within the zone of influence of each individual irrigation head to assess any head distribution problems and provide insight into potential causes (Figure 4); and c) assessing head spacing and system performance issues. The software program has been developed as a practical decision-support system to provide information on how uniform is soil VWC status (and all other measured parameters) at these spatial levels and to generate recommend corrective measures or fixes at each spatial level in order to enhance water application efficiency. If an irrigation system is not well-designed, the degree and nature of design flaws are characterized and illustrated. For practical and cost-effective use of multiple-sensor, mobile PTM platform information, decision-support systems software such as described is critical in order for large quantities of data to be processed, analyzed, and presented in a timely manner.

On non-sports field sites, the soil moisture-based water audit would be used to assess water-use efficiency and conservation. But, for sport fields, of most importance is the spatial variability in soil moisture as related to the player safety and field playability factors of soil hardness, traction, and shear strength; while still receiving the other water audit benefits. Plant performance can also be assessed by spectral reflectance (NDVI) and possibly mobile digital imaging devices in the future. Spatial differences in NDVI can be related to traffic patterns (wear and soil compaction aspects) as well as soil moisture distribution.

OTHER PTM APPLICATIONS FOR SPORTS FIELDS
In addition to performance testing and soil-based water audit applications, site-specific cultivation and salinity mapping are other applications of PTM applicable to sport fields. Penetration resistance data obtained at field capacity can determine areas requiring cultivation. The salinity data on sites with saline irrigation water can be used to determine spatial variability of soil salinity and aid in developing site-specific leaching programs. Surface hardness of infill systems has also been investigated on a preliminary basis. Over time, other measurement devices such as the ones identified in the sidebar will likely be developed that will allow other PTM field applications.

Performance testing on sports fields can be significantly advanced by using PTM concepts and technology. Of special importance is to move beyond the practice of sport field “site-assessment” being based on only 4 to 6 sample areas per field and the lack of exploring inter-relationships of soil surface characteristics.

Dr. Robert N. Carrow is with the Crop and Soil Science Dept., University of Georgia-Griffin Campus; Dr. Van Cline is Toro’s manager of agronomics and turf. The authors would like to acknowledge The Center for Advanced Turfgrass Technology for research funds and Kathy Rice of the CATT for her expertise in development of the Decision Support System software package.
ROSS KURCAB, CSFM, turf manager for the Denver Broncos, gave an engaging presentation on “sight turfing” as he calls it, at STMA’s Conference in January. Kurcab shared his observations on how by using their eyes, turf managers can increase their field management skills.

“How do you make critical decisions?” Kurcab asked the crowd. “Because it can be the difference between success and failure.

“There is no operations manual for a field; it’s the only part of any facility that doesn’t have one,” Kurcab said to a nodding audience. “There’s no set standard for doing your job. It’s a cowboy world; you have to figure it out.”

Kurcab said in 26 years he’s never had a turf boss. “I’m a self-taught idiot,” he joked. He said he learns day to day and acknowledged that his situation, managing only one field, isn’t a typical situation for the audience, yet the sight-turfing approach has benefits for multi-field operations.

Several times in his talk Kurcab mentioned Attention to Detail. He mentioned having a back-up plan in case your mower breaks down—do you have a 2nd mower or access to one?

“My style of field management is a daily read-and-react, using my eyes, which I consider my most valuable asset. For example once we had a coyote peeing on the field and it was making the grass greener around the outside of the spot, so I decided it needed nitrogen,” he said.

“You have to know how to look at your turfgrass and develop a working hypothesis on what’s going on with it. When you see something not green, address it. We see green best with our own eyes, it’s been proven scientifically,” he said. “I believe we see green better through evolution because our ancestors recognized green as a food source.”

SUNGLASSES ARE A TOOL

Kurcab called sunglasses, holding up the pair hanging around his neck, “light conditioners” and pointed out the safety factor in wearing sunglasses. He said polarized sunglasses are safe against UV rays, reduce glare and increase clarity. “If you are getting too much glare in your eyes, you are getting too much light; that glare can be coming from your turf,” he said.

