Turf Advisory Service
ON-SITE VISIT REPORT

BEMIDJI TOWN & COUNTRY CLUB
Bemidji, Minnesota

Visit Date: June 27, 2013

Present:
Tom Johanns, Superintendent
Tiffany Paine, Club President
Tom Conzemius, Green Committee Chairman
Bob Paine, Green Committee Member
Gary Rients, Green Committee Member
Paul Iverson, Green Committee Member
Pam Johnson, Green Committee Member
Paul Rowe, Club Member
Don Dale, Board of Directors
Rick Grand, Golf Professional
Robert C. Vavrek, Jr., Senior Agronomist

United States Golf Association
Robert C. Vavrek, Jr., Senior Agronomist | Green Section | North Central Region
PO Box 5069 | Elm Grove, WI 53122 | Phone (262) 797-8743 | Fax (262) 797-8838 | rvavrek@usga.org

USGA Green Section Mission: The USGA Green Section are leaders in developing and disseminating agronomically, environmentally, and economically sustainable management practices. We help golf facilities maintain better playing conditions for better golf through science-based and practical solutions.

WINTER INJURY

Unseasonably late snow cover and a severe thaw/freeze cycle during early May was the most likely the cause of winterkill to greens and isolated areas of fairways. The most severe damage and the slowest rate of recovery were observed on the most heavily shaded greens. Losses of turf were limited to the *Poa annua* component of the playing surfaces and we notice little, if any, injury to Kentucky bluegrass or creeping bentgrass.

Cause

It is impossible to determine the exact cause of the 2013 winterkill, but the combination of water saturated turf accompanied by temperatures of 21 degrees on May 2nd and 3rd and an even colder 19 degree low temperature on May 12 was likely the stress that killed the *Poa annua*. Cool season turf prepares for winter stress during fall as the days become shorter and temperatures cool down. Plants lose moisture and "harden off" during this time. This process causes the grass tissues to store and concentrate carbohydrates in the plant cells. Concentrated carbohydrates in the cells are similar to antifreeze in a radiator and they supply energy during spring to initiate green-up and recovery from winter stress.

Poa annua will have the highest level of winter hardiness during December right after the hardening off and tolerance to cold temperatures or severe thaw/freeze events will diminish through winter and into spring. By May, there is little, if any, residual tolerance to cold temperatures. It was no surprise that the combination of temperatures in the teens and plant tissues lush with moisture from melting snow had little chance of survival. In fact, numerous golf courses across the Region experienced significant winter injury this spring mostly caused by the rapid freezing of waterlogged turf during late winter and early spring.

Recovery

The right decision was made to play temporary greens on two holes and to take the practice green out of play. In addition, we observed enough injury on the 13th green to warrant taking this green out of play as well. Putting across a bumpy, heavily damaged green every day will only frustrate golfers and cause them to lose patience with the recovery efforts very quickly.

Temporary greens are always an unpopular option, but keeping traffic off damaged turf provides ample time for seed to germinate and seedlings to mature before they are subjected to the stress of foot traffic and close mowing. Greens in play cannot be covered and covers are necessary during early/mid spring to raise the soil temperature to the point where seed can germinate (55 degrees or so).

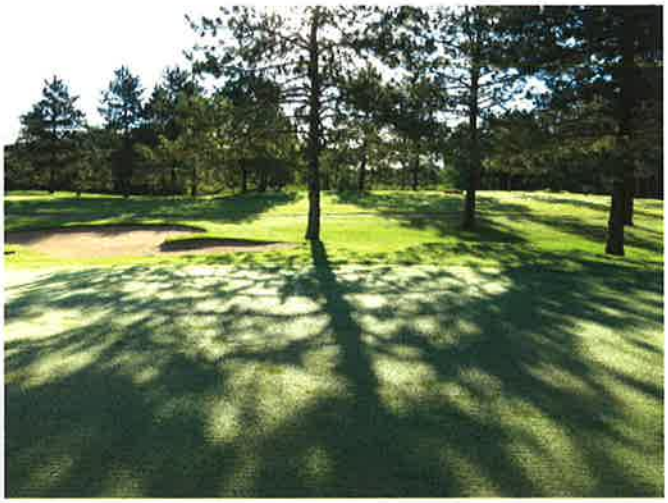
Immature plants have delicate, shallow root systems and need to be watered frequently. Watering lightly multiple times a day will interfere with play and most courses do not water the seeded area of turf damage adequately, so germination occurs, but the

