

# Hole Notes

The Official Publication of the MGCSA



**2018 MGCSA  
President  
Brandon Schindele**

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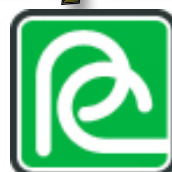
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## Mark Your Calendars:

January 10

Lakes Area Outreach and Fom at Cragun's Resort  
Host Matt McKinnon

January 15-17

Northern Green at the Minneapolis Convention Center

February 4 - 8

GIS In San Diego, California

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**Thank you**

**Thank you**

***Have a Safe and Happy Holiday Season***



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***On the Cover***  
***Brandon Schindele 2018***  
***MGCSA President has been***  
***a very motivated and***  
***dedicated member.***

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# Presidential Perspective

by Brandon Schindele, Superintendent Edina Country Club

The end of the calendar year is upon us and with that the Holiday Season. If you are

remains an incredibly positive individual and looks at each day as a gift because he experienced first hand losing two of his best friends in that same explosion.

like me it is also a time of reflection as you spend more time at home with loved ones than you do in July. The MEGA Seminar was held on December 5th and 6th at Medina Golf and Country Club and, new this year, was a “Key Note” speaker.

Up until that day, he states that his worst day was the day the Vikings lost in the NFC Championship to the Atlanta Falcons, which now, in the comparison, really is not a big deal.

John Kriesel gave an inspirational talk about his journey from the time he was 17 to the present day and his time in the National Guard serving our country. If you don’t know John’s story or are not familiar with him on Twitter, then I would suggest it is worth taking a little time to learn about him and his outlook on life. In a nutshell, he was injured by an IED in Iraq and had to have both of his legs amputated around the knees. Through that adversity he

Understanding that we have our own individual journeys and challenges that occur in our personal lives as well as our professional lives I think this is a great time of year to really reflect on keeping things in perspective as we re-charge the batteries for next year. I would be hard-pressed to say that any of us had as bad as of day as John especially when I think the quote that I can’t seem to get out of my head and Matt Cavanaugh repeating it the next



day was, “They flopped my legs over onto to my chest”....let that sink in for a minute. That is a really tough day and one, to be honest, that you don’t know for sure if you are going to live through.

We all have crappy days and it wears on us but keeping things in perspective and trying not let things get you down can be easier said than done. For those of us that can brush those daily obstacles off and not to let them ruin a day, that is awesome, and I think I have been able to move my needle in that direction as I have gotten older and more mature.

However; for those of us that have difficulties with the affliction of letting things bring us down and every cart infraction or un-replaced divot just feels like it has a stranglehold on you, I think it is worth reaching out to a colleague or turf-friend and see if there is time to have a heart to heart about those issues and discover how you can improve upon that part of

yourself.

Your golf course, staff, family and friends will be better off for it and, most importantly, you will be better off and healthier as well. I think this issue is becoming more acceptable to be discussed in our industry and whether it is defined and labeled as mental health or preventative maintenance on ourselves, I don’t think it really matters, but I think it is important that it is no longer an elephant in the room that no one talks about.

Over the last year I have observed more and more mentioning of it on social media and even some turf podcasts scratching the surface of this important issue of mental health.

One of the general characteristics of the “Golf Course Superintendent” is that we just get the job done and we do not look for recognition or praise when we do it. Unfortunately, I think a very unhealthy and negative effect of

this is that we bottle things up. You might be surprised how many of your fellow turfies have the same issues and challenges going on, so don't be afraid to reach out if you feel you need to bend an ear or even if you feel a colleague needs a little boost. You are not alone!!!

With the end of the year upon us, this will also be my last Presidential Perspective. It has been a year that went by incredibly fast, as I reflect upon it, and I feel that the MGCSA is in a better position than it was last year at this time. Every year changes and decisions are made in the interest of better serving the membership. Each Board of Directors and President for any given year always has that goal of leaving the association better than it was the prior year, and I really think that we have done that.

The Board, for 2019, will follow the leadership of Matt Rostal and improve upon what was done in 2018 and we have a good

roadmap to get us there created by Boards and Presidents of previous years. The one constant that we are so fortunate to have is our Executive Director Jack MacKenzie. He keeps us focused and on-task, which is not an easy job at times, but we are all thankful to have him as the face of the MGCSA and his passion and drive is unmatched. Thank you, Jack, for making this year as President a very enjoyable one and one that I learned a great deal from you.

Now I won't go into re-hash of my President's report that will be in the annual meeting report, but a couple of thanks are in order as my time as President starts to come to an end.

To the entire MGCSA for giving me the privilege to serve as President for 2018; this was never really a goal of mine but it is something that I am glad I did and I could not do it without the blessing of the membership, thank you. To the Board of Directors for



helping lead the organization and having thoughtful and thorough discussions with the goal of constant improvement, thank you. To every affiliate member that supports the association and that all of us rely on to help us do our jobs every day, thank you. To my colleague Superintendents that I have regular texts, emails, phone calls, or visits with, thank you as this is still where I find the best information and from whom I learn the most from; this is one of my favorite parts of this industry.

Thank you to my staff and fellow managers at Edina Country Club that enjoy what they do and love coming to work every day with a great group of people. To the Board of Directors and Green Committee at Edina Country Club that are 100% supportive of me serving in this capacity, thank you. They recognize the value in it for me professionally as well as the benefit to their facility.

appreciation, I thank my family, for without them I would not be able to do what I do on a daily basis. Whether it is MGCSA or club related, they are my motivation.

With that goal of leaving the Association better than it was last year and for years to come I will end with this quote:

***“Someone  
is sitting in  
the shade  
today because  
someone planted  
a tree a long  
time ago.”  
Warren Buffett***

Lastly, and with greatest



# three anonymous supers

interviewed by matt cavanaugh

*adjective*

insensitive to criticism or insults.

“you have to be thick-skinned to work in the turf industry”

synonyms: insensitive, unfeeling, tough, hardened, callous.

Have you ever gotten the stare? The stare of a dog owner picking up their dog's poop as you drive by. It's the grim beginning of knowing they have to carry around a bag of warm goo for the rest of the walk. I have never once seen a dog owner that looks happy walking their dog. Many times that same stare can be found on a superintendent driving around the course in their cart. The 'poop just keeps heading our way'. Weather, labor issues and the golfers, oh the golfers. The business of work and life never seems to stop. As you will see below, we often don't get everything accomplished we want to, but it's important in many situations to not force the issue and convey information in a productive way, but the fact remains, we don't know what we don't know and you may need to be thick-skinned to hear it.



## **The one simple thick-skinned question:**

Anonymous superintendent, you visit with and have many conversations with golf course superintendents and assistants. Based on the current facts, research and knowledge, what is



one thing you see that we as turfgrass managers could change to help improve turfgrass decisions?

### **Anonymous Autonomous**

**(AA):** *"The number one thing I believe that we as turfgrass managers could change is the use of technology to help fill the labor shortage. As an industry we are progressive with technology. Social media*



*has bridged a huge communication gap in our industry that has allowed us as managers to keep our pulse on local, national and international conversations. Irrigation software has given us the ability to manage watering practices via our smartphone remotely or in the field. Moisture sensors have also added a tool to help manage our watering decisions. Infrared Drone Technology is also a tool that some turfgrass managers have benefited from which helps make their decisions less subjective and more informed. Equipment technology, whether it be sprayers or mowers has also added value and increased our team's productivity. Chemical technology continues to evolve with very low rate pesticides and plant health products to help reduce our environmental foot print."*

**thick-skinned:** Is there a technology that you hope to adapt more?

**AA:** *"The one piece of the technology equation that seems slow to grab mass use is autonomous mowers. There is still plenty of work that a robot will not be capable of doing for a while, but I believe the potential of autonomous mowers filling the labor gap is something that will happen quickly over the next 5-10 years. As everyone competes for employees the cost of labor is only going to go up so investing in autonomous equipment*



*should be something we are all considering. Maintaining a golf course is labor intensive and robots are the future. Dominos already has autonomous cars delivering pizza so it's only a matter of time before we will be managing fleets of robots."*

**thick-skinned:** What parts of your turf management program have you had to change based on labor issues and what items may not be getting done based on labor issues?

**AA:** *"Everything is getting done less frequently which makes it very difficult to maintain a quality golf course. We are mowing less often to try to complete other routine tasks around the golf course which makes for a consistent golf course on a day to day basis. We are spraying products less and pushing the limits of our thresholds more and more. Golf Course Management is labor intensive and I believe we need to explore every option to stay competitive."*





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# Next Opinion

**Research Reaction (RR):** *“My first thought to the question was how can I answer this, I am a terrible turfgrass manager. I continued to think about the question and research kept coming to mind, but it was on the flip side of what you may think. There is so much research around us, but overall there is not much that turfgrass research can do for me to make me a better manager of turf. I can be the best manager to my turf by the things I learn at my course. What works, what doesn’t and most importantly what do I screw up to not do again. I realize that research helps make us better by introducing us to the next greatest thing, practice or tool but as of right now, I need time and people to make me the best turfgrass manager I can be.”*

**thick-skinned:** What is the biggest mistake (in your mind) that you have gained the most from?

**RR:** *“I have been in this business working on golf courses for...what is it... 26 years, so needless to say I have made my fair share of mistakes. Some I have learned from, some I have not, which*



*sucks, but the one thing that sticks out in my mind is not to force it. When it’s not going ‘your way’, don’t force it. When people are not doing the job exactly the way you want, don’t force it. When the grass isn’t growing, don’t force it. When the*



*weather isn't cooperating, don't force it. The more you do is often worse for the overall situation you are in. Letting it be, letting things go and being patient is sometimes the best advice I could ever give to myself when things get frustrating."*

**thick-skinned:** Do you think the turfgrass industry puts too much emphasis on research?



**RR:** “*, way too much. Like I said don't force it, let it be. We don't have to know everything on why it's not working or why it is working. Stick with what you know and it will be ok! Just my two cents."*

## *Next Opinion*

**Simple Superintendent (SS):** “*Stop trying to prove who you are, what you do and how important you are to the product. I think our industry has a problem with what we are and what we do. We grow grass, dig holes, wrench on equipment and manage people. I feel the industry puts so much energy into trying to convey our purpose because when it comes down to it, all people really want is to have nice playing conditions. In general,*

*people do not care how we do it, what problems we had to solve, what labor issues we have to overcome, what weather issues have been impacting conditions or budget issues. People just want to come and play some golf.”*

**thick-skinned:** I’ve said in a past article that “I’m a big believer in being informative and not smart.” How do you see this statement based on the comments you just made?

