

### **Graiping.**

As the intensity of play on turfgrass sports surfaces increased problems with soil compaction became a concern in sustaining a turfgrass cover. Impaired internal soil drainage of water and eventual turfgrass thinning were warning symptoms. Physical disturbance of the soil by manual “graiping” or forking came into use by the late-1800’s. This was a laborious, time-consuming practice on compacted clay soils, especially if dry. This procedure was used on a 4 – 6 inch (10 – 15 cm) spacing for areas as large as one acre (0.4 ha) or more.

Early turfgrass cultivation by graiping involved a fork with 4 – 5 fixed, solid, flat, metal tines mounted on a wooden handle. It was physically forced into the soil primarily by the downward pressure of the human foot. Soil openings were accomplished via horizontal displacement. A significant advance in 1935 was a manual coring device. The advantage was the physical removal of a vertical soil core. It involved 3 – 4 fixed, hollow, metal tines mounted on a wooden handle. As with forking, it was physically forced into the soil by the downward pressure of a human foot. The soil core was pushed upward out of the hollow tine and dropped onto the turfgrass surface. An effective powered, mechanical coring machine was not invented until the 1950’s.

### **Systematic Root Zone Construction.**

During the 1800’s the first known widely-adopted systematic method for construction of root zones evolved in Scotland for bowling greens. The “Scotch Greens” were flat in contrast to the

crowns of northern England, and thus internal drainage of excess water was desired to minimize cancellation of play days. This indicated a need for construction on sand sites. However, many bowling greens sited in villages and estates around Scotland were on poorly-drained native soils.

The solution developed in Scotland was construction of a root zone thought to have improved internal drainage of water. This method consisted in variations of the following “soil-less” profile: digging a flat subbase, placement of clay pipe drains at a 9 – 21 foot (2.8 – 6.4 m) spacing, spreading a 6 – 12 inch (15 – 30 cm) deep layer of coarse clinker, broken stone or brick-bats, adding a 1 – 3 inch (2.5 – 7.6 cm) thick layer of fine ash, and topped with 1 – 3 inches (2.5 – 7.6 cm) of sand upon which the sea-marsh turfgrass was laid. This method eventually

was widely used in bowling green construction throughout Great Britain.

### **Closing.**

The evolutionary history of turfgrass cultural practices spans almost two centuries. The major developments up to the 1950’s are addressed herein. Most of the changes have been in response to increased intensity of use, quality demands, and safety concerns. •

## THE EVOLUTIONARY HISTORY OF TURFGRASS CULTURAL PRACTICES SPANS ALMOST TWO CENTURIES.

*The original source for this article is being published by the Michigan State University Press in a book titled Turfgrass History and Literature under the copyright of James B. Beard.*





## FIELD DAY HIGHLIGHT

Presented September, 2012  
Vaughan, Ontario.

# Strategies for Managing Heavily-Used Fields

Tom Serensits, The Pennsylvania State University

Managing a heavily-used athletic field can be a daunting task. While you may do your best to limit the number of events, the reality is that many times your field will host more activities than it can handle under your normal maintenance practices. As athletic field managers, we must remember that fields are meant to be played on and we need to do everything in our power to provide the best possible field conditions regardless of intensity of use. Here are some keys to successful management of heavily-used fields.

**1. Mowing.** It sounds simple enough and it is something that we all do on a regular basis. Because it is such a routine practice, sometimes it is a good idea to take a step back and really think about your mowing practices and how they can be improved.

How often do you mow? Most professional facilities are mowed a minimum of three times per week during the growing season. Sure, they may be mowing at lower mowing heights than most field managers do and those lower heights require mowing more often. But in general, more frequent mowing leads to increased density and uniformity. If you are currently mowing once per week, try to

mow twice per week. If you are mowing twice per week, bump it up to three times per week and see if conditions improve. More frequent mowing means that you are removing less of the grass blade each time,

## A CLEAN CUT IS IMPORTANT IN THE OVERALL HEALTH OF THE TURF PLANT.

which is a good thing because you never want to remove more than one third of the grass blade during a single mowing. And, since you will be mowing more often, it is important to routinely sharpen the mower blades. A clean cut is important in the overall health of the turf plant.

