



Environmental conservation: one sports turf manager's story

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I never thought I would be writing an article with Environmental Conservation in the title, but as I reflect on how sports field managers do their job that is exactly what we are trying to accomplish. We are all trying to create an environment in which both grass and athlete can have success. When it comes to athletes we all make safety our priority. While making the fields safe, we are usually doing something to the fields to help it thrive in the environment in which it lives. Conservation for a sports field manager could include irrigation practices, pesticides, fertilizers, and cultural practices.

IRRIGATION

Irrigation across the country means many different things. Some are being faced with major water restrictions while others of us irrigate freely without much thought given to water shortages. As I have managed multiple fields and systems in the past years, I like to think that I am getting better at conserving water. For

me it started by understanding some of the technologies that are available and not pulling a plug and feeling the soil every afternoon. Instead I started using two particular technologies in tandem; ET (evapotranspiration) rates and a TDR (time domain reflectometry) soil moisture meter.

Using ET can be accomplished a couple different ways. We have our own weather station next to one of our practice football fields that reports the data to our central irrigation system. This allows us to have weather data very close to the facilities that we are managing. Obviously there is some cost associated, but the water we have saved has more than paid for the weather station. We irrigate with city water, so only watering with the amounts of water necessary can save money in hurry.

The other way to use ET is by using your local weather reports. Many of the common weather websites report ET rates for the day. You should be able to see the ET for the day and set irrigation run times

accordingly. Using ET is only effective if you know your precipitation rates of your irrigation system.

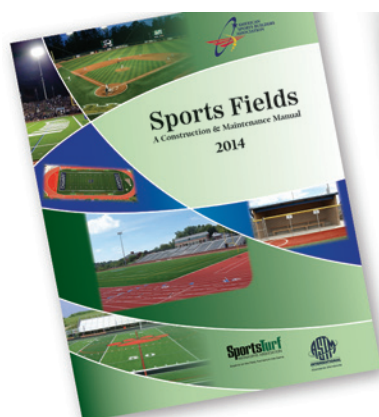
TDR soil moisture probes or TDR soil moisture readers that are placed into the soil permanently are great at giving you an idea of how much moisture is in the soil. Every soil is different, so it takes a little work to understand how to use this effectively to set up irrigation. You will need to figure out what moisture level is Wilting Point and Field Capacity. This doesn't have to be perfect, but getting this close is very helpful. Drying down the field until it wilts and then measuring the moisture level will give you an idea of what Wilting Point is for that soil.

Field capacity is the amount of water the soil holds in its micropore spaces within the soil. This is when the soil is slightly damp and water can be squeezed out of the soil with a little effort. Again you want to be close, not perfect. If you know what field capacity and wilting point for your field are then you can target your irrigation cycles to be somewhere in between those two values. If you irrigate much more than field capacity you could be wasting water going through the soil profile quicker than the plant can use it or its running off the surface in a saturated state. In the real world we probably irrigate slightly above field capacity, but are really just trying to keep the soil at field capacity.

Understanding your precipitation rates for your irrigation

system is very important. I won't be able to give a lot of detail on this in this article for the sake of length, but figuring out how many inches an hour your system irrigates is very important when understanding how to schedule your run times. If you don't know your precipitation rates than you're just guessing with your run times. Guessing could lead to over or under irrigating. Either way it's not an efficient use of water. Auditing your irrigation system isn't terribly difficult if you wanted to do it yourself or there are companies that could do it for you (see *SportsTurf* August 2014 issue, page 30 on how to conduct an irrigation audit). Sometimes spending some money on the front end can save you money on the back end.

If you understand and use ET, TDR probes, and precipitation rates you would absolutely be justified in using the water you do to deliver safe and healthy athletic fields. There are other things like rain sensors and central irrigation that can help make you more efficient as well. The point to all the irrigation tools is to help you conserve water. Remember, you're conversationalists even if you didn't know it. Ask yourself if you do everything you can to conserve water, even if it's readily available. There are times for playability you may abuse water, but that should only be justified for player safety. The rest of the time you should be trying to conserve as much water as possible.