“The lens tint makes a difference. I’ve found a green tint provides the best color contrast. Copper, rose and brown lenses are better for sight-turfing, as they minimize the green and blue ‘wash’ and clarify any turf off color,” Kurcab said.

“I call my purple lens-glasses my “plant stress detection” glasses. That color is the best for seeing where it is NOT green. I recommend purple for giving you advanced notice of disease and other potential problems. “Give your eyes time to adjust to the purple lens,” he said. “They work best in bright sunlight and are great for wilt patrol but they aren’t for everyday 24/7 use.”

SIGHT TURFING TIPS

Kurcab shared some ideas on using your vision to improve your turf. “See what you are not looking for,” he said. “Look for tonal contrast and ask yourself ‘Why?’ if anything’s not green. And look at your turf from different sun angles, especially looking toward the sun which gives more tonal contrast.”

“I think you should practice your sight turfing. Don’t do it just on your field but your lawn, when you’re at a park, wherever. Practice seeing the contrasts. Look macro and look micro,” Kurcab said. “Don’t walk
past colors that look off. I try and diagnose ‘every day and in every way’. I get a working hypothesis and try to get an action plan for what I just saw.

“You can’t sight turf unless you know how grass plants grow in soils; you need some education and you can get it online these days.”

He said a turf manager’s job description is basically a “daily update on working hypotheses.” “Your maintenance plan should include a daily read-and-react. Sight turf your field(s) during the game. Watch the play from the knees down. Watch different position players and skill-types. Note the footwear being used. How is the field or pitch performing? After the game, check the depth of the divots whether they are “skates, moguls, flaps, wrinkles or blowouts,” he said.

**TIPS**

If others come to look at a problem, don’t try to sell them on your theory of what’s wrong, Kurcab advised. “Let them have their own diagnosis, maybe it will help.”

Other tips included managing the weakest link on your field; doing no harm—grass often knows how to solve the issue; and remembering sometimes taking no action is the best action.

Kurbac said it’s key to find out if your problem is man-made or natural. “See a straight line of trouble? That’s likely man-made.

Kurbac said when tackling a problem make sure you determine if it is a safety issue, a playability issue or an appearance issue. “Remember in football, it’s between the sidelines that is important. Be sure to consider how much time you have to mitigate a problem if it’s not affecting play. Teach your crew to sight turf to multiply the number of eyes watching the field,” he said.

“The best advice is no good if you can’t execute it though. Try and boil down your plan to a simple sentence. Analyze the effectiveness of past treatments or solutions,” he said. “And always save a spot where you don’t spray when trying a different product; use it as a control spot to check for effectiveness of that product.”

Kurbac urged the audience to use all their senses, with a nod against tasting your turf. But smelling is fair game. “Only sports turf managers smell their own turf,” he said.

He recommended managers use a digital camera and its cheap storage to take a lot of pictures of your turf and to consider making a video as your check your fields that includes a running commentary about the issues. He mentioned the infamous band camp that he wanted to make sure he remembered about the next year.

Kurbac closed by responding to a question about his biggest challenges as a turf manager. “I can figure out the fields; it’s managing people and staying calm in a stressful environment that is most challenging to me.”
Money-saving tips from parks & rec pros

In celebration of National Park and Recreation Month, STMA has asked several sports turf managers who work in parks and recreation to share their top tips for cost savings and effectiveness.

**SHARE EQUIPMENT**

“Working in the public sector definitely has its challenges. The greatest and most obvious is the ever-shrinking budgets and the chore of doing more with less as members of the community still demand services at the highest possible level. One way to help us achieve the continued high level of service is by reaching out to other municipalities in our area by primarily the borrowing of equipment. Whether it is a tractor or an aerator, this practice has been done with 4-5 communities in the greater Portland, ME area for the past 10 years. Individually each community cannot have all the necessary equipment but together it is surprising what is available just by picking up the phone and asking. This version of networking with other communities has helped each community in which they need help to achieve their goals in providing quality services. I would strongly urge other communities to start reaching out to others, whether other parks and rec or even golf courses. Again, communities don’t want to lose services, so it is our job to think outside of the box and keep services at the level community members expect.”-Rick Perruzzi, CSFM, CPRP, Wainwright Recreation Complex, South Portland, ME