It is also important to mow at the proper height for your situation. Professional fields consisting of Kentucky bluegrass (*Poa pratensis*) and/or perennial ryegrass (*Lolium perenne*) are often mowed between 1 and 1.25 inches. Unless it is a high maintenance situation, recreational fields should not be mowed that low. Mowing

heights of 2–3 inches typically work best on these types of fields. Lower mowing heights can lead to increased density but also result in less wear resistance and shallower rooting. Setting the mower higher than three inches will promote deeper rooting, but may also negatively affect the playability of the field—especially in a sport like soccer.

**2. Fertilization.** A good fertilization plan is the backbone to successful field management. Without enough nutrients—especially nitrogen—the turf cannot recover from the wear and tear of constant use. When putting together a nutrient management plan, the first step is to have a nutrient analysis performed on your soil. The results of that test will give you a starting point for your plan. It is recommended that you have your soil tested once per year at the same time each year. On unirrigated fields, we typically see the best results when we apply a minimum of 4 lbs of nitrogen per 1000 ft<sup>2</sup> each year. The amount of nitrogen can be increased to 5–7 lbs of nitrogen per 1000 ft<sup>2</sup> on irrigated fields.

You can get the most out of your fertilizer application when you apply it at

the proper time of the year. For example, fertilizing in the spring and fall is much more effective than fertilizing during the summer months. Applying a fertilizer to drought and heat stressed turf is never a good idea. If you have an irrigation system, you have a little more flexibility with summer fertilization. But, you still want to apply the majority of your fertilizer in the spring and especially in the fall.

**3. Overseeding.** On a field that is heavily used, you will lose turf cover. That is just the nature of the beast. As a result, it is important to have seed in the ground to take the place of turf plants that are worn away. How often should you seed? As often as you can. In most cases, a rotary spreader works best. Start seeding after the first game and continue to seed before and after each game. Seed that is spread before the game will be worked into the soil by players' cleats. You will build up a "seed bank" that will continually replace ripped-out plants with new seedlings. The more seed you put down, the more turf cover you will have. Best results occur when at least 30 lbs of seed /1000 ft<sup>2</sup> per year is applied.

It is also important to seed with the correct species. From both an agronomic and economic perspective, perennial ryegrass is the best choice for in-season overseeding because it germinates and matures quickly. Kentucky bluegrass should only be overseeded when there is sufficient time for the plants to mature

(several months without field use). Under most circumstances, high-use fields should be seeded with perennial ryegrass. Information on the performance of many perennial ryegrass varieties (along with other species) can be found on the National Turfgrass Evaluation Program's website (ntep.org).

Another trick to overseeding is to not treat the entire field the same way. If the outside portions of your field do not receive much wear and have good turf coverage, focus your efforts on the high wear areas like down the center of the field and goal mouths. There is no rule that you need to spread your seed evenly across the entire field.

Finally, include some seed in your divot mix. After each game, fill in divots with a mix of sand, organic fertilizer, and perennial ryegrass seed. An easy way to make divot mix is to cut a 55-gallon drum in half and pour in sand, some organic fertilizer, seed, and enough water to wet the sand. Then, give it a good mix with a shovel and continue mixing once per day. This will start the seed germination process so when you fill the divots, it won't take as long for the seed to germinate. New divot mix will need to be mixed each week because if the seed germinates in the drum, it is no longer viable for field use.

**4. Aerification.** Routine core aerification is another important step in maintaining high-use fields. One of the biggest enemies on

heavily-used fields, is soil compaction. Soil compaction increases surface hardness, reduces pore space, limits root growth, and slows water infiltration. Aerifying several times per year will help combat these problems, making your field safer and healthier.