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▲ The outside booms on this sprayer are each their own single zone and are automatically controlled by GPS. This doesn't allow any overlap and closely monitors flow rates and application rates from the operator's seat.

PESTICIDES

The other area where technology has really helped me conserve is pesticide application. Living in the land of corn and soy beans, I was seeing GPS technology being used everywhere. Why not on our fields? was the question we asked. So we built a sprayer (with John Deere's help) that is GPS-equipped. The outside booms are their own single zone and are automatically controlled by the GPS controller. This doesn't allow any overlap which means we never double apply anywhere and can closely monitor flow rates and application rates from the seat of the sprayer.

The other bonus that I didn't expect is that we can now apply at twice the speed we used to and are far more precise. Using this technology shows that we are committed to applying chemicals responsibly and as accurately as possible. It could also lead to pesticide reduction if you have vast areas that you're spraying or struggle with small overlap areas.

GPS technology is not available to all sports turf managers due to costs, but thinking about ways to reduce overlaps and making sure application rates are correct is an important part of being a conversationalists. It is our responsibility to make applications as accurately as possible.

FERTILITY

Another practical area for conservation is fertility. Regular soil tests and plant monitoring is absolutely necessary. Soil tests don't have to be done every year, but they should be done often enough for you to know what's going on with your soil. Fertilizing to specific soil needs is not only going to save you money, but it will also save on nutrient fate in the environment. Each year is different with rain, temps, and field use.

Thinking about all components of what the soil, environment, and field playability will help you justify fertility needs. If you are doing this before fertilizing then you are conserving when you maybe didn't know it.

CULTURAL PRACTICES

Cultural practices are another way we act as conversationalists when we may have not realized. If you are keeping sandy and native soil fields free from compaction and consistent throughout the soil profile you are giving the plants an environment to grow healthy with fewer inputs. If the plants can grow roots and respire more efficiently you will have a healthier grass stand that may need fewer inputs like fertilizers and pesticides. So keep poking holes, pulling cores, and slicing the fields you have. It may save you from disease and other issues that arise when the soil profile is compromised.

Conservation, many of you are already doing it. My hope in writing this article was to share some of the things we do at Iowa State University to help conserve the environment we have. Many of you already conserve, don't be afraid to share those details with your superiors. The general population needs to know that managing natural grass fields is a very specific science and we as sports turf managers take it very seriously. Sharing that we are conversationalists could help change the perception that some people have toward our industry. ■

Tim VanLoo, CSFM, is manager of athletic turf & grounds for Iowa State University and the Higher Education representative on the Sports Turf Managers Association Board of Directors.



▲ Jack Trice Stadium, Iowa State University, Ames, IA.



Rolling with the cool kids

If you really think about it, you could say that athletic fields are the cool kids of turf management. People will drive for hours, pay hundreds of dollars, and brave the worst weather conditions imaginable just to get a seat as close to them as possible. National and international television broadcasts are fixated on them for hours at a time. Heck, athletic fields have even been showing up fashionably late to the turfgrass management party for decades.

» Research has proven that frequent and consistent rolling **can provide a faster (smoother) putting surface**, along with many other benefits that may not seem quite as obvious

Taking a quick look at the methods used to manage both athletic fields and golf course greens, it is rather easy to pick up on the similarities. When you glance a little closer, you'll find that virtually every one of these methods was originally honed by golf course superintendents across the world and then, typically years later, adopted by sports field managers everywhere. Tactics such as stripe mowing, applying sand topdressing, and core cultivation were at one time unique to putting green management and have since become commonplace on virtually every competition athletic field in the world; and because of it, the quality of those fields has improved dramatically!

"So who's showing up next to the party?"

One common management technique used daily (and sometimes more) by managers of golf course greens is routine lightweight rolling. Although, it has yet to gain similar popu-

larity in athletic field maintenance, it is a cultural practice used in managing turf that dates back as far as the 18th century on golf courses. Since this time, and particularly in the last quarter century, routine lightweight rolling has become an essential tool for golf courses. Research has proven that frequent and consistent rolling can provide a faster (smoother) putting surface, along with many other benefits that may not seem quite as obvious (and we'll discuss those a little later).

