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Inside This Issue Of Hole Notes

VENDOR APPRCIATION DAY AT MIDLAND HILLS

MGCSA AFFILIATE MEMBERS met on May 12th at Midland Hills Country Club for the 6th Annual MGCSA Vendor Appreciation Day. Though the weather was a bit brisk, Mike Manthey, Superintendent, had the course in nice shape. The day began with a round of golf followed by lunch and a meeting. Our MGCSA Affiliate representatives, Shane Andrews and Joe Churchill, ran the discussion. MNLA's Bob Fitch gave an overview of the 2011 Northern Green Expo. Affiliate members discussed the 2010 Expo and the changes for the 2011 show. The meeting ended with talk about the MGCSA sponsorship opportunities. Affiliates are happy with the support the National Hospitality Night has been getting. In 2011, the event will be held at Tommy Bahama's in Orlando.

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JUNE HOLE NOTES ADVERTISERS

About the Cover:

Eastwood Golf Course played host for the 2010 MGCSA Assistants Spring Mixer on May 26. Pictured on the cover is the seventh hole, a 484-yard, par 5. (See story on Page 14).

MGCSA EVENTS

June 14
MGCSA Scholarship Scramble
Greystone GC
Superintendent Host: Lee Mahnke

August 16
MGCSA Championship
The Jewel
Superintendent Host: Doug Mahal, CGCS

September 16
U of M Field Day
TROE Center
Host: Brian Horgan, Ph.D.

September 20
MGCSA Harold Stodola Research Scramble
The Classic at Madden's
Superintendent Host: Scott Hoffmann, CGCS

October 4
MGCSA Fall Mixer
Minnesota Horse & Hunt Club
Superintendent Host: Tom Proshek

December 8
MGCSA Awards & Recognition Banquet
Southview CC
Superintendent Host: Jeramie Gossman

PRESIDENT'S MESSAGE

The Gift of Giving

By Paul Diegnau, CGCS

As you may have read in the last issue of *Hole Notes*, former Golf Course Superintendent Tom Fuller, was forced to leave his sales position with Turfwerks, due to illness. He was diagnosed with Idiopathic Pulmonary Fibrosis, an incurable lung disease that will require a lung transplant. He has been added to the lung transplant list and he requires an oxygen delivery system to accompany him wherever he goes. Beyond sending silent prayers, it also appears that a benefit golf tournament is appropriate with the proceeds going to Tom and his family.

Enter the Wee One Foundation (www.weeone.org). This Wisconsin-based organization was founded in 2004 in memory of Wayne Otto, CGCS, and longtime Superintendent at Ozaukee CC in Mequon, Wisconsin. In the short time since its inception, this Foundation has gifted over $300,000 to those experiencing economic hardships due to overwhelming medical expenses. To be eligible, the recipient must be a GCS, an Assistant GCS, an individual that services the golf course management industry or a dependent thereof.

Dale Parske of Reinders contacted Rod Johnson, CGCS, and Vice-President of the Wee One Foundation, for possible assistance with a golf tournament. Not only was the Wee One willing to help, but they stepped up to the plate in a big way. They have offered to take care of online registration, cover all of MGCSA's expenses to host the tournament, match dollar for dollar any money we raise up to a very generous limit, and donate very nice prizes for the event. The MGCSA would have been foolish to turn down this kind offer and unanimously voted to approve the event.

At this time we think we have a very nice venue lined up this fall for the event. The last and most important thing we need is participants. I hope that many of my fellow MGCSA members will find value in participating in this tournament to help one of our own.

Tournament information will be made available on our website (www.mgcsa.org) and in *Hole Notes* as details become available. Let's make this event a HUGE success!

