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June 2013

# SportsTurf

FIELD OF THE YEAR

## DICK'S SPORTING GOODS PARK: PRO SOCCER'S *BEST FIELD*

FIELD SCIENCE

**RESEARCH UPDATE:**  
*Nitrate leaching*


**TURFGRASS BREEDING  
FOR SPORTS**

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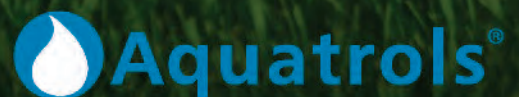


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**On the cover:** Major League Soccer's Denver home is Dick's Sporting Goods Park, maintained during the long MLS season by head turf manager Bret Baird, STMA Board member Phil McQuade, Cody Witham, Manuel Garcia, and Brad Young. The guys apparently have all survived the brutal "spring" of 2013.



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## From the Sidelines



**Eric Schroder**  
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### Ripken Experience includes quality fields

**M**Y FIRST “RIPKEN EXPERIENCE” was at STMA’s infamous San Antonio “Ice” Conference in 2007 when severe ice storms affected a large swath of North America and resulted in at least 85 deaths and caused hundreds of thousands of people to lose power. I had set up an interview with Cal Ripken, Jr., before his appearance at the Jacobsen booth on the trade show floor, and because of flight cancellations arrived in Texas with just enough time to get to his hotel suite after a mad dash through the airport.

I ended up doing the interview in the back of a Lincoln Town Car, sitting in between the former Baltimore Oriole “Iron Man” and the Jake PR woman, as we drove from his hotel to the convention center. My first question was, “Who will introduce you when you are inducted into the Hall of Fame this summer?” When he replied, “The Pro Football Hall of Fame does that,” I could feel the PR woman beside me begin to squirm. But I was at my self-deprecating best and recovered, and Ripken continued to be gracious as we walked through a back entrance and onto the show floor, feeling everyone’s eyes on the 6’4” icon and yes, me, to whom he was giving the time of day.

My second “Ripken Experience” was last month when my 13-year-old son, Max, played in the Armed Forces Day tournament at the Ripken Baseball complex in Aberdeen, MD. The Ripken Experience, its formal name, is home to youth camps and tournaments and consists of a youth-sized version of Oriole Park at Camden Yards and youth-sized replicas of Wrigley Field, Fenway Park, Citizens Bank Park, Nationals Stadium, and the old Memorial Stadium in Baltimore, which is 35 miles south of Aberdeen.

While there I met up with Patrick Coakley, CSFM, the facility’s sports turf superintendent, who took a few minutes out of his busy Saturday to meet us. Coakley, known as “Irish” to many STMA members, said his nickname is so prevalent that some fellow employees at Ripken don’t know his real name. During the 15 minutes or so we chatted, Coakley’s walkie-talkie squawked five or six times with questions and updates from his mostly student crew. When we parted I watched him jog away and realized that the time he’d given me was time he really should have been doing something else!

▼ **PATRICK “IRISH” COAKLEY, CSFM**, left, and Max Schroder. Irish asked that we report the 13-year-old is not taller than him but rather was posing uphill.



Coakley said currently he is working on determining the budget numbers of what it will cost to get to, and maintain, the natural turf fields at the complex at a “professional level,” which is his goal as well as that of his boss—Cal Ripken, Jr. Irish said he works directly and regularly with Ripken on field maintenance issues and that the former infielder understands well what it takes to get a field into professional condition.

Max and his teammates had heard that their Hall of Fame host regularly shows up at tournaments and practice sessions; I was skeptical, knowing what a busy schedule he must have, but we learned Saturday night that we had just missed a visit by the big man by a few minutes that day. ■

## SportsTurf

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## Swinging into summer

**J**UNE? That means we are almost half way through the year, and I still can not write 2013 on anything. Our committees have been in full swing for a few months now and it is encouraging, rewarding, and exciting for the Board to get our weekly updates from Kim Heck (STMA CEO) each Friday about all the progress being made. The continued commitment of your time and talents in serving this association is what makes us the vibrant association that we are.

There have been plenty of opportunities for me to expand my writing skills over the past month as well, as the Board addresses important issues raised by the membership. You should always feel empowered to challenge the Board and let us know your thoughts and concerns; we represent you and will always strive to do what is in the best interest of our membership. I had the opportunity to represent STMA at the US Department of Agriculture's Grass Roots Initiative at the National Arboretum in Washington, DC in early May. This is the first time ever that turfgrass is scheduled to be a featured horticultural plant at the Arboretum, complete with a multi-acre outdoor display and turfgrass-specific educational programming for the arboretum audience. For 4 years, arboretum visitors will learn first-hand about the function, benefits, and value of grasses, with the focal point being turfgrass (and one exhibit site devoted to sports turf). STMA is proud to support this initiative.

There is one particular article that I hope you will give special attention to this month so that you might possibly garner some recognition for your efforts in delivering safe and aesthetically pleasing sports fields: STMA's Field of the Year program (see p. 42). I will once again have the privilege of presenting these awards to our winners in 2014 in San Antonio, and I doubt there is more meaningful recognition than to have your peers select your facility for a FOY award. Having served on the Awards Committee several years ago myself, I know how challenging it will be for 2013 Chair Andy Gossel and his committee members to select this year's winners. I encourage you to take the time to put together a really well-prepared submission and make this committee's job that much tougher (sorry Andy)! Put your marketing expertise to work and "sell" your facility. In particular, spend extra time on your written materials and carefully detail your challenges (whatever they may be... budget, climate, labor...), strategies, and solutions, that allow you to deliver a field most worthy of recognition. And by all means, if you don't win this year, keep trying in the coming years. It is an old adage but it still rings so true—"Anything worth having rarely comes easy."

I hope your summer season has gotten off to a great start. I do hope you can find some time in your busy schedules to plan a little rest and relaxation with friends and family during this time of year. Seeing the schedules that many of my colleagues keep during the summer season, I know you deserve it. Take care. ■







# Research update: nitrate leaching

**I**N 2005, research began in 3 locations in Florida to quantify nitrate-N and phosphorus leaching under a variety of circumstances. The research is in response to increasing concerns regarding potential nutrient pollution of water resources from urban turf fertilization. Florida has experienced a growing number of fertilizer ordinances enacted at the local

government level, often based on perceived notions rather than science. The research has been completely funded by the Florida Department of Environmental Protection. Sites and researchers include Dr. John Cisar at the Ft. Lauderdale Research and Education Center, Dr. Jerry Sartain (phosphorus) and Dr. Laurie Trenholm (nitrate-N) at the Plant Science Research and Education Unit

in Gainesville, and Dr. Bryan Unruh at the West Florida Research and Education Center in Jay.

The research is broken down into various projects, most of which were conducted at two or three of the sites. Each project was conducted for a period from 2-4 years per site. While the research was specifically conducted on lawngrass species, results would be applicable to most warm-season grasses. Variations might occur on athletic turf due to the injury from traffic, but the anticipated outcomes would be similar to results seen here based on the treatments and condition of the turf. Here is a brief synopsis of results from some of the main projects in Gainesville.

Newly planted turf, whether sodded, seeded, sprigged, or plugged, should not be fertilized with N for at least 30 to 60 days after planting, due to the potential for large nutrient losses before a root and/or shoot system has been established.

## GENERAL METHODOLOGY

Drainage lysimeters were installed in the center of each experimental plot at a depth of 4" below ground. The lysimeters were 22" in diameter and 42" tall (Figure 1). Tubing was fitted to the base of each unit, running to above ground boxes. A vacuum

▼ **FIGURE 1.** N Source Study Treatments

	N Rate (lb N 1,000 ft <sup>2</sup> per application)	Frequency of Application
Control	0	0
Ammonium nitrate	1	60 days
Urea	1	60 days
30% SCU	1	60 days
50% SCU	1	60 days
32.8% PCU	1	60 days
32.8% PCU	2	120 days
Milorganite	1	60 days

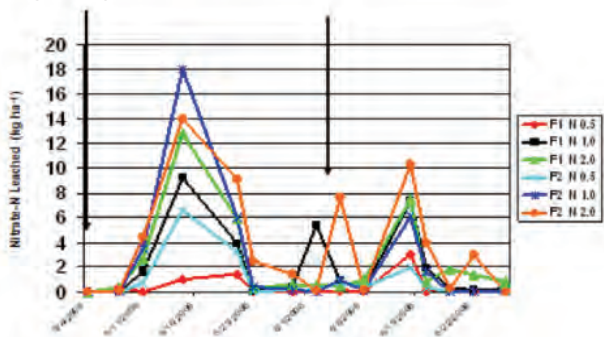


was applied to the tubing to evacuate the lysimeters weekly. Samples were sent to the Analytical Research Lab for analysis of nitrate-N. Data from all projects are expressed in units of kg ha<sup>-1</sup>, which is a measurement of the nitrate-N loading that occurred based on nitrate-N concentration and volume of leachate.

### NITRATE-N LEACHING FROM NEWLY PLANTED TURFGRASS

'Empire' zoysiagrass and 'Floritam' St. Augustinegrass were sodded and N treatments were applied the same day at rates of 0.5, 1.0, 1.5, or 2.0 lbs N 1,000 ft<sup>-2</sup>. Nitrogen was applied as soluble

▼ **FIGURE 2.** Nitrate-N leaching losses from newly planted Floritam St. Augustinegrass.



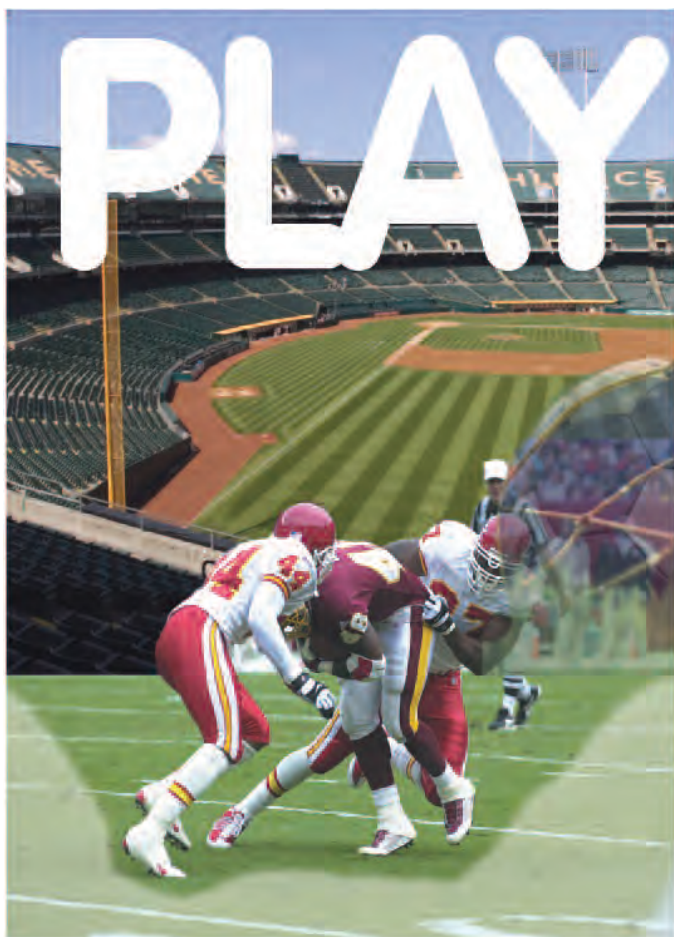
urea. Half of the plots received the same treatments 30 days later.

Nitrate-N leaching from both grasses over all years was considerably greater than from the established grass studies, regardless of N rate (Figure 2). The percent of applied N that leached from St. Augustinegrass in 2006 was 73.4% of what was applied the same day as planting in 2006. Leaching from the plots that received a second treatment 30 days later was reduced to 56.4% of the applied N. Similar results were seen in all years.

Newly planted turf, whether sodded, seeded, sprigged, or plugged, should not be fertilized with N for at least 30 to 60 days after planting, due to the potential for large nutrient losses before a root and/or shoot system has been established. This is now a Best Management Practices (BMP) recommendation.

### NITRATE-N LEACHING FROM ESTABLISHED TURFGRASS

Nitrogen was applied to Empire zoysiagrass and Floritam St. Augustinegrass over a 3-year study. Annual N rates were 1, 4, 7, or 10 lbs N 1,000 ft<sup>-2</sup> applied every 60 days throughout the growing season. Nitrogen was applied as soluble urea. Leaching data are presented for 2006 and 2007 for each of the four Fertilizer Cycles (defined as the 60-day interval between each fertilizer application). Fertilizer cycles are presented as spring (April-May), Early Summer (June-July), Late Summer (Aug-Sept), and fall (Oct-Nov).



# BALL!

### FOOTBALL, BASEBALL, SOFTBALL, SOCCER

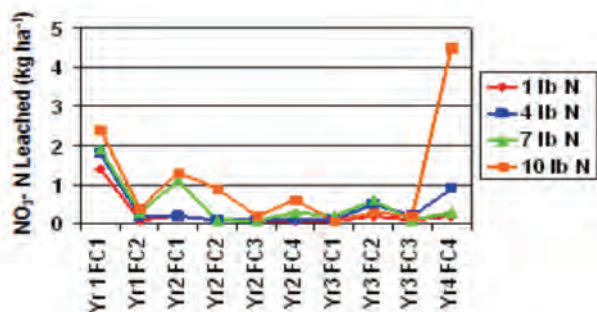
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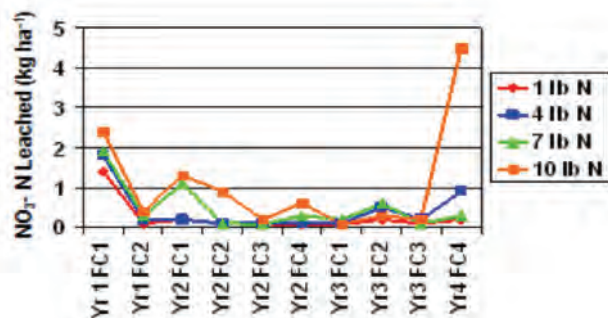
▼ **FIGURE 3.** Nitrate-N leaching losses from Floratam St. Augustinegrass due to N rate.