Although used on occasion during special circumstances, such as alleviating frost heaving or as a part of seeding/sodding projects, a roller is yet to become an everyday piece of equipment on a sports field. A rare field manager might swear by the benefits he or she gets from the consistent use of a lightweight roller, but it is definitely the exception rather than the rule.

Since we're on the topic of cool kids, I thought: Who's funnier, more popular, and just plain cooler than David Letterman? So why not use a Top 10 list to examine whether lightweight rolling might be the next cultural practice that began in golf to become a staple on athletic fields?

Let's take a look at the 2014 Canadian International Turfgrass Conference & Trade Show presentation given by Dr. Thom Nikolai of Michigan State University on his Top 10 Reasons to Roll Course Greens:

10. Alleviate heaving and minimize scalping when climactic conditions dictate.

Nikolai talks about the freeze/thaw cycles contributing to uneven surfaces on golf course greens, and it certainly applies to athletic fields as well. This is undoubtedly the current most common reason for rolling athletic fields. Rolling not only helps to smooth out a bumpy playing surface but it can also protect against scalping during the first spring mowing.

9. Seed bed preparation.

This is another reason that rolling logically translates from golf to athletic fields, where it is certainly time well spent when prepping a site for establishment by seed. In addition, rolling immediately after seeding is a great way to ensure that you achieve the all-important seed-to-soil contact required for germination and nutrient uptake. Similar benefits from rolling can also be seen when establishing an athletic field by sod. Lightweight rolling after sod installation can help create consistent contact between the soil and roots of the new turfgrass.

8. Broadleaf weed, moss, and algae reduction.

Although moss and algae tend not to be as big of a problem on an athletic field as on a low mown putting green, broadleaf weeds certainly are a common menace. Dr. Nikolai's Top 10 list hypothesizes that an increased turf density could help to out-compete unwanted pests such as dandelions and white clover. This could be especially beneficial for managers of school athletic fields who are required to

use little to no chemical herbicides and where they are prohibited by legislation.

7. Decreased localized dry spot.

Research has shown that rolled putting greens experienced less localized dry spot, while the soil samples showed that the rolled plots retained more moisture and had greater root mass than those that were not. On an athletic field, the impact of increased root mass from rolling would be even more meaningful than on a golf course due to its positive effect on turf stability and, ultimately, athlete safety. Preliminary data from an athletic field rolling study at Michigan State University (**Fig. 1**) shows that rolling athletic fields five times per week may potentially increase root mass of a Kentucky bluegrass field maintained at 2.5 cm. More evidence needs to be seen to draw any conclusions on this and it is being evaluated further.

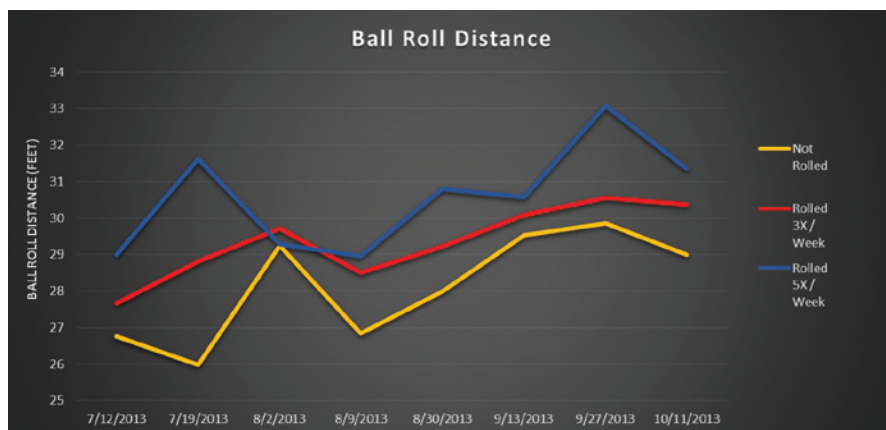


Figure 1. Preliminary data from an athletic field rolling study at Michigan State.