The Backbone of our Industry

I had the pleasure of playing golf with host Superintendent Jeff Minske at the Assistants Mixer at Eastwood GC on May 26. As we conversed during the round, I learned the "ins and outs" of his operation. I was somewhat taken aback by the fact that he maintains 18 holes of regulation golf with a staff of five and one-half, including himself. In addition, he oversees the maintenance operations at Soldiers Field GC, another 18-hole facility in the Rochester parks system. WOW! These revelations caused me to pause and reflect on the many small-budget courses that provide very playable, enjoyable conditions with minimal resources. The dedication, strong work ethic and ingenuity of these maintenance staffs are what make our industry so strong. Then Jeff said something that tied it all together for me - after 21 years at the same facility he still looks forward to getting up and going to work every day. Hats off to the backbone of our industry! Thanks Jeff!

Until next month,
Paul Diegnau, CGCS

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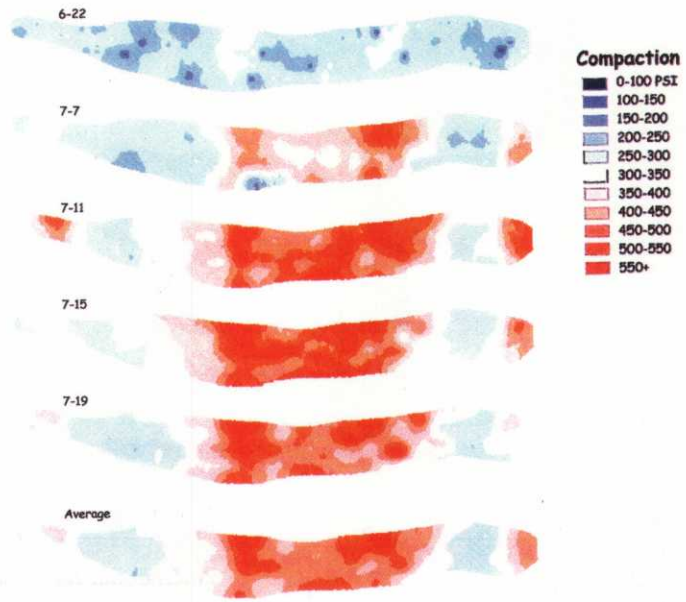
Art vs. Science-Based Irrigation Scheduling

By E. P. ECKHOLM, CGCS
Heritage Links Golf Club

I was recently reading an article in a trade journal about using ET (evapotranspiration) for irrigation scheduling. The article painted the practice in very broad strokes, citing superintendents who used the practice and how successful they felt that it was. Most of them noted that there were other variables that needed to be considered when scheduling irrigation effectively thus making the practice more of an art than a science. Developing a system to help base irrigation scheduling more on scientifically based needs of the plant rather than using an ET rate calculation from a weather station in one corner of a course for whole course irrigation scheduling would seem to be in order.

To that end, I have been working with a company for the past five or so years to investigate a better tool to help take out some of the magic in irrigation scheduling and replace it with a stronger dose of science. We began with the premise that turf moisture needs were based not only on the amount of water lost but how much is available for the plant to access in the first place. We know of course, that there is any number of factors influencing soil moisture availability including turf type, soil type, compaction, ground contours as well as others. The first step was to better understand the site conditions for the irrigated areas. We sampled the soil throughout the area looking at soil type, soil moisture, compaction to extreme depths, at one point we even punctured an irrigation pipe, and our irrigation efficiency. To be sure that we had accurate maps these measurements were taken on a GPS based grid. After all this was done, we had detailed maps of many of the factors that would influence our irrigation needs.