The most effective and beneficial method is hollow-tine aerification. Select tines that remove the largest size cores (3/4-inch is typical) and set the spacing on the machine as close as possible. Large tines combined with close spacing will give you the best results. While hollow-tine aerification is best, it also causes the most amount of surface disruption and your field will need time to recover before it can be played on again. If your maintenance time-window is short, use solid tines. Solid tines do not remove soil cores so compaction is unaffected, but using solid tines does increase oxygen levels and water infiltration. You can also use a deep-tine aerator, which penetrates to depths of up to 16 inches and fractures the soil below the surface, increasing soil oxygen. Other methods of aerification include verticutting, slicing, spiking, and water injection. Aerifying when it is too dry will limit tine penetration into the soil and if it is too wet, the sides of the aerification hole can glaze-over and seal-up. So, it is best to avoid extremely wet and dry conditions. Deep-tine aeration is an exception. The soil should be dry so that the soil fractures easily.



**Figure 1.** Regular overseeding will result in more turf cover and less weed invasion such as the knotweed found in the center of this field.



**Figure 2.** Aerification is a key component of managing high traffic fields



**Figure 3.** Intense wear often occurs down the center of fields. Apply the majority of your seed in these locations.

We often get asked the question of what to do with the cores after aerification. After you hollow-tine aerate, cores should be dragged back into the soil using a drag mat. Going over the field with a rotary mower also breaks up the cores (remember to sharpen your blades after you do this). If you plan to topdress with sand, the cores must be removed prior to topdressing instead of being dragged back into the field. If you are managing a sand-based rootzone, you should always remove the cores instead of dragging them back in.

Another technique to improve field conditions is to incorporate a good, quality compost into your soil. Spreading 1/4-inch of quality compost onto the field before you aerate and then incorporating it into the soil through aeration is an inexpensive way to improve your field. Compost increases nutrient retention and microbial activity along with improving soil structure.

Yearly compost applications will improve your field's turf density and color, increase root growth, and reduce the need for fertilizer and irrigation.

Additional information about using compost can be found at <http://plantscience.psu.edu/research/centers/turf/extension/factsheets/composts>. Do not use compost on sand-based rootzones.

Finally, after you drag in the cores or topdress, it is a great time to fertilize and seed. Then, if you have irrigation, give the field a good, long soaking. If you don't have irrigation, try to time this process before rain is expected.

**5. Other Strategies.** While the preceding four keys describe how to improve your field from turf and soil management aspects, there are some other techniques that can help you deal with heavy use of fields. If possible, try to rotate or slide your fields to spread out the wear on the most heavily used areas like goal mouths. By doing this, you can use the techniques we already described to revive your trouble areas. Designating practice areas off the field of play for repetitive practice drills can also help. Also, growth blankets can provide a jump start on recovery in late fall or early spring. Again, you don't need to put growth blankets over the entire field, just focus on those heavily-used areas. Finally if you manage a complex with multiple fields, select one field to be your "showcase" field. Pay a little more attention to this field and try to limit use on it. Then when teams play on it, it will be a special event for them and you can use it as an example of what you can do if play was limited on other fields and you were provided with the manpower, equipment, and budget required for those field conditions.

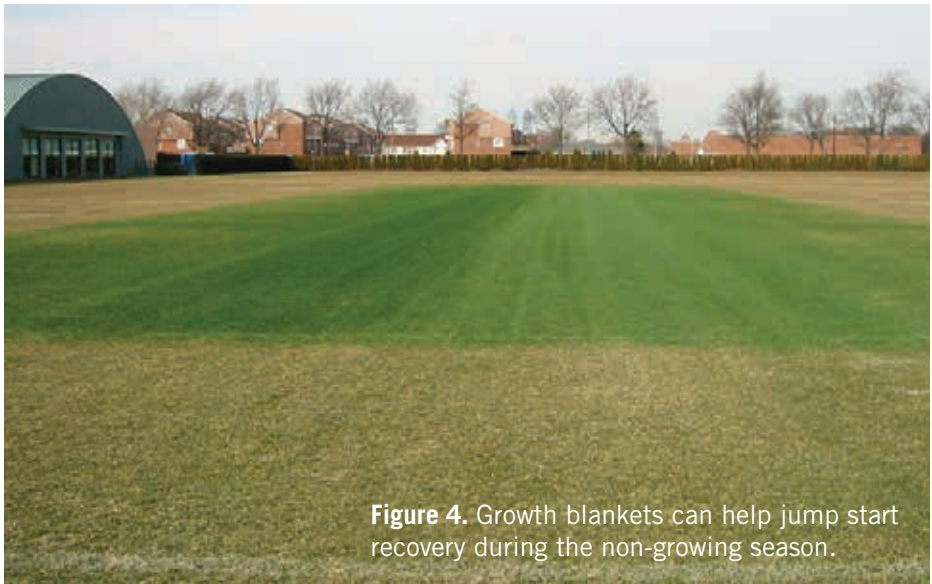


Figure 4. Growth blankets can help jump start recovery during the non-growing season.