There were few statistical differences in nitrate-N leached due to N rate in St. Augustinegrass (Figure 3). Where there were differences (primarily Fall 2007), greatest nitrate-N load occurred at the highest N rate. During this study, the St. Augustinegrass was in good health and had good growth and cover. The dense root and shoot system provided the grass the ability to take up nitrogen at the excessively high rates applied to some of the plots (7 and 10 lbs 1,000 ft<sup>2</sup> yr<sup>-1</sup>, which far exceeds the current recommendations for fertilizing St. Augustinegrass in north central Florida). Nitrate leached did not exceed 1.4% of the applied N in any fertilizer cycle and was generally below 1% of that applied N. Increased leaching occurred in the fall of 2007 at the 10 lb N rate in response to increased disease and associated injury due to the high N rates. This reduced the cover and density of the grass, resulting in less ability for nutrient uptake and the higher N losses.

Zoysiagrass showed a greater tendency to leach more nitrate-N as N rate increased (Figure 4), but it is important to remember that many zoysiagrass cultivars stay green and healthy with less N. Plots that received the high N rates in this study had large patch disease and poor cover by the 3rd year. As seen in the St. Augustinegrass, this resulted in less ability to take up the N and therefore greater N losses.

▼ **FIGURE 4.** Nitrate-N leaching losses from Empire zoysiagrass due to N rate.



By late summer, the disease was suppressed and the grass had resumed active growth, slowing the high leaching losses down. When N is applied at the recommended rates for zoysiagrass, leaching is minimized as with St. Augustinegrass.

Results of this study clearly indicate that maintenance of a healthy grass that provides dense cover will minimize nitrate-N losses when N is applied at the recommended range of rates and at the correct times. All practices that help to maintain a healthy turfgrass, including proper irrigation and mowing contribute to a healthy turf. An interest-

ing observation is that the lowest N losses generally occurred during the summer fertilizer cycles as opposed to spring or fall. This is, of course, the time of greatest warm-season grass growth and therefore also the time for the greatest demand for nutrients. This also corresponds with the time when many of the local fertilizer ordinances ban fertilization with N and P throughout the state.

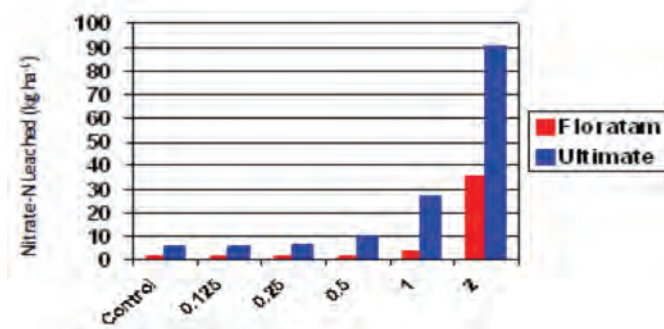
## WINTER FERTILIZATION

This study was conducted in Gainesville (north-central Florida) and Jay (northwest Florida) to determine the impact of fertilizing dormant or semi-dormant turfgrass through the winter months. Floratam St. Augustinegrass and 'UltimateFlora' zoysiagrass were sodded in the fall of 2006. Nitrogen rate treatments were applied monthly as soluble urea. Rates applied were 0, 0.13, 0.25, 0.5, 1.0 and 2.0 lbs N 1,000 ft<sup>2</sup> mo<sup>-1</sup>.

Total nitrate-N leaching losses for the season differed due to an interaction of N rate and grass in years 1 and 2. In both of these cases, St. Augustinegrass had no differences in leaching between control and up to 1 lb N 1,000 ft<sup>2</sup>, while zoysiagrass had greatest leaching from either the 1 or 2 lb N rate (Figure 5).

Nitrate-N leaching was also compared for differences between months (Table 2). In years 2 and 3, after the grass was well established, greatest leaching generally occurred in the winter and early

▼ **FIGURE 5.** Cumulative nitrate-N leaching losses from Nov-March.



spring months as compared to the fall months. More N was able to be taken up in the fall when the grass still had a root system as compared to January through March, when the grass was in deeper dormancy and a large portion of the roots had sloughed off. While N fertilization is not recommended for home lawns during the winter months in north Florida, there is less potential for nitrate-N leaching from late fall fertilization than from fertilization during Jan-March. These results are based on north Florida conditions and do not apply to south Florida.

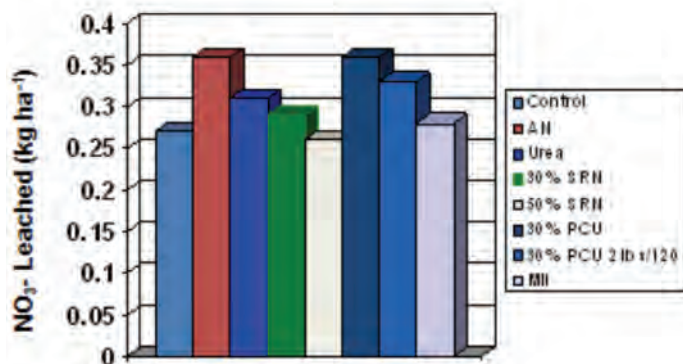
## N SOURCE STUDY

This study ran from 2008 through 2011 on Floratam St. Augustinegrass and Empire zoysiagrass. Treatments are listed in Table 1 and were applied as granular treatments at 1 lb N 1,000 ft<sup>2</sup> every 60 days, unless noted otherwise. In 2008, this project began in July and therefore only two treatment applications were applied.

In 2008, St. Augustinegrass had no differences in total nitrate-N loading (Figure 6) Zoysiagrass had significantly greater leaching from ammonium nitrate than from any of the other N fertilizers,



▼ **FIGURE 6.** Cumulative nitrate-N leaching losses from Floratam St. Augustinegrass from April-Nov.



with no differences between the other products. In 2009, there were no differences in leaching due to either grass or N source. Similar results were seen in subsequent years.

While many automatically think that slow-release N sources are less likely to leach N, these results indicate that there are no differences in nitrate-N leaching from either soluble or slow release sources *when they are applied to healthy turfgrass*. Healthy turf that provides good ground cover is able to take up the fertilizer that is applied to it, as long as the fertilizer is properly applied.

## CLOSING THOUGHTS

All of the research results from the 3 locations indicate that a healthy turfgrass cover mitigates nitrate-N leaching when fertilizer is applied correctly. Maintaining a healthy turfgrass cover includes proper irrigation, mowing, fertilization, and pest control. Following appropriate turf cultural practices to maintain a healthy turf can reduce nutrient leaching and potential nonpoint source pollution.

On athletic turf, traffic injury compounds management and turf health and often results in loss of density and bare ground. As our results clearly show, this is the time when there is greatest opportunity for nutrient movement that may result in nonpoint source pollution. Careful nutrient management, consisting of a spoon-feeding approach of low rates of N applied frequently to stimulate regrowth, is the best way to manage regrowth from injury while reducing N losses. In reality, the continuous demands placed on athletic fields often result in insufficient opportunity for turf to regrow before the next event, with little time to fertilize in a spoon-feeding manner. It is important that athletic field managers recognize the potential for nutrient losses on injured turf and plan their fertilization regimes as best as possible to minimize these losses from occurring. ■

*Laurie E. Trenholm, PhD, is professor and graduate coordinator, Environmental Horticulture Department—Turfgrass Science Program, University of Florida.*

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# Turfgrass breeding for sports

**T**URFGRASS BREEDERS may have a more difficult job than most other plant breeders. For the most part they deal with more than one species, usually at least four major species and many minor ones, and a vast geographic area for each species. What also complicates the breeding for the seed propagated species is breeders must breed at the same time for turf quality, disease resistance and other characteristics for turf

performance and also for seed yield.

Most turfgrass species are cross-pollinated, self-incompatible species, which means the same plant cannot be the mother and the father. This makes development of inbred lines for hybrids or seed propagated varieties with one genotype unfeasible. Breeders must cross similar plants together to start the breeding process selected for the characteristics desired in the new cultivar. This means traditional breeding operates as a form of population improvement, with

▲ **SELECTED PERENNIAL RYEGRASS** plants placed into an isolation cage for crossing.

each individual seed in a variety genetically related to but distinct from others. By taking the portion of the population with the best of a certain characteristic, darkest green, highest stress tolerance, least disease, and crossing these together the breeder moves the mean of that characteristic up. The selected plants must still match for

**Improvement of turfgrass varieties is dependent on being able to efficiently screen large numbers of plants for the desired characteristic(s).**



many other characteristics such as color, date of seedhead appearance and height to make a uniform variety.

Kentucky bluegrass is the exception due to its apomictic reproduction. It is hard to get hybrids, with often only 10% of plants in a cross being the hybrids, the rest being genetically identical to the mother plant. These hybrids usually have all the chromosomes of the mother plant and about half of the father. Each plant is a shot in the dark but if you do get a good plant that is apomictic the progeny will all be the same and it can be a new variety.

The general outline for breeding is

1. Establish a goal (Improved wear tolerance, diseases resistance)
2. Decide how to screen for improvements ( Select in turf trials or spaced plants)
3. Screen a large number of plants and select the best ones
4. Cross these plants together letting wind scatter the pollen (small crossing cages or bigger blocks of related plants), harvest seed, plant new trials
5. Evaluate progeny for selected improvement (perhaps select best plants again)
6. Seed from best plants or lines bulked together as Breeder Seed
7. Breeder Seed used to plant first seedstock field and enter into NTEP and other trials
8. Seedstock (Foundation) seed used to plant Certified fields

Improvement of turfgrass varieties is dependent on being able to efficiently screen large numbers of plants for the desired characteristic(s). The selected plants need to be crossed together and the progeny (offspring) evaluated again for the characteristic(s). If the characteristic is highly heritable the majority of the population may then have the characteristic or additional cycles of selection must be performed. Due to the complex inheritance of many desired characteristics being able to concentrate many of them in one population or variety is often difficult. It is often necessary to evaluate the selected plants and progeny over a number of years and environments to reliably screen for some characteristics. Screening for wear tolerance was

▼ **BREEDER BLOCK OF TALL FESCUE.** Seed from the isolated plants are planted in the greenhouse and spaced plants are established into a Breeder block (each row has plants derived from one plant). Look for uniformity and seed yield of these progeny. Usually also planted in turf plots. Poor performers will have the whole row eliminated.



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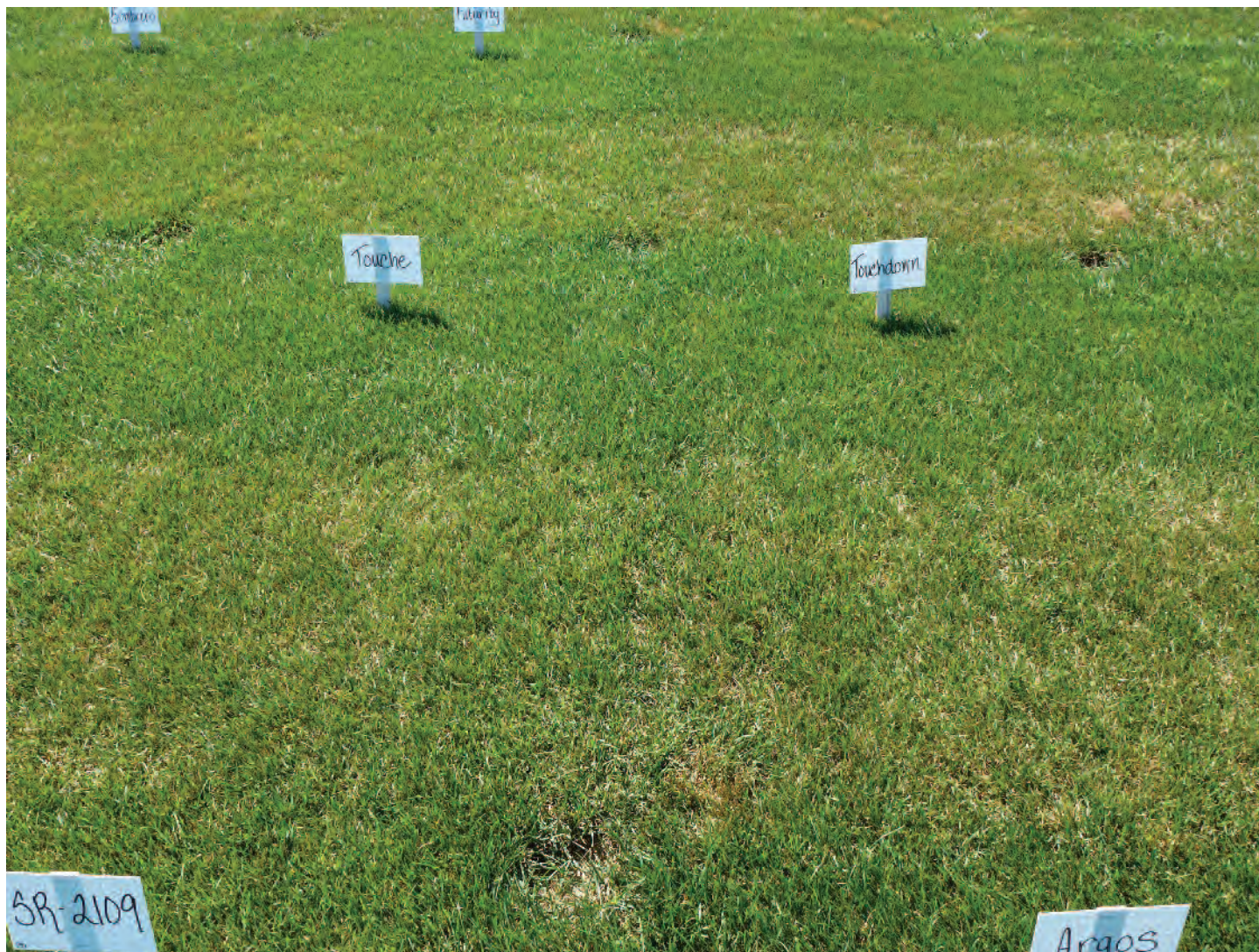


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▲ **KENTUCKY BLUEGRASS TRIALS** at Rutgers University with wear done on front half of each plot. Cultivar names are in the back of the plot.

often difficult since the size and speed of the machines made it difficult to screen large numbers of turf plots. Recently Rutgers University developed the Rutgers Wear Stimulator (Turf Slapper) that can apply wear over a large number of plots and has enable wear tolerance and recovery to be more easily integrated into varietal development.

Tall fescues with improved wear tolerance and the ability to demonstrate wear tolerance as younger plants has been a recent emphasis. Recent information by Dr. David Miner of Iowa State University suggests that addition of large seed quantities early in the season, even with wear applied, increases the percentage of tall fescue, perennial ryegrass or Kentucky bluegrass in the stand. Increased establishment occurred at rates up to 200 kg/ha for perennial ryegrass and 40 kg/ha for

**Perennial ryegrass breeding in the United States for many years has emphasized darker green dwarf varieties with high turf quality.**



▲ **KENTUCKY BLUEGRASS BREEDER BLOCK.** Very uniform due to high apomixis.