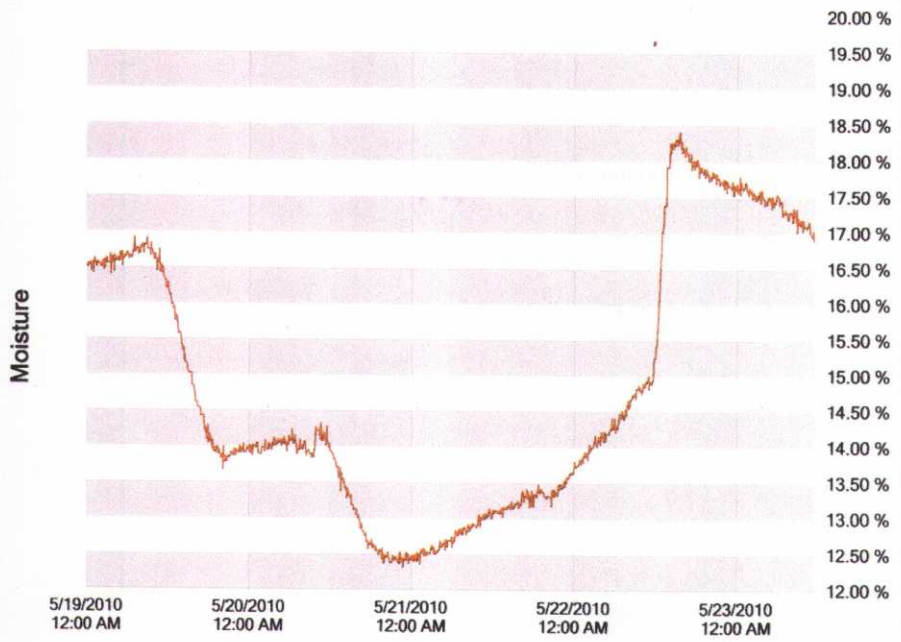
This data provided us a set of maps that showed general areas that were related in compaction and moisture content and generally speaking, soil type as well. This gave us a basis to start to look at how we could monitor those areas and see if we could indeed use these measurements to help us better irrigate the turf.



SOIL COMPACTION - 0-4"

Heritage Links #3: Soil compaction is expressed here as the amount of force in pounds per square inch (PSI) required to push a metal probe into the soil to a depth of 4". Therefore, the measurement is the maximum value for compaction in the rootzone (0-4").

We installed soil moisture sensors in two distinctly different areas on one fairway at two, four and six inches deep into the soil and began to collect data. After watching the soil moisture values and observing the Turfgrass over a number of years, I have a good understanding of what the data tells me about the moisture content in each of the different areas and how to use the data. There is still a bit of art, but it is based more on science than using the ET method. One of the major things that I have learned is that you can indeed predict the need for an irrigation event based on the soil moisture sensors; however, the trigger number is different depending on the time of the year. I am sure this has to do with root length, ET rates and a slew of other factors we have yet to figure out how to measure. By knowing when the soil is beginning to dry down I am able to irrigate ahead of when a stress point will hit thus reducing the need for syringing and spot irrigation. With these sensors you can even see how a rainfall event infiltrates the soil.



(Continued on Page 7)

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Irrigation Scheduling-

(Continued from Page 5)

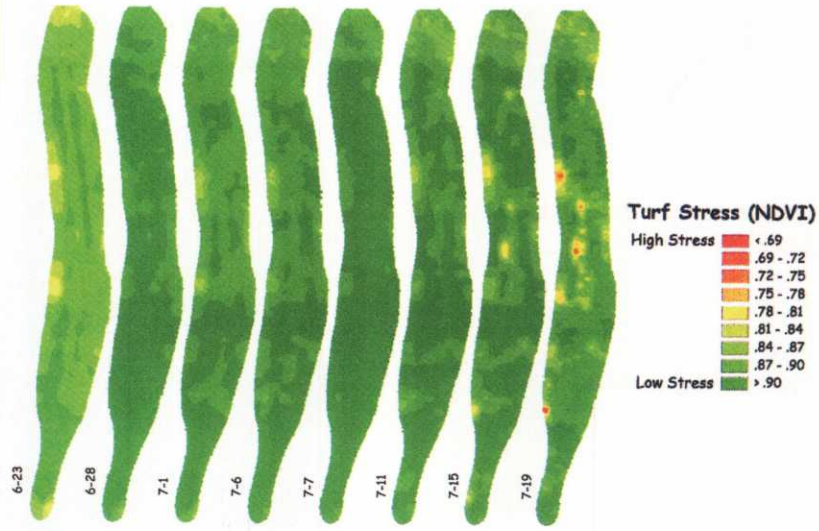
What we have shown is that by mapping out your course and finding turf areas that are similar in structure and turf type, the ability is there to use soil moisture monitoring to help better utilize your irrigation system and reduce water use. Additionally, a representative area with similar soil type and compaction can be used as an indicator for related areas throughout the course, so you don't need a thousand sensors, just enough to cover the different soil type areas you have. Granted, some adjustments will be needed for terrain differences and such, but we never thought the human input could be totally eliminated.