**SS:** *“I think it’s a good distinction, but I see it as being informative vs. being a smart aleck at what golfers do when they are on the course. I do think many people in our industry provide great industry insight of what we deal with, but the information should also be simple. We can often provide too much information that just causes people to ‘glaze over’ and stop listening. The other side is being a smart aleck by saying ‘look what you did golfer and now I have to use my magic wand to fix it’, which I feel does not accomplish very much. Practical, simple information goes a long way.”*

**thick-skinned:** I’ll be honest, it can be very hard not to be a smart aleck many days.

**thick-skinned:** The stare. Just like the dog owner, I know I give that stare to golfers. Maybe not on a daily basis, but certainly more than once a week. The stare of “don’t you know how hard I work and you decided to drive your cart there?” I







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wonder if golfers ask each other, “Have you ever seen the stare of a superintendent?” As superintendents we are continually faced with the task of providing great conditions on a daily basis regardless of what we are dealing with and that can often take a toll, but golfers really just want nice conditions and we are there to provide it. I think it is a great reminder to not force the issue, be informative and continue to adapt the great resources and technology that are being produced in our industry to provide the conditions golfers are looking for.



AA, RR and SS all enjoy spending time reading teeny bopper love stories and listening to the sweet sounds of Kenny G.

Matt Cavanaugh is an Assistant Superintendent at Rush Creek Golf Club in Maple Grove, MN.

**The MGCSA wishes to thank Matt Cavanaugh for his inspired, enlightening and fun columns presented during 2018. We look forward to more contemplative insights in the year ahead.**





# The 2018 Southeast Outreach Education and Forum Somerby Golf Club Host Jake Kocak





# Brandon Schindele

## MGCSA 2018 President:

# DRIVEN

## TO BE THE BEST THAT HE CAN BE





## *Edina Country Club, home course of Brandon Schindele*



Peter Wong, Hole 18

Some esteemed superintendents enter the profession due to a passion for the game of golf. Others grew up under the tutelage of their fathers who were greenkeepers, and still more just fell into the work as an opportunity to be “outside”. A ‘Catch 22’ and perhaps the desires of a teenage boy motivated the current President of the Minnesota Golf Course Superintendents Association, Brandon Schindele, to invest himself in the golf course turf management industry.

Growing up in the Schindele household, there was a simple rite to adulthood; no driver’s license with-

out a job. With full appreciation that the ‘Catch 22’ of, “How can I get a job if I am not able to drive, and how do I get to work if I don’t have access to a car?” was not going to gain traction with his parents, Brandon took it upon himself to walk across the neighboring golf course, Oak Glen Golf Club, and apply for a seasonal position.

Superintendent Pete Mogren saw an opportunity and needed only slight prompting to hire a local boy, easily accessible too, as he lived just a fairway away, to supplement his staff. Little did he know that he was instrumental in the career of young



Brandon Schindele. From Brandon's short sighted and youthful perspective, he was garnering a set of wheels to cruise the streets of Stillwater, Minnesota, in reality he was romancing a love, only second to his family, of golf course management.

Growing up next to a golf course has its perks, especially if you are employed there. The convenience allowed for sleeping in a couple more minutes than the rest of the crew. Proximity also led to assurances that he was available for work, and that led to responsibilities, which were administered and appreciated by his boss. With more authority came an understanding of

leadership. With leadership, came respect of the property and those who manage golf courses.

Then there were the intangible benefits that captured Brandon at a young age: working outside, witnessing a project from concept through completion, sunrises, rainbows, the underappreciated "smell of fresh mown grass" and the camaraderie of a finely tuned crew. From these elements the beginnings of a Golf Course Superintendent was born.

After cutting his teeth on the Oak Glen green staff with growing responsibilities each season, the golf industry mantra of the 1990's,

"build them and players will come", inspired Brandon to begin formal education to become a golf course superintendent at the University of North Dakota with a transfer and graduation from the University of Minnesota with a B.S. degree in Horticulture, specializing in Turfgrass Science. It was at the UMN that he was



***Brandon with superintendent mentor, Mike Kelly.***



encouraged to do his internship at one of the finest private clubs in the metropolitan area, Edina Country Club.

Mike Kelly, ECC Superintendent from 1999 until 2007, took a shine to Brandon and rapidly promoted him through the intern position in 1998 to second assistant in '99, and then senior assistant from 1999 until 2007. Seeking new opportunities, Mr. Kelly changed careers late in 2007 and was temporarily replaced by short-term Superintendent Mike Powers, who, in 2010, left behind a golden opportunity for a young and eager Brandon Schindele, the final grow-in phase of a recently rebuilt ECC under the architectural direction of Tom Lehman.

“The third time is a charm” and Brandon applied this aphorism to the giant project of renovating the country club to its glorious potential, following two previous attempts to satisfy the membership’s desire to modernize the golf course. And indeed it was, as Brandon and his staff worked hard to assist golf professional and architect, Tom



***Talking turf and design with architect and golf professional Tom Lehman***



Lehman, in transforming a rough diamond into a true gem.

Not to be overlooked during this decade and a half transition from seasonal employee to Superintendent, Schindele was also busy with a growing relationship. In 2007 Brandon tied the knot with his wife, Hilary. Theirs has been a blissful relationship and despite the challenges of a career in the turf management industry they have been fortunate to have begun a family, including twins Colton and Gage age 6, Harper age 3 1/2 and the trustworthy dual purpose family/work hound Lacey, a Border Collie (age 8). Maintaining a growing family as well as a golf course has made Brandon's life very busy.



***Brandon's family***

So what does an overachiever do when their plate is close to full? Well, how about become elected to the MGCSA Board of Directors and work their way up the ladder to President over a four-year period, which is exactly what Brandon did.



Brandon has always had a strong account of the MGCSA membership, “Our industry and association, for that matter, is a close knit group and I really don’t know of anyone that is not willing to help out their colleague and that, in my mind, is what sets our industry apart from others. Although our clubs and courses are in competition with one another for business, I don’t think we as turf and property managers see it that way when it comes to offering some advice or loaning a piece of equipment when your neighbor superintendent gets in a bind. That is what really makes it special; it really is a “brotherhood.”

An active President and Board member, Brandon has supported several recent MGCSA initiatives such as the creation of BMPs Industry Guidelines, a Water and Irrigation Efficiency Manual, a well thought out financial forecast and budget to keep the association healthy enough to fulfill its motto of: Education, Research and Advocacy and also a push to reduce the number of Board Members with an eye on fewer, yet more refined



***The “posse” at Edina Country Club, from left to right: Assistant Superintendent Kyle Rick, Senior Assistant Superintendent Zach Stebstad, Brandon Schindele, Assistant Superintendent Brian Volkenant.***



and active BOD participants.

Yet, a pragmatist, Schindele sees into a challenging future and suggests that the membership be aware of three critical current and future issues, “First, staffing on two fronts. Obviously the seasonal work force is going to continue to be a problem in finding people to work on our courses, especially in the spring and the fall and the second being that it is going to get harder and harder to find the individuals to fill the roles of 2nd Assistants, Spray/Irrigation Techs, or Foremen/AITs.

Second, restrictions on pesticides are going to continue to work their way into daily discussions and if we as turf managers and suppliers do not get involved in advocating for ourselves then we may lose some important tools out of the toolbox.

And third, water. This horse I know has been beaten to death but until we get to the point where we have some type of assurance that we can keep



***The “A” Team at Edina Country Club. With their support, Brandon is able to provide the membership at ECC exceptional conditions all season long.***





minimal water to keep our most sensitive turf areas alive in a period of drought we can not give up.”

Brandon is however, very excited about the future opportunities the turf management profession will enjoy, “I think the industry overall is in a good place, that doesn’t imply however that we are not without our challenges. My goal when I came onto the board was the same as how I approach any endeavor, ‘Make it better than it was from the time you started’. I hope that will be case when I do leave the board next year after completing my year as Past President.”

Once just a dreamer wishing to get behind the wheel, Brandon Schindele definitely chose the right road to a successful career. Strong mentors, Pete Mogren and Mike Kelly inspired Brandon to be the very best he could possibly. Support from a loving family created a secure base and stability. Solid educational and vocational choices paved the way for a busy work schedule, but fortunately for the MGCSA, Brandon carved out time to be an excellent leader in the golf course turf management industry.

***The MGCSA Membership and Board of Directors thank Brandon for his leadership. Your dedication to the advancement of the Association is greatly appreciated.***



# ***2018 The MEGA At Medina G&CC Thank You Host Erin McManus and Sponsor John S with Syngenta***







Spaulding





# ***Studies On the MN Bee Labeling Laws: Determination of residue in pollen, flowers and leaves from use of systemic insecticides***

**By Dr Vera Krischik, Department of Entomology, UMN**



## ***20 years of neonicotinoid use***

***1996 French beekeepers protest use of imidacloprid seed dressing  
and noticed effects on bee movement and foraging***

***2000 NYC makes neonics “restricted use pesticide (RUP)” not  
available to consumers***

***2008 Ontario bans all landscape or cosmetic use of neonicotinoids***

***2018 Connecticut makes neonics a restricted use pesticide, RUP, not  
available to consumers***

***2018 Canada bans neonicotinoid insecticides, imidacloprid, clothian  
idin and thiamethoxam in crops and phased out over five years***

***2018 France bans used of neonicotinoids in crops and landscapes***

***2018 European Food Safety Authority, EFSA, bans neonicotinoid use  
in crops, landscapes, and permits some GH use***



## Introduction

Integrated pest management programs (IPM) promote the use of cultural, biological and chemical tactics to manage pest insects, while conserving pollinators and beneficial insects. Bee and beneficial insect conservation is important. Honey bees and bumblebees pollinate 1,000's of native plants and crops that produce the seeds, fruits, and nuts that we consume and bees contribute approximately \$15 billion worth of crop yields. Bee loss is due to a combination of factors, such as insecticides, habitat loss, and disease. In addition, using beneficial insects to kill pest insects is a major part of an IPM program which can reduce insecticide use and decrease the potential that pests will develop resistance to insecticides.

In 2016, at the MN State Fair, Governor Dayton announced a pollinator task force to create some ways to help managed honeybees and native bees, such as bumble bees. A pollinator committee met for a year to discuss and create some guidelines and policies on protecting pollinators. These recommendations are being prepared for release in fall 2018.