Kentucky bluegrass. Tall fescues were only slightly less effective than perennial ryegrass in establishing during play. Additional breeding work in tall fescues has emphasized drought tolerance as well as brown patch resistance in multiple locations, for durable resistance.

Perennial ryegrass breeding in the United States for many years has emphasized darker green dwarf varieties with high turf quality. An important new characteristic has been the discovery and incorporation of genes for resistance to gray leaf spot disease, which is the same pathogen as rice blast disease, and has decimated stands of Perennial ryegrass breeding in the United States for many years has emphasized darker green dwarf varieties with high turf quality. perennial ryegrass in the transition zone of the United States. A bal-



ance must be achieved between resistance to this disease and resistance to other important pathogens such as brown patch and red thread. Wear tolerance as a major component in selecting new ryegrasses. Breeders have been crossing more winter-active wear tolerant ryegrasses with American germplasm to increase the wear tolerance during the colder months. An additional high priority in perennial ryegrass breeding has been salt tolerance. This is due to the increasing use of effluent water in many golf courses in the United States and elsewhere.

Hybrids of Texas bluegrass and Kentucky bluegrass have the potential to expand the range of Kentucky bluegrass. Many of these are more heat and drought tolerant than traditional Kentucky bluegrasses, although some new cultivars of Kentucky bluegrass have also been selected for more heat and drought tolerance. The other major advantage of these hybrids is their extensive rhizomes systems. In wear trials they have shown excellent wear toler-



▲ **PURE SEED COMPANY** seed yield trials for Kentucky bluegrass. Wide variability in maturity and appearance. Only a small fraction of these will make it to market.



▲ **WEAR TRIALS** on tall fescues at Rutgers University July 2011. New tall fescues are more wear tolerant even under heat stress.

ance, rapid recovery and more winter-active growth making them better suited for many applications.

In breeding of all species seed yield is just as important as diseases resistance or turf quality. Often if you find cultivars or experimentals that are only on the market a short time or are never marketed it is due to inadequate seed yield. We must often cycle one generation for a turf characteristic and then another for seed yield. Turf breeders have been very successful in improving turf quality and seed yield at the same time but we may not find that true in the future.

Development of new turf cultivars takes many steps and the diverse needs make it different from many other crops. Turf breeders must have patience and understand the many needs of customers plus seed growers. ■

*Dr. Leah A. Brilman is the director of research and technical services for Pickseed/Seed Research of Oregon, [www.sroseed.com](http://www.sroseed.com).*

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# 10 years later:

## Q&A with Vanini and Sorochan on using crumb rubber on natural turf

**TEN YEARS** after we published an article on their research into using crumb rubber on natural turf fields, and nearly 20 years after their original research at Michigan State, *SportsTurf* spoke with J. Tim Vanini, PhD, founder and president of New Dimensions Turfgrass, and Dr. John Sorochan, associate professor turfgrass science, University of Tennessee, regarding their current thoughts on the practice.

**SportsTurf:** Under what circumstances would you advise turf managers to try using crumb rubber on natural grass?

**Vanini:** You want to use crumb rubber in high traffic situations. You can make the case for a whole field application because for example soccer field complexes where they move around are used length-wise and width-wise. We have observed a benefit to the plant through the use of less water as the crumb rubber serves as a “mulch” at the surface to help retain water.

**Sorochan:** Native soil athletic fields often drain poorly because they are high silt and clay, so when it rains you can tear up the field. Like adding 2 inches of sand on top of a field will help drain excess moisture, as Alex Kowalewski’s studies showed, adding ½ to ¾ inch

of crumb rubber helps take away moisture from a field’s surface. Even ¼ inch can help.

**Vanini:** Last year I partnered with Liberty Tire on a program that gave several schools 1 ton of crumb rubber to work with; we learned that, for cool-season turf at least, the crumb rubber

depth had to be a minimum of 25% of the mowing height to protect the crown tissue of the plants. And it’s important you have 100% turf coverage on a field before using crumb rubber—it won’t resurrect your grass on a cool-season field.

When budgets are getting less, consider that crumb rubber use can stabilize your field’s surface and make it not too hard or too soft, i.e., more consistent playing surface, improved traction, etc.

**ST:** How expensive is using crumb rubber and where do you buy it?

**Vanini:** Right now the cost is approximately \$.25 a pound. But the cost of freight plays a role in the overall cost; it depends from where the product is

***When budgets are getting less, consider that crumb rubber use can stabilize your field’s surface and make it not too hard or too soft.***



## JOHN MASCARO'S PHOTO QUIZ

John Mascaro is President of Turf-Tec International

*Can you identify this sports turf problem?*

**Problem:** Brown rectangular area with green center

**Turfgrass area:** Major League Baseball stadium

**Location:** San Diego, California

**Grass Variety:** TifSport Bermuda overseeded with perennial rye

**Answer to John Mascaro's Photo Quiz on Page 33**



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▲ **THE FOUL PLAY AREAS** were airfield and topdressed with crumb rubber one month before a baseball tourney in Cranberry, PA. The first base side (2) had crumb rubber applied, and third base side did not (3). After the tourney (15 games and 3.5 inches of rain), the first base side was just worn (4), and the third base side had no grass (5).

shipped. Besides Liberty there are other companies selling it to [sports turf managers].

**Sorochan:** It isn't sold through distributors though there is a landscape supply company in Tennessee that has a supply because of the research we are doing at the university (Sorochan is director of the Center for Safer Athletic Fields in Knoxville).

**Vanini:** Actually I am a distributor for Liberty Tire for crumb rubber that is used on natural turf only.

We have started a pilot program with one school and one municipality who are buying

more crumb rubber, and we are also involved in another project, with Rebecca Auchter of Cranberry Township, PA. *Editor's note: see article on page 8 of our April issue written by Auchter.* Because she has liked how the crumb rubber has helped in the foul territory areas of the township's Baseball Field I, Rebecca has convinced the local soccer association to let us use 5-6 tons of crumb rubber on an enlarged rectangular area on their Dick's Sportplex at Graham Park soccer field G.

Let's say you were going to do an entire football field including the sidelines; that is 80,000 square feet. Say the mowing height is

2 inches, so you are going to put down ½ inch of crumb rubber, which is approximately two truckloads; adding in freight costs, that might be \$22,000 to \$27,000.

**Sorochan:** We are looking at the long-term effects on the soil; in bluegrass it might stay on the surface longer but bermudagrass grows above it and buries in the crumb rubber like thatch, so you have to add 1/8 inch to ¼ inch every 2-3 weeks. It should be noted that you don't get "walk off" effects with the crumb rubber on natural turf as you do on synthetic turf. But if the turf has worn areas it will wash off.

**ST:** How should turf managers determine what particle size to employ?

**Sorochan:** For bermudagrass we currently are investigating particle sizes and are finding that varying particle size adds stability to a field. Most people are using 10/20 mesh-sized particles, which is similar to that used in synthetic turf, a bit on the coarser side. It is easier to incorporate a finer particle, for example 20 mesh, in bermudagrass as well as cool-season turf [for comparison's sake, USGA-spec sand is 30 mesh].

**Vanini:** I have observed that .25 particle size is better for cool-season turf. Turf managers need to be mindful when applying crumb rubber to get down at least ¼ inch depth down every time they apply. You can put down ¼ inch now and then another ¼ inch 2 weeks later. The crumb rubber works its way down, even if you apply ½ inch of 10/20 mesh.

You do run into static electricity and hydrophobicity (repelling water) issues when you first put the crumb rubber down. Use a wetting agent or spread out your applications to combat this.

**ST:** How do maintenance practices change when employing crumb rubber on natural grass?

**Sorochan:** You need to do what you should be doing—all the normal cultural practices that optimize turfgrass growth. There is no need to do anything differently, including using sand topdressing.

**Vanini:** You still want disruption at the surface; the sand will make it past the crumb rubber because it has a higher particle weight. Crumb rubber topdressing should be considered another tool to com-

## USING CRUMB RUBBER ON NATURAL TURF

Here are some of the findings from Drs. Vanini and Sorochan's research:

"It is important to maintain a high quality, athletic-field stand that will hold up to aggressive wear, while continuing to provide consistent, stable cover. Maintaining quality turf stands that withstand athletic-field conditions has always been a challenge. This is particularly evident when many athletic-field events are scheduled to be played when growing conditions are not favorable for turfgrass recovery from wear. Proper implementation of the five primary cultural practices (mowing, irrigation, fertilization, cultivation, and pest control) and the use of non-traditional methods are important management practices in maximizing turfgrass vigor. Non-traditional methods can be cost beneficial and can extend the performance of the athletic field in the long run. The use of crumb rubber as a topdressing is a method that has demonstrated improved turfgrass functionality.

Crumb rubber serves two functions when topdressed, this blanket of rubber or "rubber thatch" reduces soil compaction and improves wear tolerance of the turfgrass stand. No different than the "padding" used to protect an

athlete, crumb rubber for an athletic-field acts as a "padding" for protecting the turfgrass. If the crown tissue area of a turfgrass plant is damaged by the cleats of an athlete, the turf will quickly die because the point of rejuvenation has been damaged beyond repair. However, if crumb rubber is used, the crown tissue of the turfgrass is protected by the crumb rubber. This limits the direct impact of an athlete's cleat/shoe, thus resulting in the prolonged wear tolerance of the turf stand.

No question there have been concerns about topdressing crumb rubber if too much water takes over an area i.e. rainfall or excessive irrigation. Crumb rubber is half the density of a soil particle, thus causing it to float. Strategies to deal with this problem are first, be in tune with the weather second, do not put too much crumb rubber down at one time. Our recommendation is that no more than ¼ inch of crumb rubber should be topdressed in a single application. Remember, you can always add more crumb rubber. A final strategy is to fertilize more frequently, budget permitting. Obviously, the grass will grow more vigorously and crumb rubber will gravitate quicker down to the surface.



plement your normal maintenance practices. Using crumb rubber is not bullet proof; you will still have wear but it will wear more slowly.

**ST:** How should turf managers respond to any environmental concerns expressed over the use of crumb rubber?

**Sorochan:** The Environmental Protection Agency has tested and approved the use of crumb rubber in synthetic turf. In natural grass the likelihood of any exposure to the crumb rubber is unlikely.

**Vanini:** I agree with John; other agencies, such as the Connecticut Agricultural Experiment Station, and New York State, have looked at it and found no health problems. Parents should be more concerned about exposure on synthetic turf, not to mention the heat factor with synthetic fields. Microbial activity eventually breaks down the rubber in natural turf.

**Sorochan:** Also, with the moisture that is held on the natural fields, it means less dust in the air. We should rely on research data to understand that no results show the crumb rubber to be unsafe; rather, using it makes fields safer.

**Vanini:** More research is coming regarding the environmental, agronomic, and biomechanical benefits of using crumb rubber. It can make a difference in poorly managed fields. ■

## CRUMB RUBBER SUPPLIER ANSWERS QUESTIONS

**WE ASKED ONE OF THE MOST PROMINENT COMPANIES** supplying crumb rubber for natural turf and synthetic turf fields, Liberty Tire Recycling, to answer some questions about their products. John Ripp, an account executive for Liberty, responded:

**ST:** How should turf managers wanting to incorporate crumb rubber into their natural fields determine what particle size to buy?

**Ripp:** It all depends on what type of turf stand it is. If it's a situation where we are treating a tight Bermuda or bentgrass stand, a 20 minus or 30 minus will work just fine. If it's a cool season grass stand, we suggest the 10:20 mesh (commonly used for synthetic turf infill), a 1-3 mm mesh or 1-5 mm mesh (commonly used in track construction).

**ST:** Do you have recommendations for how to best incorporate the product—when and how often?

**Ripp:** Although it may be directly topdressed over existing turf, we suggest you aerify first and then topdress. We suggest applying a ¼ inch per application(s) (600 lbs/1000 sq ft.) and brushing it in. [We suggest] two applications in medium traffic areas and three applications in heavy traffic areas. In cool season turf, ¾" can be achieved with two 900-lb./per 1000 sq. ft. applications.

**ST:** How (or perhaps more appropriately, where) can turf managers buy your product? Any recommendations on reducing shipping costs?

**Ripp:** Liberty has seven locations in the US and three locations in Canada where these products are available. As with any product, the more you order the lower the freight cost. I suggest you develop a plan of attack and order the amount necessary to complete a job successfully. For crumb rubber to be effective, multiple applications within a month's time are preferred. The objective is to cover and protect the crown of the plant as soon as possible.

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# Drought conditions and player safety

**Editor's note:** This article was produced by Aquatrols, a provider of soil surfactants and other technologies used to optimize soil-water-plant interactions.

**THE ISSUE OF PLAYER SAFETY** has taken center stage in recent years. Advancements in our understanding of sports injuries and their long-term effects on the human body have made us more aware of the tremendous risks athletes take every time they step onto the playing field.

Officials in every sport and at every level are now working to ensure that the health and safety of players is never again taken for granted. Many leagues are changing rules and upgrading equipment in an attempt to make the games safer.

However, ensuring player safety often begins with something much more basic than the rulebook: the playing surface itself. A consistent playing surface lays the foundation for safety, allowing athletes to do what they do best without having to think twice about making a sharp cut or leaving their feet to make a play.

Playing conditions are often compromised during inclement weather. Despite turf managers' best efforts, rain and snow events can quickly make conditions dangerous and unplayable. The 2013 baseball season has already seen its fair share of rain (and snow) delays. While we normally associate interruptions in play with this type of stormy weather, a lack of precipitation can be equally damaging.

In 2012, drought conditions across large sections of the United States left turf managers struggling to keep their turf alive and playable. Some counties and school districts were forced to shut down their playing fields because of turf damage brought on by prolonged drought conditions. The extremely dry weather made field conditions simply too dangerous for student-athletes.

As we head into the summer months, it's important to think about how drought can impact playing conditions and ultimately the health and safety of players. Turf managers must take steps to ensure that a lack

of rain will not interfere with their most important task: keeping players safe.

## DROUGHT'S EFFECT ON TURFGRASS

It's no secret that water is vital to the growth of healthy turfgrass. Water keeps plants hydrated and plays an important role in photosynthesis. It also serves as the natu-

ral delivery mechanism for most other applied inputs on a sports field. A lack of water can cause turf to wilt, go dormant, or die altogether in a short period of time. Drought stress also leaves plants more susceptible to regular summer stresses, such as increased traffic, heat stress and disease pressure from pathogens and insects.