6. Height of cut raised and green speed retained.

Ongoing athletic field research at Michigan State University also shows promising results in regard to the possibility of routine rolling yielding a smoother, faster surface, just as it has on golf course greens. A soccer field gauge, which is essentially soccer's version of a golf Stimpmeter which measures green speed, was used to determine surface smoothness. Plots rolled five times per week were found to be faster than plots that were not rolled (**Fig. 2** on page 14). The thought of being able to create a surface that plays quicker, and more importantly is smoother and more consistent, would have the attention of athletes and coaches in such sports as soccer, baseball, lacrosse, and more.

5. Decreased cutworm activity—maybe!

Cutworms do their damage by feeding on roots and shoots of a turfgrass stand. This damage is much more evident and devastating at lower cutting heights, such as on putting greens, but can even become a problem on grass that is cut at home lawn height (7-10 cm). Anecdotal evidence indicates rolling may decrease cutworm activity on golf course greens and thus lead to a healthier, stronger rooted turf.

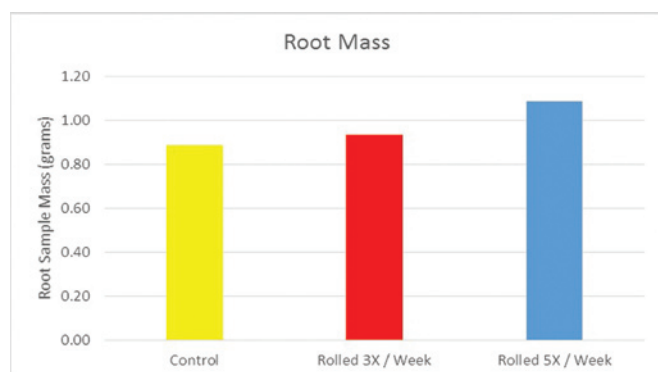


Figure 2. Plots rolled five times per week were found to be faster than plots that were not rolled.

4. Improved topdressing incorporation.

As indicated earlier, topdressing is one of the many cultural practices that athletic field management has adopted from the golf course industry. Sand topdressing needs to be incorporated into the root zone allowing it to serve its intended purpose beneath the canopy. No research has been performed specifically with athletic field rolling, but vibratory rolling after topdressing has been proven to be better for working the sand into the soil profile. Performing your athletic field rolling following a topdressing application might very well add one more benefit.

3. Decreased dollar spot.

One of the most impressive findings amongst the vast amount of research on rolling greens is the continued observation of decreased incidence of dollar spot. With the reason for this phenomenon being rather involved and somewhat intangible, the translation of this benefit to an athletic field setting currently stands at “to be determined” due to the current lack of dollar spot for athletic field rolling.

2. It's the economy (rolling/mowing frequency programs).

Cost savings analyses of greens rolling have focused on a rolling/mowing trade off in which labor, fuel, and maintenance costs are all considered. Alternating rolling and mowing, as opposed to mowing every day, is said to save time and money (both fuel and maintenance costs), while also improving wear tolerance and yielding similar green speeds. If comparable conditions can be replicated with this method on athletic fields, these cost savings could certainly be seen. This tactic could be particularly valuable on fields that do not receive play on a daily basis, and thus may not require a fresh mowing as often.

1. Increased customer satisfaction.

The customer of a golf course, the golfer, is satisfied by many of the same things as the customer of an athletic field, the athlete. Both desire a smooth and consistent surface that will allow them to direct their concern toward their own performance rather than that of the turf. Routine lightweight rolling has been proven, through research and application, to help give golf course customers what they want. There is definitely

some evidence that rolling can deliver the same to athletes.

Now with all these potential benefits, what has prevented the majority of groundskeepers and field managers from joining this rolling revolution seen in golf over the last 20+ years? Just as was once the case in golf turf management, the concern that detrimental effects caused by consistent rolling will negate, or even eclipse, its benefits has caused many sports field managers to balk at the idea.