seedlings die from moisture stress right after they reach the "green fuzz" stage. Just a short episode of desiccation can wipe out a stand of seedlings and then two to three weeks of recovery efforts can disappear on one dry, windy afternoon. Covers can serve as a mulch to help maintain a consistent level of moisture in the root zone when they are used properly.

Unusually cool spring weather is partly to blame for the slow recovery of turf this spring despite multiple attempts to seed bentgrass into damaged areas of the greens. Dense shade from adjacent trees, especially evergreens, also shares the blame for the lack of turf growth. On a positive note, we did find a considerable amount of bentgrass growing in aeration holes and the new turf is just beginning to tiller and spread laterally into the bare areas between the holes. Warm days and, more importantly, mild nights are necessary to encourage faster recovery. With a little more patience, the percentage of bentgrass may increase significantly in several localized areas of the most heavily damaged greens.

It was no surprise to find that morning shade from trees located adjacent to damaged greens is hindering the rate of recovery. Removing the problem trees as soon as possible is recommended. Several of the sites we identified for tree removal were:

- It was obvious that the shaded portion of turf on the practice green was much thinner versus the turf in full sun. Remove the trees that cause morning shade and the grass will recover faster. Eliminating shade during the winter will also make the turf less susceptible to ice and snow accumulations.

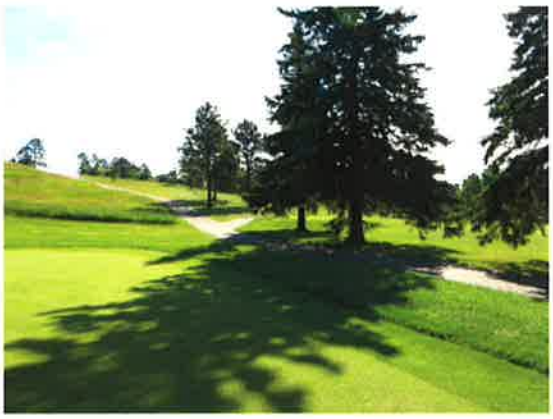


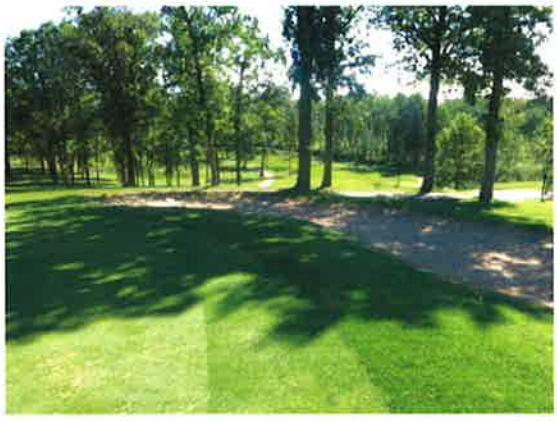
The relationship between shade and poor turf quality was apparent on a number of holes, especially areas affected by severe winterkill.

- The back right of the 1st green is still thin due to morning shade. Three evergreens and an oak closest to the back right of the green are the primary problems. Try removing the evergreens first and reevaluate the shade patterns before considering the options for the oak. A healthy oak that has a well-balanced canopy is an asset, so remove deadwood and selectively prune out unnecessary branches to increase sunlight. Reduce the shade and perhaps the oak and the green can coexist.