Managing a heavily-used field is not easy. However, by improving your mowing, fertilization, aerification, and overseeding practices, you can overcome many of the challenges brought about by field over-use. So, when it seems like your field is being used all day, every day, don't throw your arms up and walk away. Take on the challenge and make your field the best it can be. •



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**W**aterloo is bursting with active, healthy people who make good use of the City's existing recreational facilities.

The City of Waterloo's new Outdoor Sports Field Strategy is a long-term plan that will help ensure residents have access to quality fields on an ongoing basis and will also help city staff balance today's needs with changing demands over the next 20 years.

The strategy paints a picture of an ideal future and a path moving forward. The goal of the strategy, when implemented, is for Waterloo to become a community where everyone who wants to play field sports can do so, regardless of their sport of choice, their age, their ability, or their gender. The City will be a recognized leader in outdoor sports field development, management, maintenance and programming. Waterloo will be seen as one of the best communities in which to play, compete, coach, officiate or be a spectator of outdoor field sports. The City of Waterloo developed this ambitious strategy in response to a number of community needs and pressures.

Development of this Outdoor Sports Field Strategy involved best practice

research, data analysis and collaboration between staff from the Public Works Department and the Community, Culture and Recreation Services Department. It also involved a public engagement process that included an online survey, public open houses and stakeholder meetings.

**WATERLOO IS BURSTING WITH ACTIVE, HEALTHY PEOPLE WHO MAKE GOOD USE OF THE CITY'S EXISTING RECREATIONAL FACILITIES.**

What emerged through the strategy development process was the following vision statement:

"The residents of Waterloo have equitable access to quality outdoor sports

fields throughout the City, thereby fostering improved individual and community health and increased capacity for sport and play."

It is hoped that this vision statement will provide direction not only to city staff but also to the sport organizations that use the fields and to the community at large. Seven strategic goals have been identified to form the core of the overall strategy. These goals speak to areas of greatest need where high impact changes can be made within available resources. They have been placed in order of priority based on public input.

**Goal 1:** To improve the safety and long-term quality of outdoor sports fields.

**Goal 2:** To maximize use and expand the amount of programmable time at existing fields to maximize the use of these fields prior to new development.

**Goal 3:** To develop new outdoor sports fields, within available resources while recognizing competing pressures, based on population growth and field need projections.

**Goal 4:** To enable participation in physical fitness activities in Waterloo through improved outdoor sports field access for neighbourhood, recreation,



# Developing a Long Term Plan for Sports Fields in Waterloo

Beth Rajnovich, MA, Coordinator/Analyst  
Culture Plan, City of Waterloo

and competitive use for the full range of outdoor sports of public interest in Waterloo.

**Goal 5:** To increase capacity throughout the sport and recreation services system in Waterloo to allow for continuous improvement in field maintenance, allocation, and management.

**Goal 6:** To pursue, facilitate and encourage innovative partnerships for the provision of access to outdoor sports fields.

**Goal 7:** To invest in enhanced communication, relationship building and collaboration between city staff and outdoor sport organizations.

As part of the general movement to make cities more livable, municipalities face public pressure to deliver increasingly sophisticated, higher quality sports fields. There are also an increasing number of community groups wanting access to recreation facilities for a broader range of activities than in the past. Opportunities

for informal, recreational and competitive sport are desired by local residents.

Meeting the demand for outdoor sports fields today and in the future is important because these fields contribute to opportunities for an active lifestyle. They also contribute to the social, cultural and economic vitality of the City. Sports fields make cities great places to live, thereby attracting employers to the area, who in turn attract and retain high quality talent. Additionally, sports fields can increase tourism to the City, as teams and their families come to the City to compete, contributing to our local economy by staying in local hotels, eating in local restaurants, shopping at local retailers and visiting other local cultural sites and attractions.