These added obstacles can create a nasty ripple effect for turf managers. Troy Smith, who served as the Turf Manager at the Denver Broncos practice facility for more than a decade, has seen the effects of drought firsthand.

"Without the correct amount of water, the plant will be compromised and cannot complete its life cycle. Drought makes it difficult to predict how much water is needed for the fields and interrupts subsequent maintenance practices, such as aerification and fertilization," he said.

Without adequate water and these important cultural practices, field conditions can quickly deteriorate and become unfit for play.

"Field hardness is a real concern, especially for turf managers who don't have the ability to water adequately," Smith said.

Field harness can make grass surfaces feel more like concrete. This can result in increased rates of injury in both contact and non-contact sports.

Over time, soils can naturally become water repellent, meaning they can no longer properly absorb water. If a soil has become water repellent, when rain finally does come, it will not be able to penetrate the soil surface properly. Most of it will simply run off the surface.

## SEEKING SOLUTIONS

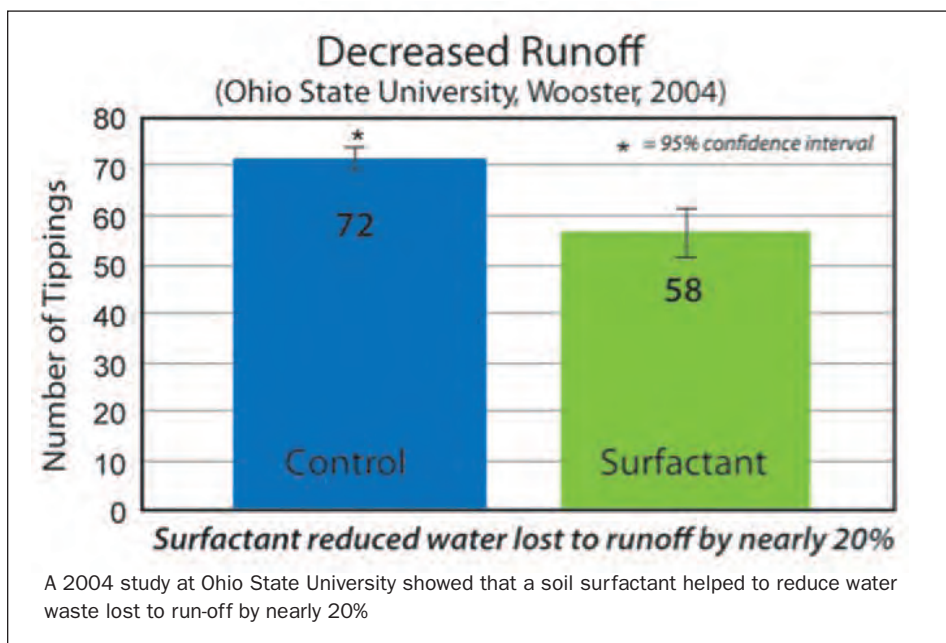
"Drought opens your eyes to how important water is to your fields on a consistent basis. Once you go through drought conditions, you are always on the look out for products that will help you manage your turf more efficiently during dry periods," said Smith.

Smith turned to soil surfactants to help offset the stress brought on by drought conditions. He explained that soil surfactants help to overcome issues with water repellency, ensuring even distribution of water throughout the soil profile. This helps to cre-



▲ **TROY SMITH, CSFM**, Denver Broncos, is a former president of the Sports Turf Managers Association.





ate more uniformity at and below the surface. "It is important to evenly distribute water through the soil profile to provide adequate hydration for the plants," he said.

When it comes to creating safe playing conditions, uniformity is key. Patchy or uneven turf growth can create a hazard for athletes. By helping to balance air and water in the rootzone, soil surfactants encourage more uniform root growth and more consistency on the surface.

Soil surfactants can also help to reduce the amount of water lost to run-off, which is critical for turf managers who are dealing with water-use restrictions. By cutting back on waste and making more efficient use of applied water, soil surfactants can produce monetary savings and potentially stretch the time between irrigation events.

Because most soil surfactants can be tank mixed with a wide variety of other inputs, there is no added labor cost involved. Turf managers can simply add the soil surfactant to their regular spray program. Smith cited this ease of use another bonus of his surfactant program. "Being on a two-week spray schedule made it very easy to apply surfactant on a regular basis," he said.

### GETTING A HEAD START

The key to any successful surfactant program is to start early. Although soil

surfactants can help turf recover from existing drought damage, instituting a proven surfactant program before drought

conditions develop can provide a number of benefits.

By increasing soil moisture uniformity, soil surfactants help to create a healthier and more consistent growing environment. If the growing environment is managed to its peak potential early in the season, turf will be healthier and better able to defend itself when drought stress kicks in. In addition, water and monetary savings produced early in the season can be banked for the late summer months when the need for frequent irrigation becomes greater.

Seasons like 2012 remind us that we are often at the whim of unpredictable weather conditions. While a repeat of last year's historic drought isn't guaranteed, turf managers should be prepared for another difficult season in 2013. By maximizing water use efficiency, soil surfactants can help turf managers offset the physical and financial strain of a drought year and ensure safer playing conditions for all athletes. The key is to *start early*. ■

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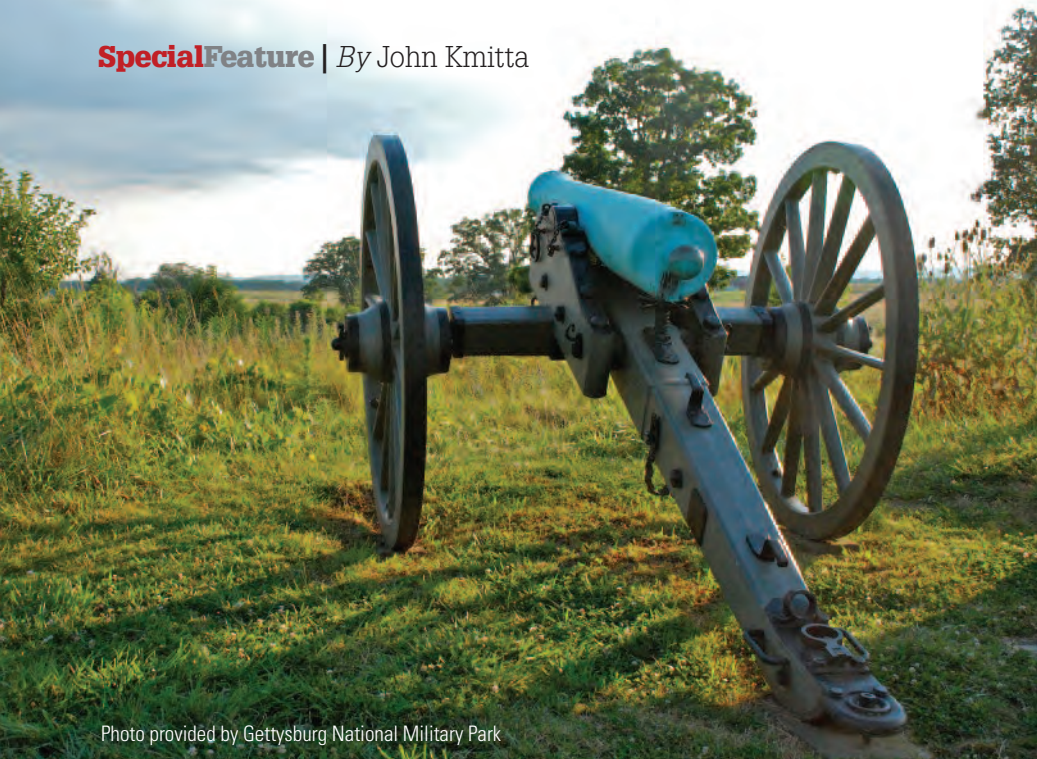


Photo provided by Gettysburg National Military Park

# Hallowed Ground

The landscape restoration and maintenance of Gettysburg National Military Park

**Since 1863**, nature and human development have changed the appearance of the landscape and historic battlefields at Gettysburg National Military Park (NMP). Now, as the 150th anniversary of that historic battle draws near, Gettysburg NMP staff members share their insights into the ongoing efforts to preserve the topographic, landscape and cultural features that were significant to the outcome of the battle.

The battlefield is now a vast national park, and the landscape is a mosaic of woodlands and woodlots, agricultural fields, pastures and intermittent streams. And although most of the landscape is natural, it still needs maintenance.

For example, fields that have not been farmed during the past 65-plus years have become forests. While some vegetation fea-

tures (thickets, woodlots and woodlands) were removed by man over the years, others were overgrown by nature, becoming dense and containing many non-native species. In addition, some historic fields, pastures and other open areas are covered by non-historic vegetation.

In 1999, the Gettysburg NMP General Management Plan/Environmental Impact

Statement (GMP/EIS) was approved, outlining goals for rehabilitating the 1863 cultural and natural features that impacted the battle.

“Battlefield Rehabilitation is a multi-year project to return major battle action areas on the Gettysburg battlefield to their appearance at the time of the Battle of Gettysburg in 1863, and to help the public better understand the soldier’s experiences on the battlefield,” said Katie Lawhon, management assistant, Gettysburg NMP. “The project includes removal of non-historic trees, but also the planting of trees, maintaining historic woodlots, planting historic orchards, building fences, and more.”

## OBTAINING HISTORICAL ACCURACY

The initial challenge was to understand the historic landscapes of the 1863 battle, and how those landscapes had changed throughout the years.

According to Lawhon, historians developed a history of the park landscapes and a set of historical base maps that documented the park’s landscape and built features. Those maps were based upon extensive research, including park archival materials, library records, historic photographs and sketches, maps, and — more recently — aerial photographs. The most important mapping resources were Department of War and Gettysburg Battlefield Memorial Association maps prepared in 1863, 1868 and 1872, as well as other maps developed by the War Department and the National Park Service (NPS) that document conditions at various times. Each set of information gathered was mapped on base maps at a common scale, and the maps were then digitized. By comparing the maps, it was possible to see how the battlefield landscape features had changed, and estimate the extent of the changes.

The next step was to determine which of the natural, manmade and topographic features were significant to the outcome of the battle.

“Using military terrain analysis, the entire battlefield was examined for characteristics such as key terrain, observation and fields of fire, cover and concealment, obstacles (both natural and manmade), and avenues of approach,” said Lawhon.



According to Lawhon, it was then a matter of determining which features were significant to the fighting of the battle. The battle action for each day of the battle was studied by reviewing official maps, War Department after-action reports written by officers of the various units that participated in the battle, letters from soldiers, diaries, and newspaper accounts.

According to the NPS, the resulting battle action maps for each day showed where troops were positioned, where they moved, and where on the field they were engaged. The maps for all three days were then combined, and a map showing the action for all three days was prepared.

Comparison of the theoretical terrain analysis map with the actual battle action map showed exactly which terrain features were significant to the outcome of the Battle of Gettysburg. Those significant features automatically became the highest priority for preservation and rehabilitation.

## REHABILITATION AND RESTORATION

The rehabilitation project began in 2000 following completion of the GMP/EIS. Much progress has been made, but there is much more yet to be accomplished.

Understanding how the generals organized the terrain for battle requires removal of non-historic trees that have grown over the past 65 to 70 years. Understanding the avenues of approach that were available and/or used requires restoration of farm lanes and roads that once crisscrossed the battlefield, but have long since disappeared.

According to the NPS, small-scale features such as fences, orchards, open woodlots and buildings affected the tactical movements of small units. These missing, dilapidated or damaged features are being repaired or replaced so that visitors can clearly understand the cover and concealment available to the soldiers and the obstacles that affected them during combat. For example, for years visitors saw the field of Pickett's Charge as one large, unbroken field. Now, nine miles of fences have been rebuilt, showing the field of Pickett's Charge in its historic configuration of 12 small fields, and the difficulties and challenges facing those troops can be understood in more depth.

According to Lawhon, the project also calls for re-establishing grasslands; restoring wetlands; replanting orchards; fencing cattle from streams to improve water quality; increasing habitat for grassland species, ground nesting birds and native plants; and more.

But rehabilitation is not without its challenges.

"Mapping and other historical documentation does not always provide enough

detail to rebuild an individual landscape feature such as a fence," said Lawhon. "Sometimes, we will know that a fence existed in a certain place, but there is not enough detail in the historical record to tell us what it looked like. Was it a five-rail fence, a Virginia worm fence, or some other type? We try to confirm each feature with two or more sources before we try to return it to the battlefield."



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Other challenges include communicating why it is important to remove non-historic trees to reopen fields and meadows of the 1863 battlefield, and keeping battlefield rehabilitation efforts sustainable by controlling brush and regrowth in newly opened fields.

### **TREE MANAGEMENT**

When it comes to achieving and maintaining the historical appearance of the trees as they were at the time of the battle, there are several examples where the appearance of trees or landscape features are considered important to the historic appearance of the battlefield, said Zach Bolitho, chief of resource management, Gettysburg NMP.

“Landscape features such as thicket areas are important to the interpretation of the battle,” he said. “The height of thickets consisted of low, woody vegetation. Thickets were possibly fields left to grow fallow, and woody vegetation started to encroach. To counter this problem, the park chose to use native shrubs to rehabilitate thickets. At a mature height, native shrubs will reach a height of 10 to 15 feet. This approach allowed the park to create a landscape feature using wood plant material that simulated young trees but removed a step to management that would involve managing vegetation that would exceed a height desired by the park. Undesirable trees found growing in the area still need to be maintained, but management of this vegetation is kept to a minimum.”

According to Bolitho, orchards were another area where historic appearance was considered important.

“Historically, it was a common practice to grow trees on a high-headed trunk, and pruning was not a common practice in the late 19th century,” he said. “After orchard trees are planted, the trees are trained and pruned for several years to create a high trunk of approximately 6 feet. The trees are then allowed to grow and take on their own appearance (see sidebar below).”

“Rootstock is also considered when rehabilitating the orchards. To create orchards that were mature at the



Photo provided by Gettysburg National Military Park

## **The Battle of Gettysburg at a Glance**

The first steps toward the Battle of Gettysburg started in June 1863. Confederate General Robert E. Lee's soldiers crossed the Potomac River in Virginia and began to march toward the Susquehanna River in Pennsylvania, with thoughts that a victory in the North would erode the Union's will to continue the fight.

The Battle of Gettysburg started on July 1, 1863, when Gen. Lee's Army of Northern Virginia, and the Union Army of the Potomac, commanded by Union General George G. Meade, met at Gettysburg by chance and engaged in battle. During the three-day battle, about 165,000 soldiers clashed in and around the small town of Gettysburg (battle-era population: 2,400).