Certainly the number one concern with consistent rolling of athletic fields is the potential for compaction, and rightfully so. A compacted field can create an unhealthy turf stand, as well as create poor drainage and fields that are unplayable during any type of rainfall. Surface hardness (a measure of compaction) is being observed closely in all athletic field rolling studies at Michigan State. To date, there has been no statistical evidence of any significant compaction (Fig. 3), however if a field manager chooses to implement a routine rolling program, he/she should do so with caution. Compaction is greatest when forces are applied to the wet ground, especially on fields with high silt/clay content and rolling should never be done on saturated soil. Additionally, on any

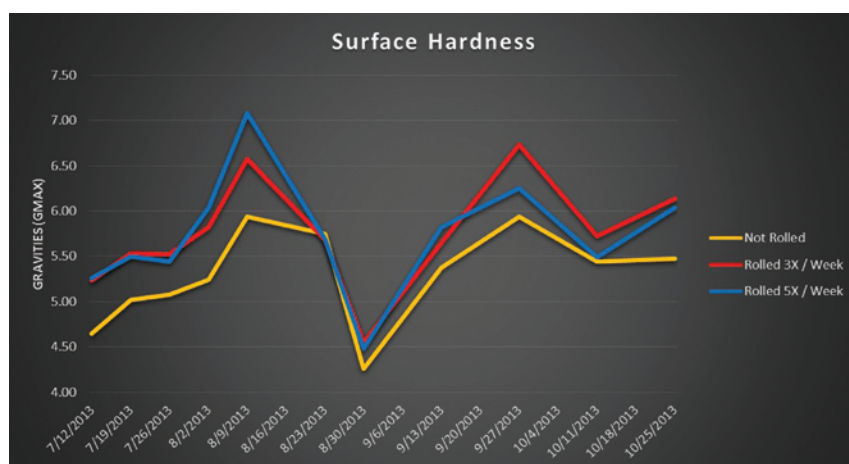


Figure 3. There has been no statistical evidence of any significant compaction.

field where frequent rolling occurs, regular core cultivation/aeration should also be done to counteract any potential compaction that may happen over time.

Furthermore, rolling should be done with extreme caution during potential periods of stress on the turf. Rolling during drought, heat, cold, or disease stress will only intensify or spread the negative effects incurred during these harsh conditions.

Overall, the evidence to support rolling golf course greens is strong and rarely debated. However, there currently just seems to not be enough research and experience for most athletic field managers to follow their superintendent counterparts in this practice. Early research is beginning to show that routine rolling of athletic fields is worth looking into, with more research and in every day practice. Only then will we get the chance to see this cultural practice roll through the door, fashionably late. ■

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RENOVATING Parkview Field in Fort Wayne

Renovation of a baseball field at the amateur, collegiate, or professional level can be a daunting and expensive task. However, when the condition or appearance of a field warrants a “makeover,” dollars should be secondary to player safety, and at the professional level, the overall aesthetics of the playing surface.

In the fall of 2012, Parkview Field in downtown Fort Wayne, IN home of the San Diego Padres Class A affiliate Fort Wayne TinCaps, was the site for a complete field renovation. Constructed in the fall of 2008 for a spring 2009

opening, the field was dominated by *poa annua*. Despite winning Midwest League Field of the Year awards in 2010, 2011, and 2012, the front office, field manager, and city officials (the ballpark is owned by the City of Fort Wayne), agreed that field replacement was necessary.

Planning for the project actually began a year earlier as The Motz Group, the original field contractor, was contacted in regards to a replacement schedule. Pre-renovation planning is paramount in paving the way for a smooth, efficient, and cost-effective agenda. First and foremost, the dollars need to be allocated to do the work. Most complete field renova-





tions of sand-based fields cost in the \$200,000-\$250,000 range. A presentation made to the city's Redevelopment Commission in the fall of 2011 confirmed the dollars for the labor and materials (sod, rootzone, warning track material), setting in motion the process of selecting the sod farm. Graff's Turf Farm in Fort Morgan, CO was selected based on the quality of their short-cut, 100% bluegrass. A July 2012 visit to the farm to inspect the turf plot confirmed everything was in place for the harvesting and shipping that fall.

