Management

Digital Guide TO GRASS FIELD MAINTENANCE



PARTICIPATING COMPANIES:











Benefits of NATURAL GRASS SPORTS SURFACES

by Jerad Minnick

Turfgrass can be found on lawns, athletic fields, golf courses, parks, roadsides, and many other natural and recreational areas. The benefits of natural turfgrass surfaces continue to grow with ongoing research. Turfgrass areas have been shown to provide environmental, economic, and health and community benefits. Let's examine those positives.

Natural grass is just that...natural. The environmental benefits of natural grass are numerous. Even the U.S. Congress has acknowledged the positive benefits of the natural grass to our environment. "Turfgrass in urban areas and communities can aid in the reduction of carbon dioxide emissions, mitigating the heat island effect, reducing energy consumption and contributing to efforts to reduce global warming trends."

Air Quality:

Turfgrass is a living organism. Each and every plant takes in carbon dioxide and converts it into simple sugars to use as food through the process of photosynthesis. As a result of photosynthesis, oxygen is released into the atmosphere. In a single day, a full-size 2-acre soccer field will produce enough oxygen for 128 people. That same field will remove 1840 pounds of carbon dioxide from the atmosphere in a year. To put that in perspective, removing 1840 pounds of carbon dioxide equals the amount of carbon dioxide produced by burning 97 gallons of gasoline. Because of this, Dr. Thomas Watschke of Penn State University stated in "The Environmental Benefits of Turfgrass and Their Impact on the Greenhouse Effect" that "the strategic use of turfgrass is the most sensible and economically feasible approach to countering the greenhouse effect in urban areas." In addition to reducing carbon dioxide, turfgrass traps an estimated 12 million tons of dust and dirt released annually into the atmosphere.

Pollution Filter:

In 2013, an EPA Chesapeake Bay Program panel of experts concluded, based upon a review of all the science and research done on the topic, that a "dense vegetative cover of turfgrass" reduces pollution and runoff. More precisely, the average soccer field can absorb 50,000 gallons of water before runoff occurs. The fibrous root system stabilizes soil to reduce erosion and prevent the movement of sediment into creeks and rivers. Additionally, studies have found that turfgrass reduces noise pollution up to 40%.



Stormwater Management:

Green spaces protect lakes and streams by providing stormwater management. Landscaped areas reduce pollutants from leaching through the soil into the water supply or from entering surface water runoff. Turfgrasses filter stormwater runoff and reduce sediment, nutrients, and other pollutants from entering water bodies.



Heat:

Environmental heating is reduced by turfgrass. On a hot summer day, a grass field will be at least 30 degrees cooler than asphalt. The overall environmental cooling effect of turfgrass can be understood by comparing it to air conditioning. The average home has an air conditioner with a three or four ton capacity. A single high school baseball field provides up to 70 tons of air conditioning. This cooling effect is beneficial for athletes and also for reducing electrical needs for buildings and homes.

Wellness and Stress:

Green spaces have been shown to improve wellness and reduce stress. There is growing evidence that horticulture and natural grass found on sports fields and lawns is important on a human level. Plants lower blood pressure, reduce muscle tension related to stress, improve attention, and reduce feelings of fear and anger or aggression. The University of California in Riverside has done research to support that hospital stays are positively affected by turfgrass

and green spaces. Patients in hospital rooms with a view of nature and lawns recover more quickly than similar patients in rooms with a view of building walls.

Similarly, people who live and work in an environment with a view of lawns and nature compared to an urban view were found to recover from stress more quickly. Employees with a view of landscaped areas experience less job pressure, greater job satisfaction, and fewer headaches than those who do not have a view or view manmade objects. Green spaces are also shown to increase worker productivity.

Also related to wellness and stress, two surveys on Attention-Deficit/ Hyperactivity Disorder have shown that children active in green spaces, such as lawn areas, experience less severe symptoms. Another study published in Environment and Behavior indicated that green spaces can enable children to think more clearly and cope more effectively with life's stress.

Therapeutic:

The care of turfgrass and plants can have such a positive therapeutic effect that it is included in many rehabilitation programs. These programs range from treating the ill, the handicapped, and the elderly. Programs have even been implemented successfully in prison systems.

Recreation and Sport:

Turfgrass is used extensively for recreation and sport and provides places where adults, kids, and pets can spend time outside the home. About 80 million people in the United States over the age of 7 play sports on turfgrasses. Providing places for recreation and encouraging activity is especially important with the Center for Disease Control reporting 17% of American children and adolescents as obese. Recreational activities also provide children and adults leisure time in a positive and safe environment.

The majority of professional athletes prefer to play on natural grass surfaces. When built and maintained appropriately, natural grass fields can provide safe, high performing surfaces that meet the needs of users.

Community Appeal:

Turfgrass and green spaces in general increase community appeal and improve property values. Well landscaped areas are one of the most important factors individuals and families consider when deciding where to live.

Green spaces create close-knit communities, which increases safety. Research indicates lower crime, decreased police calls for domestic violence, and decreased incidences of child abuse. Residents in landscaped areas tend to know their neighbors better, socialize more often, and have stronger feelings of community when compared to residents living in more barren areas.

A study in 2005 suggested that there are nearly 41 million acres of maintained, irrigated natural grass in the United States. With the benefits turfgrass provides, those 41 million acres make a difference. Research continues to improve turfgrass to require fewer inputs while improving environmental impact. Maintaining natural turfgrass and other green spaces is important for the environment, economy, and communities to realize the benefits.