Remove the evergreens, but try to save the oak by removing deadwood and selectively removing branches from the canopy to allow more sunlight to reach the putting surface.

- At least four trees along the left side of the 13th green are shading the putting surface. Thinning out or removing the trees is recommended.
- The site of the 16th green is a poor environment for growing high quality turf. Shade and inadequate air circulation are problems that cannot be completely addressed by only removing a few trees from this site; however, any additional sunlight would be helpful.





We found a direct relationship between morning shade and extra-slow recovery of winterkill. Aggressive tree management in localized areas of the course would benefit the turf this summer and in the future.

- The current height of 0.170" makes sense for the problem greens until the turf recovers. Try using a solid front roller instead of a grooved front roller on the mowers to reduce mechanical stress to the immature bentgrass plants.
- Topdress the thin, weak greens lightly throughout the recovery process. This will help support the mowers and prevent scalping injury to the turf. In addition, sand will

cover and shade any algae that forms across bare areas in the putting green. Algae is likely to grow on bare areas of turf whenever greens are irrigated several times a day to keep seedlings alive.

- It was a good idea to use the woven breathable covers to raise soil temperature of seeded greens during early spring, but they tend to trap too much heat when air temperatures are above 55-60 degrees. A relatively inexpensive option for covering turf during the milder weather of mid to late spring is a light spun bound material - DeWitt Seed & Plant Guard (SPG) (800-888-9669). This highly breathable fabric has less ability to raise soil temperatures compared to plastic or dark woven covers (green HPI cover), but it can be left on the playing surface during warm, sunny days with little risk of injuring the turf. SPG is durable enough to be removed and reapplied to the turf several times, but is typically discarded after the damaged area is open to play. The modest cost of this material makes it useful for covering extensive areas of damaged turf when necessary. One source of this material is:

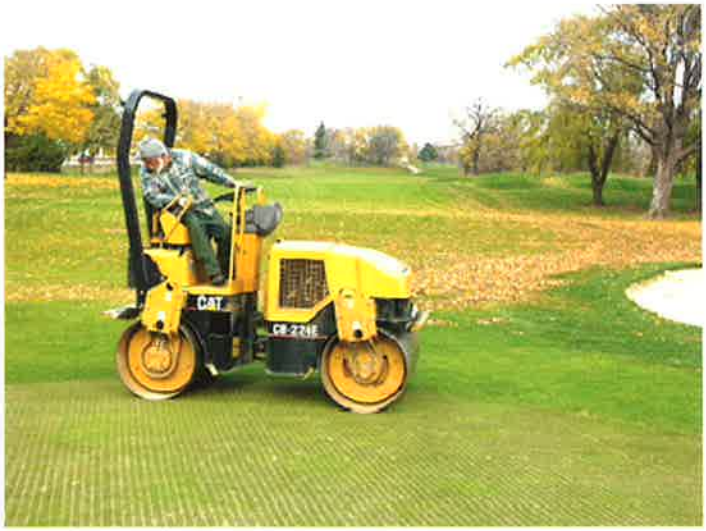
  http://www.gemplers.com/product/152010/DeWitt-12-ft-x-1000-ft-Reusable-Seed-Guard-Fabric-Roll

- Moisture management is critical during recovery. Too much water encourages algae growth which can seal off the surface of the green, but the lack of adequate moisture for even one afternoon can severely thin out an immature stand of turf. We discussed the importance of using a high quality moisture meter to measure and monitor water content in the upper soil profile of the problem greens. In addition, a moisture meter can be used on greens, tees, and fairways throughout the season to help manage irrigation scheduling. Most highly regarded courses are using this technology to schedule irrigation and the usual result is a drier, firmer golf course that uses less water. A popular unit used at many courses to measure water content of the soil can be found in the following link and similar units are available from other sources.

  http://www.specmeters.com/soil-and-water/soil-moisture/fieldscout-tdr-meters/tdr300/

- A side effect of topdressing greens and working sand into aeration holes with brushes has been the buildup of sand in the higher cut turf at the border of the green and approach. This creates a curb on some greens that can impede the free movement of excess water off the putting surfaces. Impeded drainage will increase the chances of ice accumulation and winter injury. We noticed a "curb" effect on several greens during a tour of the course.