The first shot of the Battle of Gettysburg was fired early in the morning of July 1, when fighting broke out north and west of town. During the day, Confederate troops forced Union troops southeast through Gettysburg, where the Union took up a position on Cemetery Hill, Cemetery Ridge and Culp's Hill. On July 2, the fighting centered on the southern end of the Union position, near locations such as Little Round Top, Devil's Den, the Wheatfield and the Peach Orchard. Union troops held their position, and the Battle of Gettysburg continued for one more fateful day.

On July 3, Confederate troops attacked the center of the Union line on Cemetery Ridge. After a cannonade raged for about two hours, Gen. Lee ordered his Confederate infantry to attack. More than 14,000 Confederate troops advanced across the field toward Cemetery Ridge; a deluge of artillery shot and shell raked their lines. Those who moved on toward the ridge advanced under a hail of fire. Of those who made it to the Union line, many fell or were captured in the fighting at the Angle, near the Copse of Trees. The attack that became known to history as Pickett's Charge concluded with a Confederate defeat and also ended the Battle of Gettysburg.

When the Battle of Gettysburg was over on July 3, 51,000 soldiers were casualties (killed, wounded, captured or missing) in what remains the largest battle ever fought in North America.

It proved impossible for the war-stressed economy of the Confederacy to replace the extensive losses suffered during the Battle of Gettysburg by Gen. Lee and the Army of Northern Virginia. On July 4, as smoke still lingered from the Battle of Gettysburg, the besieged city of Vicksburg, Miss., surrendered to Union soldiers, restoring Union control of the Mississippi River. Twenty-one months later, Gen. Lee surrendered to Union General Ulysses S. Grant at Appomattox Courthouse, signaling the end of the Civil War.

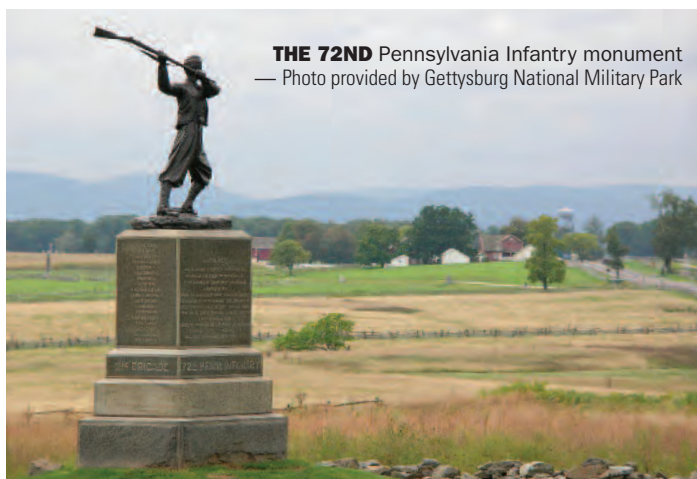
— Sidebar information provided by Gettysburg National Military Park and the National Park Service.

For the official map of Gettysburg National Military Park, visit [www.nps.gov/gett/plan\\_yourvisit/upload/GETT%20brochure.pdf](http://www.nps.gov/gett/plan_yourvisit/upload/GETT%20brochure.pdf)

**“The world will little note, nor long remember what we say here, but it can never forget what they did here.”**

**— Abraham Lincoln, The Gettysburg Address**





time of the battle, trees are planted on standard and MM111 rootstock. These trees will reach a height of 21 to 35 feet when mature. To simulate younger orchards, tree varieties were chosen that were budded on EMLA 7 rootstock. These trees reach a mature height of 10 to 12 feet.”

Unless tree species and cultivars are specific to a landscape feature, trees planted in the park are those that have been found growing in the park, are documented in scientific studies, and also are known to occur naturally in Adams County, Bolitho added.

“Fruit trees used to rehabilitate the park’s orchards were chosen for known resistance to diseases such as fire blight, scab, mildew and cedar apple rust,” he said. “By using resistant varieties, the park hopes to lessen the overall potential output of harmful pesticides.”

Since 2003, approximately 48 acres of historic woods, 28 acres of historic thickets and 28 acres of riparian buffers have been rehabilitated or established throughout the park. The park used a strategy to saturate the areas through a high-density planting using small bare root trees. It was decided that woodlands would be replaced using 680 trees per acre, Bolitho added.

“If we had an approximate survival rate of 60 percent (400 trees per acre) of the total trees planted, this would be a sufficient number of trees to begin regenerating a forest,” he said. “It was also decided that successional tree species would be used to begin regenerating a woodland because they are better adapted for growing in warmer soils exposed to higher amounts of sun. To rehabilitate thickets and riparian areas, 1,200 shrubs were planted per acre. It was important to the park that these areas receive a heavy planting that would quickly establish a woody appearance. The soils in all these areas were evaluated for wet/dry characteristics, and trees species were chosen and planted in the soil types that they were better suited for growing in.”

Irrigation needs are one of the most limiting factors on new plantings, said Randy Hill, supervisor of the Landscape Preservation Branch, Gettysburg NMP.

“We have limited water sources throughout the park, so most of our irrigation is done by hand with a water buffalo,” said Hill. “Fortunately, we have a good climate in this region which takes care of the majority of the watering naturally.”

Trees are consistently monitored for disease, insects and other

factors that could cause death or decline in the park’s trees. Issues concerning trees are correctly identified before any action is taken, and treatment options are evaluated to best resolve the given situation in an environmentally sound way.

According to Bolitho, a typical orchard day may include monitoring the approximately 117 acres of re-established orchards for damage from deer, rodents or insects and disease.

“If necessary, tree guards are installed or replaced,” he said. “The fruit trees are checked for browsing, and deer deterrents are hung from the trees to discourage browsing from becoming excessive on the young fruit trees. Throughout the season, the trees are consistently monitored for insect and disease problems. Monitoring usually occurs when doing other work activities in the orchards such as pruning and mowing or drive-by observations when an employee observes something that may be out of place.”

## COMBATING INVASIVE PLANT SPECIES

Another major factor for the rehabilitation and maintenance of Gettysburg NMP is combating invasive plant species such as multiflora rose, Japanese barberry, ailanthus and mile-a-minute.

“We have a layered and an adaptive management approach to combating invasive plant species in the park, which means we have a priority list of target species,” said Bolitho. “However, if we discover a threat through Early Detection Rapid Response, the priority may shift.”

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Photo provided by Gettysburg National Military Park

Some of the steps that have been taken to combat invasive plants include the following:

- \* Identify the top-10 most highly invasive plant species within the park.

- \* Understand the plants' biology to determine the best approach to either eradication, if possible, or control. This may be through mechanical means, or through chemical controls.

- \* Identify the long-term goals of landscape rehabilitation and ensure that invasive plant control is conducted in coordination with these activities. "Prior to opening the tree canopy, which will allow more sunlight to reach the forest floor and encourage seedlings to sprout more readily, we target invasive plant species (within those woodlots) that have characteristics to out-compete native species," said Bolitho.

According to Bolitho, current documentation indicates that there are probably more than 700 species of vascular plants in the park, with some 200 of those being non-native.

## ADDRESSING PROJECT NEEDS

Gettysburg NMP has a current year-round maintenance staff of 28 permanent employees and a seasonal staff of 26 that grows the total to 54 employees.

"At the height of the season, we have 21 employees devoted to cultural landscape care, 18 employees devoted to historic structure care, nine employees devoted to monument care, and six employees that work on the administrative requirements of the program," said Marc Pratt, chief of maintenance, Gettysburg NMP.

The staff includes professionals with a range of specialties, including facilities operations, safety, budgeting, maintenance, engineering, tractor operation, maintenance, gardening, labor, welding, automotive work, exhibits, preservation, masonry, carpentry, electrical, plumbing and more.

"These varied professionals take care of over 6,000 acres of land, 150 historic structures, and 1,200 monuments," said Pratt.

According to Hill, the majority of the work performed is done using an in-house fleet, but some pieces of equipment are rented when the need arises. The frequency of use of an item determines whether it is better to rent or purchase the equipment.

"Each equipment operator is responsible for the day-to-day maintenance of that item," said Hill. "We have a mechanic on staff who performs diagnosis and repairs on equipment beyond

the scope of routine maintenance. Service intervals are performed according to the manufacturer's recommendations."

Gettysburg NMP utilizes several different equipment dealers locally and regionally due to its use of a diverse range of equipment brands, and also to spread business throughout the region.

With regard to plant stock, much of the bare-root tree and shrub stock is purchased from several nurseries located in the Mid-Atlantic region, said Bolitho. Purchases are dependent on the extent of species availability and quantity from individual nurseries.

"Native seed is used to rehabilitate open areas such as fields, pastures and wetland areas," he added. "In the early years of grassland rehabilitation, the park purchased native grass seed varieties through local seed suppliers. Additionally, the park cooperatively worked with Fort Indiantown Gap north of Harrisburg, Pennsylvania, to plant bio-types that are indigenous to this area of Pennsylvania. However, in recent years, volunteers have assisted with collecting native grass and other native herbaceous seeds in the park for use in our rehabilitation efforts. Seed from native shrubs has been collected and used in thickets and riparian areas to supplement riparian plantings."

## AN ONGOING EFFORT

The Gettysburg NMP GMP/EIS project involves continuous effort, and includes not only major rehabilitation efforts, but also day-to-day maintenance of the park.

"Winter is when we perform the majority of our tree work, field mowing, and preparing equipment for the spring and summer," said Hill. "In the spring, summer, and into fall, mowing, trimming, brushing, and fence repair/replacement are daily occurrences. When the grass is growing quickly, a typical day would be to get on the tractor and mow roadsides all day, or get a string trimmer and trim all day. But when the grass slows down, you could build a fence one day, and the next day be working with a volunteer group on a special park project."

Bolitho added that managing erosion along park avenues and trails is one of the park's routine concerns.

"Recently, the park completed a site-specific cultural landscape report that addresses erosion issues of the Little Round Top, as well as many other landscape features important to that area," he said. "Designing better trail alignments and using appropriate surfaces for traffic are just some tools that will help to reduce erosion in this one area."

And, according to Lawhon, the Gettysburg NMP GMP/EIS project has also enhanced Gettysburg's natural environment. Some of the environmental benefits of the project include:

- \* Increasing grassland areas to increase habitat for grassland species such as Upland Sandpipers, Meadowlarks, Loggerhead Shrikes and Least Shrews, many of which are state-listed species of special concern.

- \* Removing cattle from key pastures with streams and wetlands to reduce soil compaction, erosion, excess nutrient loading, and ground cover loss, as well as improve water quality in the park and the Chesapeake Bay watershed.

- \* Delaying the cutting of hay to allow ground-nesting birds such as



Henslow's Sparrows, Bobolinks, and Grasshopper Sparrows to thrive.

\* Removing exotic plant species to provide opportunities for re-establishment of native plant species.

July 1-3, 2013, will signify 150 years since the largest battle ever fought in North America. Over much of that time, historic topographic features and their significance had been lost. As a result, visitors and historians could not fully understand the Battle of Gettysburg. But through their continuing efforts, the staff members at Gettysburg National Military Park (NMP) are undoing the effects of time, and realizing the goals of the NPS to preserve the features that were significant to the outcome of the Battle of Gettysburg. Because of their work and attention to detail, current and future generations can better understand this historic event.

John Kmitta is associate publisher at Green Media, and editor of Landscape and Irrigation magazine and Arbor Age magazine.

Green Media editors Eric Schroder and Steve Noe contributed to this piece.

Special thanks to the National Park Service and Gettysburg National Military Park for the wealth of background information that made this feature possible, as well as for their special assistance on site at Gettysburg National Military Park.

For more information, visit [www.nps.gov/gett/index.htm](http://www.nps.gov/gett/index.htm) or [www.gettysburgfoundation.org/](http://www.gettysburgfoundation.org/)



▲ **RANDY KRICHTEN**, orchard manager for the Gettysburg National Military Park, poses in front of "The Barn with the Bullet Hole" as it is known to the locals; it also is known as "The Trostle Barn." The hole is just below the diamond-shaped patterns in the brickwork. It was near this barn that General Dan Sickles lost his leg to a Confederate cannonball.  
— Photo by Eric Schroder

## Pruning for Historic Appearance

As part of the overall battlefield cultural landscape rehabilitation described in the 1999 General Management Plan (GMP), Gettysburg National Military Park (NMP) has been systematically reintroducing orchards into the cultural landscape.

A primary goal is to manage the orchards to achieve a historic appearance rather than fruit production. Pruning in these orchards is limited to the removal of dead and diseased wood, crossed branches, and other conditions that threaten the health of the tree. Pest control has been modified to treat only those pests that threaten the health and structural stability of trees. It is believed that these actions will have a positive impact on the historic character and appearance of orchards, and also reduce possible safety concerns for visitors.

In 1847, the influential agricultural writer Andrew Jackson Downing published his "Fruits and Fruit Trees of America." This occurred at a time when farmers were taking up commercial orcharding as a vocation more than any other time in American history. During this era, farmers were planting at least a handful of fruit trees for subsistence and/or curiosity. Nearly every farmer on the battlefield had a small orchard of some type. Many of these were for home use, with occasional surpluses being sold at market. Downing believed a lack of pruning helped to promote the longevity of an orchard. He also believed "high heading" the tree canopy kept fruit out of the reach of cattle and swine (Dolan, 2009).

During the mid-19th century, most fruit trees had a rounded head, and were un-pruned, with a 4- to 6-foot-high trunk before the first scaffold branches (Dolan, 2009). When several orchards were first being established, Gettysburg NMP began experimenting with pruning techniques to achieve an historic appearance. Staff used historic photographs taken during and after the battle to guide its efforts.

Structural pruning begins when the trees are first planted, and this initial

pruning begins to establish their mature appearance. The young trees are pruned back to a height of 3 feet. Limbs that are broken and those with narrow crotches are removed, and the scaffold branches are shortened to approximately 15 inches. Reducing the tree's height and shortening the scaffold limbs stiffens the branches so they are able to support the weight of new growth. As the trees grow for the next 5 years or so, they are pruned aggressively in order to train them to have a strong central leader and to set up the structure of the scaffold limbs. The limbs are pruned to remain relatively horizontal to the ground, so they do not interfere with the limbs growing further up the trunk. The trees are pruned to a pyramidal or Christmas tree shape, and as the trees grow, the lower scaffolds are removed and the limbs are pruned to keep them flattened. Again, limbs that are diseased, dead, growing up or down, or growing toward the trunk are removed so they do not interfere with each other.