How to Avoid the Field Work Day Prior to the Season

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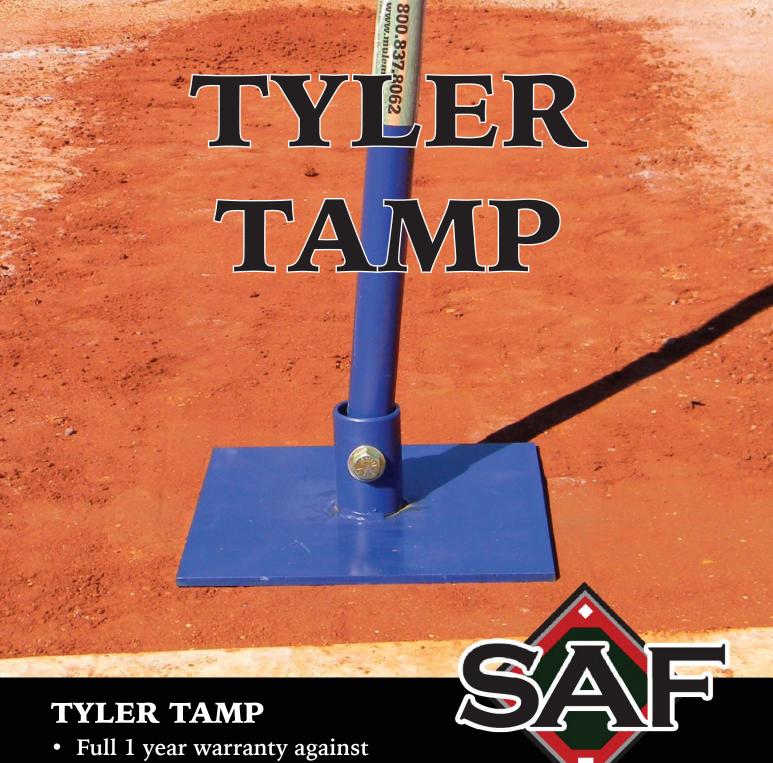


As we all know and realize, maintaining athletic fields and facilities can be a year round job for the coaches, grounds keeper, booster clubs, maintenance staff, etc. So often we hear of coaches setting the work day in January for "all hands on deck" and the long 12 hour or more day is spent edging, painting, cleaning bathrooms, concession stand etc. Over the next few paragraphs, we will hopefully give you some ideas that can be put in place throughout the year that will help you avoid the work day on the cold, cloudy, dreary January day.









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Annual FIELD MANAGEMENT

By Jason Kopp

aving a plan in place is essential for anyone who has a number of tasks to complete within a given time frame. Creating a maintenance plan for your turfgrass should be fairly easy with the help of a few pieces of information. This article will help you organize key factors and field information from the previous year and combine them to develop a plan for the upcoming year. Having a plan in place will help you get the most out of the time and resources you have available as well as help prevent you from wasting valuable resources. The information provided can help maximize your time and efforts by producing immediate results and avoiding the problems that many turfgrass managers may find throughout the season.

Natural grass field management programs vary and are directly affected by both agronomic and non-agronomic factors. The agronomic factors could include mowing, watering, fertilizing, aeration, topdressing, renovation, and drainage. There are also many non-agronomic factors that directly influence the success of playing fields: annual budgets, a field manager's knowledge and expertise, equipment, and resources available. The relationship with other staff members such as coaches, parents, and administrators will have an influence as well. Many of these factors will have an impact on the playability and safety of your fields.

The following is a general guide for developing a maintenance plan. Depending on your geographic location, the timing for certain practices may need to be adjusted. Before starting next year's plan, review notes from previous years to identify any challenges or issues your facility faced. The notes you take throughout the year will be advantageous when constructing your plan for the upcoming year.

January -

For most of the country this time of year is spent focusing on snow operations, equipment maintenance, budgets, plans, attending the STMA Annual Conference, and managing other tasks completed indoors. If the weather is decent, you can check your field covers to make sure they are still securely in place.

Warm-Season

Warm season turfgrass managers may have a few tasks that can be completed on natural grass fields. If the turfgrass hasn't gone dormant or you have over seeded it with a winter cover, maintain mowing heights that are consistent with fall heights. If your grass has gone dormant or it is uncovered, do not mow it at this time. Warm season grasses will typically go dormant with the first hard frost, which can occur in warmer regions in early December through the middle of January.

Transition Zone and Cool-Season

For managers in the cool season and transition zones you can skip ahead to March since snow will likely be around for the next few months.

February –

Turfgrass managers throughout the country will likely still be completing indoor tasks throughout February. If you are able to be outdoors, try to stay off of the fields if they are too wet to prevent damage to the turfgrass rootzone. Start documenting weather patterns and turfgrass conditions for future reference. Many areas will face snow mold and other disease pressures in the spring, so it is good to keep records to reflect back on.



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This is a great time of the year to go over policies and procedures with your staff. Discuss any issues from the previous year and go over plans for the new year. This will go a long way in preparing the team for the upcoming year. It is also a time to see what continuing education events may be going on in your area that can help improve your team. There are tradeshows, conferences, and lectures going on all the time, so find some in your area or see about hosting one at your facility.

March -

March should be a busy time for most turfgrass managers. Spring is getting close and work and activities will begin shortly on your natural field. This is a great time to complete a soil test on your field. Once results are returned, you can order the products needed for spring nutrient applications. It is also a good time to ensure equipment is ready to go, employees are hired and trained, and all personnel files are updated.

Warm-Season

In warm season areas, when soil temperatures reach 65 degrees Fahrenheit at or above 4 inches of depth, grasses will start to break dormancy. Soil warming may be inhibited by varying temps and/or shade conditions on your turf. The "green-up" period could take anywhere from 2-6 weeks depending on these factors. Soil moisture is also very important to take note of at this time. Soil that is too dry or too wet can prevent plants from

transferring built up energy into soluble sugars needed for growth. If you have a soil moisture meter, take some readings at various locations to get a sense of the current moisture levels. If the average temperatures are in the upper 60's to 70's, now may be a good time to start your agronomic plan and complete the first nutrient application. Check with your local STMA chapter on what other turfgrass managers are doing in your area.

Transition Zone

Weather is unpredictable in the transition zone, but there may be an opportunity to get out in late March to start working on your fields. Depending on how much snow you received over the winter, the water table could be high causing fields to have excessive moisture. Make sure to check field wetness before starting any work. If the fields are usable, now may be a good time to get out and lay-out markings for spring sports. Outlining field corners, boxes, circles, and lines with small markings can set the field up and save time later when you are ready to paint full lines. This is also a great time to edge areas such as infields/outfields, irrigation boxes, and any other location on the field.

Cool-Season

In the northern half of the country, in the cool season zone, fields may still be under snow cover and maintenance is not yet possible.

April -

It is officially spring and everyone is ready to get outside and get moving. This month there will be a flurry of activity going on at your facility. As everyone gets started with their season there is an endless amount of tasks to complete and sometimes only a short window to get them accomplished.