Previously in 2014, MN passed a “pollinator labeling law” that required plants that were labelled as pollinator friendly need to be free of systemic insecticides. A MDA regulatory program tested plants for insecticidal residues in flowers that were labeled as pollinator friendly. We wanted to know if greenhouse applied neonicotinoid insecticides resulted in sufficient residue in pollen to kill or alter behavior of bees.

Residue amount of neonicotinoids in pollen and nectar differ depending on the application method that is used in crops and landscapes. A sunflower seed is covered with 0.25 mg active imidacloprid (neonicotinoid chemical) that results in 7.6 ppb imidacloprid pollen. In agriculture, an imidacloprid soil drench resulted in 122 ppb in pollen and 18 ppb in nectar of pumpkin (Dively and Kamal 2012) and 15 ppb in pollen and 10 ppb in nectar of squash (Stoner and Eitzer and 2012). A 300 mg soil surface application of imidacloprid can be applied to a 3 gal pot in the greenhouse

which results in residues of 6000 ppb in flowers (Rogers et al. 2007, Krischik et al. 2015).

Landscape applications of imidacloprid result in much higher amounts of residue in nectar and pollen. Doering et al. (2005) found 1,038–2,816 ppb in *Cornus* spp., dogwood flowers, at 17 months after application. A soil injection around Eucalyptus trees resulted in 550 ppb imidacloprid in nectar (Paine et al. 2011). Turf and white clover treated with clothianidin resulted in residues of 172 ppb in nectar. Colonies of *B. impatiens* did not avoid foraging on treated clover and showed reduced foraging activity and increased worker mortality in the hives within five days. Colonies showed a trend for fewer workers and males, no queen production, reduced number of wax pots, and reduced colony weight compared to controls (Larson et al. 2013). Thus, the potential for neonicotinoid insecticides to impact bee health through may be underestimated as residue amounts in agricultural and landscape plants are higher than reported for seed treatments. To help understand the relative acute toxicity (LD50, lethal dose to 50% of the test animals) of all insecticides we created a table containing the EPA approved Ld50 for all insecticides used by the green industry, such as golf courses landscapes, and crops.



Aphis , honey bee (left) Bombus impatiens, Eastern bumblebee (right)

Entomological Society of America

<https://entomologytoday.org/2018/06/18/more-research-needed-to-better-balance-honey-bees-and-native-bees/apis-mellifera-and-bombus-impatiens/>

Citation style: Clemson Univ./USDA CES, Bugwood.org



<b>Table 1. Residue in GH plants at 5 and 10 wks after treatment to soil applied neonicotinoid insecticides (imidacloprid, Merit and dinotefuran, Safari) and foliar applied pymetroxine (Endeavor)</b>				
<b>insecticide</b>	<b>5 wks whole flower</b>	<b>5 wks 25% pollen</b>	<b>10 wks whole flower</b>	<b>10 wks 25% pollen</b>
<b><i>Ruellia humilis</i>, Prairie petunia</b>				
<b>imidacloprid</b>	<b>1,100 ppb</b>	<b>267 ppb</b>	<b>502 ppb</b>	<b>125 ppb, down 46%</b>
<b>dinotefuran</b>	<b>415 ppb</b>	<b>103 ppb</b>	<b>88 ppb</b>	<b>22 ppb, down 22%</b>
<b>pymetrozine</b>	<b>0 ppb</b>	<b>0 ppb</b>	<b>0 ppb</b>	<b>0 ppb</b>
<b><i>Calibrochoa</i>, million bells</b>				
<b>imidacloprid</b>	<b>1,971 ppb</b>	<b>492 ppb</b>	<b>383 ppb</b>	<b>96 ppb, down 20%</b>
<b>dinotefuran</b>	<b>2,993 ppb</b>	<b>748 ppb</b>	<b>386 ppb</b>	<b>96 ppb, down 25%</b>
<b>pymetrozine</b>	<b>126 ppb 1/9</b>	<b>0 ppb</b>	<b>0 ppb</b>	<b>0 ppb</b>
<b>effects on bees</b>		<b>mortality</b>		<b>behavior.&gt;15 ppb, mortality&gt;90 ppb</b>

We performed a greenhouse (GH) experiment to understand if protecting plants with systemic insecticides resulted in significant residue in pollen that would hurt foraging bees. (Table 1) We treated 2 plant species a native and a bedding plant with label rates of soil drenches of imidacloprid (Merit) and dinotefuran (Safari) when plugs were planted in pots to determine the residue in flowers at 5 weeks and at 10 week, which is the usual time of sale. At 5 and 10 weeks leaves, flowers, and pollen were sent to the USDA insecticide residue testing lab for analysis. The bee friendly pymetrozine was also applied as a foliar treatment at label rate. Pymetrozine works specifically to stop the sucking mouthparts of aphids, mealybugs, and scales from working, It does not affect bees or lady beetles with chewing mouthparts.

Residue from soil applied neonicotinoid insecticides (imidacloprid, Merit and dinotefuran, Safari) are highest in leaves, then flowers, and pollen and decreased from 5 to 10 wk. Imidacloprid was detected in flowers treated with dinotefuran (5 wk, 88 ppb; 10 wk, 12 ppb) as well as in flowers of controls (5 wk, 10ppb), probably due to plugs being treated with imidacloprid prior to purchase. By 10 wk imidacloprid residues were around 2X times and 4X lower for two species. By 10 wk dinotefuran levels were 5X lower in both species.

By week 10 imiacloprid levels in both species and dinotefuran levels in one species were high enough to kill bees and dinotefuran residue in the second species was high enough to influence movement and feeding behavior. Pymetrozine was found in 1 out of 9 samples in week 5, but not in flowers of either species by wk 10.

Consequently, pymetrozine is a good substitute for conserving beneficial insects and killing sucking, pest insects in greenhouse production

### **Pesticide Toxicity to Pollinators**

The active and inert ingredient can be found on the label on the pesticide container. The active ingredient is the chemical registered by the EPA as causing the toxicity of the product to the pest or beneficial insect. Recent papers demonstrate that inert ingredients are highly toxicity to bees as well. Inert ingredients are penetrating agents, odor maskers, stabilizers, preservatives, diluents, surfactants, emulsifiers, propellants, solvents, spreaders, stickers, antifoaming agents, dyes, and drift retardants that modify the physicochemical properties of the spray mixture. Some recent papers demonstrate that the inert ingredient called “organosilicone surfactant adjuvants” increase virus transmission in bees. Also, in recent studies fungicides demonstrated toxicity to bees.

Another major issue is that the EPA registers the active ingredient and determines toxicity of the chemical based on short term, 4 day, LD 50 tests



**Table 2. Toxicity to Pollinators of Insecticides Used in Greenhouse, Nursery, Landscape.** Bolded are insecticides not permitted by the MDA on bee-friendly-labeled plants. Highlighted in gray are less toxic AI.

Chemical class/MOA	Common name/MOA	Trade name	Toxicity to honeybees**			
			LD50* ug/bee	Non	Moderate	High
Carbamates/1A	carbaryl	Sevin	0.014			x
	methomyl	Lannate	0.816			x
Neonicotinoids/4	imidacloprid	Merit, Marathon	0.004			x
	thiamethoxam	Flagship, Meridian	0.004			x
	clothianidin	Arena, Avolt	0.005			x
	acetamiprid	Safari, Venom	0.023			x
	imidaclopridin	Wetzel	0.004			x
	imidacypridin	Discus	0.004			x
	ag: imidacloprid	Admire, Gaucho				
	ag: clothianidin	Poncho				
	ag: thiamethoxam	Lhriser, Platinum				
	pyraclostrobin	Aitus	1.2			x
	sulfloxatone/acrinatocam	XXpire cancelled	0.02+0.1			x
	less toxic:					
	acetamiprid	Flistar, Assail Larypso	14.5	x		
	thiacloprid		27.8	x		
Organophosphates/1B	acephate	Orthene	0.1082			x
	chlorpyrifos	Lorsban/Lorsban	0.06			x
	dimethoate	Lamprostate	0.038			x
	malathion	Malathion	0.16			x
	phosmet	Imidan	0.1			x
Pyrethroids/3A	bifenthrin	Attain/Talstar	0.1			x
	cyfluthrin	Tempo, Decathlon	0.001			x
	terbufosfatin	Lame	0.05			x
	lambda-cyhalothrin	Scimitar	0.038			x
	permethrin	Astro, Pounce	0.029			x
	resmethrin	Loggers	0.065			x
Botanical/3	pyrethrin	Pyganic	0.15			x
Insect growth regulators	difluhenzuron/15	Adept, Dimilin	25	x		
	teniteozide/18	Contirm	234	x		
	azadirachtin/UN	Aza-Direct, Azatin	2.5		x	
	neem oil		163	x		
	pyrethrin/16	Paris	100	x		
	pyriproxyfen/16	Distance, Twicam				
Anthranilic Diamides/28	novaluron/15	Pedestal	150	x		
	cyromazine/17	Citation	25	x		
Macrocytic lactones/6	chlorantraniliprole	Acelepryn	>104	x		
	cyantraniliprole	Mainspring	0.116			x
Miticides	abamectin	Avid, Sirocco	0.009			x
	emamectin-benzoate	Free-age, Entoid	0.41			x
	acequinocyl/20B	Shuttle	>100	x		
	etoxazole/10B	TetraSan, Beethoven	200	x		
	fenpyroximate/21A	Akari, Vendex	162	x		

Table 2 shows the relative of insecticides use in golf courses, landscape and greenhouse on bees. The EPA LD50 or lethal death to 50% of the population of test bees is provided and its relative toxicity is ranked with an X. In bold are the systemic insecticides not approved in MN on plants labeled as bee friendly. In gray are the insecticides that are less toxic to bees

Toxicity to Pollinators of Insecticides Used in Greenhouse, Nursery, Landscape.						
Bolded are insecticides not permitted by the MDA on bee-friendly-labeled plants.						
Highlighted in gray are less toxic AI.						
				Toxicity to honeybees**		
Chemical class/MOA	Common name/MOA	Trade name	LD50* ug/bee	Non	Moderate	Highly
	<b>fenbutatin-oxide/12B</b>	Mach II	3982	X		
	<b>naotenozone/ 18</b>		100	X		
	<b>clotentezine/10A</b>	Ovation	111	X		
	<b>hexythiazox / 10A</b>	Hexygon	200	X		
	<b>bifenazate/20D</b>	Floramite	7.8		X	
	<b>bifenazate/ 20D+</b>	Sirocco	0.009			X
	<b>apemectin/b</b>		1.8			X
	<b>pyridaben/21A</b>	Sanmite	0.024			X
	<b>chlorfenapyr/13</b>	Pylon	0.12			X
	<b>cyflumetofen/25A</b>	Sultan	102	X		
Spinosyns/5	<b>spinosad</b>	Conserve/Entrust, less toxic dried	0.05			X
	<b>spinetoram</b>	Radiant	0.14			X
Tetronic acids/23	<b>spirotetramat</b>	Kontos	107	X		
	<b>spiromesifen</b>	Judo, Florida	200	X		
GABA-channel	<b>flupronil/2B</b>	Flupronil, Termidor	0.004			X
Pyridine carboxamide	<b>flonicamid/29</b>	Aria	60.5	X		
Pyridine azomethines/9B	<b>pymetrozine</b>	Endeavor	158.5	X		
	<b>pyrifluquinazon</b>	Rycar		X		
	<b>pyridalyl/UN</b>	Overture	6.16		X	
	<b>Bacillus thuringiensis/11A</b>	Bt/Dipel		X		
	<b>other Bacillus sp.</b>					
	<b>Chromobacterium/11A</b>	Granevo		X		
	<b>Isaria fungus</b>	Preferal				
	<b>potassium salts fatty acids soaps</b>	Surround, M-Pede		X		
	<b>horticultural oils</b>	Monterey Oil			X	

The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by University of Minnesota Extension. Remember, the label is law.