As the trunk is raised to the desired height of 4 to 6 feet, the trees are left to grow naturally, and their appearance takes on a rounded head. At this point, the trees will no longer need to be pruned, and eventually the trees will take on their own characteristics and shapes. The only pruning that will be necessary from this time on is to remove crowded, dead or diseased branches.

*Sidebar provided by Gettysburg National Military Park and the National Park Service.*

*Resources: Dolan, Susan, A Fruitful Legacy: A Historic Context of Orchards in the United States, with Technical Information for Registering Orchards in the National Historic Register of Historic Places, U.S Government Printing Office, 2009.*



# Tips from the front lines on how to save money

*Editor's note: We asked STMA member turf managers for some tips on saving money in maintenance practices. Here are the responses we received:*

## **RICH WATSON** Grounds Supervisor/ Middle School Foreman Pine Hill (NJ) Public Schools

Every penny counts, so goes the saying. Over the past few years that statement more has really rung true. There have been a few money saving moves that we have made here in Pine Hill. School districts have a lot of weekend activities going on regularly. Most of the activity occurs on Saturday for us. About 10 years ago we hired a Tuesday-through-Saturday groundskeeper that covers many of those events. Sometimes for larger events we still need to bring others in for overtime but the bulk of the events are covered by the overlap shift. It also allows us to get some mowing tasks around the buildings done that are difficult to do while school is in session. Nothing is a perfect solution, but it has saved some money previously spent on overtime.

Another money saving option is to enter a shared service agreement with your local municipality or school district. In our case, we provide field maintenance such as fertilizer/pesticide applications, aeration, seeding and infield maintenance for our town facilities and in return they help us out with leaf removal and use of larger equipment. These sound like small things but over time they add up.

## **DAN BERGSTROM** Director, Major League Field Operations Houston Astros

It is wise to shop around and get multiple bids for purchases. Negotiate lower prices using all bids as leverage if necessary. Another idea regarding soil and tissue tests: Knowing exactly what nutrients are available in the soil and present in the plants can save money or redirect dollars to the needed nutrients. Your end result is stronger turf, which starts an entirely new cycle of saving money.

## **GREG BURGESS** Head Groundskeeper Greenville Drive

We will spray a PGR once we are about 90% Bermuda to help reduce clippings. This cuts our costs as we are mowing just about every day either way during the ball season.

Probably the main way I reduce costs is borrowing equipment that I would normally rent or pay for someone to perform the practice. For example, I have a couple good friends that are local golf superintendents at some pretty nice courses, which means they have a lot of equipment. I have a great rapport with these guys. Our saying is "Mi casa es su casa" (My house is your house). My favorite piece of equipment is a walking aerifier that I can use often on all my tight and more sensitive areas like my infield and foul territory, where the golf course is only using this particular unit once a year to aerify tees. Also, I reduce rental costs for several other pieces of equipment, like sod cutters, box blades, sod layers, dump trailers, etc.

## **RYAN WOODLEY** Head Groundskeeper Trenton Thunder

When I arrived in Trenton this season I inherited a trade deal with Jacobsen that allows me to have access to an aerator and core sweeper up to five times a season. Along with that I can demo almost any equipment I want for a few weeks. In return Jacobsen gets a field day and a suite for a game. Since the stadium is owned by Mercer County, it allows me to get my equipment tuned up and reels sharpened during the season.

## **CJ LAUER** Director of Grounds McDonogh School (MD)

We have 850 acres that I am responsible to maintain. Cutting maintenance costs and man hours is always a factor. We employ a lot of the tried and true methods such as using PGRs in our liquid fertilizer applications; we also use poly-coated fertilizers that give us a long, slow release through the season, and we have created no-mow and naturalized areas to cut down on our mowing of less trafficked areas around campus.

## **MATT ANDERSON, CSFM** Sports Turf Project Manager University of Arizona

I've saved dollars in the past by making some of my own tools. Main examples are: chalk stencil for batter's boxes, topdressing brush (old broom heads and some plywood), various nail drags and my own mound gauge.

## **MICHAEL HOPKINS** Agriculture Instructor Louisa County (VA) High School

I am in a different role from most turf grass managers since I teach Turf Grass Science and have my students help take care of the athletic fields on the high school campus. So what I can give you is this: That by having a student crew, plus my knowledge and expertise as a turf instructor, our school system saves a lot of money on labor plus has some of the best maintained fields in the district.

It's also a win-win from the standpoint that my students gain a lot of real life, hands-on skills through their participation in class. We also have a great working relationship with Parks & Rec and the schools maintenance department by sharing equipment and resources. So, in short, a partnership between the Turf Science program, Parks and Rec and the maintenance department can save everyone involved money while benefiting each group in other ways also.

## **BRANT WILLIAMS** Manager of Athletic Facilities Dallas Baptist University

Three things that we have done here at DBU to keep cost low is first, lease our reel mowers and Gators from John Deere Austin Turf and Tractor. This has help reduce maintenance cost of equipment, keep us under a warranty, and we can always count on new mowers every few years. Working with your mower supplier they can fully customize a lease to fit your budget.

Secondly, we have made investments in our own topdresser and core cultivation equipment whereas we use to subcontract these services out. Last, we use equipment rental companies to the best of our abilities by only renting equipment for the days we will need the equipment and not by the week if at all possible, based on the job. ■



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## Update on drainage for new field construction

**W**HEN LAYING THE GROUNDWORK (on paper, at least) for a new synthetic turf field, a new owner has the opportunity to create the field of his dreams. The array of options available can bump up the ‘wow’ factor of any facility, including upgraded seating, a press box, a high-tech scoreboard and facility-wide WiFi.

So where does drainage come in? (crickets chirping)

Unfortunately, because it’s invisible (but still represents a significant investment) drainage just might fall to the bottom of the priority list if an owner isn’t knowledgeable. But as field builders will be glad to point out, it doesn’t matter how great the seats are, or how easy it is to stream

results or how nice the scoreboard is—if the field isn’t draining well enough to be playable when the time comes.

“It’s important for field owners to take a long-term approach when it comes to construction,” says Darby McCamy of Sporturf in Dalton, GA.

“Even at the end of the turf’s useful life, when it is time to replace the field” says Ed Norton of Norton, Holcomb and Partners in Birmingham, AL, “the base and drainage system should still be functioning as they were designed to do.”

### MORE THAN SURFACE DEEP

Poor drainage is not just an aesthetic problem, nor is it simply a game-day issue. The usefulness of the

▲ **THIS PHOTO**, taken during construction of a sports field, shows piping at the entrance to the drainage chamber. Note the crushed rock beneath the pipe, which helps filter water vertically. All photos courtesy of Stantec, Boston, MA

field and its long-term performance hinge on the dependability of the drainage system. When water remains on the subgrade for too long, it may cause the subgrade to become unstable and allow the base to move. It may even allow water to back up through the base and onto the surface, washing out the infill or stretching the carpet.

### WHAT FALLS ON THE SURFACE...

Synthetic fields generally drain well, but not without help. Ideally, the only water to fall on the field should be rainwater or water put on by the irrigation/cooling system. Make sure water does not drain, run or drip onto the field from a track, or from bleachers, dugouts, overhangs that cover seating or any other source. Because water that enters the field in these ways may carry silt and other particulates, it has the potential, over time, to cause problems with the drainage system, and the playability, of the field itself.

Site drainage; that is, the drainage that works around the outside of the field itself, may include interceptor drains, catch basins and retention ponds, as well as other measures used to harvest and disperse storm water. For now, though, the focus is on the subsurface drainage systems; that is, those that are installed beneath sports fields.

An experienced field builder can advise an owner on



# JOHN MASCARO'S PHOTO QUIZ

## Answers from page 17

**THE BROWN RECTANGULAR AREA** with a green center is the result of a party. When the Golf Industry Show was in San Diego this past January, Petco Park (home of the MLB San Diego Padres), located right across the street from the convention center, was a prime location for several events during the show. In addition to hosting numerous tours and some equipment demonstrations, Petco Park also was the site of a large reception put on by one of the major mower manufacturers. The event featured live music, several bars, tables and chairs set up in the infield and the outfield. Several food stations were also set up at various locations around the field. The rectangular area in the photo was where one of the more popular food stations was located and the green area is where a table and a grill were located. The brown area was caused by people standing to pick up their food. The sports turf manager was not upset about the damage as the field was scheduled for a complete renovation about 2 weeks after this event was held. ■

*Thanks to Luke Yoder, Sports Turf Manager at Petco Park in San Diego, for allowing me to take these pictures.*

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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▲ **A LAYER OF AGGREGATE** is smoothed into place as part of the field construction process.



▲ **LEFT:** This cross-section shows the flat underdrain prior to installation in a field under construction. **RIGHT:** Sports field under construction showing the gravel drainage material.



▲ **FINISHED FIELD**, showing new turf surface and game lines.

the various options available, and can give guidance on which choices best suit the site, the climate and the intended use of the field. Also on the list of considerations: the financial resources and commitment of the owner, time constraints for field construction, the annual amount of rainfall and when it is likely to come, and local codes and regulations regarding stormwater management.

“The availability and quality of the rock used is important,” adds McCamy, “as it can be expensive to haul rock for hundreds of miles. Be careful of any wide fluctuations in the price of the base when turf prices remain consistent. Pricing that is too low could be a red flag pointing to skimping on quality with a lower grade stone. When that happens, your field stops draining properly and in some cases mini-sink holes can form over time.”

“The stone drainage layer is typically made up of two layers of stone,” notes Norton, “a base stone ranging in size from 1” down to

3/8” and a thin layer of a finer finish stone on top to achieve the desired planarity of the field. The size shape and hardness of the stone is very important. Angular stone will interlock and give the field a more stable base than a rounded stone. The hardness and soundness of both the base and finish stone should be tested prior to use.”

In addition to having a builder’s expertise, a design professional can provide guidance on pipe diameters or the sizes of flat drains, location and distance of laterals, collection systems and storm sewer ties for the drainage system.

(Yes, there’s a lot to this drainage stuff, isn’t there? And we’re just getting started.)

Design and construction of sports facilities is a specific, exacting discipline. It’s not something that needs to be left to the low bidder; in fact, it should never be a ‘cheapest option available’ scenario, whether you’re talking about one field or a number of them. There are many options to finding a good design professional or field builder. The Internet is everyone’s favorite (quickly replacing the Yellow Pages) but another option is to check the American Sports Builders Association (ASBA). ASBA offers a voluntary builder certification program for field professionals.

### DOING THE MATH

To facilitate discussions with your field builder and/or your design professional, you can estimate the amount of water your field will need to handle with the following formula:

Length of the field in feet x width of the field in feet x .623 gallons = gallons of water produced by 1” of rainfall

Drainage products are rated by gallons of flow per minute (abbreviated as gpm), or sometimes as cubic feet per second (cfs).

### TYPES OF DRAINAGE SYSTEMS

To understand what works best, it’s imperative to know what is on the market, since various systems are used.

“It is important to remember that most of the projects being designed today for synthetic turf consist of what is known as a drainage layer of stone (typically 6” to 8” deep) under the entire field,” notes Norton. “This increases the efficiency of drainage by providing another way to move water through the drainage layer of stone and away from the field. Obviously, piping will serve to move water even more quickly to the established collection/exit points. The stone is not just for drainage, but also provides stability for the field.”

**Flat Drains:** One type consists of flat drains, used with or without a wrapping of filter fabric, placed horizontally on the subgrade in a diagonal, herringbone pattern. Because synthetic turf fields drain quickly and have the potential to capture significant amounts of water, internal drainage lines usually can be placed farther apart than for natural grass. Of course, the closer the lines are placed, the more quickly the field will drain and be available for use after rain, but the more costly the drainage system will be.

The rate of drainage also will depend on the depth of the subgrade and the slope of the drains; this is usually .5% - 1%.

**Trench Systems:** An alternate system uses perforated pipes, 4” in diameter, also laid in a diagonal or herringbone pattern. (Larger pipes, around 10”, will be used in the perimeter of the field). Pipes must be sized and spaced correctly by the design professional, de-



pending on the amount of water they should be expected to handle. These perforated pipes are laid in trenches, surrounded by clean stone or coarse sand. In some cases, filter fabric may also be used. The deeper the drains are placed, the slower will be the initial response time.

Whether the field uses flat drains or trenches, water flowing into the drainage system can carry with it silt or clay particles or other contaminants. Therefore, it is important to surround the drainage pipes with clean stone (in this case, clean is defined as being without silt or clay contamination) or coarse sand, both of which help to remove those particles and prevent them from entering the drainage system.

### MOVEMENT OF WATER OFF THE FIELD

Whether a field uses flat or trench drains, both are sloped to the edges of a rectangular field. The drains should extend 10' – 15' beyond the sidelines themselves to an area where the water is deposited in perimeter collector pipes. Depending on the grading plan, the amount of water to be moved and other factors, intermediate collector pipes also may be included in the drainage plan; again, this is an issue where a builder and a field design professional can provide advice.

Placement of collector pipes may depend upon the sport itself. Most baseball or softball fields include intermediate collector pipes starting approximately halfway up the sideline, or foul lines, and running parallel to the centerline. Some football or soccer fields also may

include intermediate collector pipes depending upon the grade of the subbase, the amount of water expected, how quickly the field must be available after rain and other factors. These intermediate collector pipes as well as the drainage pipes move the water to perimeter collector pipes, which in turn move it to a disposal site such as a storm drain or catch basin.

It is important to remember that most of the projects being designed today for synthetic turf consist of what is known as a drainage layer of stone (typically 6" to 8" deep) under the entire field. This increases the efficiency of drainage by providing another way to move water through the drainage layer of stone and away from the field. Obviously, piping will serve to move water even more quickly to the established collection/exit points.

As was mentioned previously, there are multiple systems that should be employed to move water beyond the site itself, and to deposit it into a legitimate collection area. These issues will be discussed in a future article. ■

*Mary Helen Sprecher wrote this article on behalf of the American Sports Builders Association. Available at no charge is a listing of all publications offered by the ASBA, as well as their Membership Directory. For info, 866-501-2722 or [www.sportsbuilders.org](http://www.sportsbuilders.org). ASBA also offers its book, Sports Fields: A Construction and Maintenance Manual, which contains information on sports facilities, from concept to completion.*

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### POST-EMERGENT PRODUCTS

With the industry as a whole being more environmentally aware, especially in sports turf with participation levels so high in competitive and recreational youth athletics, it is expected that companies will move toward active ingredients that offer effective

control and are not harmful. That being stated, it is important to note that every pesticide sold or used has been thoroughly tested for a possible impact on human health and only control products determined to have a reasonable certainty of not being

harmful to the environment or to humans will be registered by the EPA.-Jim Goodrich, product sales specialist, professional products, PBI-Gordon Corp.