Warm-Season

In the warm season zone temperatures are averaging between upper 70's to low 80's and the grass is growing. If you haven't already, now is a good time to start your annual agronomic plan. Follow the recommendations provided on your soil test results for nutrient applications. Early spring nutrient applications can help aid in recovery from winter damage and promote green-up. Be familiar with the makeup of the field's rootzone. High sand content root zones have low nutrient retention and require more frequent fertilizer applications.

Check your irrigation system. Since most irrigation systems in this zone are not winterized, only minor adjustments / replacements may need to be made along with your annual irrigation audit. While working on your irrigation system, it is a great time to check with your irrigation supplier on new technology. You may need to replace items now, or get them in the budget for the next cycle.

Mow as often as needed and remember to not take off more than 1/3 of the leaf surface at one time. Taking off more than the recommended amount can negatively affect photosynthetic production of food, deplete carbohydrate reserves in the plant roots, cause graying or browning of leaf tips, restrict root growth, encourage weeds, increase susceptibility to damage from pests, environment, and traffic, and contribute to excess clippings.

Transition Zone

The transition zone has a lot going on this month as well. Start your early spring fertilizer applications as suggested in your agronomic calendar. Although it is not the ideal time of year, overseeding may need to take place. If you are overseeding, make sure to hold off on preemergence herbicides so as not to restrict germination and growth of new seedlings. Since temperatures are still low enough, the preemergence application can be moved back to occur after new seedlings have established. If you have an irrigation system, this is the time to get it started for the season. As noted above, consult with your local irrigation supplier regarding the latest technology available as well as preforming your annual irrigation audits. If growing cool season grasses, the first mowing of the season can take place. Make sure the blades are sharp, tire pressure is correct, and the mowing heights are at the full season height.



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A Sports Turf Manager in New England uses a Model 320 Earth & Turf MultiSpread™ topdresser. He has put more than 3,000 yards of compost and a few loads of 2 mm sand through the unit so far. The field in the accompanying photo, taken immediately after a core aeration was done, has had 35 yds. of leaf compost applied each of the last three years. It gets fertilized with an organic-based program, 2 to 2.5 lbs. of nitrogen per year.

Compaction is an issue, so core aeration is used after spreading compost. The benefits of compost he has found are:

- It reduces soil compaction
- It improves soil structure
- It improves moisture retention

Now spraying is done only as needed, because the turf has become very thick and strong with a great root system, which can be seen in the close-up photo from the same field taken in December, 2014. Mostly leaf compost is spread and overall savings have paid for the compost in just two seasons. The use of pesticides has been reduced, as beneficial soil microbes, biology and organisms have helped the soil health.

Spreading compost, aerating and seeding have also had a big, positive effect on seed germination. This Sports Manager believes that seeding is important and advises not to skimp on the seed when planting.

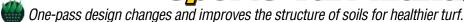


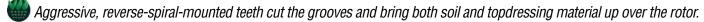
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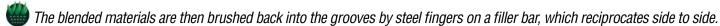


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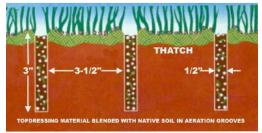
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Field Maintenance Tips from Earth and Turf Earth & Turf Linear Aerator

TOPDRESS FIRST! Afterwards, linear aeration can reduce sports injuries by softening turf on athletic fields and arenas. Soil and thatch restriction are permanently modified by the process of topdressing with materials such as calcined clay, compost or sand, then cutting and filling vertical grooves with a Linear Aerator. Linear Aeration improves water infiltration and retention, turf and root growth, nutrient absorption and organic decomposition. The one-pass design of the Earth & Turf Linear Aerator assures maximum cultivation and soil remediation of turf on athletic fields, golf courses and polo grounds.

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The one-pass design of the Earth & Turf Linear Aerator changes and improves the structure of soils for healthier turf. Soil and thatch restriction are permanently modified. Maximum modification of turf on athletic fields, golf courses and polo grounds is assured. Used after the area has been topdressed with calcined clay, compost or sand, the Linear Aerator conditions an 58-inch swath by cutting grooves in the turf 3 inches deep, approximately one half inch wide and 3.5 inches apart.

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Cool-Season

Average temperatures in the cool season zone will likely still be below the ideal temperature for turfgrasses to start their annual green-up. If there is no snow cover, you can get out and start to check the fields. Take notes and pictures to document the start of the year. If you were able to cover fields for the winter, this is a great time to start checking underneath the tarps to see how the turfgrass looks.

Check the STMA website http://www.stma.org/cultural-practices for more information regarding your zone and recommended cultural practices to get your plan started off right.

May -

As we begin this month, many will have to focus on budget items to be included with the next budget cycle starting July 1st. If you fall into this category, it will be important to start gathering information and making a wish list. Review future needs for equipment, turf products, staff, and any other needs you may have for your shop. Having a 5-10 year plan in place for equipment can be one of the most important items to cut down on long term maintenance and minimize downtime. Talk with local sales representatives about new products on the market that may benefit your field. You may also want to consider including turf blankets in the budget if you do not have them for use.

Warm-Season and Transition Zone

With the warm season and transition zones both in full swing, this month will be similar to April. Spring fertilizer applications will continue to push turfgrass growth. If you find that the turfgrass is not recovering well due to a harsh winter, Plant Growth Regulators (PGR) may be a consideration to assist in root growth and turf density. At this time of the year the plant is pushing top growth, and PGR applications will utilize this energy to encourage root growth instead. Spring weed suppression may also take place at this time. Continue mowing as needed, which at this point could be twice a week. When mowing, remember to change directions as often as possible and never cut off more than 1/3 of the blade at any one time. Irrigation is likely taking place frequently in warm season areas at this point in the year. Check each zone to ensure you are getting full coverage and even distribution with each sprinkler head. In the transition zone, irrigation may not be needed as often depending on weather conditions. Check various locations on the field with a soil moisture meter and record the readings. Because the weather changes year to year, keep notes on weather patterns and include information on temperatures, rainfall, wind, and humidity. This will help you keep track of evapotranspiration rates and whether you need more or less irrigation. The average field needs 1-1.5 inches of water per week minus any rainfall. Sand capped or sand based fields may

require more if you find the rootzone drying out faster than needed. If you are transitioning from an overseeded cool season grass to warm season grass, now is the time to start thinking about the transition. Transition can take place naturally or chemically. Contact your local STMA chapter for more information on the pros and cons associated with natural versus chemical transitions.