Land for development is scarce in the City of Waterloo. All remaining green field land within city boundaries has been allocated for development. There is also

high demand for other lands available for redevelopment. While it was anticipated that additional sports fields would be needed to support population growth, a strategy that demonstrated through data that additional sports fields were needed in the future, and predicted when those fields would be needed, would not only help with long term planning, but would also support planning for acquisition of land to enable construction of additional sports fields.

In addition to land constraints, like many municipalities Waterloo is facing financial constraints. The City has identified the importance of focusing on maximizing the use of existing facilities prior to constructing any new facilities. A significant part of the strategy work analyzed the existing fields to determine if they were being well used and to determine where and how that use could be improved.

Central to the development of the strategy was understanding the City's current assets. A comprehensive inventory of the existing sports fields in Waterloo was established. This involved looking at all of the multi-purpose fields, diamonds and cricket pitches in the City that sport groups can book through the City's central booking system.

For 2011, the City of Waterloo offered access to 92 facilities across the City. There are 44 diamonds that can accommodate baseball, softball, slow-pitch, fastball and t-ball, and two pitches for cricket. The remaining 46 fields are rectangular, multi-purpose fields for sports such as soccer, football, rugby, field lacrosse, field hockey and ultimate frisbee.

The majority of the highest quality facilities are located on the east side, with some in the central part of the City. There are no facilities on the west side, an area that has seen significant growth and expansion of residential communities in recent years. This lack of higher quality facilities on the west side of the City indicates a geographic disparity in field distribution and points to an opportunity for new, high quality, field development to allow residents access to facilities closer to home.

**Table 1.** All fields by type and ownership, estimated 2011 inventory

	Number	City Owned	School	Leased
Rectangular	46	29	13	4
Diamonds	44	23	21	0
Cricket	2	1	0	1
<b>TOTALS</b>	<b>92</b>	<b>53</b>	<b>34</b>	<b>5</b>

**Table 2.** All fields by type, characteristics and amenities, estimated 2011 inventory

	Artificial Turf	Lights	Irrigation	Parking	Washrooms
Rectangular	2	9	9	39	23
Diamonds	0	8	5	37	18
Cricket	0	0	0	2	0
<b>TOTALS</b>	<b>2</b>	<b>17</b>	<b>14</b>	<b>78</b>	<b>41</b>

**Table 3.** Rectangular multi-purpose sports fields – bookings in 2009/2010

Maximum Weekly Capacity	Number of Fields	Total Hours Used (Average of 09/10 Bookings)	Maximum Use Capacity Per Season (All Fields)	% Use of 100% (Max) Capacity	% Use of 80% (Goal) Capacity
High (26 hours)	4	1,698.0 hrs	1,768 hrs	96.0%	120.05%
Medium (18 hours)	28	6,702.0 hrs	8,568 hrs	78.2%	97.78%
Low (10 hours)	7	862.9 hrs	1,190 hrs	72.5%	90.64%

*Note: The length of a season for these fields was estimated at 17 weeks (May to August). This is an average season length.*



New artificial turf fields at RIM Park with public art in the foreground



Land on Westmount Road where the City of Waterloo is currently in the process of developing three new fields. It is anticipated they will be available for use in 2016.

The inventory also examined ownership of fields booked through the City.

Of all the outdoor sports fields in the City of Waterloo’s inventory, 58% are on city land, 37% are on school lands and the remaining 5% are on leased lands. The inventory also included details about the fields such as surface type and whether or not they had irrigation or lights, as well as associated amenities such as washrooms and parking.

Amenities vary greatly from field to field. Two of the City’s multi-purpose rectangular fields have artificial turf. Only 18% of all fields have lights. There is in-ground irrigation at nine fields. Washrooms are available at 45% of fields and parking is available at 85% of fields. Local residents indicated that washrooms are the most important amenity to have at sports fields, followed in priority order by off-street parking, player seating, lights, shaded areas and spectator seating. These features improve player and spectator comfort, whereas turf type, lights and irrigation increase the amount of time the field can be used.