**BE TRAINED IN TREE REMOVAL**

“One way we save thousands of dollars throughout the season is through tree removal. I was lucky enough to be trained by a highly skilled tree feller at my old job at a golf course. Since then, I have also taken a 40-hour training session through Stihl Corporation. I have now trained my staff in the proper techniques to fell live, dead and storm damaged trees. Other than situations near power lines, we pretty much handle everything in house.”-Shane Young, CSFM, Prince William County Park Authority, Woodbridge, VA

**INSTALL FENCING FOR SAFETY**

“When fencing for athletic fields is installed, make sure the mesh fabric is fastened on the inside or field side of the posts. This is to soften the blow when contact is made by the player. Also on Little League and baseball fields, the outfield and foul territory fencing should be a minimum of 6 feet high, and the higher the better. This is all to help prevent serious injury from occurring when participants come in contact with fencing.”-Stephen G. Matuza, CGCS, Master Greenkeeper, CSFM and much more, for The Farm at Oyster Bay, Syosset, NY

**USE VOLUNTEERS**

“I do make extensive use of volunteers in the sports organizations for some maintenance like raking the baseball infield areas. And some volunteers have businesses that are willing to donate grass seed and fertilizer throughout the year.”-Dudley Rice, CPRP, CPSI, Solebury Township Parks & Recreation, Solebury, PA

**COMMUNICATE TO REDUCE WASTED TIME**

“Good communication and proper planning with your staff results in the desired result of the work that is to be done. Communicating with your staff about what needs to be done and the time frame that is expected will reduce the amount of wasted time by not having the right tools and equipment for the task. And it will reduce wasted trips back to the shop for anything that was forgotten. Lack of communication results in work not being done to the standard that was expected, along with having to take more time to redo the task.”-Jason Moore CSFM, Tualatin Hills Park & Recreation District, Beaverton, OR

**GOING GREEN SAVES YOU GREEN**

“Convert outside area/security lighting to solar lighting. We are in the process of even placing solar up-lighting at flagpoles. Reduce maintained turf areas to minimize costs (mowing, fertilizer, irrigation, etc). Even categorize the remaining areas as athletic use, multi-use, and passive use to justify changes in maintenance practices.

Reduce the amount of overhead irrigation where possible, use micro irrigation. Change out interior lighting, HVAC, etc to more efficient modern models. There are several grant opportunities still out there for energy conservation.

Stop using huge trucks (3/4 ton and larger) for every job. Replace what you can with smaller trucks and alternative fuel and hybrids.”-Joel McKnight, CGCS, CPRP El Paso General Services Dept., El Paso, TX
A new range of professional artificial turf care machines have been developed by Redexim North America. Known worldwide for their reliable and effective range of natural turf care equipment such as the Verti-Drain®, Redexim North America has produced a complete range of equipment to meet the challenging needs of the artificial turf market.

**Verti-Brush**
The Verti-Brush quickly and effectively levels and distributes applied or existing infill with powerful hydraulic brushes.

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For brushing and striping of artificial turf, nothing beats the proven Verti-Broom. The highly effective triangular arrangement of the brushes will straighten and groom each grass blade for an attractive and realistic finish.

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To brush, loosen and decompact the hardest infill, the Verti-Groom is equipped with a variety of interchangeable tools.

**Verti-Air**
The Verti-Air utilizes a rotary brush and turbine compressed air to lift all material out of the turf, dry and filter the material, sift out the debris and return the clean, dry and decompacted infill back into the turf.

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SportsTurf Management Association
Synthetic Turf Council
The panel began by assuring the audience that some day every synthetic turf field will need to be replaced.

In response to a question on alternatives to SBR rubber infill, the panel cited research saying the crumb rubber is safe and noted that some areas don’t allow crumb rubber as infill, in New York City and Los Angeles, for example. Alternative infills cost significantly more than crumb rubber, it was noted.

Daily of the Bengals said the NFL currently has no policy regarding whether its playing surfaces should be natural turf or synthetic. He advised that if rain is forecast the day of an event on your synthetic field you should cover the field if possible, though Daily noted that he has the luxury of the time and money to do this.