Cool-Season

In the cool season zone, temperatures are typically in the upper 50's to low 60's by the end of the month. The first spring fertilizer application can take place to assist with the green up process. The first application should be based on the soil test results and contain the recommended nutrients. The product may also contain preemergence weed control to assist with controlling spring weeds. Mow as often as needed. While bagging clippings is not typically recommended for the first or second mowing, it may be beneficial to clean up excess clippings and winter debris. With the last of the season's frost already past, this could be the time to get your irrigation system started and perform your irrigation audit. Check with your local irrigation supplier on new products that are available. Many water saving products are on the market with new technology always being introduced.

June -

Temperatures are rising and so is the amount of activity on your fields. Both sports activities and your operational activities are competing for field time. This is the time of the year when you really have to work closely with coaches and other staff to address field usage and timing of tasks that must be completed.

Warm-Season

Warm season grasses are growing rapidly and monthly fertilizer applications are needed. Typically, applications of 0.5-1.5 lbs. N / 1000 sq. ft. are made this time of the year. Make sure to check your state's nutrient allowances to ensure that you do not exceed annual application amounts.

Mowing is very important and will take place several times per week due to increased growth, higher temperatures, and irrigation. Check blade sharpness, tire pressure, and mowing heights to ensure a uniform height throughout the year. Mowing with a dull blade can shred the tops of the blades making them more susceptible to disease.

Disease, insect, and weed pressure may start to appear at this time of year. Follow Integrated Pest Management (IPM) practices to monitor pest populations and take proper measures towards control. If pest populations dictate that control measures must be taken, ensure proper timing of applications based on what you observe on fields. It is not the best policy to do blanket treatments on the fields, but rather monitoring the fields for issues and treating them as needed.

If areas of your fields are getting heavy foot traffic and becoming compacted, try to aerate to reduce compaction. Hollow, solid, or slicing tines will work well. The entire field does not need to be aerated, but rather focus on areas that are worn, such as goal areas, center of the field, baseball infield, foul lines, and bench areas.

If there are any issues with your irrigation system, you will have identified it by now. Keep checking sprinkler heads to ensure proper coverage.

Transition Zone and Cool-Season

Active growth of cool season and warm season grasses will be taking place in the transition zone this month. Cool season grasses are becoming well established and will likely start to see weed, insect,

and disease pressure. Monitor your field and make pesticide applications based on your Integrated Pest Management plan. Control may be necessary to prevent pest pressure from taking away necessary energy and nutrients from desired turfgrass. If you have had grub issues in the past, begin checking for them as they make their way towards the surface to start feeding. If the grub population exceeds the threshold, consider making a chemical application this month or next when they start to actively feed on turfgrass roots. This application will depend on observations now and notes from past years. If you have a warm season grass as your base plant, this month will be the transition month. Pushing the growth of your base plant (warm season grass) and removing the competing cover plant (cool season grass) will require timing and communication. There are challenges associated with both natural and chemical removal of the cover plant. Consult local Cooperative Extension services or STMA chapters for help in deciding which would be a better option for your facility. The preemergence weed application earlier in the season should provide enough control that you do not have an issue with spring weeds. However, a wet spring, heavy foot traffic, and aggressive cultural practices can break down the weed control barrier prematurely. Watching weather patterns and noting play hours on the fields will help you to anticipate some of these concerns.

July -

July can be a troubling month if not planned correctly. Across the United States temperatures and humidity are nearing their peak levels. This is the month that many insect and disease pressures will arise. Correctly identifying the signs and symptoms is vital to controlling these harmful pests. Ask your local Cooperative Extension Service, STMA Chapter, or landscape product supplier what they are seeing in the area as far as insects and diseases specific to your turfgrass variety. Maintain blade sharpness, reel sharpness and contact, tire pressure, and regular maintenance items. As disease pressures rise, having a sharp blade/reel will help to protect the grass and reduce susceptibility to disease.

Irrigation is going to be the key if available at your location. Understanding ET (evapotranspiration) rates and the effect they will have on your irrigation is very important. This is the amount of water lost through evaporation and transpiration each day. Evaporation can account for nearly 50% of water lost through solar radiation, temperature, wind movement, and operating pressures. Transpiration is the movement of water vapor through the plant to the atmosphere. Accounting for these losses through adjustments in your irrigation system will have an impact on turfgrass performance.

There are several ways and resources to capture this information including the PAN test and information on the area's climatic data found on sites like WeatherBug.

Warm-Season

Active turfgrass growth will continue in the warm season zone. Monthly or bi-weekly fertilizer applications may be necessary to push growth and provide continuous nutrition for plants. Mowing will still be a frequent task to ensure you are not taking too much of the leaf blade off at one time. Plant Growth Regulators (PGR) may be considered to suppress top growth and shift carbohydrates to the roots, crowns, and stems of the plant. However, if the turf is stressed, avoid a PGR application as it will inhibit the turf from growing out and/or recovering from stress.

Aeration provides the most benefit to warm season grasses during active growth. If you do not have the time to aerate the entire field, consider aerating the high wear areas – goal mouths, the center of the field, and bench areas on football, soccer, lacrosse, and field hockey fields. For a baseball or softball field, focusing on the infield grass, foul lines where teams will throw, worn areas in the outfield, and areas around the outside of the infield arc will be important.

Transition Zone

In the transition zone, focus on fertilizer applications, frequent mowing, and aeration of worn areas on warm season grasses. With cool season grasses in this area, frequency of mowing will start to slow as the turfgrass starts to go dormant with higher temperatures. If you have irrigation, mowing may still take place. Fertilizer applications at this time may not be practical due to the heat. Scout for diseases, insects, and weeds and refer to your IPM program when making a decision about control options.

Cool-Season

In the cool season zone, average daytime temperatures will be in the 80's with nighttime temperatures averaging between 60-70 degrees. Focus on getting the turfgrass through hot temperatures with irrigation if available. Plants need 1 – 1 ½ inches of water per week minus any rainfall. Sand capped and sand based fields may require additional irrigation as they tend to dry out more quickly than native soil fields.