A number of courses in the Region have had success addressing this problem on greens by stripping the elevated collars, shaving down the elevated areas and returning the original sod to the collars. Another option is to core the elevated collar with 5/8-inch hollow tines, remove the plugs, water, and mash down the high spots with a heavy tennis court/pavement roller. Roller as heavy as one-ton have been used to smooth out putting surface undulations in this manner. The wet, open holes provide room for sand and soil to shift under the weight of the roller.



A heavy roller can help restore surface drainage through the perimeter of the greens by lowering the grade of an elevated collar.

On a final note, we discussed the need to core greens with 1/2-inch diameter hollow tines at least once and preferably twice a season to remove organic matter accumulation in the upper soil profile of the greens. In addition, the old program of applying light dustings of sand to the greens throughout the season needs to be part of the annual maintenance operations again. Less aggressive topdressing and coring operations were initiated in 2010, perhaps due to budget limitations and because these operations are unpopular when they cause temporary disruption to the playing surfaces.

A zone of organic matter accumulation has developed in the upper soil profile of the greens when the standard coring and topdressing program was modified during 2010. Coring and topdressing needs to be part of annual maintenance operations in the future.

Where does the organic matter come from and why are routine coring/topdressing operations so important? A healthy stand of turf will constantly recycle plant debris into the upper soil profile when roots, shoots, stolons and other plant parts die back and are replaced throughout the season. Soil microbes decay excess plant debris and, under ideal conditions, the rate of decomposition can keep pace with the rate of organic matter accumulation. However, in northern Minnesota, cool or cold weather much of the year will inhibit microbial degradation and the result is excess organic matter accumulation. For example, a peat bog is a large natural deposit of excess organic matter.

From a golfer's standpoint, excess organic matter (thatch) in fairways and tees makes for soft, spongy footing and limited ability to impart or control backspin on the ball. Greens with too much organic matter at the surface can be soft and hold water for extended periods of time after irrigation or rainfall. Deep, pitted ball marks are often a symptom of excessive organic matter buildup in the upper soil profile of greens.

From an agronomic standpoint, a thatchy playing surface often becomes puffy, which makes the turf more susceptible to scalping, particularly during hot, humid weather. Turf affected by excessive organic matter may have more problems with diseases such as snow mold, brown patch and dollar spot because of fungal pathogens that cause these diseases to lie dormant in thatch until favorable conditions for disease activity occur. Wind desiccation during open winters and isolated dry spots during the summer are often a concern where too much thatch exists, though open winters are not usually a concern in Bemidji. To make matters worse, nearly all of the root system becomes confined to the upper zone of organic matter accumulation, which makes turf roots more susceptible to injury from heat, drought, cold temperatures, traffic and other stress.

Aerating the turf with hollow tines and removing the cores before filling the open holes with straight sand is the most effective way to remove organic matter from greens. This process removes some of the thatch while the sand filled holes improve drainage and root growth.

If there are any questions regarding the recommendations made in this report, feel free to contact the North-Central Region office at (262)797-8743. Arrangements for Turf Advisory Service visits to select Minnesota Golf Association golf courses were made by Tom Ryan, Executive Director—Minnesota Golf Association. Feedback to the Green Section office or to the Minnesota Golf Association regarding ways to improve the Turf Advisory Service and whether cooperative efforts between the associations are a desirable benefit to member clubs would be greatly appreciated.

Sincerely,

Robert C Vavrek Jr

Robert C. Vavrek, Jr.
Senior Agronomist

RCV:gs

cc: Tom Johanns, Superintendent
Tiffany Paine, President
Tom Conzemius, Green Committee Chairman