He said he is more aggressive now with grooming the field in Cincinnati, hitting it three times a week during the NFL season. He added that the Bengals also practice on the game field, unlike many NFL teams, and that makes a difference. “I can see the difference if we can’t drag it,” he said.

In response to another question, Daily said wavy lines can sometimes be an issue and recommends using a broom to straighten the lines. He said firm but not hard is the goal and that too much grooming makes the field too soft and not enough grooming makes it too hard. After 7 years, Daily’s field is showing signs of age and its Gmax rating has risen.

Daily also said his field was manufactured before the new monofilament products now in vogue, and that he has heard complaints about “moving infill” in some of these fields at the NFL level. “All fibers are going to lay over regardless of what kind it is,” Daily said.

Putting moisture into the sand and rubber gives players a feel they like, Daily said, they can feel their cleats going in and out and it’s not sticky. “Later in the season I might cut down because there’s already moisture, like if it snows.”

Daily said his field has experienced less static as it has aged. The panel agreed that 8-year warranties are now the industry standard.

When a field is between 8 and 11 years old, if it has been subject to sunlight 365 days a year, the UV rays will start to break down the fibers, Daily said. He said to get maximum years out of your synthetic turf you should groom it less, and that a field’s location also makes a difference. A Texas field absorbs a more intense UV ray than one in New Hampshire, for example, so theoretically the NH field would last longer.

Serensits cited research at PSU, where they have tested shoes on their synthetic turf plots, that showed flat-soled shoes will wear a field faster than cleats.

One attendee wondered if someday there would be an environmentally related tax to pay to process the old infill material. A panel member responded that equipment exists that can remove 65-70% of the old infill; it is cut up and put in a landfill and that he knew of no current issues with that practice.

Another attendee, from Cincinnati, said a nearby cement plant was causing abrasions to his field’s fibers and was told he had to just keep flushing that unwanted material through the

The panel agreed that 8-year warranties are now the industry standard.
The panel expressed more concern about the number of sticks and sunflower seeds and god-knows what else that regularly must be removed from these fields.

Mahonski said at Towson that outside groups, particularly soccer and lacrosse leagues, renting his facility sign for responsibility if the field needs to be cleaned after they use it. The bill to clean the field? Mahonski said about $1,700. He recommended everyone put language doing the same in all their contracts.

Mahonski said he knows a guy who grooms his field every day and that he's wearing out the 4-year-old field.

Cook said manufacturers' manuals most often recommend grooming every 4 to 6 weeks. The GreensGroomer product was mentioned for the second time by an audience member as being an effective groomer. This one said he saves his field from wear by setting the brush height differently and lightens the setting on his machine and also by adjusting the tension.

The panel recommended removing leaves ASAP using air such as a pull-behind blower, to get them off. Handhelds work too, no matter what leaves need to "leave" in a hurry.

A machine from Redexim Charterhouse also was mentioned by an attendee who said its rotary brush helped bring the rubber and debris up off the surface and the rubber is then shaken back out, which works for him. A panelist recommended a magnet attachment to pull out metal, and showed a slide with more than a handful of hairpins and worse pulled from the surface.

STUDIES ON PROLONGING LIFE?

The panel said that infill material gets harder over time and the carpet fibers wear, though it was noted that the newer fields' fibers are wearing better while some questions remain as to their longevity.

Cook said, "After 4 or 5 years, I recommend that once a year you spend the $5,000 it costs for a professional, deep-cleaning service to help prolong your field’s life. You should work this cost into the budget for the project upfront."

This deep cleaning also includes tining of the field and added infill to bring down Gmax numbers. A growing number of contractors nationwide are getting into the business of cleaning the ever-increasing number of synthetic fields being built annually.

The panel cited it is important to have strength and other coaches rotate the spots they use repetitively on the field. Another point was made on the wisdom of a $15,000 fence to protect a $750,000 investment in a synthetic field. Companies are happy to replace damaged, or as in the case in Canada recently stolen, turf but it will cost you.