Continue to mow as needed and reduce fertilizer applications. Try to maintain a dense turfgrass canopy to help the plants withstand stress from foot traffic and reduce weed competition. Regularly monitor turfgrass areas for pests. Applications of insecticides, fungicides, or herbicides may

be needed if pest populations exceed the predetermined threshold. Communicate with other turfgrass managers in your area about their pest issues and control options.

August -

In general, the majority of August can be a slower month for turfgrass management as the transition for fall is on the horizon. Spring and summer sports are wrapping up and school will soon be back in session. As you look forward to fall sports starting, this is a great time to take a moment to look back over the first half of the year. Hopefully you have taken extensive notes and lots of pictures of the different issues you may have faced - challenges you saw and areas where you had great success. Take a few moments to meet with your staff and go over the first half of the year. Get some feedback from them as to what they saw, think, and ideas they may have to move forward. Involving your staff is a great way to show them how much they are appreciated and the value they bring to the team. Provide continuing education opportunities to help staff members grow and improve so they can contribute to the success of the facility. If you haven't already, order your products for the fall season so they are on hand and ready when you need them. This could include turf products, growth blankets, tines, and equipment maintenance items like filters, fluids, and belts.

Warm-Season and Transition Zone

August is much the same as July in areas growing warm season grasses – apply fertilizer to promote growth, mow frequently, aerate, and irrigate as needed based on climatic and turfgrass conditions.

Cool-Season

If cool season grasses have gone dormant, there is not much to do other than check for weeds, insects, and disease. Infrequent mowing may take place once a month in some areas or where irrigation is not available. If irrigation is available, continue to run your summer cycle and check for hot spots in the turfgrass.

September -

September will bring transitions throughout the country with the onset of cooler temperatures and fewer daylight hours. Depending on geographic location, it is time to think about fall turfgrass renovation, transitioning from warm season to cool season turfgrass, and decreasing irrigation needs. Mowing needs will probably not change due to continued turfgrass growth – warm season grasses are still growing and starting to store energy reserves for the winter; cool season grasses are actively growing due to lower temperatures. Mow as often as needed removing no more than 1/3 of the leaf blade.

Warm-Season

Fertilizer applications will decrease in warm season areas. Too much nitrogen applied at this time can reduce the winter survival rate of warm season grasses. Apply enough nitrogen to provide energy for storage and allow it to go through its starting dormancy period. Mowing and irrigation are still important aspects of turf care at this point and should not be neglected.

Transition Zone

If you are managing warm season grass in the transition zone, this is the time to aerate and overseed. This is always a balancing act to promote the growth of the newly establishing cover without pushing too much growth of the warm season grass that is starting to go dormant. It is also important to constantly check irrigation needs and soil temperatures. The temperature at ground level and below typically cools faster than actual air temperatures. This results in increased dew on the turfgrass leaves. Here again is finding the balance between promoting water needs of newly establishing turfgrass without drowning existing warm season grass. If transitioning to a cool season grass, mowing needs may change as ryegrass should be moved between 1-2.5 inches. Fall is the best time to aerate and overseed cool season grasses; however, fall sports may be in full swing and prevent renovation projects. Aeration is an essential maintenance practice for the long term success of a field. If aeration cannot be completed due to the fall sports schedule, be sure to complete aeration as soon as the season ends. Continued fertilizer applications will promote growth and establishment of newly seeded turfgrass. Nutrient applications will also give the existing turfgrass energy needed to store resources for winter. Weed, insect, and disease control will probably not be necessary at this time of year.

Cool-Season

Cool season grasses will be actively growing with cooler temperatures of the fall. Frequent mowing may be needed to control growth. Fertilization of cool season grasses is important this time of year as the nutrients are directed toward root growth and energy reserves for winter. Irrigate only on an as needed basis.

October -

Fall is in the air with average day temperatures in the cool season region averaging in the 50's, 60's to lower 70's in the transition zone, and lower 80's in southern regions of the warm season area. Turfgrass growth is starting to slow down. Mowing, fertilization, and irrigation may still be taking place, but with decreased frequency, and renovation projects should be finishing up.

Transition Zone

In the transition zone, leaves should be removed from the turfgrass in a timely manner. Leaves can be mulched into the turfgrass or completely removed. Mowing can take place on an as needed basis for the remainder of the season. One fertilizer application this month can take place to enhance root growth and carbohydrate storage for the winter. Irrigation is probably unnecessary with lower temperatures and high dew points.

Cool-Season

In the cool season region, the end of the season is nearing and managers should be preparing the turfgrass for winter. Mowing should be completed on an as needed basis. Irrigation systems should be winterized to prevent water freezing in the pipes and potentially damaging the system. If soil tests determine the need for a lime application, this is the ideal time to apply it. Lime is essential for turfgrass to be in the optimal pH zone for growth. If test results indicate a need for more than 50 lbs/ 1000 sq ft, apply the lime in split applications.

November –

For many, the end of the turfgrass season has arrived. Irrigation systems in the cool season and transition zones have already been winterized or will be this month. In the warm season, while winterizing irrigation systems isn't necessary, it may be a good time to do an irrigation audit on

your system and replace rings and seals as needed. Mowing may no longer need to take place as grass growth has substantially slowed. Nutrient applications to turfgrass have ended except for lime applications in the warm season and transition zones. Refer to your soil test for lime application recommendations. If more than 50 lbs / 1000 sq ft are recommended, split the application. If you have access to turf blankets, consider using them to protect your field from harsh winter weather. Even if you cannot get enough to cover the entire field, covering the infield, goal mouth, center circle, bench areas, and other high traffic areas will benefit problem areas.

November may be a budget month to get your wish list turned in. Having an equipment replacement schedule in place for 5-10 years is important. While you may not have the budget to replace equipment, you can at least show documentation of when it will be needed along with any increased maintenance costs and down time associated with older equipment. Part of the role of turfgrass manager is to keep not only your staff informed but those in positions above you informed as well. Check to see what new products are on the market or what may be coming out soon. Many of the newer technologies and products are aimed to reduce maintenance costs and increase productivity. These important pieces can make your role as turf

manager much more effective by getting more out of the time you spend on your fields and not wasting this valuable resource.