**\*\*Toxicity Category I, highly toxic to bees, Acute Contact LD<sub>50</sub> is < 2 µg/bee;**  
**Toxicity Category II, moderately toxic to bees, the LD<sub>50</sub> is 2-10.99 µg/bee;**  
**Toxicity Category III, Relatively nontoxic, NT, to bees, the LD<sub>50</sub> is 11-100 µg/bee**  
 \*1. [Protecting honeybees from pesticides, Purdue](#), E-53W, [Krupke, C., G. Hunt, and R. Foster](#), June 2014  
 2. [How to reduce bee poisoning from pesticides](#), A Pacific Northwest Extension Publication, OSU, UI, WSU, PNW 591, [Hooven, L., Sagili, and E. Johansen](#); Pesticide toxicity to bees  
 3. [Pesticide stewardship](#)  
 4. [Farmland birds, list of EPA 2011 pesticides and LD50](#)  
 5. [University of PPDB Hertfordshire, pesticide properties database](#)  
 6. [Pesticide Target Interaction Base](#)  
 7. [Safety and use of neonicotinoids insecticides in turfgrass](#), Doug Richmond, Purdue University

(lethal dose to 50% of the population) and not chronic, long term exposure. However, numerous papers are demonstrating that lower, sub-lethal amounts of pesticides affect behavior and alter the ability of insects to find food and survive. For these and numerous other reasons most insecticides are not safe to use around bees and other beneficial insects, such as lady beetles.

### **IPM: Systemic Compared to Contact Insecticides**

The conservation of beneficial insects, that includes bees, insect predators, parasitic wasps, and butterflies, is an essential part of Integrated Pest Management (IPM) programs. IPM promotes multiple tactics to manage pests and to suppress the population size below levels that will damage the plant. Beneficial insects can only manage small, pest populations, when populations of pests are high, conventional insecticides must be used. For most pests that eat leaves, use contact insecticides that sit on the leaf surface and do not move into the plant and the toxicity to pests last for a few days on the foliage. Flowers that open after being sprayed with contact insecticides do not contain insecticide residue. Systemic insecticides move from the leaves or soil into OTHER plant parts as nectar and pollen. Flowers that open after systemic insecticides are sprayed can absorb the insecticide and the residue in leaves and flowers can last for many months.

Systemic, neonicotinoid insecticides are widely used, due to their low mammalian toxicity and the ability of the insecticide to move systemically

from soil into the entire plant. However, they often move into pollen and nectar and when fed on by bees alter bee behavior or increase bee mortality. Application methods include seed treatments, foliar sprays, soil and trunk drenches, and trunk-injections. There are six systemic neonicotinoid active ingredients, imidacloprid, dinotefuran, thiamethoxam, clothianidin, acetamiprid and thiacloprid. You will find these active ingredients listed on the insecticide label in small print. Neonicotinoid insecticides are very toxic to bees and beneficial insects, especially as residue in pollen and nectar.

Manage with IPM by using cultural control, sanitation, biological control, using insecticides friendly to beneficial insects (low toxicity in the table). Remember “organic MRI approved insecticides” can be very toxic. Before applying any insecticide follow these guidelines:

1. Scout for populations of both pest and beneficial insects, such as lady beetles and bees. Determine if the good bugs are suppressing the pest bugs and no loss to flowering or food production can be found.
2. If beneficial insects are present and the pest population is increasing, then spray CONTACT insecticides on the foliage. Contact insecticides are degraded in a few days by light, water, and microbes.
3. Do not apply insecticides to flowers.
4. Spray contact insecticides on leaves in the evening when bees and lady beetles are not foraging.
5. Use insecticides that are less toxic to bees, such as oils, soaps, neem oil, Acelepryn (chlorantraniliprole), miticides, insect growth regulators, and microbial insecticides.

***The MGCSA wishes to thank Dr. Vera Krischick for her continued dedication to the golf course industry. Pollinators are critical to our existence and the more information we have to share with our constituents, the greater our opportunity to be recognized as stewards of the environment.***



# NORTHERN GREEN 2019 KEYNOTES



## Opening Keynote

### Open Roads Open Minds

*An Exploration of Creative Problem Solving*

Steve Uzzell

WEDNESDAY 8:30 AM–9:45 AM | MAIN AUDITORIUM

Anyone who has had the good fortune to drive for any length of time on a true open road has experienced the remarkable mind-opening phenomenon that results: our imagination is released, and problems resolve quickly in solution. Why? Why does this ALWAYS work? Steve calls this effect the Spirit of the Open Road. As adults, the continuum of every day is spent solving problems, so... how DO we access the Spirit of the Open Road and turn it into an attitude for everyday problem solving? A 58-minute presentation with over 250 photographs from 44 of the United States and 11 other countries covers 10 key points of the process and much more.



Steve Uzzell

Steve Uzzell is an internationally renowned photographer and inspirational speaker. His photographic assignments have taken him to all 50 United States and 30 countries: from corporations, such as Boeing and IBM to more than 100 publications including National Geographic, Smithsonian and Time. As a speaker, he has taken his message

of creativity and the power of ideas to over 490 organizations, associations, corporations and colleges (in all 50 states and six countries, India and China among them) including the U.S. Naval Post Graduate School, Merrill Lynch, J.P. Morgan Chase, Northrop Grumman, HSBC, Marriott, BNY Mellon and Adobe.

Steve began his photography career as the assistant to the editor of National Geographic and a member of its photographic staff. He struck out on his own in 1975 and today spends six months of the year traveling the world for his photographic clients and the rest as a teacher and inspirational speaker. Along the way, Steve has published three books of his photography, and received 10 prestigious Communication Arts awards.

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## Closing Keynote

### The Work We Do

Ted Schick, Schick Corporate Learning

THURSDAY, 3:20–4:00 PM | INNOVATION THEATER

We spend nearly 40% of our lives working. And let's face it – our work, to some degree, *defines who we are*. In this fun and engaging closing keynote, we will look at our work, our motivation and what we need to flourish every day. We'll examine the roots of our professionalism, as well as how to cultivate our teams, so they can grow and blossom. We will close with how to till our own soil, taking care of us as we tend to our health and well-being. A perfect way to close our conference as we anxiously wait for spring (and we will be waiting for a while more).



Ted Schick

Residing in Duluth, MN, Ted is a corporate trainer, professional speaker and consultant with his own business, Schick Corporate Learning. A retired naval officer who rose up from the enlisted ranks, Ted has over 30-years' experience leading people.

With over 20 years in teaching, Ted holds a BA Business from the University of Wisconsin, Madison, a teaching certificate from Bemidji State University, and Master of Education from the University of Minnesota, Duluth.

Ted is a member and past president of the Lake Superior Chapter of the American Society of Training and Development located in Duluth, MN.

Ted is active in his community with 13 years on the Spirit Mountain Ski Patrol and volunteering with local animal humane societies such as Animal Allies in Duluth and Friends of Animals in Cloquet. Ted is also part of the Cloquet Rotary and Mentor Duluth. In his "spare" time, he has been a stand-up comedian, teaches Boot Camp fitness classes in the Twin Ports and is an accomplished triathlete.

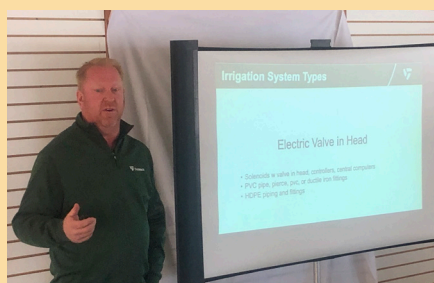
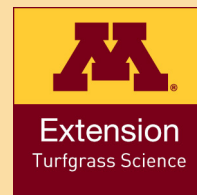
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# YOUTH RULES

FOR KIDS AT WORK

Each year, thousands of Minnesota teens work in part-time or summer jobs. Early work experiences can be rewarding for young workers – providing great opportunities to learn important job skills. The Minnesota Department of Labor and Industry wants to help you have a safe and rewarding work experience. Below are some rights and responsibilities teens need to know about in the workplace.



## YOUR SAFETY AND HEALTH ON THE JOB

You have a right to a safe and healthy workplace. Proper safety training is a key component to help avoid injuries on the job. A recent U.S. study reported that 26 percent of workers younger than **18** years of age worked at least part of the day without an adult supervisor and as many as one-third of them reported not having any health and safety training. In Minnesota, the most common occupations for injured teens each year are cooks, food preparation workers, nursing aides and laborers.

**TIP:** To avoid injury, ask for help when you need it or if you are unsure about any job-related tasks. Most importantly, make sure you have access and training about safety gear and first-aid equipment.

## WHERE DO MOST MINNESOTA TEENS WORK?

Teens are typically employed in fast food, retail, parks and recreation, amusement parks, or federal or state youth employment programs. In Minnesota, the majority of employed **14-** to **18**-year-olds work in lodging and food services (36 percent), retail (26 percent), and health care and social assistance (8 percent).

## WHAT HOURS CAN TEENS WORK?

If both federal and state laws apply to an employer, the more protective or stricter standard must be followed. The minimum age for most employment is **14**, unless a federal and state law exemption allows for a younger minimum age.