With a fairly good grasp of the technology, I have installed sensors in two of my greens and have been able to determine a trigger point where a hands on monitoring needs to take place. Where I would have irrigated before, I am able to know how much moisture is available to the plant and can even delay an irrigation event if there is rain in the forecast, thus preventing overwatering due to a moist green having to accept rain. Working with my golf professional, we have been able to develop an irrigation regime that keeps a green accepting a shot more consistently, even though it is much drier than in the past.

> ***"During the past two seasons I have reduced water consumption by over 30 percent. The only down side is that I have spent many hours fine tuning my system run times by individual head to irrigate only what I have to and when I have to. But, now that they are adjusted I only need to make minor adjustments now and then."***
>
> *- E. P. Eckholm CGCS*

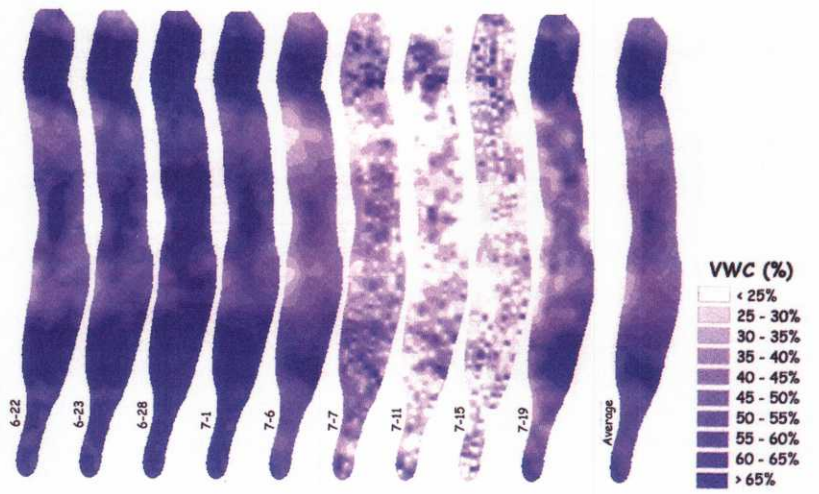
During the past two seasons I have reduced water consumption by over 30 percent. The only down side is that I have spent many hours fine tuning my system run times by individual head to irrigate only what I have to and when I have to. But, now that they are adjusted I only need to make minor adjustments now and then. The tools are available commercially; we just need to embrace the technology to help us to continue to reduce the inputs needed to keep our courses healthy.

When this project started, I thought I was a judicious user of water, and knew that I irrigated less than many of my peers, what I found was that I too overwatered on many occasions. While I feel I now have a good handle on how to use this technology, new questions continue to pop up on how to make the system work better and continue to develop the data into a more hard set of science bases rules of use. Growing a healthy stand of turf will always require a good dose of art; however, I feel a strong base of science will go a long way to making our lives a lot easier.