December -

You made it through another great year managing your turf. There may have been challenges, but that is what continues to push innovation, creativity, and growth. Reflect back on the year using the notes and pictures you took. Start to devise a plan for next year now. Gather your staff to get their input as well. For most of the country this is tradeshow and conference time. Look around your area or across the country for opportunities that will allow you to connect with other turfgrass managers and continue your education. These events are invaluable to your growth and your team's growth. What a great season, best of luck in the new year!

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ANNUAL MAINTENANCE CALENDAR

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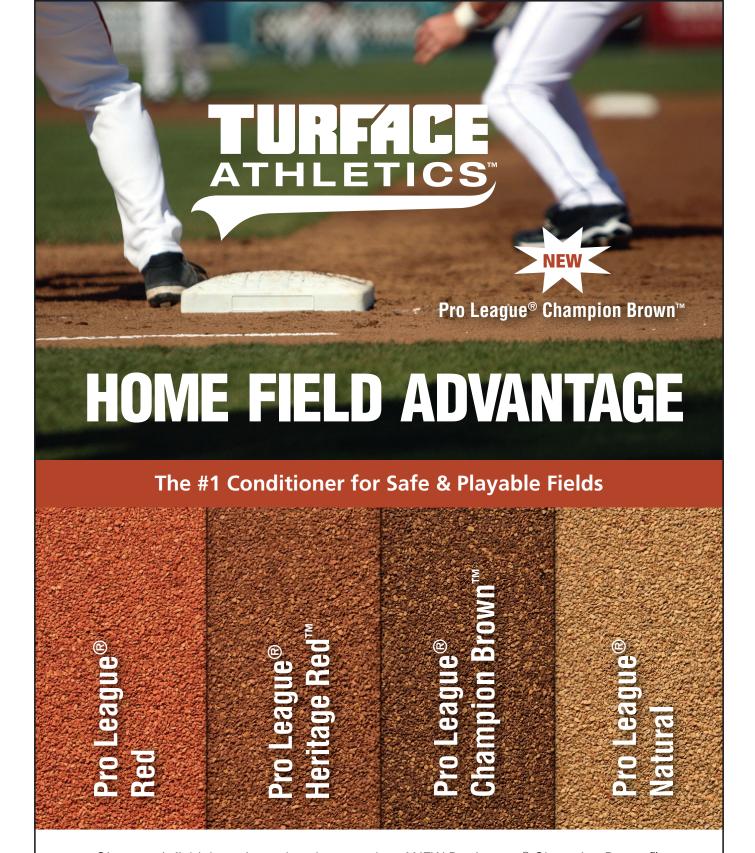
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Maintaining FIELDS on a LIMITED BUDGET

by Brad Fresenburg, Ph.D.

The priority when maintaining athletic fields at any level of play is to provide safe, playable fields for athletes. All too often, budgetary limitations get in the way of proper care and maintenance of fields. Although there is no universal budgetary formula, some level of success can be achieved on most athletic fields. Understanding and applying the essential field care practices, as well as utilizing outside sources, athletic directors, coaches, users, and sports turf managers can collaborate to provide a healthy field that meets community expectations.

Have a Plan:

Whether maintaining one field or 20, prioritizing fields can help determine where time, supplies, and maintenance should be allocated. Distinguish high priority areas from low priority areas. For example, game and main practice fields require the most time and money to maintain at a high level. Maintenance frequency and material allocation can be reduced on low priority fields and other areas.

Concentrate Maintenance Practices:

While a practice like mowing and fertility may occur over the entire field, over-seeding, aeration, and sometimes topdressing, can be applied to areas of greatest need. Applying seed between football hash marks only will reduce seed requirements by 66%. Other high traffic areas include goal boxes on soccer fields and positional areas on baseball and softball outfields. Focusing on the areas of dire need will stretch limited dollars for the most good.

Cultural Practices:

There are cultural practices that are necessary and others that can be altered from a little to a lot. Mowing (time, fuel, and repairs) is a must and always part of every annual budget. Beyond this, two of the next best practices are fertility and seeding. Maintaining proper fertility (nutrients and pH) helps to reduce weeds and increases turfgrass tolerance to insects and disease, which can save money in the long term. Maintaining the highest possible mowing height allowed (up to 3.5 to 4 inches) in combination with overseeding and fertility will help to maintain the highest turfgrass density possible for safety, playability, and weed competition. When overseeding, always provide good seed / soil contact to get the highest level of seed germination. Seed and fertilizer are often spread on bare, compacted soil surfaces providing very little benefit for the dollars spent.



- Cool-season grasses (tall fescue, Kentucky bluegrass, perennial ryegrass) are optimally over-seeded and fertilized in the fall of the year. Spring over-seeding and fertility may be an option if spring play occurs. However, late spring fertility can be detrimental to cool-season grasses as it relates to turfgrass diseases. Coolseason grasses, like fescue, are more susceptible to brown patch disease if the fescue is pumped full of nitrogen late spring to early summer. If a budget only allows minimal over-seeding and fertility (one or two applications), fall is the optimum time.
- Warm-season grasses (bermudagrass, zoysiagrass) are re-established and fertilized during the early summer months for rapid growth and recovery.
 Seeding is the most economical followed by sprigging.

To avoid fertilizer waste, determine the exact square footage of fertilized areas. Accurate fertilizer applications are dependent on purchasing the correct amount of fertilizer for a known square footage. Also, slightly reducing the fertilizer application rate (adjusting from 1 lb N/1000 sq. ft. to ¾ lb N/1000 sq. ft.) can make a difference when it comes to budget dollars. Spreading your fertilizer over several applications will be more beneficial than all at once (i.e. – Two applications of 0.50 lb of nitrogen per 1,000 square feet versus one application of 1 lb of nitrogen per 1,000 square feet).

Soil testing is another inexpensive practice to consider as a means to save money. Sports turf managers can determine what the needs are for nutrients as well as what the soil pH is. If soil pH falls outside of a desirable range (pH 6 to 7), applications of fertilizer may not benefit turfgrass plants as nutrients could be locked up in the soil colloid. Soil test results may also indicate sufficient levels of some nutrients like phosphorus and potassium, which eliminates the need to purchase fertilizers containing those nutrients. The savings can be applied to additional nitrogen fertilizers or allocated to other maintenance practices.