Furthermore, consultation with our front office on limiting the number of games and events in 2013 played a key part in assuring a successful grow-in. No other baseball games were scheduled besides the TinCap's dates, and other on-field activity was restricted until the fall, giving the field almost an entire year to develop.

Work began on the field the second week of September after the team made a run to the Midwest League finals, and 2 weeks before a major on-field running event the last Saturday of the month that brings more than 10,000 runners to Parkview Field. The entire oblong infield horn (created during initial field installation) was reconfigured, constructing a more traditional 95-foot arc from the mound. This meant removing large amounts of clay and sod from areas to establish the new symmetry. This work was all done by the grounds crew with a 3-ton mini-excavator and a lot of hand digging and edging.

On October 1 The Motz Group moved in with their Koro Field Topmaker and began stripping and grinding the existing sod layer. The Koro conveyor shoots the pulverized material into trailers pulled by tractors to get the debris off-site. More pre-planning put in place bagged meters and traffic control devices to block off a lane of parking and traffic on the road adjacent to the field ramp. From there, 700 cubic yards of material was hauled away thanks to a large front loader and 30-35 dump truck loads.

As the sod was stripped from infield, baseline, and warning track edges, re-working of all edges was done with hand spades by the grounds crew. This is the only chance you ever get to create a new edge, and meticulous attention and time was spent to make the rootzone, clay, warning track transition zones as perfect as possible.

All 88,000 square feet of sod was stripped in 2 days. As the rootzone was exposed, 70 tons of new 92% sand, 8% peat was brought in and laser graded. The infield turf area was dropped from a .1% grade to level, and all the outfield and sidelines were laser graded to spec. At this point we were ready to sod, but . . .

» A total of **22 trucks** bearing anywhere from 20-22 rolls made the hike to Fort Wayne.

With an extremely high content of *poa annua* infestation in the field, the decision was made to fumigate the entire turf area before the new sod was brought in. Using Basamid (dazomet) dropped from a 36-inch drop spreader, a 10-day window was allowed to kill off any remaining *poa* seed or plant material. Fumigation is based on soil temperatures and moisture. Moisture causes the release of vapors which penetrate the soil particles and upon contact, kill plant matter, seeds, insects, and anything living. The higher the soil temperature, the faster it works. Because dazomet is a restricted product, application was made using a respirator and full Personal Protection Equipment (PPE) attire. Additionally, barricades and posted signs around the ballpark restricted access to the field area as gases were emitted.

After a 10-day fumigation window, work resumed on October 15. Before that, an organic granular starter fertilizer (5-6-6) was applied on the exposed rootzone at a rate of 10lbs/M. The maxi-rolls of Graff's short cut bluegrass began to arrive on flat bed trucks from Colorado, which was a 1,070 mile one-way trip! A total of 22 trucks bearing anywhere from 20-22 rolls made the hike to Fort Wayne. Assistant groundskeeper Andrew Burnette off-loaded the rolls with a skid steer and The Motz Group crew went to work, rolling out sod and pulling in seams. The TinCaps grounds crew concentrated on perfecting edges while Motz laid "the carpet." At the end of Day One, the infield and skirts were completed. After waiting on the intermittent arrival of sod trucks, it took 2 more days to finish the outfield. When all 88,000 square feet of new sod was in place, another round of granular starter fertilizer (5-6-6) went down at the same rate. A couple of days later, we began our foliar fertility with a good dose of micronutrients, potassium, and magnesium.

October 22, 22 tons of DuraEdge Pro infield mix arrived for infield lasing grading. The skin and base paths were pulverized with a Blecavator, the infield mix was worked in, laser graded, and rolled. An additional load of warning track material (crushed lava rock) was distributed on the edges to bring all the new turf edges flush.

Our fall granular organic program commenced two weeks later with a 21-3-7, followed by two more foliar applications in November,



and finally another 21-3-7 granular in early December. A shot of PCNB before the first major snow fall had us prepared for winter and the establishment of some good root mass.

Excellent color remained in the turf until time for the January

surface and intrinsic beauty that should be the goal of every sports turf manager. ■

Keith Winter is head groundskeeper for the Fort Wayne TinCaps.



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