An audience member said he knew of a 6-year-old field in New Hampshire that had been dragged in the same direction the entire time and was left with a "not good" situation. He recommended changing it up, going corner to corner, side to side, north and south, and don't set the machine to go too deep so as not to disturb the seams, whether glued or sewn. □
MARK FREVER, CSFM, Albion College (MI)
Pre-mow surface with rotary mower that has side discharge or capable of bagging.
Clean nozzle tips or replace worn tips for consistent width of painted line.
From start to finish, pull lines with string, preferably offset.
A local soccer club parent had the idea to reduce the frequency of painting lines—he would just add a touch of glyphosate to the paint. After 2 weeks of painting he reduced the turf but had to continue painting bare soil. Consequently, the bare soil lines became trip hazards until they filled in with weeds.

ALLEN JOHNSON, CSFM, Green Bay Packers
No disruptions from extra activity like team walk-throughs, extra event practices, etc. during application.
Make sure there is drying time and good weather if possible.
Have the correct number of people to do the job right.
I hate to admit this, but I inadvertently painted the “G” on Lambeau’s 50-yard line upside down once. The error was caught by one of our stadium chefs who was looking at the field from one of the luxury suites. I was very, very glad that someone noticed and brought it to our attention with plenty of time to correct the error. Ironically the upside down G looks like an “e” and we happened to be hosting the Philadelphia Eagles. Someone was looking out for me on that day.

DAVID M. PRESNELL, CSFM, Gainesville (GA) Parks & Recreation
A good surface. You need healthy turfgrass that is mowed at a good height.
Be prepared. Always check weather, have all supplies on hand, mix paint properly and paint as close to the event as possible.
Be precise. ALWAYS pull strings/sled & use stencil. Always measure everything and check it twice. Straight lines and crisp logos make all the difference.
I have seen and been a part of all kinds of mishaps. Everything from spilling paint, string getting pulled on wrong side and putting arrows on the wrong side of numbers. The biggest one was when we were painting an end zone logo and someone was blowing clippings off with a tractor and blower. The guys painting went to refill the paint and before you knew it the tractor went thru the logo (not once but twice) and tracked red and white paint everywhere. Thank goodness it was water-based.

SHAUN ILTEN, Home Depot Center (CA)
Make sure all equipment is running properly and have all the required tools needed for the job (tips, measuring tapes, nails/stakes, string, fuel, proper paint etc.)
Double check all your measurements—make sure all your points are accurate and making sure your field is squared.
Proper communication with your staff during the field painting work, which means being aware of each individual task is being accomplished properly.
The worst painting disaster I was involved would have to be when I was painting a standard football field for a high school game. I was painting yard lines when I reached my last three yard lines to go, when I noticed that one of my yard lines was severely angled. One of my co-workers had skipped a marker and went to the next one so one side was 5 yards and the other side was 10 yards! This could have been avoided with proper communication and double checking all my measurements making sure that every yard line that I paint is accurate.

KEVIN MALONE, CSFM, Columbia University
Have enough prior notice from athletics to complete the task when weather and conditions are most favorable.
Ensure the sprayer is in tip top shape.
Using high quality paint.
I would say the worst disaster would be just before my taking this position, the lacrosse lines that are supposed to be painted with removable paint were painted with a permanent product! It took many gallons of Goof Off, paint remover, you name it and many, many hours of scrubbing to finally remove the paint. Columbia only wants football lines on the main fields during the game season. Hopefully that will never happen again!
Krylon® Industrial Line-Up® Synthetic Turf Paint features highly pigmented formulas fortified with optical brighteners for crisp, sharp stripes in one pass. It is also easily removable with our environmentally friendly, non-toxic Line-Up® Synthetic Turf Paint Remover. Whether it's soccer one day or lacrosse the next, striping synthetic turf has never been easier.

So make your mark on and off the field with Krylon® Industrial Line-Up® Striping Paints...we'll help you produce the best-looking athletic fields while increasing your productivity!
Defending your “turf”

A_old joke made its way through e-mail a few years back. It was something like, “You know it’s a bad day when you wake up in the morning, and Mike Wallace and a “60 Minutes” crew are perched on your front porch.”