Irrigation may or may not be an option. Most low budget programs tend not to have a source of water, especially if it is potable water being purchased. While soil moisture is important during play, it can increase the chances of turfgrass diseases if applied too often. It is best to be on the conservative side of irrigation except where safety is a concern.



Aerification (soil cultivation) is and always will be the most neglected maintenance practice. It provides some of the greatest benefits – reduced compaction, air exchange, water and nutrient infiltration, and opportunities for deeper root development. It is a practice that can be completed using a borrowed piece of equipment. Walk-behind units can be rented daily for a nominal fee and used in those areas with the most need (center of a football field, goal mouths, sidelines, etc.).

Although it is not always feasible depending on budget limitations, consider topdressing. Topdressing is beneficial in that it dilutes the buildup of organic residue and provides turfgrass protection against traffic or inclement weather. Topdressing is typically done following aerification, but can take place at any time. Consider topdressing high priority areas only, such as between the hashes on football fields or in goal areas. Some local farm co-ops may allow the usage of a fertilizer buggy to spread sand if a topdresser is not available.

Equipment such as mowers and fertilizer spreaders are necessary to complete essential cultural practices. If a program has the ability to purchase equipment, always consider the long term versus short term costs of equipment. For example, diesel mowers can save a lot of money on fuel over time.

Control Usage

Over-use is a problem where athletic grounds are very limited. Any opportunity to restrict activities like physical education and band practice will greatly reduce wear and stretch maintenance dollars. Flexibility to change up a sporting event from a home to an away game due to wet playing conditions can save a field from destruction. In addition, shifting a field 20 to 30 feet or rotating a field can spread the concentration of traffic over more area, therefore allowing previously worn areas to recover. Control usage the best you can.

Consider Outside Relationships

Most communities will have a sports-plex or golf course nearby. Relationships between these facilities and a local school district can be as simple as introducing one-self and asking a question. If a school district has no means to purchase an aerator, don't be afraid to contact a local golf course to potentially borrow their aerator. Perhaps several nearby school districts can purchase a piece of equipment to share. Many lawn care businesses will have specialized equipment like vertical slicers and aerators. Local farm co-ops are often a great source for seed, fertilizers, and pesticides.

Consider an advertising trade off. Community businesses may have some excellent sources for knowledge and may be willing to donate products, equipment, and services for an advertisement spot on a scoreboard or outfield fence. Many sporting events are announced on local radio stations where broadcasters can promote a business for their contributions to a school or sporting program.

Booster clubs help to off-set some of the cost for team uniforms, equipment, and even field maintenance needs. Saturday morning bake sales, trivia nights, or auctions may raise enough money to buy a piece of equipment or seed and fertilizer for a season.

Conclusion

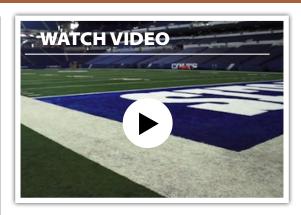
Athletic field maintenance at the high school level or in any low-budget situation is not hopeless. Devise a plan, provide a list of needs, and start asking around. You may find that safe and playable sports fields are an achievable goal even on a limited budget.



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SPRING Field PREP

Your turfgrass survived the long, hard winter and now it is time to get your field ready for play again. Hopefully, you prepared your field for the winter during the fall and you are heading into the spring with a strong, healthy turfgrass stand. Even if your field is not in the condition you want it to be in at the beginning of spring, there are things you can do to get it ready for the first game. After all, you know that as soon as the weather breaks, your field will be a busy place. Here are some tips to get your field looking great before that first game.

Have a Plan

- Be prepared Take time during the winter to plan out your maintenance schedule so as soon as the weather warms up, you will be ready to go.
- Take a soil sample and send it to your local testing facility (most universities can test your soil). You will get a report back with fertilizer recommendations that you can use to set up your fertilizer program. You will also find out if you need to correct your soil pH.
- Be sure to have all equipment, seed, and fertilizers on hand before they are needed.
- Get ready to battle Mother Nature. Spring rains can create water-logged fields. Make sure all of your baseball tarps are in good condition and explain the consequences of playing on a saturated field to the coaches, administrators, parents, and players.

What to do When Spring has Sprung

- Survey your fields. Identify potential problem areas like high wear areas, and on bermudagrass fields, look for areas affected by winterkill and spring dead spot. Be sure to give extra attention to these areas so they can recover quickly.
- Consider rotating or sliding your fields to spread out the wear. Sometimes sliding a field over just 10 yards can make a big difference.



Base your fertilizer program on soil test results.

- If you used growth covers over the winter, remove them after 4 or 5 consecutive days of warm temperatures, but don't put them away.
 Be prepared to put the covers back on if you get an early spring cold snap.
- Seed or sod high wear areas and areas that did not survive the winter.
- Fill in low areas with sand or soil to prevent puddles from forming and seed or sod them. If you fix the problems now, you won't be battling them all year long.
- Prepare your irrigation system. Once you charge the system, check for broken heads and leaky pipes that need to be repaired.

Cool Season Grasses

The following are recommendations for managing Kentucky bluegrass and/or perennial ryegrass sports fields in the spring.



Adding soil and seeding or sodding bare, low-lying areas like goal mouths early in the spring eliminates having to deal with these areas all year long.

Mowing

Mowing properly can make a big difference in the look and performance of your field. It is important to keep up with your mowing schedule, especially in the spring when the grass is growing quickly.

- Begin mowing as soon as the grass begins to grow.
- Be sure to use sharp blades so you get a clean cut.
- Do not remove more than 1/3 of the leaf blade per mowing.
- Mow frequently you will improve the density
 of your turfgrass with more frequent mowings
 and you will not leave unsightly clumps of grass
 behind. You may need to mow three times per
 week during the spring flush of growth.
- Delay mowing on waterlogged fields to prevent ruts.

Fertilization

When temperatures are consistently in the 50's, cool season grasses begin to grow and require fertilizer for healthy growth and development. Springtime fertilization can help your field recover from fall

damage as well as prepare the turfgrass for the upcoming season.