Maximizing utilization of existing fields is a priority of the strategy. To understand how field use can be improved, it is necessary to look at how the fields are currently being used.

To do this, planning staff drew from the Sports Turf Association’s classification system, the expertise of city staff responsible for field maintenance, and booking data. Based on this information a maximum field usage capacity was

assigned to each field in the City. The assigned maximum capacity is based on current field conditions and assumes that existing maintenance practices continue. Maximum field use capacity can be defined as the maximum hours of use allowed per week before turf quality begins to decline in a significant way. However, achieving 100% of the maximum capacity for each

## THERE ARE PLANS TO REDEVELOP LAND CURRENTLY OCCUPIED BY SPORTS FIELDS IN TWO LOCAL PARKS.

field is not a realistic or appropriate goal. While it is desirable and cost effective to use the fields as much as possible, the complexities of field use scheduling need to be considered. Time is needed for breaks between games, for weather related cancellations and to allow for unexpected field maintenance. Since this is also the first time staff has assigned use capacities to each field, staff suggest 80% of the maximum use as a reasonable target.

By assigning a goal use (80% of maximum capacity) to each field and comparing actual use in 2009 and 2010 to that benchmark, it was possible to get a sense of which fields were being efficiently used and which could accommodate more use.

Data analysis suggests that low capacity fields are under-utilized, medium capacity fields are used appropriately and high capacity fields are over-utilized. Based on the goal use, usage results indicate 90.64%, 97.78%, and 120.05% respectively.

Diamonds were classified into two categories: high capacity (those with lights) and medium capacity (those without lights). High capacity diamonds are close to goal use capacity at 98.91%. On the other hand, medium capacity diamonds are used only 67.98%, suggesting they could be used more. The two cricket pitches in Waterloo were both ranked medium capacity and are used at 96.98% of goal use, suggesting there is little additional capacity for more use.

This analysis indicated not only which fields were well used and which were not, but also provided a starting point for discussion with local sport groups about why they used some fields and not others and what changes they might make to their scheduling practices to better use the existing fields.

Based on this analysis, staff also identified opportunities for policy and operational changes that would enable increased use of the fields. These include development of space allocation procedures to improve equity in access to fields and identifying or creating opportunities to use fields for alternate or multiple sports. The analysis also confirmed the importance of leased and school fields to meet community needs. Negotiating longer term leases for leased facilities and exploring the



development of shared use agreements with school boards will also contribute to better use of available fields and potentially delay the need for new fields.

While there is much that can be done to improve the use of the current field inventory to meet the needs of sports organizations in Waterloo today, consideration must also be given to future needs.

To project future field need, field demand projections (based on current booking trends and projected population growth in the City) were developed and then compared to the capacity of the anticipated field inventory at five year intervals between 2011 and 2031. There were several key factors involved in developing the projections. First, the projections were based on the assumption that usage of all of the existing fields could be improved before building any additional fields. It also assumed that maintenance standards would remain the same in the future as they are today. However, additional resources (human and financial) to improve maintenance may add new capacity to the field inventory. The projection also takes into account the removal of fields from the current inventory. For example, there are plans to redevelop land currently occupied by sports fields in two local parks. The loss of these fields had to be taken into account

in the projections. Finally, the projection methodology assumed that the demand for sports fields would grow at the same rate as the population.

Comparing projected demand to the anticipated field inventory capacity at five year intervals between 2011 and 2031 revealed when additional fields will be needed and the type of fields required. Based on this analysis, recommendations have been made on how many additional facilities of each type are needed over the next 20 years.

Even after meeting the target of using the fields to 80% capacity, results show there will be a need for additional multi-purpose rectangular fields over the next 20 years. By 2031, more artificial turf fields, 3 – 4 more high capacity rectangular fields and nine more medium capacity rectangular fields will be needed across the City.

The projections suggest that between 2011 and 2031 there will be a need for four more high capacity diamonds, although this need can largely be attributed to loss of diamonds within city parks to redevelopment. There will also be a need for another 1 – 2 cricket pitches within the City to accommodate redevelopment of one of the two existing cricket pitches and projected population growth.