**FACT:** Teens working too late at night is the most common complaint state investigators hear each year.

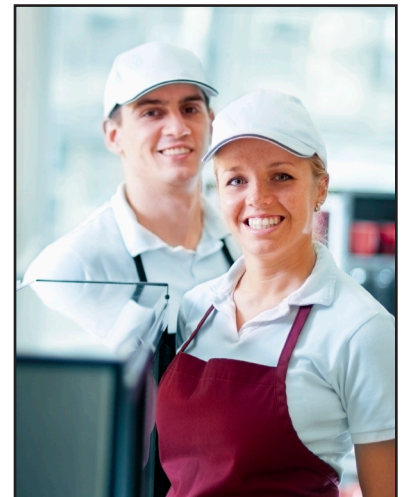
Minors ages **14** and **15** may not work:

- before 7 a.m. or after 9 p.m. with the exception of a newspaper carrier;
- more than eight hours a day, except in agriculture;
- more than 40 hours a week, except in agriculture;
- on school days during school hours, without an employment certificate issued by the school district superintendent.

During the school year, large employers (sales of more than \$500,000 annually) are prohibited from letting minors younger than **16** work later than 7 p.m., work more than three hours a day and work more than 18 hours a week.

Small employers (sales of less than \$500,000 annually) may allow minors younger than **16** to work until 9 p.m.

High school students aged **16** and **17** may not work after 11 p.m. on an evening before a school day or before 5 a.m. on a school day.





# YOUTH RULES

## FOR KIDS AT WORK

### PROHIBITED WORK

There are both federal and Minnesota child labor laws that restrict minors from working in certain hazardous jobs or conditions.

For example, teens younger than **18** may not be employed in or about construction or building projects.

Other prohibited work for minors younger than **18** includes driving passenger-carrying vehicles; operating, erecting or dismantling rides or machinery in an amusement park; or working with explosives or fireworks.

Minors younger than **16** may not work with machinery such as power-driven snowblowers and other lawn and garden equipment, meat slicers or bakery equipment.

Other prohibited work for minors younger than **16** includes working with laundry, rug cleaning or dry cleaning equipment; being in contact with a carwash on a mechanized conveyor line; or doing welding of any kind.

A homeowner can hire a **14**-year-old to mow his or her lawn (which is considered a home chore), but a company that hires individuals to do similar jobs may not hire a **14**-year-old to mow a lawn.

**EXEMPTIONS:** Although a minor younger than **14** may not be employed in most cases, there are exemptions, such as a newspaper carrier, actor, actress, model, agricultural field worker or youth sports official. Such exemptions require a permit from Labor Standards.

### QUESTIONS

Many of the things parents hear – and sometimes business owners hear – about labor laws are from relatives, friends or other workers' experiences, **not the actual statutes and rules**. If you have questions, contact Labor Standards.

If you have questions about workplace safety or health, contact Minnesota OSHA Workplace Safety Consultation at (651) 284-5060, 1-800-657-3776 or [osha.consultation@state.mn.us](mailto:osha.consultation@state.mn.us).

### MINIMUM WAGE

Employers cannot pay teens less than the minimum wage. Employees must be paid at least the current minimum wage rate, regardless of the method of compensation, for all hours worked, including training time.

**NO TIP CREDIT:** Minnesota does not allow for tips received by employees to be credited toward the payment of minimum wages.

<b>Large employer wage</b> \$9.65/hour on Jan. 1, 2018	Any enterprise with an annual gross dollar volume of sales made or business done of \$500,000 or more
<b>Small employer wage</b> \$7.87/hour on on Jan. 1, 2018	Any enterprise with an annual gross volume of sales made or business done of less than \$500,000
<b>90-day training wage</b> \$7.87/hour on on Jan. 1, 2018	May be paid to employees younger than 20 years of age for the first 90 consecutive days of employment
<b>Youth wage</b> \$7.87/hour on on Jan. 1, 2018	Paid to employees younger than 18 years of age who are not covered by federal laws



(December 2016)

## **Child Labor Provisions of the Fair Labor Standards Act (FLSA) for Nonagricultural Occupations\***

**\* Modified to exclude information irrelevant to golf course operation.**

This Fact Sheet provides general information about the Federal youth employment provisions applicable to [nonagricultural occupations](#). Different standards apply to [farm work](#).

The Department of Labor is committed to helping young workers find those positive and early employment experiences that can be so important to their development, but the work must be safe. The youth employment provisions of the FLSA were enacted to ensure that when young people work, the work does not jeopardize their health, well-being or educational opportunities. Employers are subject to the youth employment provisions generally under the same coverage criteria as established for the other provisions of the FLSA.

It is an unfortunate fact that children do get injured, even killed, in the workplace. The National Institute for Occupational Safety and Health estimates that 160,000 American children suffer occupational injuries every year—and 54,800 of these injuries are serious enough to warrant emergency room treatment.

***For more information on youth employment laws, visit the YouthRules! Web site at [www.youthrules.dol.gov](http://www.youthrules.dol.gov) or call toll-free 1-866-4US-WAGE (1-866-487-9243).***



Both Federal and State laws govern the employment of young workers and when both are applicable, the law with the stricter standard must be obeyed.

The Federal youth employment provisions do not:

- require minors to obtain "working papers" or "work permits," though many States do;
- restrict the number of hours or times of day that workers 16 years of age and older may be employed, though many States do;
- apply where no FLSA employment relationship exists;
- regulate or require such things as breaks, meal periods, or fringe benefits;
- regulate such issues as discrimination, harassment, verbal or physical abuse, or morality, though other Federal and State laws may.

## **OCCUPATIONS BANNED FOR ALL MINORS UNDER THE AGE OF 18**

### **The Hazardous Occupations Orders (HO)**

The FLSA establishes an 18-year minimum age for those nonagricultural occupations that the Secretary of Labor finds and declares to be particularly hazardous for 16- and 17-year-old minors, or detrimental to their health or wellbeing. In addition, Child Labor Regulation No. 3 also bans 14- and 15-year-olds from performing any work proscribed by the HOs. There are currently 17 HOs which include a partial or total ban on the occupations or industries they cover. Only two impact golf operations: *HO 14. Power-driven circular saws, band saws, guillotine shears, chain saws, reciprocating saws, wood chippers, and abrasive cutting discs—bans the operation of, and working as a helper on, the named types of power-driven equipment, no matter what kind of items are being cut by the equipment.\**

*HO 7. Power-driven hoisting apparatus—bans operating, riding on, and assisting in the operation of most power-driven hoisting apparatus such as forklifts, non-automatic elevators, skid-steers, skid-steer loaders, backhoes, manlifts, scissor lifts, cherry pickers, work-assist platforms, boom trucks, and cranes.*

# **DNR Analysis: Current Groundwater Use Is Sustainable *But Does Affect White Bear Lake***

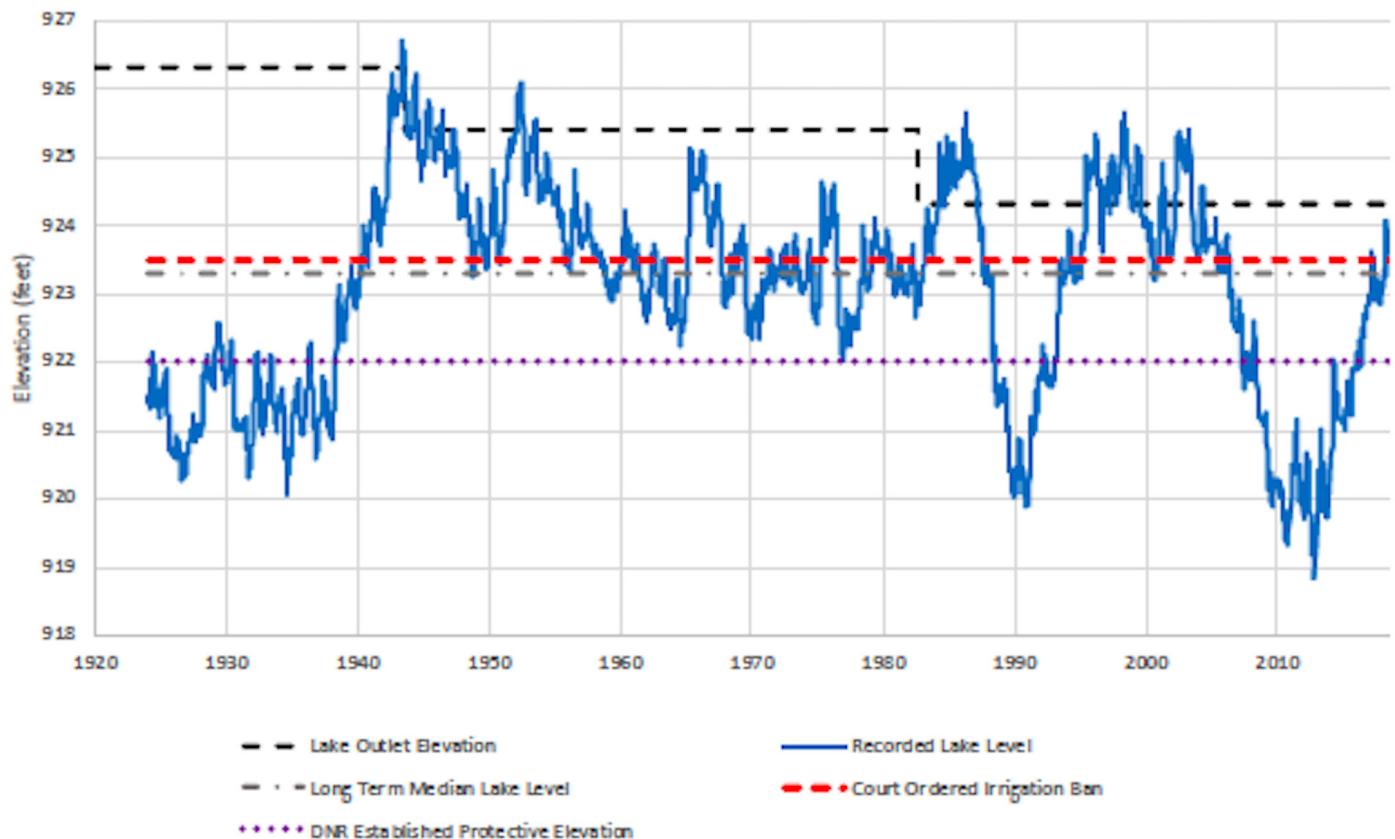
*By the MN Department of Natural Resources*

## **WHY WE'RE PUBLISHING THIS**

Water levels in White Bear Lake have been the subject of public debate for over a century, with people thinking they are sometimes too high and sometimes too low. Most recently, a 2012 lawsuit by the White Bear Lake Restoration Association and White Bear Lake Homeowners Association charged that the Minnesota Department of Natural Resources (DNR) was allowing communities and businesses in the area to use too much groundwater, leading to unacceptably low lake levels that harmed White Bear Lake and violated Minnesota's water sustainability standard. In August 2017, the Ramsey County District Court ruled in favor of the associations and ordered DNR to make several modifications to existing permits and conduct additional analysis to determine whether further changes are needed. This publication presents the results of that analysis in a public newspaper, as required by the court.

