snow and ice. De-icing is performed after snow removal operations to melt any remaining snow and ice.

Anti-icing is the pro-active application of ice and snow melting products to driving or walking surfaces prior to a snow or ice storm. Anti-icing helps prevent snow and ice from bonding to the pavement, allowing snow and ice to be cleared more easily. When used effectively, anti-icing can create some of the safest conditions in the winter, and be a cost-effective alternative to de-icing.

Understanding the difference between anti-icing and de-icing can yield insight into the different approaches used by professional snow removal services. In general, materials used in de-icing and/or anti-icing include:

**Sand:** Although sand can provide some amount of traction, it technically is not a de-icing material, since sand in no way melts snow or ice. A common misperception is that sand is the best alternative for snow and ice control due to its low cost and common use. Sand may also have environmental impacts related to drainage that must be considered.

**Salt:** Sodium Chloride, or rock salt, is the most common de-icer in use today. Generally this product is effective, though not at all conditions. In very cold conditions (typically less than 23 degrees F), salt begins to lose its effectiveness and is either not used or is overused in an attempt to make up for reduced performance.

**Sand/Salt Mix:** Another common practice is to mix sand and salt together for de-icing. This method is effective in maintaining some traction, due to the sand, but it will reduce the amount of salt that can be applied to an area, so less de-icing occurs while environmental concerns and clean-up costs associated with sand rise.

There are many other products in use in today's market, and each of these differs in effectiveness, cost, availability, and environmental impact. These products include: calcium chloride; magnesium chloride; potassium chloride; urea; calcium magnesium acetate; and potassium acetate. ■

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# SODDING A SEEDED VARIETY gets MLB teams up & running quickly



▲ **Busch Stadium**, home of the St. Louis Cardinals

► **Graff's Turf Farms** during the harvest of the HGT Bluegrass.

It's late November 2013 in Fort Morgan, CO and the crew at Graff's Turf Farms stands in a field of HGT Bluegrass waiting for the frost to melt away from the tips of the grass blades. Once the shiny layer of white frost, the telltale signs of morning cold, have disappeared, the crew jumps on their harvester to peel 3/4-inch of sod and soil from the sandy surface of the farm field. The 4-foot-wide strip of turf runs up a conveyor belt and rolls around and around and around, until a 75-foot-long strip of sod is tightly wound into what is known in the sod production industry as a big roll.

From there, the big rolls of turf are packaged onto a climate-controlled truck so that they won't freeze during the trek from Colorado to St. Louis, MO. A short 36