TURF STRESS - REFLECTANCE AS NDVI
(Normalized Difference Vegetative Index)

Figure 2 *- Heritage Links #3: The earth is bombarded with energy from sunlight. Plants absorb specific wavelengths of energy (red and blue) found in the visible portion of the electromagnetic spectrum to fuel photosynthesis. Photosynthesis in turf is very responsive to stress. Therefore, the amount of red and blue light absorbed (or reflected) by the turf canopy is a reliable measurement of photosynthesis level or vigor/stress. Spectrometers are sensors that emit specific wavelengths of energy and measure the amount of each reflected back from the turf canopy. More red energy reflected back indicates a lower level of photosynthesis or a higher level of stress. Two stress indicators are used to map stress: NDVI and R/IR (red energy as a fraction f near infrared energy.)*



SOIL MOISTURE VWCO-4"
(Volumetric Water Content)

Figure 3 *- Heritage Links #3: Soil moisture data is collected using a sensing technique called "Time Domain Reflectometry" or TDR. Two 4" long metal probes are inserted into the soil. A high frequency electrical pulse is generated along the probes. The soil's moisture content affects the amount of time required for the signal to be reflected back to the probes. The duration of this response time is measured by the sensor and used to calculate soil moisture averaged to a depth of 4" and expressed as % volumetric water content.*

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Improving Turfgrass Health With Improved Water Management

By AARON JOHNSEN
Winfield Solutions

Water is essential to turfgrass health. Water is used in photosynthesis, cooling, and many other critical plant functions. In Minnesota, it has been well documented that the annual distribution of precipitation is not uniform enough to sustain healthy turfgrass growth. Therefore, it should be no surprise that irrigation is an essential part of turfgrass management.

I believe the desire to improve irrigation is driven by two factors, the financial cost of irrigating and the improvement in turfgrass conditions. In other regions of the country, the financial cost of irrigating can run into the tens and even hundreds of thousands of dollars. One superintendent in California saved $10,000 last summer by managing soil moisture occasionally. This summer he has hired someone to monitor soil moisture on a regular basis. He expects to save around $40,000. In Minnesota, we do not have this financial concern. With that said, there is a new "user fee" of 0.0008 cents for every gallon of water pumped during the season. In the future, the financial cost of irrigating may be a concern in Minnesota.