Well ol’ Mike has retired and, for the most part, you’ll never have to worry about someone else from “60 Minutes” heading to your 3rd base coach’s box and asking what caused that giant mushroom cloud. But the recent explosion of new media outlets combined with the more traditional media outlets has led to a whole new army of reporters who just might be interested in how you handle (or don’t handle) your business. That growth of media outlets has re-emphasized for every potential newsmaker, the importance of knowing how to deal with the media, or as you should think of it, defending your “turf.”

Back when you were much younger (probably only five or 10 years ago), you could assess potential media coverage by considering the local newspaper, the local talk radio station and the local TV news outlet. You knew the reporters by name and by sight, and they knew you. You shopped at the same stores, ate at the same restaurants and told similar stories about how high your golf handicap should be. Ahhhh, life was so simple then.

Then along came the internet and your world turned upside down. You quickly moved into the age of instant news and the self-appointed, citizen journalist. Thoughtful, edited journalism gave way to “seat-of-the-pants” journalism. Fact-based reporting gave way to opinion and commentary. You have now entered a world of bloggers, twitterers and whole bunch of ‘ers that haven’t even been invented yet. Better get ready.

The first step in dealing with this hyper-speed news media cycle is to do what you should have been doing all along—play offense. Most newsmakers love to contact the media when they bring “good news.” Your department received an award from an environmental organization, check. Number of turf-related injuries reduced in the past 12 months, check. You come up with an innovative way of watering the playing fields, check. Those are all valid stories, and you should contact the local media to get the word out.

But what happens when the news is not so good or just downright bad? Many organizations follow a, “if we just don’t feed it, maybe it will go away” philosophy. Toyota and BP pretty much took that approach in recent months. Now that worked well, didn’t it?

Had those organizations taken more ownership of the story, each would have greatly reduced the self-inflicted public relations damage. Yes, the news would have been truly negative in the early days, but maybe, just maybe, if they had a chance to advance their version of what happened, perhaps the media might have seen another side and soft-pedaled some of the criticism. You could argue that would be a losing proposition. And the “just ignore it” plan was not?

In all likelihood you will never face that kind of major crisis. But one way to keep a minor crisis from becoming a major one is to initiate the coverage. Let’s look at some examples that you could encounter: injuries grow as poor lighting hampers your key fields; staph infections develop in players using the synthetic turf fields; or bleachers fail during kids’ soccer game.

If the media get a tip on what happened in any of those cases, you will be playing defense, answering the “How could you ever let that happen?” question. You know what it’s like when a parent or coach decides to escalate something that you think is rather insignificant. Things can get out of hand in a hurry.

Now let’s take a look at how to initiate coverage and frame each of those stories in a more positive way.

• The lighting on River Bend Field is more than 30 years old. We haven’t been able to find parts to repair some of the broken units. As a result the illumination is about half of what it should be. That has led to a number of recent injuries. We need new lights, but that is going to cost more than $200,000. This is a bad time to be asking the city for more money. We may have to stop using that field.

• A local pediatrician recently contacted us and said he had been treating a number of kids with staph infection. He had discovered that all of them were soccer players who play their games on the synthetic surface at Partridge Park. Once he called that to our attention we were able to use a non-toxic chemical sweeper to rid those fields of potential problems. The surface is clean and ready for its heavy fall use.

• Fortunately no one was hurt seriously, but three parents had to seek medical attention when the front row of wooden bleachers snapped during a girls’ softball game. That incident has prompted us to begin inspecting every row of every set of bleachers we have at our 73 facilities. We will have the full inspection completed by the end of the week.

The process follows a very simple formula. Admit the wrongdoing then explain how you will keep it from happening again. If you admit to the problem, it’s very hard for the reporter to keep beating you up over it. Deny the problem, and the reporter will go after you like crabgrass on zoysiagrass.

This all starts from a premise that if you are a part of a story that has legitimate public interest, you have a responsibility to be accessible to the media. This is especially true if you work for a taxpayer-supported, government body like many of you do.

While the process begins with initiating the coverage, your job is far from finished. Now you must handle the interview. Fol-