Figure 1 shows the long-term water level record for White Bear Lake. The fact that water levels on White Bear have fluctuated considerably over time is well-established, as is the fact that the lake is connected to its underlying aquifers. What has been less clear is the relative impact of groundwater use on lake levels, compared with precipitation and evaporation. Building on previous work by the US Geological Survey and a nationally recognized groundwater modeling firm, DNR has developed a new groundwater flow model, completed in August 2018, that allows us to distinguish weather effects from groundwater use and helps us understand the impact of individual permits. To develop the model, DNR consulted other agencies and experts, and used the best available data on water use, precipitation, and evaporation.



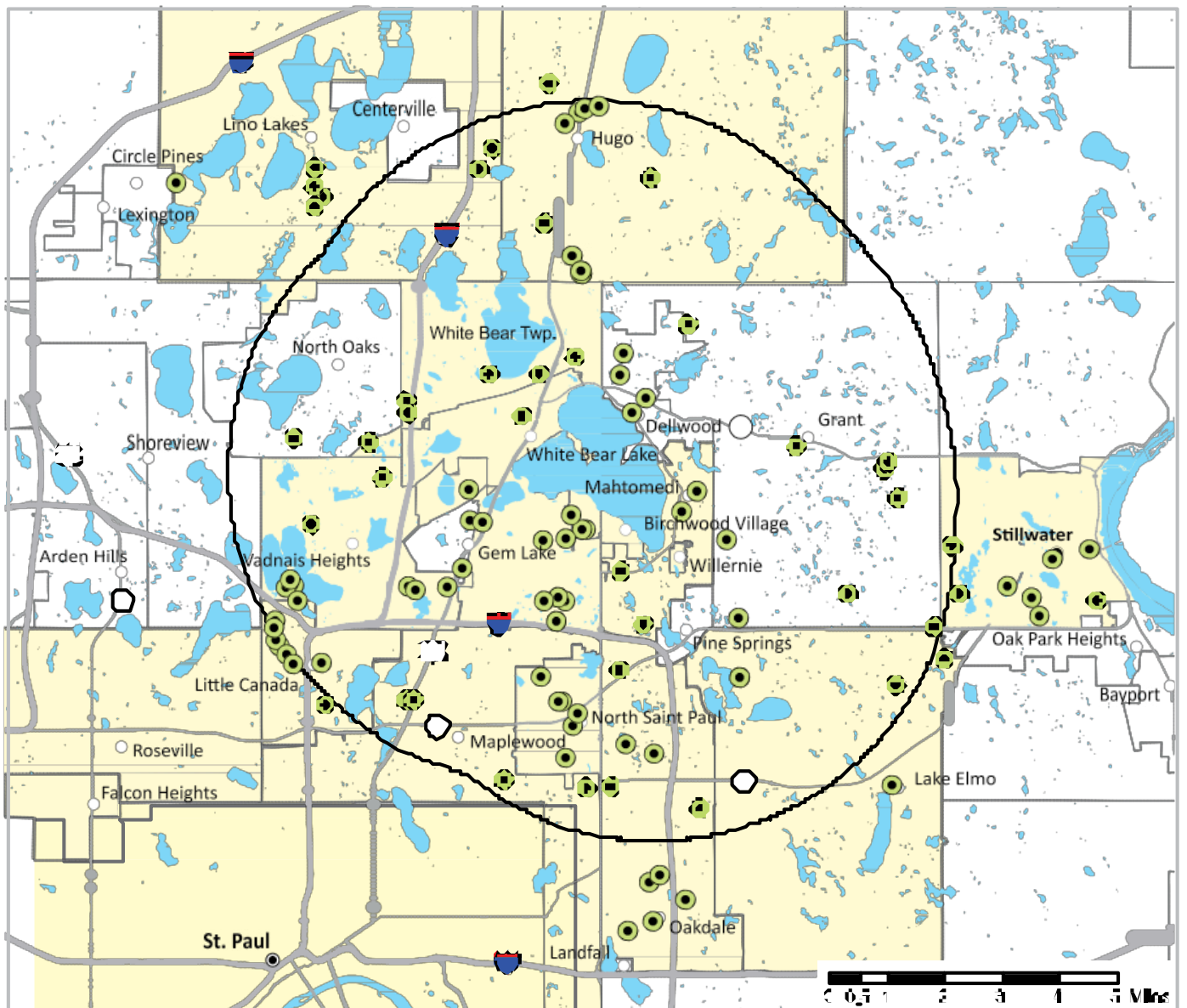


**Figure 1.** *This graph illustrates that water levels have fluctuated widely in White Bear Lake over the last ninety years. The graph also shows historic lake levels relative to several key elevations, including the lake’s outlet, which has varied over time and is currently 924.3 feet; the long-term median lake level of 923.3 feet; the court’s residential irrigation ban trigger of 923.5 feet; and the protective elevation of 922.0 feet that DNR established in 2016.*

## KEY FINDINGS

Using a state-of-the-science groundwater flow model and the best available data, DNR’s major findings from its analysis of permits that include wells within 5-miles of White Bear Lake (Figure 2) are:

1. Groundwater use has been declining (Figure 3)
2. Current groundwater use complies with Minnesota’s sustainability standard
3. Current groundwater use has contributed to water levels falling below



 Community served by public supply wells within buffer

 Analyzed permit installations

 White Bear Lake 5-mile buffer

**Figure 2. This map shows the approximate location of the permits that were included for this analysis, along with the 5-mile radius around White Bear Lake. The yellow areas indicate the communities that are served by water supplies with at least one well within the five-mile radius and that are thus subject to the court's order. Unshaded areas either do not have public water supply wells or the wells are located entirely outside of the of the five mile radius.**



the recently established protective elevation for White Bear Lake (established in 2016 to protect recreational uses)

4. Temporary irrigation bans within nearby cities would not have a significant effect on water levels in White Bear Lake

## **What we analyzed**

The Ramsey County District Court ordered DNR to review all existing groundwater appropriation permits within five miles of White Bear Lake, both individually and cumulatively, to ensure they meet the state sustainability standard (see inset at top of next page). The court also ordered DNR to assess the sustainability of an unprecedented scenario in which all of the permittees within 5-miles of White Bear Lake pump at their maximum permitted rates. Groundwater is used to supply drinking water—as well as water for businesses, irrigation, and other uses—in the five-mile area.

To conduct this analysis, DNR established a 5-mile radius around White Bear Lake and identified 44 groundwater permits within that area (Figure 2). It is important to note that communities often have multiple wells under a single groundwater appropriation permit. For purposes of this analysis, if a community had wells both within and outside the 5-mile radius, DNR considered all of their wells and their total water use in this analysis. Approximately 500,000 people are served by community water supplies subject to the court's order. See Figure 2 for a depiction of the communities affected and approximate location of all permits that were analyzed. Further details regarding how we conducted our analysis are provided in the Analysis section.

## **Where to go for more information**

This publication summarizes DNR's analysis and findings at a high level. Additional information on our groundwater flow model and our full technical analysis are available at: [\*\*www.mndnr.gov/gwmp/wbl/index.html\*\*](http://www.mndnr.gov/gwmp/wbl/index.html)

*Minnesota Statute 103G.287, Subd. 5. Sustainability standard.  
The commissioner [of the DNR] may issue water-use permits for appropriation from groundwater only if the commissioner determines that the groundwater use is sustainable to supply the needs of future generations and the proposed use will not harm ecosystems, degrade water, or reduce water levels beyond the reach of public water supply and private domestic wells constructed according to Minnesota Rules, chapter 4725.*

## **ANALYSIS SUPPORTING OUR FINDINGS**

To comply with the court order, DNR analyzed three groundwater use scenarios, using the groundwater flow model to predict aquifer and lake levels resulting from changes in groundwater use when other factors (precipitation and evaporation) are held constant. To make our modeling as real world as possible, we applied each scenario to actual conditions beginning in 1988, allowing us to capture both wet and dry periods and compare model results with actual observed lake levels over the same period. However, because of lag times between changes in groundwater use and impacts to White Bear Lake, the model requires a “warm-up” period. For the timeframe we modeled, the long-term impacts of the three scenarios we modeled are most clearly evident from 2002 forward.

The three scenarios modeled are:

- No Groundwater Use - no permitted groundwater use in the area starting in 1988. This scenario provides a reference for comparison.
- Existing Groundwater Use - all reported use within five miles of White Bear Lake during the last ten years, projected back to 1988. The total amount of groundwater used over the past ten years is less than the amount used in the 1980s and 1990s. This decrease is reflected in the projected water levels (Figure 4), and better allows us to assess the sustainability of current use.
- Maximum Groundwater Use - this scenario considered all permits as using the absolute maximum allowable groundwater from



1988 forward. This has never actually happened and is not expected to occur, but is something the court directed DNR to evaluate.