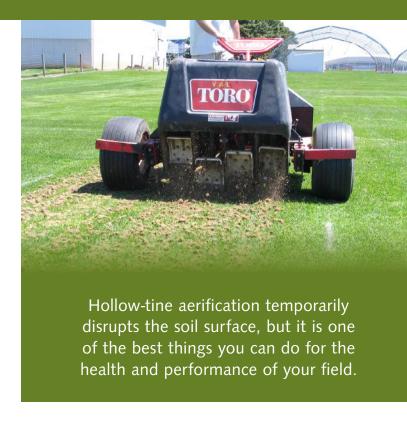
- Follow the recommendations in your soil test report to provide plants with the required amounts of nutrients. By applying only the amounts the plants need, you are not only being environmentally responsible, but you are also saving money.
- Apply 1.5 to 2 lbs. of nitrogen per 1000 ft2 during spring. It is best to split the amount into 2 applications – one in early spring and one in late spring.
- Combine your fertilizer applications with your cultivation practices (i.e. aerification).

Cultivation Practices

Spring is an important time to perform cultivation practices that relieve soil compaction, increase water infiltration, remove thatch, and increase soil oxygen flow.

 Aggressively aerify your field with hollow tines. Removing plugs of soil with hollow tines is the most effective way to reduce surface compaction. The soil should not be too wet (the sides of the holes will glaze over) or too dry (the tines will not penetrate the soil).

- Consider using a deep-tine aerator, which has long tines that penetrate deeper into the soil.
 This relieves compaction by shattering the soil.
 The soil should be dry so it shatters easily.
- Using a spiker, slicer, or hydroject will help improve soil conditions but should only be used in the spring when surface disruption must be kept to a minimum. These are not acceptable substitutes for hollow tine aerification and/or deep-tine aerification.
- Applying 1/4 inch of quality compost prior to aerification will improve your soil. After the compost has been applied and the field has been aerified, drag the field to help incorporate compost into the soil. Do not use compost on sand-based fields.
- If compost is not used, following aerification, topdress the field with a layer of sand that matches the existing rootzone, seed with Kentucky bluegrass and/or perennial ryegrass, and fertilize according to soil test recommendations.
- If your soil requires lime to correct your pH (based on your soil test), apply the recommended amount after cultivation and drag the field to allow the lime to work into the soil.



Weed Control

Not only is your turfgrass waking up and growing when the warm temperatures hit, so are the weeds. In addition to preparing for the usual crabgrass and goosegrass outbreaks, knotweed can be a problem on highly compacted fields.

- You must decide if it is more important to seed your field in the spring or prevent weeds from germinating – you can't do both. If you apply a preemergent herbicide, your grass seed will not grow.
- Seeding early in the spring will repair your field from wear and then you can apply postemergent herbicides to kill any weeds later in the spring or summer.
- If knotweed is a major problem early in the spring, you can apply a broadleaf herbicide after it germinates and then seed after waiting the required period of time (see herbicide label for seeding instructions).

Bermudagrass

The following are recommendations for managing bermudagrass fields in the spring.

Mowing

Bermudagrass begins to green-up when temperatures hit the 50's, but it does not begin active growth until temperatures reach the upper 60's. Once it does begin to grow, the same guidelines for springtime mowing that were presented in the cool season grasses section should be followed. Here are some additional tips for bermudagrass fields:

- Reduce mowing height several weeks before expected bermudagrass green-up to allow more light to warm the soil. Lowering the mowing height also stresses the overseeded ryegrass in preparation for removal.
- Mowing regularly will also help knock down actively growing weeds that can flourish early in the spring in slow growing bermudagrass.

Fertilization

It is important to not push the bermudagrass too soon with fertilizer because if the weather turns cold, there is an increased risk of cold temperature injury.

- After there is no longer a threat of frost and the bermudagrass is actively growing, begin fertilizing based on your soil test results.
 Bermudagrass typically needs about 1 lb. of nitrogen per 1000 ft2 per month during its growing season.
- Quick release nitrogen (urea and ammonium sulfate) usually works best for bermudagrass.

Cultivation Practices

Cultivation practices should be done after the bermudagrass has fully greened-up and is actively growing (late spring and summer). If you perform these practices any sooner, you are increasing your risk for cold damage and weed invasion.

Removal of Overseeded Grass

If you overseeded in the fall, the ryegrass must be removed to allow the bermudagrass competition-free growth in the summer. Many perennial ryegrasses have high heat and drought tolerance and will often persist well into the summer and limit bermudagrass growth. Remember, bermudagrass needs at least 100 days of competition-free growth in the summer.

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FOOTBALL/SOCCER FIELD SAFETY CHECKLIST

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- If you don't need the green color from the
 overseeded grass in the spring, spray the field
 with Roundup (glyphosate) before temperatures
 warm up, making sure the bermudagrass is
 COMPLETELY dormant. This is the best case
 scenario for the bermudagrass because it can
 green-up without any competition.
- Cultural methods such as verticutting and aerifying are often ineffective at completely removing the overseeded grass.
- Transitional herbicides may be necessary to remove overseeded ryegrass without injuring the bermudagrass.
- Temperature affects the amount of time it takes for the transitional herbicides to remove the ryegrass. It will take longer to kill the ryegrass if it is cold.
- Timing is key if you spray too early, your bermudagrass will still be brown when the ryegrass dies out and if you wait too long, you will be holding back the bermudagrass. The best time to treat is dependent on your location. If you time it perfectly, your ryegrass will be dying out just as your bermudagrass is beginning active growth.

Weed Control

Winter weeds can be a serious problem in dormant bermudagrass. For example, annual bluegrass thrives in the cool, damp conditions of late fall and early spring. Weed control at the beginning of spring is an important step to providing a great field.

- If the bermudagrass is COMPLETELY dormant, apply Roundup (glyphosate) to kill all actively growing weeds.
- Applying a preemergent herbicide in the late fall or early spring will prevent weeds like annual bluegrass, crabgrass, and goosegrass from germinating.

Spring can be both an exciting and stressful time for field managers. Make it easier on yourself by developing your maintenance plan before the weather breaks so you are ready to go as soon as the turf greens-up. Spring maintenance practices such as mowing, fertilization, cultivation practices, and weed control lay the foundation for season-long success.