#### Blindside herbicide

Blindside herbicide is a new, fast-acting postemergence herbicide offering a unique solution for challenging weeds like dove-weed, dollarweed, buttonweed and sedges in warm-season turf. Blindside can be applied to most types of warm-season turfgrass even St. Augustinegrass as well as Kentucky bluegrass and tall fescue, offering transition zone flexibility. Dual-action Blindside works through both foliar and root uptake to deliver faster control of more than 70 broadleaf weeds and sedges. An optimized combination of active ingredients, Blindside delivers visible signs of control within a week, making it significantly faster than other products. The label allows for a follow-up application under extreme weed pressure or for specific weeds. Blindside can also be applied in warmer temperatures without causing additional stress to turf.

**FMC**

#### Tribute Total

Tribute Total provides broad-spectrum, post-emergent weed control in bermudagrass. Tribute Total is a novel herbicide that provides sports turf managers a complete solution for post-emergent control of the most troublesome weeds including *Poa annua*, goosegrass, dallisgrass, Virginia buttonweed, doveweed, and sedges as well as many other broadleaf weeds. Tribute Total is readily absorbed by the foliage and carried to the site of action in the growing points of the susceptible plant. The unique combination of active ingredients in Tribute Total replaces the need for tank mixing multiple products to achieve desired weed control.

**Bayer Environmental Science**

#### Q4 Plus

One of PBI Gordon's best herbicides formulations for sports turf is Q4 Plus. It is a combination of 4 active ingredients (2, 4-D; dicamba, quinclorac and sulfentrazone) and offers broad spectrum weed control. It is very affordable and safe to use on cool-season and warm-season turf. It controls broadleaf weeds and grassy weeds so it makes it kind of an "all-in-one" option for sports field managers. Sports fields are made playable because of weed control.

**PBI Gordon**



#### Monument 75WG herbicide

The post-emergence, broad-spectrum herbicide Monument 75WG from Syngenta controls all major sedges and key weeds that frustrate professionals in a water-soluble, pre-measured package, with two application options, broadcast or spot treatment. Monument 75WG controls all major sedges and more than 40 other weeds, including key lawn weeds on warm-season grasses. Monument 75WG is conveniently packaged in new individual 0.5 gram pre-measured packets. Simply add the water-soluble packet to two gallons of water in a backpack or handheld sprayer.

**Syngenta**

#### Combo product from Lebanon Turf

ProScape 19-0-6 40% MESA with LockUp and .17 Dimension is the ultimate combination product that delivers extended feeding to the plant with MESA, while providing post-emergent control of perennial broadleaf weeds and annual grasses with LockUp, and pre-emergent control of annual grassy weeds with Dimension. Labeled for use on established residential lawns, golf courses, parks, sports fields, commercial buildings and any other turf situation where eliminating existing weeds and preventing new weeds is highly desirable. This time saving product successfully performs three specific jobs with one simple application.

**Lebanon Turf**



#### XONERATE herbicide

XONERATE Herbicide doesn't just manage or suppress *Poa annua*, it eliminates it. Studies have shown XONERATE to be 90% effective in controlling *Poa annua*, more than any current product on the market, a major breakthrough in *Poa annua* control. XONERATE also provides greater application flexibility than current products. And by eliminating *Poa annua*, you're also eliminating the time and expense of trying to manage it: Less nutrient and water requirements. Less time spent watering and mowing. And less pesticide use due to a possible reduction in disease and insects. XONERATE allows for selective removal of *Poa annua*.

**Arysta LifeScience**



#### NEGATE, a synergistic post-emergent herbicide

Quali-Pro, a division of Control Solutions Inc., has launched NEGATE 37WG herbicide. NEGATE's synergistic formulation allows turf managers to control more than 35 grasses and broadleaf weeds in Bermudagrass and Zoysiagrass. NEGATE inhibits the growth enzyme acetolactate synthase (ALS), providing fast and complete post-emergent control. NEGATE also allows you the ability to control problematic grasses such as POA, and ryegrass as well as broadleaf weeds. NEGATE attacks grasses and weeds systemically, moving through the plant by absorption through the foliage and roots. The distinct formulation of NEGATE will also control stubborn weed species such as clover, dandelion, henbit, chickweed, and prostrate spurge.

**Quali-Pro**



## Katana turf herbicide

The trend we are seeing in the industry is the move toward low-impact, reduced use-rate active ingredients. Our Katana Turf Herbicide falls into this category. Katana is an herbicide that controls cool-season grassy weeds, broadleaf weeds and sedges in warm-season turf (i.e. bermudagrass, zoysiagrass, buffalograss, etc.). Katana controls these weeds at very low use rates, 1.0 – 3.0 ounces per acre. Katana has been available for 2 years for professional sports turf, but was recently granted use on all sports turf.

**PBI Gordon**

## DIG's new solar-powered irrigation controller

DIG has debuted the LEIT-1, the latest addition to its eco-conscious product-line of ambient light powered, LEIT irrigation controllers. The single station LEIT-1 is unique in that, unlike most other solar controllers, it does not require direct sunlight to operate and commits to using only clean and sustainable energy. It uses SimpleSmart programming technology, which provides smart irrigation control made simple and easy. In addition to the LEIT-1, DIG offers a robust inventory of eco-friendly products like the LEIT and LEIT-2ET controllers, 700 series battery controllers, and key drip irrigation products like their EXCEL LFPB dripline, which is an economical drip emitter line that uses fewer materials without compromising strength or quality.

**DIG Corporation**



## Redesigned Drag King from Newstripe

Newstripe, Inc. has completely redesigned the Drag King infield drag and groomer. Of particular note, the new Drag King uses long lasting, reversible, hardened teeth that are replaceable. This design increases cutting action on hard-packed surfaces plus the teeth will last much longer. It also features a 48" wide cutting path and may be pulled with garden tractors, ATVs or light utility vehicles. Three sections allow scarifying, levelling and final grooming in a single pass. A debris basket catches large stone and trash. The scarifier simply flips over for transport or to level and finish without scarifying. The cutting blade position has been moved to the center section improving levelling of base lines.

**Newstripe**



## Broyhill's Stadium Vac

Broyhill's Stadium Vac is a totally self-contained vacuum for turf vehicles and RTV's. Unit features a new 20.8 HP Honda engine and wireless remote controls for suction hose height

(up-down) and distance (in and out from vehicle). Trash is collected in the 1 cubic yard container and no trash goes thru the impeller. Perfect for parks & rec departments and along bike paths.

**Broyhill**



## Gravely introduces line of three Hurricane Plus blowers

Gravely introduces a new line of Hurricane Plus walk-behind blowers for easy debris clean-up without the hassle of back or arm strain. The Hurricane Plus Blowers are available in the 169cc, 265cc and 404cc Subaru engines. All three blowers feature remote throttle control with an optional remote locking caster. The remote throttle control is located conveniently on the handle near the operator for easy access. Direction and dispersion of the debris can be controlled by the front and side discharge on the blower as well. The blowers are covered by Gravely's one-year limited warranty. Two accessory kits are available for increasing the functionality of the blowers: a hose kit with parking brake and a front swivel caster kit.

**Gravely**



## NutriSmart fertilizer and soil amendment

LidoChem, Inc.'s Performance Nutrition Division is the US distributor of NutriSmart, an environmentally friendly, patented granular biological fertilizer and humate soil amendment developed by CK Life Sciences. OMRI listed NutriSmart interacts with soil and plant roots to significantly improve nutrient balance and enhance the efficiency of root systems. NutriSmart improves turf performance by supplying nitrogen according to plant demand, by releasing "locked-up" P&K in the soil and by improving uptake of both macro and micronutrients. Maintaining adequate levels of soil nutrients results in improved turf color, shoot density and a higher root-shoot ratio. NutriSmart changes the property of the soil through the improvement of soil water holding capacity, soil friability and porosity. It also enhances the soil's chemical and biological properties such as organic matter content and beneficial microbial populations in the rootzone.

**LidoChem, Inc.**



## 10-foot seeder from Kasco

Kasco Manufacturing recently introduced a new 10' wide Vari-Slice seeder. The disc angle can be adjusted quickly to move more aggressively over the ground with rugged cutting coulters to cut through roots, limbs and debris. Other widths of 3', 4', 5', 6' and 8' are also available. These seeders feature a unique metering system for planting a variety of seeds such as Bermuda, alfalfa, timothy, rye and oats. A patented, optional positive feed agitator system is also in a second box to plant native or warm season grasses. Vari-Slice units with a standard seedbox and warm season grass box are able to plant virtually any seed variety.

**Kasco Manufacturing**







# DICK'S SPORTING GOODS PARK, Commerce City, Colorado



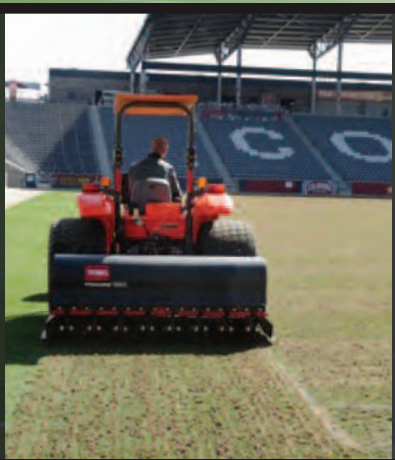


# F.O.Y.

## Field of the Year



- ◎ **Level of Submission:** Professional
- ◎ **Category of Submission:** Soccer
- ◎ **Head Sports Turf Manager:** Bret Baird
- ◎ **Title:** Turf Manager
- ◎ **Education:** Bachelor's degree from Michigan State in Crop and Soil Sciences
- ◎ **Experience:** May 2001-May 2006, Assistant Turf Manager, Denver Broncos; May 2006 to present, Turf Manager, Dick's Sporting Good Park
- ◎ **Other crew to recognize:** Phil McQuade (current STMA Board member); Cody Witham; Manuel Garcia; and Brad Youn
- ◎ **Original construction:** 2006; won STMA Field of the Year Award in 2008
- ◎ **Turfgrass variety:** The field is 100% Kentucky bluegrass. The original sod was grown with the following varieties: Brilliant, North Star, Moonlight, and Blackstone.
- ◎ **Overseed:** Our current overseeding mix consists of 100% Kentucky Bluegrass with the following varieties: Rugby II, Brooklawn, Prosperity, Moonlight SLT, and Orfeo.



- ◎ **Rootzone composition:** 90% sand, 10% peat; field features SubAir forced air soil heating system.
- ◎ **Drainage:** 6-inch drainage pipes on 10-foot centers across field.

Although we made it through the weekend, the field was much more worn than it would have been if we had not weakened 40% of the field by being covered and exposed to extreme temperatures just days before.



## CHALLENGES

One of our largest challenges this year is the extreme amount of practices on our field. Our new coach has stated he would like to train in the stadium the day before every game. In my opinion one practice is more destructive than a game. For example a goal keeper performing practice drills may make 15 cuts in the exact same spot during practice but during a game his 15 cuts are spread throughout the entire goal mouth. Our coaching staff always uses cones for warm-up drills. We work with them on proper placement but all 28 players still cut in the exact same spots opposed to a game where the wear is spread throughout the field.

The timing of practices could not be worse—the day before a game when we have to paint. To combat that, this year we have had to paint the field on Thursday instead of on Friday for a weekend game. The paint for the game is not as bright and the game is played on a chewed up field.

Another challenge this year was a 3 day PHISH concert over Labor Day weekend. The stage was placed on the field directly over a goal mouth. We had a less-than-desirable field covering. Although we specified 100% translucent flooring the suppliers sent us field covering that was two different colors. Sixty percent of the flooring was translucent and 40% was a grey non-translucent. We were not made aware of this until the day before the show when the flooring arrived and by then it was too late to change suppliers. Where the gray covering was we received severe leaf burn from the high temps during the weekend. The field was uncovered on Monday and we hosted an MLS game on Wednesday and two college soccer games on Friday. On Saturday we had US/Canada lacrosse game with practices for each team in the morning. On Sunday we had a season-ticket holder party on the field with various soccer type games and drills on the field for 300 people. Our main concern was extreme wear on the weakened, burnt turf. Although we made it through the weekend, the field was much more worn than it would have been if we had not weakened 40% of the field by being covered and exposed to extreme temperatures just days before.

Year in and year out one of our largest challenges is keeping this field in the best possible condition while also taking care of the rest of the complex. The same crew that takes care of our stadium field is also responsible for the rest of the complex which, beside the stadium field, includes a sand-based practice field, two synthetic fields and 21 native soil fields.

Year in and year out one of our largest challenges is keeping this field in the best possible condition while also taking care of the rest of the complex. The same crew that takes care of our stadium field is also responsible for the rest of the complex which, beside the stadium field, includes a sand-based practice field, two synthetic fields and 21 native soil fields.

Unique to MLS is the length of the season. Our first event was on March 10 and our last event is November 10. Our season begins and ends with the field in dormancy. Our concern during these times is keeping high wear areas in good enough condition that they can re-grow once the soil is warm enough. If we do not constantly monitor these high wear areas and talk to user groups about proper usage the field will never make it out of cold months with enough crowns to re-grow once warm.

**SportsTurf:** What type of turf do you have on your field? What is the soil profile? What would be your perfect turf/soil combination for your “dream field”.

**Baird:** We have 100% Kentucky bluegrass, on a 90% sand 10% peat profile. I have my ideal; the 90% sand 10% peat has been excellent.

**ST:** How do you balance your family life with work demands?

**Baird:** We have an outstanding crew.

**ST:** Did you or are you planning on making any adjustments, large or small, to your maintenance plan in 2013?

**Baird:** No.

**ST:** Did you purchase any new equipment or try a new product this year?

**Baird:** No.

**SportsTurf:** What's the greatest pleasure you derive from your job?

**Baird:** The joy the athletes get while competing on the field when it's in top notch condition.

**SportsTurf:** What's the biggest headache?

**Baird:** Trying to rationalize irrational people.

**ST:** How do you see your job changing in the next 10 years?

**Baird:** Trying to manage turf in a more environmentally friendly way especially in regards to water use. ■

The STMA Field of the Year Awards began in 1988 and are given annually in baseball, football, softball, soccer and sporting grounds in three levels: professional, collegiate and schools/parks. A panel of 11 judges independently scores the applications and the winners are announced at the STMA Annual Conference and Exhibition. Winners receive signature clothing, complimentary conference registration, three night's accommodations and a trophy for display. The Field of the Year Program is made possible through the generous donations of Carolina Green Corporation, Ewing Irrigation Products, Hunter Industries, and World Class Athletic Surfaces, Inc.