The strategy identifies not only a need for additional fields, but also a need

to consider how the quality of existing fields can be maintained over the long term. Strategies identified include a long term plan for upgrades and renovations to existing fields in the inventory to improve facility quality, as well as development of a long term capital investment plan for infrastructure such as benches, backstops and goal posts. There will also be opportunities to change operating budgets and maintenance practices to improve turf quality and to better align with user expectations and industry best practices.

These are some of the highlights of the City of Waterloo's Outdoor Sports Field Strategy. Development of the strategy is just the first step. The upcoming implementation process will lead to improvements and take the City of Waterloo on its path towards the envisioned future.

The Outdoor Sports Field Strategy document can be found in its entirety at [www.waterloo.ca/outdoorsport](http://www.waterloo.ca/outdoorsport). Questions about the strategy and the planning process and methodology can be directed to [beth.rajnovich@waterloo.ca](mailto:beth.rajnovich@waterloo.ca).

*Editor's Note: Beth Rajnovich will be speaking at the Ontario Turfgrass Symposium, Thursday, February 21, 2013. For complete details visit [www.turfsymposium.ca](http://www.turfsymposium.ca).*



## Ontario Soccer Association Board of Directors Approves Mandated Changes for U12 & Below in 2014

The Ontario Soccer Association (OSA) Board of Directors met on the weekend of September 14 to 16, 2012 and strongly endorsed the ongoing phased-in implementation of Long-Term Player Development across the Province. In particular, the OSA Board formally approved the LTPD Recreation and Development Matrices for the 2014 season.

Highlights of the mandatory implementation for the 2014 season include the following:

- No promotion and relegation from U12 and below

- No league tables from U12 and below
- Small-sided games with fewer players on the field (5v5 at U7 and U8, 7v7 at U9 and U10 and 9v9 at U11 and U12)

**Ranges for field width and length have been provided at each development stage, together with goal sizes, in the Recreation Matrix.**

Visit [www.sportsturfassociation.com](http://www.sportsturfassociation.com) for a link to the entire news release and the Recreation Matrix.

# Cultivate Your Mind.

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## ONTARIO'S KEY ANNUAL TURF CONFERENCE

### Sports Turf & ORFA Specific Sessions

#### WEDNESDAY, FEBRUARY 20

##### W6. 1:30pm - 2:00pm

**Practical uses of Normalized Difference Vegetation Index (NDVI) for the Sports Turf Manager** – Dr. Ken Carey, University of Guelph

##### W7. 2:00pm – 2:30pm

**Turfgrass Water Conservation Alliance and its qualified turfgrass products**  
– Russ Nicholson, Pennington Seed

##### W8. 2:30pm - 3:30pm

**Winter stress is not just a turf problem** – Gord Horsman, City of Moncton

#### THURSDAY, FEBRUARY 21

##### T1. 9:00am - 10:00am

**Research and real world applications using crumb rubber to improve natural turf sports fields** – Dr. Tim Vanini, New Dimensions Turf

##### T2. 10:00am - 10:30am

**Overseeding species: Best choices for success**  
– Katie Dodson, University of Guelph

##### T3. 11:00am - 11:30am

**Impact of various field playing surfaces on sports injury rates**  
– Dr. Eric Lyons, University of Guelph; Dr. William Gage, York University

##### T4. 11:30am - Noon

**Outdoor sports field strategy utilizing STA classification system and benchmarking**  
– Beth Rajnovich, City of Waterloo

The Ontario Turfgrass Symposium is a premier education symposium developed exclusively for the turfgrass industry. Speakers from both industry and academia will provide valuable insight reflecting on the OTS 2013 theme: Cultivate Your Mind. Delegates will participate in sessions providing up-to-date information responding to the complexities of maintaining healthy turf in today's more restrictive growing environment.

### General Sessions

#### THURSDAY, FEBRUARY 21

**T19. Drought dialogue: How can we, as Turf Managers, provide more drought tolerant turf surfaces for the future?**

This is a joint session with the Nursery Sod Growers Association.

**T20. Incidents and accidents record keeping: The do's and don'ts**  
– Terry Piche, ORFA

#### T21 Turf in the lab

Dr. Ken Carey and Linda Jewell, University of Guelph, Shahram Sharififar, Natural Insect Control