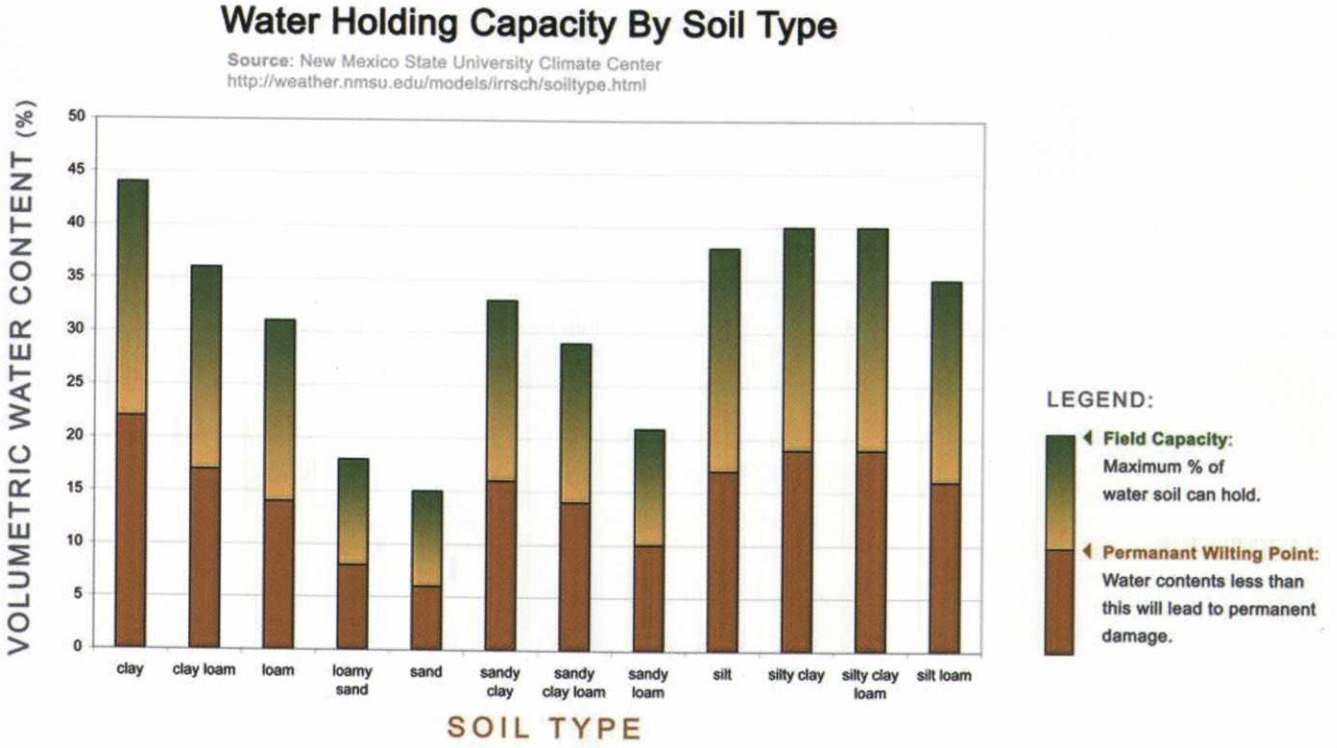
The greatest value that is obtained from managing irrigation better in Minnesota is the improvement of turfgrass conditions. The PGA Tour adopted the use of soil moisture sensors about a year ago. Their objective is to improve green firmness and develop uniformity across the course. Closer to home, Paul Diegnau, CGCS, at Keller Golf Course purchased a soil moisture sensor about two months ago. He has reported saving two irrigation cycles already this season from monitoring soil moisture.

Wilt on a creeping bentgrass fairway. Photo by Aaron Johnsen

Reducing excess water in the soil profile promotes a healthy air and water balance, which ultimately leads to healthier turfgrass.

Over the years, measuring evapotranspiration has been touted as a way to make informed irrigation decisions. My graduate studies and subsequent work with soil moisture sensors and turfgrass management has led me to determine that while evapotranspiration measurements are very useful, soil moisture sensors can be even more helpful in making informed irrigation decisions. What do you need to know if you are using or thinking about using soil moisture sensors?

(Continued on Page 11)



Approximate water holding capacity by soil type. Every soil has a different holding capacity. Photo by Spectrum Technologies

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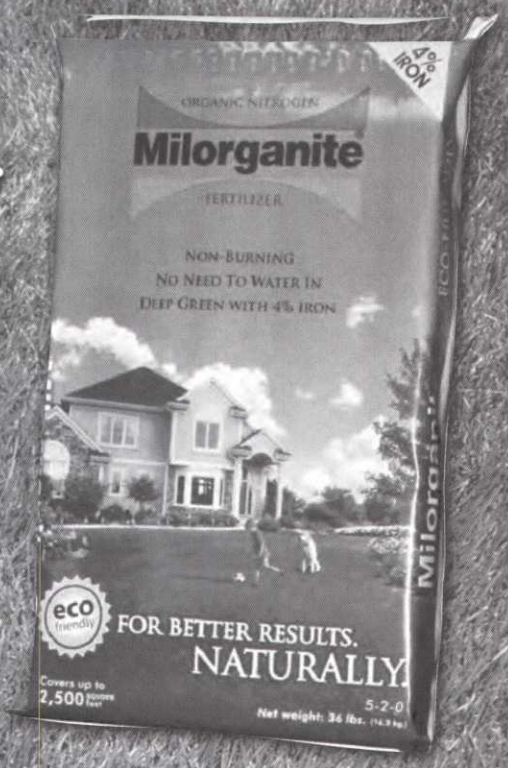

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