# Membership Application

## SportsTurf MANAGERS ASSOCIATION

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Managers Association  
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Employer/ Facility \_\_\_\_\_

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City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Home phone \_\_\_\_\_ Work phone \_\_\_\_\_ Cell phone \_\_\_\_\_

Fax \_\_\_\_\_ Email \_\_\_\_\_

Signature \_\_\_\_\_

Direct Supervisor Name \_\_\_\_\_

### Membership Category:

☐ Sports Turf Manager \$110

☐ Sports Turf Manager Associate\* (Additional member(s) from the same facility) \$75

Please select the primary facility type where you are employed:

☐ Professional Sports ☐ Higher Education ☐ Schools K-12 ☐ Parks and Recreation

☐ Academic \$95

☐ Student (verification of enrollment) \$25

☐ Commercial \$295

☐ Commercial Associate\* (Additional member(s) from the same commercial company) \$75

☐ Affiliate (Person who is indirectly or on a part-time basis, involved in the maintenance/management of sports fields) \$50

☐ Chapter Dues (contact headquarters for amount)  
Chapter name) \_\_\_\_\_ \$ \_\_\_\_\_

☐ Contribution To SAFE Foundation (research, education and scholarship): \$ \_\_\_\_\_

**Total Amount Enclosed:** \$ \_\_\_\_\_

### Payment Method:

☐ Check ☐ Money Order ☐ Purchase Order #: \_\_\_\_\_

Credit Card: ☐ Mastercard ☐ Visa ☐ American Express ☐ Discover

Name on Card \_\_\_\_\_

Card #: \_\_\_\_\_ Exp. Date: \_\_\_\_\_

Signature: \_\_\_\_\_

\*There must already be a national sports turf manager from your facility or commercial member from your company before you may sign up in the Associate category.

*"I know I am a better sports turf manager because of this association. As sports turf managers, we take the challenge seriously to make our fields the best possible for the next game. The resources I have access to through STMA helps me do it."*

— Bob Campbell, CSFM  
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Membership Segment

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[www.STMA.org](http://www.STMA.org)



# STMA Awards Committee highlights process

**THE SPORTS TURF MANAGERS ASSOCIATION AWARDS COMMITTEE** is responsible for judging three awards programs annually. These programs are the Field of the Year, Minor League Baseball Sports Turf Manager of the Year and the Innovative Awards. Each program has its own program rules, submittal procedures and judging criteria.

## Field of the Year

Awards are made in baseball, football, soccer, softball, and sporting grounds in the following applicable categories: schools or parks, professional, and collegiate. Two hundred and fifteen fields have been selected to receive this honor since the program began in 1988. The first field type recognized was baseball fields.

Two years ago this program moved completely online, although applicants are allowed to send their photos on a CD or flash drive to help simplify the process. An online application was desired to make certain that each applicant was judged solely on the information provided, and not the packaging in which it was sent. Some facilities with higher budgets would send in bound books and graphically designed applications. "Moving to an online process has added another element of impartiality to the process," says Andrew Gossel, Awards Committee Chairman. "The committee already independently scores and judges the applications; online strengthens objectivity," he says.

The application requires that a field have two full seasons of play before being submitted. Play can be concurrent. However, the judges desire to have the information in the application reflect the full year of management practices. According to Gossel, "The judges look for those fields that have a comprehensive management program. The field may have had some challenges to overcome throughout the year. We're not looking for the largest budgets, but how well utilized the budgets are in preparing the field for play." Photos of the field throughout the entire year are also required as is membership in STMA.

If a sports turf manager wishes to enter two fields; that is certainly acceptable, but two separate applications will need to be submitted. The

application requires that four Playing Conditions Indices be conducted. "Our PCI is a great way for the judges to understand how a field is playing at a certain point in time considering all of the factors affecting it," Gossel says. "It really is a useful tool for the sports turf manager and for the committee."

When asked what advice he would give to those who are submitting their field, Gossel cites three things: "Take your time with the application and really include thorough information about your field. Watch your grammar and spelling; an application with misspellings and poor grammar is not very professional. Finally, write a compelling reason why the committee should consider your field a winner," says Gossel.

The 2013 Field of the Year application is on line at [www.STMA.org](http://www.STMA.org) under the Professionalism tab. Applications are due October 15. Winners will be notified by November 8. Those who are selected will receive three nights' lodging at the upcoming Conference, a complimentary conference registration, signature clothing, and the award, which is presented during the annual banquet. The winner will also be featured in an upcoming issue of *SportsTurf* magazine and may be featured on the cover.

## Minor League Baseball Sports Turf Managers of the Year

STMA in partnership with Minor League Baseball (MiLB) presents an award each year to the Minor League Baseball Sports Turf Manager in four classifications: Triple A, Double A, Single A and Short Season or Rookie.

The MiLB has a process to select its own sports turf manager league winner. They provide to STMA the 16 league winners; STMA provides the application and criteria to each of the league winners. They subsequently apply for this award. Some of the information they must submit includes photos, narratives on their game day routines, cultural practices, letters from their league president and general manager and their involvement in the industry. All materials are required to be submitted electronically.

The deadline for this program varies; it depends upon the timing when MiLB has all of their league winners identified. Winners are announced in October and are honored during the MiLB Awards luncheon during the Baseball Winter Meetings.

## Innovative Awards Program

This program is seeks to recognize those commercial companies that are advancing the profession of sports turf management through innovation.

Any STMA Commercial member who is exhibiting at the upcoming STMA Annual Conference and Exhibition is eligible to submit one entry annually. The company must display the innovation in its booth and have introduced it for sale between the close of the current year's STMA show and the close of the following year's show.

The judging criteria focuses on if a product, service, equipment or technology enhances the effectiveness of the sports turf manager and/or makes the surface safer and more playable for athletes. When submitting for this award, Gossel advises that the definition of innovative be kept at the forefront. "From our judges' perspective, innovative really means that the submittal is cutting edge and has not been seen before. Slight improvements to existing products are good for the industry, but really don't qualify for this award," Gossel says.

Any commercial member on the committee recuses him/herself from judging this award and is not involved in this program in any way. The Committee may award multiple companies that meet the criteria.

All applications are submitted electronically, and are due by October 15. The application is online at [www.STMA.org](http://www.STMA.org), under the Professionalism tab.

Winner(s) will be kept confidential until announced during the first day of the STMA Trade Show. A special innovative logo has been designed and winners will be able to use that logo in their promotion of the winning product, service, technology or equipment. STMA will publicize the winners through its communication vehicles, STMA press releases, signage at the conference, and with special recognition during the Annual Awards Banquet.

Judging these programs takes the Awards Committee more than 30 hours of volunteer time over a 2-3 week period. Members of the Committee include: Chairman Andrew Gossel, Alan Dungey, Ben Polimer, Charlie Vestal, Chris Ralston, Dean Rush, CSFM, George Trivett, CSFM, Grant Davisson, Joey Fitzgerald, Keith Gorczyca, Lance Tibbetts, CSFM, Matt Anderson, Michael Buras, CSFM, Patrick Coakley, CSFM, Sarah Martin, CSFM, and William McBride, Sr. If any of these members know a sports turf manager who has submitted for the Field of the Year or the MiLB Sports Turf Manager, they reveal that to the Committee and do not judge that particular submittal. Scoring totals are reflected on a percentage basis for this reason.

STMA receives generous support from Carolina Green, Ewing, Hunter and World Class Athletic Surfaces for these Awards Programs. This funding allows STMA to enhance the program each year.

The 2013 Field of the Year application is on line at [www.STMA.org](http://www.STMA.org) under the Professionalism tab. Applications are due October 15.



## A Perfect Fit

**DO YOU WORK PART-TIME** on sports fields or supervise someone who does? Perhaps you are a coach or a parent who helps to care for a sports field? These and others who are indirectly involved in sports turf management can join STMA as an Affiliate member.

Affiliate membership costs \$50 and provides all of the benefits entitled to a sports turf manager member, except that there are no voting privileges. This category is also ineligible to serve on the national Board of Directors.

An Affiliate member has access to the many educational resources that can help with field safety for athletes. The STMA website has resources available when you need them. Members find information on virtually every topic that is important to sports turf management from specific calendars for field management practices by season to how to communicate with your community field providers.

For information on how to join, go to [www.STMA.org](http://www.STMA.org) and click on Join Now, or fill out the application in this issue.

## Thank You, 25+ Year Members!

STMA is very pleased to recognize its long-time members. We are fortunate to have their continued support and involvement in the association. They are an important part of STMA's history and have helped to shepherd the association on its journey for the past 25+ years!

### 32 Years

- STMA's Inaugural Year 1981  
George Bannerman  
Richard Ericson  
James Flynn  
David Frey  
Mike Schiller, CSFM  
George Toma  
Steve Wightman

### 31 Years

- Joined in 1982  
John Fik, CSFM, CGM  
Harold Howard  
Paul Zwaska

### 30 Years

- Joined in 1983  
Mark Hodnick

Brian Petonic  
James Watson, Ph.D.

### 29 Years

- Joined in 1984  
None

### 28 Years

- Joined in 1985  
George Rokosh  
John Souter  
Randy Stoneberg  
George Trivett, CSFM

### 27 Years

- Joined in 1986  
Tom Burns  
Steve Cockerham  
Eugene Mayer

Oscar Miles  
Michael Sexton, CPRP

### 26 Years

- Joined in 1987  
Frank Bowyer  
Rich Ericsson  
Ken Mrock  
Greg Petry  
Peter Van Landuyt

### 25 Years

- Joined in 1988  
John Anderson  
Timothy Burke  
Jim Frelich  
Leo Goertz  
Gil Landry, Ph.D.  
Ted Thorn

Congratulations!

## STMA Affiliated Chapters Contact Information

**Sports Turf Managers Association of Arizona:** [www.azstma.org](http://www.azstma.org)

**Colorado Sports Turf Managers Association:** [www.cstma.org](http://www.cstma.org)

**Florida #1 Chapter (South):** 305-235-5101 (Bruce Bates) or Tom Curran CTomSell@aol.com

**Florida #2 Chapter (North):** 850-580-4026, John Mascaro, [john@turf-tec.com](mailto:john@turf-tec.com)

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# Q&A



BY DR. DAVID MINNER

Professor, Iowa State University

## Questions?

Send them to  
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# Meet the challenge of coaches and mowing heights

*Our game soccer field is a Kentucky bluegrass/rye mix. We regularly topdress our native clay soil with sand and the field was originally constructed on very productive farm land. The competitive soccer season is August through November and April through May. During the non-competitive season, the hot days of north-west Ohio, there is very little action on the field and we are looking for a recommendation on grass mowing height. Our coaches prefer to maintain the field at its playing height of 1 inch. Our grounds staff prefers to let the turf grow to 2 1/2. After gathering various opinions about the benefits of higher cutting height on turf during the summer months; shade to the soil, establishing deeper roots, and improving photosynthetic surface what would your expert opinion be on a recommended grass height?*

Jim Elssner  
Associate Athletic Director for Inter-  
nal Affairs  
Bowling Green State University

A: Mowing height has been thoroughly researched and the relative differences between tall and short cutting heights are well known, as Jim indicated. Justification for a taller mowing height comes through deeper roots, more plant food making photosynthetic surface area, better ground shading that reduces weed competition and lowers soil temperature and heat stress. A follow-up phone call indicated that in past years they have in fact been raising the off season mowing height to 2 1/2 inches in June and July and then gradually reducing the mowing height back to 1 inch over a 3-week period in August. This process has worked quite well and the coaches have been pleased with field playing quality through the fall soccer season.

The old adage "if it ain't broke don't fix it" fits nicely here and the grounds crew certainly seems to have figured out how to make a premium field when it is show time and the season is on. But in this case they are being asked to see if they can up

their game a bit by making the field game ready even during the off season. I don't try to second guess coaches and if they are taking time to pay attention to the field then that is a good thing from my perspective because if they are giving some thought to the field then it is a good opportunity for you to educate them about your job and managing grass.

Despite some of the stereotypes about coaches, they are intelligent, hardworking, and passionate people that want every advantage to succeed at their job; to win games by maximizing player performance in a safe and attractive setting. Coaches that beat the field into the ground with endless repeated use and no regard for the playing surface only to complain that you are not doing your job of providing adequate turf cover feeds this negative stereotype of coaches.

That's not the case here. The coach wants the field mowed at the game ready mowing height of 1 inch during the off season in June and July. I'm not sure why but let's assume it's a good reason to improve his program. One reason that surprised me at this level of college play is that coaches are always recruiting and they want the facility to look at its best even if it is for the simple reason of spending a few minutes with recruits on the field during the off season. Whatever the reason it is important to communicate exactly what you want and why and then be ready to compromise when common sense prevails.

I happen to think field quality and recruiting is a big deal and that more sports turf managers need to include this as part of their field management awareness plan. A recruit kicking the ball around on a slow 2 1/2-inch field can leave a lasting negative impression that just doesn't get the job done. As sports turf managers we sometimes focus only on the health of the grass and forget to realize that we are part of the team, with the same goals to win, by recruiting the best players possible,

and letting them maximize their talent in a safe and attractive arena.

I sound like a broken record but when we all get on the same page then coaches, sports turf managers, and athletic directors have a better chance of knowing when to compromise. If it is not a big deal to the coach then they should compromise because all the science indicates that taller mowing during the summer is better for the grass. But we also know that if they were forced to play soccer during the summer then the grounds staff would certainly find a way to manage the field at 1 inch during the summer. The athletic director must weigh the importance of expending the resources to keep the field at a 1 inch summer mowing height; more labor, more attention to irrigation, more fungicides, and more risk of losing some grass during the summer or starting the fall season with less than desirable turf.

It's hard to argue against the taller mowing better grass strategy but here is a compromise that could work to everyone's advantage and improve the overall quality and stress tolerance of the grass. Primo is a plant growth regulator that slows vertical leaf growth and reduces mowing frequency so this will cut back on summer mowing labor. More importantly less expenditure on leaf production shifts carbohydrate utilization to improve turf in several areas; denser turf, smaller divots, and more roots. Another bonus is that after growth regulation wears off there is a rebound period of extra growth that can be timed to occur during the playing season to speed recovery from traffic. The net result of using Primo is that it will allow the coach to have a field mowed at one inch during June and July and it will also help the grounds crew reduce the need for mowing while at the same time improve summer stress tolerance of the grass. Usually I find worn-out grass in the middle of high use fields but in this situation I'm seeing middle ground with good grass all the year round. ■





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