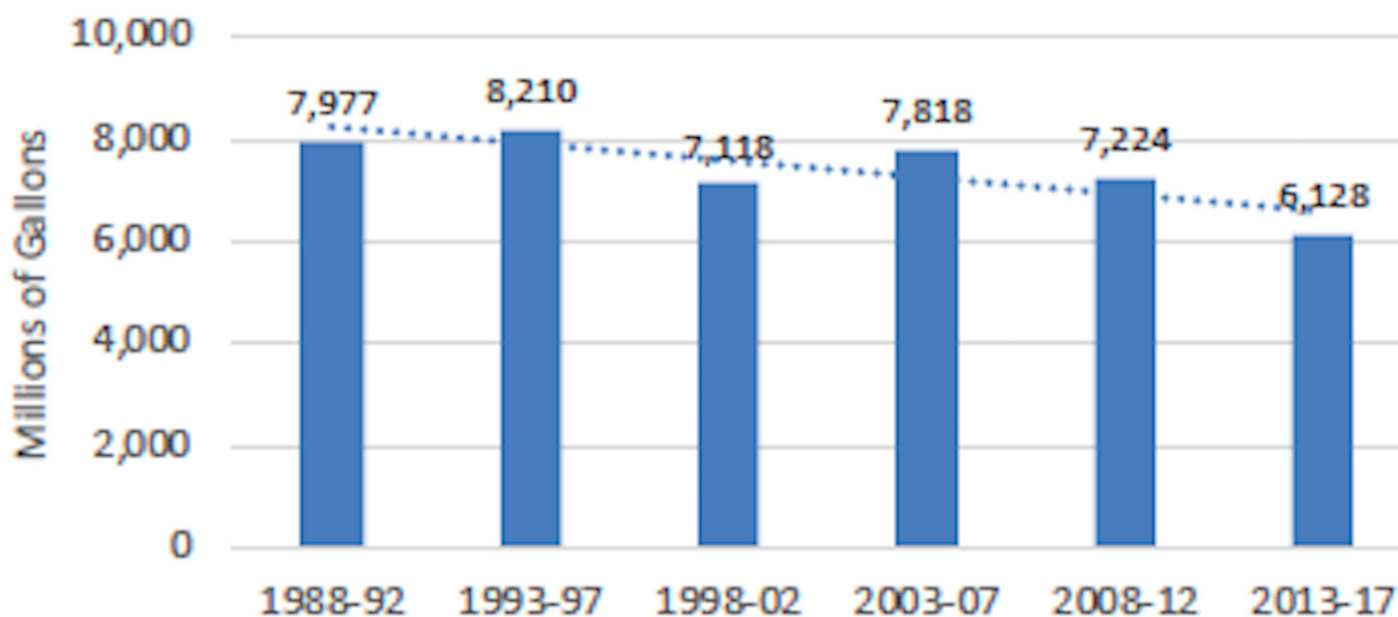
The analysis evaluated all of the permits both individually and collectively under these three scenarios. Figure 4 illustrates the results of lake level modeling under these scenarios.

## Sustainability Criteria

DNR’s analysis indicates that groundwater use in the area meets the state sustainability standard (see inset at the top of left). Specifically this means:

- *Groundwater use does not harm the White Bear Lake ecosystem*
- *Groundwater use does not jeopardize groundwater supplies for future generations or adversely impact private domestic wells*
- *Groundwater use does not degrade water quality in White Bear Lake*

Note that Minnesota’s sustainability standard does not address recreational use. However, DNR has established a protective elevation based on recreational use considerations, which is discussed separately in this publication.



***This graph illustrates that groundwater use has been declining over the last ten years. Annual average use was calculated in 5-year increments, beginning in 1988, which marks the start of consistent use reporting. The volume of water includes wells that are outside of the 5 mile radius when a community has wells both inside and outside of the radius.***

## **Groundwater Use does not Harm the White Bear Lake Ecosystem**

Under all of the scenarios considered, the groundwater use does not harm the White Bear Lake ecosystem. Each scenario results in different water levels that fluctuate to varying degrees, which creates changes in the types and abundance of aquatic vegetation, a key measure of ecosystem health. However, those changes do not cross thresholds that would result in a degraded biological community.

According to the model, in the “No Groundwater Use” scenario, water levels in the lake would have been higher than the observed water levels over the past 15 years (Figure 4). Sustained high water levels in the lake would have reduced the overall amount of near shore area that supports emergent plants (e.g. bulrush) compared to other scenarios, with minimal change in the amount of submerged vegetation.

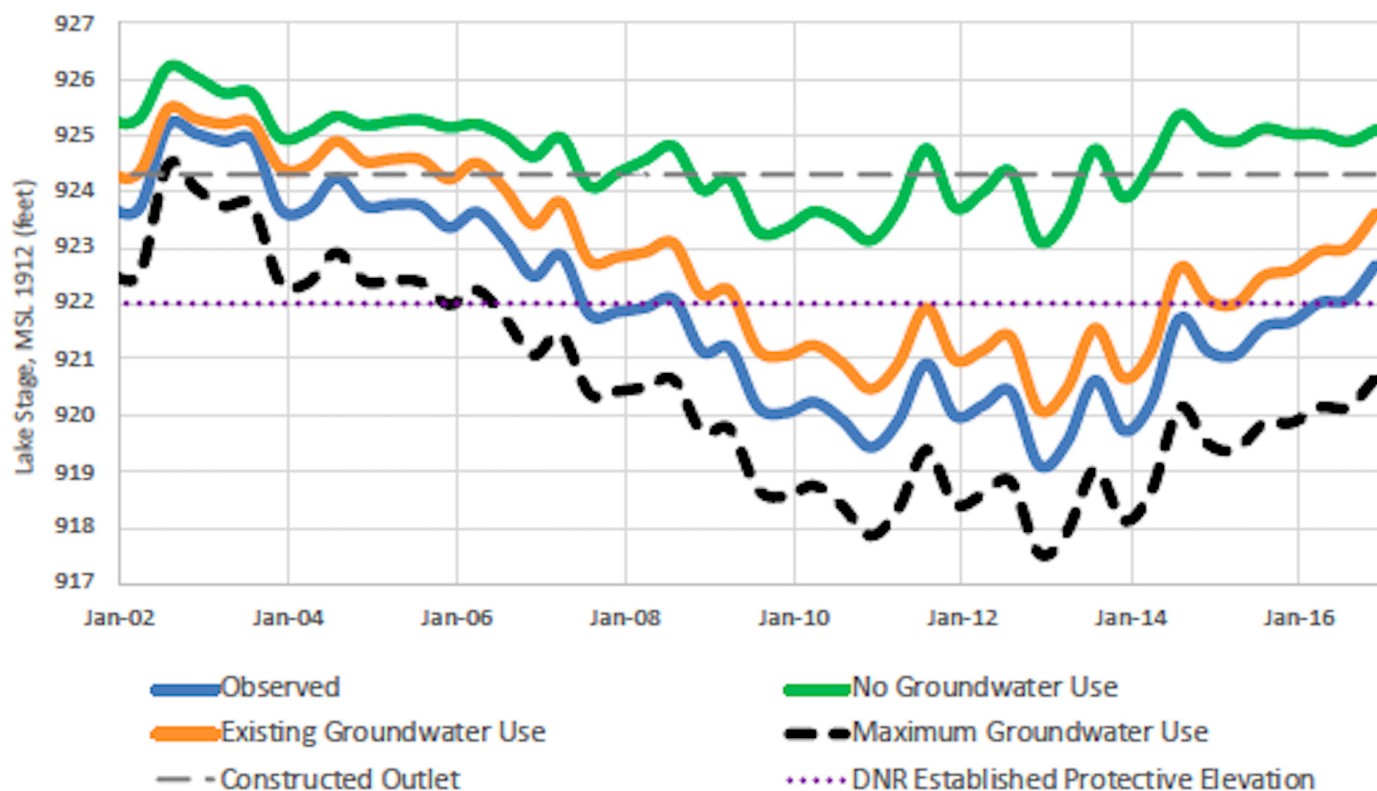
In the “Existing Groundwater Use” scenario, water levels would have been up to about one foot or more higher on average than observed water levels (Figure 4). Water levels would still have declined during periods of less than normal rainfall. Periodic lower water levels do, however, benefit the lake ecosystem because of increased emergent plant growth near the shoreline. Periodic exposure during low water is needed to germinate some types of plant seeds. These plants help reduce shoreline erosion and provide important fish and wildlife habitat, especially when water levels rise, as they have in recent years.

In the “Maximum Groundwater Use” scenario, water levels in the lake would have been lower than the observed water levels (Figure 4). Lower water levels would increase emergent vegetation in the near shore area, while decreasing the aerial extent of submerged aquatic vegetation. However, the decrease in submerged vegetation would be less than the amount allowed under Minnesota law.

## **Groundwater use does not jeopardize groundwater supplies or impact private domestic wells**

According to the model, water levels in each of the groundwater use





**Figure 4.** This graph is one of the key outputs from the groundwater flow model and illustrates the predicted water levels for White Bear Lake under different groundwater use scenarios within the 5-mile radius of the lake. The lines have the same general shape, because water level fluctuations are driven primarily by rainfall and evaporation. However the differences among the lines reflect the relative impact of different levels of groundwater use on lake levels

scenarios would be more than adequate to reliably pump groundwater over many years, known as safe yield. This means that groundwater supplies for future generations would not be jeopardized. Given these modeled aquifer levels and past experience, we also don't anticipate problems with domestic wells under any of the scenarios.

### Groundwater use does not degrade water quality

Based on past water levels and measurements of water clarity and phosphorous, there are no discernable impacts on water quality from the groundwater use simulated in these scenarios.

## Individual Permits

Because the existing groundwater use permits do not cumulatively violate the state's sustainability standard, it follows that none of them individually violate the standard. However, groundwater use does demonstrably affect lake levels, and DNR's groundwater flow model allows us to better understand the relative impact of individual permits on lake levels.

Key factors determining an individual permit's impact on White Bear Lake include distance of the well(s) from the lake and the volume of water used. Of the 44 permits analyzed, permits held by these ten entities contribute most substantially to the water level impacts.

- White Bear Lake
- White Bear Township
- Mahtomedi
- Vadnais Heights
- Oakdale
- North St. Paul
- Saputo Dairy Foods
- Hugo
- Stillwater
- Lino Lakes

Again, it is important to underscore that none of these permits is violating the state's sustainability standard. However, to the extent that adjustments may be warranted to support recreational uses (see Protective Elevation discussion), these permits would have the greatest impact.

## GROUNDWATER USE AND THE WHITE BEAR LAKE PROTECTIVE ELEVATION

In 2016, DNR established a protective elevation of 922.0 feet for White Bear Lake. State law provides for setting protective elevations for lakes that are subject to direct surface water appropriations, with the goal of limiting (not eliminating) adverse impacts to the lake from the appropriation. The protective elevation established for White Bear Lake

was the first time DNR developed a protective elevation to help manage groundwater, rather than surface water, appropriations.

In setting the protective elevation for White Bear Lake, DNR considered multiple factors, including the lake's historic range, aquatic vegetation, fisheries, water quality, recreational uses, and the area and slope of the lakebed.

We determined that there were no permanent adverse impacts to the lake ecosystem or water quality associated with temporary declines to the lower end of White Bear Lake's historic range. Indeed, there are demonstrable ecosystem benefits to variable lake levels, and declines to the lower end of the range provide an important ecological reset for aquatic vegetation, which in turn supports fish and other organisms.

However, our review of all available information also demonstrated that there were adverse impacts to recreational uses associated with lower lake levels. These adverse impacts included things like dock extensions, the closure of Ramsey County Beach, increased requests to control eurasian milfoil, reduced access at public ramps and private marinas, and limitations on shore fishing.

In seeking to balance the ecosystem benefits and negative recreational impacts of lake levels at the lower end of White Bear Lake's historic range, DNR established the 922.0 feet protective elevation. The protective elevation is not a fixed level that is maintained, or a minimum level that is guaranteed. Rather, it is a level at or before which DNR will work with permit holders to modify their water use in order to reduce the likelihood that the lake will fall below the protective elevation for an extended period of time. This does not mean that DNR will shut-off drinking water in order to protect recreational uses of the lake. But it does mean that we will implement reasonable, science-based permit adjustments to support the protective elevation.

Our analysis indicates that water levels under the "Existing Groundwater Use" scenario would have fallen below the lake's protective elevation in 6 of the last 15 years (Figure 4). Observed lake levels fell below the protective elevation in 10 of the last 15 years. The difference between



the two scenarios, relative to the protective elevation, is because current groundwater use is lower than historic use and the model applies that change starting in 1988.

The “Maximum Groundwater Use” scenario would result in falling below the protective elevation both more frequently and by a wider margin than the observed lake levels over this same time period. However, as stated previously, pumping at the maximum rate by all permitted users is an unprecedented and unrealistic scenario. The insights gained from this scenario are not particularly useful in managing groundwater appropriation permits.

Importantly, the groundwater flow model provides a new tool in applying the protective elevation. It allows us to calculate the amount of water that can be pumped without causing lake levels to fall below the protective elevation under normal weather conditions. (The protective elevation is not intended to ensure that the lake will not fall below 922.0 under prolonged drought.) It also allows us to identify which permits are having the greatest impacts on lake levels and focus our efforts to implement the protective elevation on those permits.

## **TEMPORARY IRRIGATION BAN WOULD RESULT IN LITTLE CHANGE TO WATER LEVELS**

DNR also simulated how a temporary irrigation ban would affect lake levels. Specifically, we attempted to model the Ramsey County District Court’s ban on residential irrigation when water levels drop below 923.5 feet. To do this we used the “Existing Groundwater Use” scenario and subtracted the estimated volume of water attributable to residential irrigation when the ban would have been in effect between 2002 and 2016. Under this approach, the residential irrigation ban was modeled beginning in 2007, when the existing groundwater use scenario dropped below 923.5 feet, and continued through 2016 as lake levels had not yet reached the court’s established level of 924.0 feet for lifting the ban. The model indicates that the irrigation ban would have increased lake levels by about 4.5 inches after ten years. A ban of shorter duration would have

less of an impact on lake levels.

The two main reasons for this modest change in lake level have to do with the amount of water pumped and the distance of that pumping from the lake. The communities with wells closest to White Bear Lake use a relatively small amount of water for irrigation, and the communities with higher summer water use are located many miles away from the lake. The model clearly shows it takes many years for pumping effects to fully reach the lake.

The model does demonstrate that permanent and long-term water conservation does benefit lake levels. Temporary restrictions can be extremely important for suppliers to manage peak demand and community water supplies. However, the court's temporary residential irrigation bans would not result in substantial changes to water levels on White Bear Lake.

## **WHAT'S NEXT**

DNR is appealing the Ramsey County District Court's ruling, based on the court's assessment of the science, interpretation of state law, and application of that law to the specific facts of the White Bear Lake case. That matter is pending before the Minnesota Court of Appeals. A ruling in our appeal is not expected until the first half of 2019.

Despite the pending appeal, DNR has continued to work hard to improve our collective understanding of the very complex relationship between groundwater use and water levels on White Bear Lake. Our new groundwater flow model represents a significant advancement of the science and is one of the most sophisticated models available anywhere in the United States for conducting this kind of analysis. Using this new tool, we are committed to working with local communities, businesses and residents to make carefully targeted, well-informed modifications to water use in the area.

DNR's work has been, and must continue to be, informed by the best available science. That science does change and evolve. Based on our

analysis, DNR has concluded that existing groundwater use meets Minnesota's sustainability standards, but also contributes to the frequency and degree to which White Bear Lake may fall below the protective elevation that supports recreational uses of the lake. We have initiated discussions with the affected community water suppliers regarding these findings and will be working with them to explore conservation options and alternative water sources that can help ensure White Bear Lake remains a prized recreational asset for area residents and all Minnesotans.



***The MGCSA membership, and golf industry at large, recognizes and appreciates the hard work the Minnesota Department of Natural Resources puts into managing our water resources. Thank you DNR for allowing the MGCSA to participate upon the stakeholder's committee and also provide industry on many occasions. Together we can protect and enhance our state's most valuable asset.***





## One Cause. One Goal. One Percent.

***One Cause:*** Help golf course management professionals and their dependents that are having trouble paying medical bills due to the lack of comprehensive insurance or adequate financial resources.

***One Goal:*** Raise \$10 million in 10 years to support these families.

***One Percent:*** Donate 1% of your 2014 revenue, maintenance budget, or salary over the next 10 years in 10 payments.

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### Example Contribution:

2014 Salary = \$70,000

1% = \$700

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Donation = \$70 per year for 10 years

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# In Bounds

by Jack MacKenzie, CGCS

The current Hole Notes publication is full of issues that you, as turf property managers, should

be literate about, or at the very least, have a vague idea regarding the topic. Pollinators, water, labor; Oh My! With full appreciation that those hot buttons are often “beaten to death”, especially by me, the information is required reading by professionals such as you.

Consider this: Who gets the call when someone locks their keys in their car up at the clubhouse? Who is relied upon to help move chairs and tables in the banquet hall for a big party? Who is the club’s Mac-Gyver when something needs adjustment or fixing? And who is expected to know about current issues whether golf related or not? You of course. Is this because turf managers, in general, are crafted

from the “get ‘er done” mold? Maybe you are so amazing at your job that it makes perfect sense to everybody that you know a lot about many important considerations.

It could well be an attribute born from necessity. Without your “will do” attitude, the property you manage, love and coddle would not meet anyone’s expectations, let alone your own. The owners of your club, players of your course and community constituency know that they have you as their “go-to” Plan “B”, sometimes perhaps even the Plan “A”.

Pollinators and neonicotinoides- Everyone knows that we need pollinators to help with food production (only 8-12% and not the 30+ percent often touted), and Monarchs are pretty and perhaps an environmental health indicator insect (too bad they only overwinter upon at a postage stamp size property in Mexico). However, golf courses are

sometimes focused upon as the bad egg in the neighborhood because the property is so well maintained. Yet typically 30 percent of the average 150 acre golf course property is not maintained at all. About 45 acres of an average golf course are in existence as habitat with shelter and forage.

Most courses, except those ravaged by the Japanese beetle, don't use neonics at all or only perhaps on small areas such as green and tees. As turf managers, you have many more choices to control insects, and in different available forms. Unlike farmers, your perennial ground cover is not reseeded each year with neonic dusted seeds. Yet you have to be up-to-speed on neonic insecticides so your answers are correct and complete. You may need to defend golf's use, or more often, non-use of these helpful tools.

Water- Even in the land of "10,000 lakes", this issue will not go away. And, as long as you continue to manage your resources diligently, thus creating picture perfect and

green courses, golf will continue to be a bulls eye, targeted as a water waster.

In 2011, six Minnesota golf courses had their irrigation permits suspended. In 2012, that number jumped to 20. This is roughly five percent of all golf destinations in the state. Only surface water users were targeted at the time as they were easy to monitor and no system was in place to quantify the impact of groundwater use on surface water.

The White Bear Lake judgment is a game changer as ground water users, 80 percent of all courses in Minnesota, whose water consumption has been linked scientifically to surface waters, will likely be treated under the same guidelines as surface water users. That is, because golf courses are considered non-essential water users, they will be the first to have their irrigation permits suspended.

In the White Bear Lake five-mile radius of impact, there are eight



courses using ground water. Evaluated as individuals, they are small quantity water users. However, when tabulated as an industry, golf suddenly becomes a very large water user, some would say abuser, comparable to a small municipality.

White Bear Lake serves as a template for areas across our state that are currently or will be in the future, under a water crisis. The ruling forces our hand to be more diligent than ever when it comes to responsible water use and environmental stewardship.

We, the MGCSA, continue down the path of BMP implementation in exchange for water assurances, although at a lower volume in times of need. This began a decade ago, and while progress is being made and golf is recognized at the agency and legislative levels, we still have a long way to go to achieve water certainty. But without knowledge about the concern you are not able to educate others regarding the issue.

Here is an idea; you could really help the “cause” by supporting the business during the Golf Industry Day On The Hill on February 20, 2019.

Employee woes-Who needs staff? At our outreach forums and other MGCSA events there is a common theme of anxiety about how to fill green staff vacancies. To help clear the employee hurdle, your peers have presented some great ideas. Flexibility is the major mantra.

There are several courses that have actually hired up to two times as many employees than in the past, but they offer the option of limited work hours each week. As long as the job gets done within your allocated time slot, do you really care who does what and when? Especially if without that flex-time body, your key staff or you would be relegated to a mower or line trimmer.

It seems kids, as young as 16 according to state law, are allergic to the weekend mow-and-go routine. This could be a great slot for the senior

citizen who won't work more than ten hours a week and really likes to take advantage of an employee golf policy on weekdays. Do you really care if you have ten people working forty-hour work weeks or twenty working twenty? It still adds up to 400 hours doesn't it?

Contrary to the belief that there are no high school or college workers willing to work, many of your peers are locating staff who just don't want to work early hours or forty hours a week. Perhaps a split shift would provide you a crew and still get the work done. Not everyone likes to get up early in the morning and not surprisingly; lots of courses slow down after 3:00 in the afternoon. Hmmm, management could develop an early/late start schedule with the likelihood of enhanced morning family opportunities. Imagine "sleeping in" on a regular basis.

High schools conduct job fairs several times each year. So do community colleges. Have you personally visited with the local vocational

school's horticulture club? Considering how young, and how many, transitional baby boomers are living under one roof, the "giant senior complex", have you posted job opportunities on their community board.

How crazy would it be to have multiple shifts of senior staff who drive in together, tag off on your big rigs on a regular basis and service your tee boxes or divot dress and then go home in the same car? It is time to think way outside the box to get the job done. If you always do what you have always done, you will always get what you have always got.

Three big issues, and likely many more to come. You are "the guy" who is tapped as the "all knowing and doing", it is in your best interest to keep up to date on the variety of topics that meander through your players, owner's, professional's and general manager's heads each day. By providing thoughtful solutions to current challenges you will solve a problem or two and increase your value to the organization.