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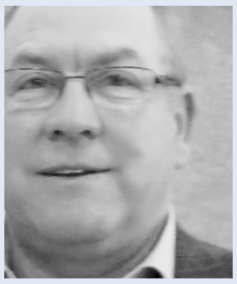
Minnesota Irrigator

PUBLICATION OF THE IRRIGATORS ASSOCIATION OF MINNESOTA FALL 2016

Comments by the IAM President



Dear Irrigators,

The State IAM board of directors met at the end of July and one of the topics was: Where should IAM go from here? Currently, we focus on maintaining membership and advocating at the capitol. Our membership doesn't change much from year to year.

Presently, we are just below 400 members. This is not impressive when there are potentially 2,000 irrigators in Minnesota. There are many local associations that don't meet anymore. I believe a strong state association starts with a strong local association.

This year we have sent out over 350 letters to irrigators who have been members in the past five years but who are not current members. We have only received a response from a small handful as of this writing. What more can IAM do to encourage irrigators to become members?

We also discussed whether IAM should have a stronger presence at farm shows and other organizations' annual meetings. All of this discussion is needed to keep IAM an important and effective organization. If you have an idea or thought on this subject you can contact your local IAM board representative or me. We value your input because to keep moving forward we need your support.

Have a safe fall harvest and I look forward to seeing you at the annual meeting in February.

Alan Peterson, IAM President

INSIDE

Rosholf Field Day–Thursday, August18

Irrigation Research at Rosholt Farm-8:30AM-RSVP *(see page 3)*

Field Day August 18th in Westport, MN

DEFICIT IRRIGATION RESEARCH

Water is a valuable commodity, and sometimes we don't understand the value of water until it is in short supply. That is why, starting in 2016, the University of Minnesota Extension, Pope County SWCD, Minnesota Department of Agriculture, CHS Prairie Lakes, and West Central Irrigation are collaborating to conduct irrigation research to answer questions that irrigators have about how crops respond to reduced soil water, and how can we manage plant populations to best respond to these variable water shortages.

The study will focus on comparing a 100% Full Irrigation Treatment (FIT) with a 75% FIT and 50% FIT. The 100% FIT will represent a typical irrigated field. The 75% and 50% FIT will get water less often. This is to simulate the periods of water stress that may be experienced in a sandy part of a field with much lower water holding capacity than the areas surrounding it. Nested within the irrigation treatments, we will have three population treatments of a drought tolerant corn hybrid. This will allow us to better understand how we can use planting populations to address areas with less water holding capacity.

This will be an excellent opportunity to see the differences in water stress with varied populations, and also to get some hands-on experience learning about different types of soil moisture sensors.

New Research Effort Will Show How Cover Crops Impact Nitrogen Management

A new research effort began in 2016 to evaluate if cover crops and living mulches can reduce nitrate leaching. The study will also answer questions about what impact cover crops can have in agronomic and economic optimum nitrogen rates. Fabian Fernandez, University of Minnesota, will be sharing final results from the 2012-2014 nitrogen

ROSHOLF continued on page 3

Welcome to the Summer/Fall 2016 Newsletter

Jerry Wright, IAM Membership Secretary

Wish you a safe and productive harvest. This newsletter comes to you thanks to the support of the enclosed advertisers, current IAM irrigators & industry membership and those Extra Mile Supporters listed in the newsletter.

IAM Directors' encourage you to become a member today if you have not already joined.

We all benefit by each other's ideas, experiences and support to continue IAM activities and leadership in keeping a watchful eye on MN Irrigation Water Rights; sharing personal stories about benefits of irrigation with Legislators as well as representing interests of irrigation practices across the state.

To become a member or renew you elapsed membership simply return the membership form located on the last page of this newsletter or print off a form from the IAM webpage **www.mnirrigator.org/**. There are many advantages in belonging to IAM with the best one being just knowing that you are in partnership with your neighboring irrigators in supporting your IAM officers and **Board of Directors'** legislative and agency contact activities. As a member you can also be placed on the IAM email alert list if you submit your email address.

If you have a topic that you would like to see discussed in a future newsletter issue, drop a note to IAM president, Alan Peterson at <alpetefarm@frontiernet.net>
Articles for the newsletter are solicited and gathered by the IAM officers and Membership Secretary, Jerry Wright can be contacted at <wrightsj@charter.net>
Crow River Press, in Hutchinson, MN manages advertiser space and edits, prints and mails the newsletter.
If you are not interested in receiving future mailings from Irrigators Association of Minnesota (IAM), please send a note to: wrightsj@charter.net or IAM, 24 S. Edquist St., Appleton, MN 56208

Mark Your Calendars

AUGUST 18, 2016
Rosholt Farm Field Day

AUGUST 18, 2016
Oakes Irrigation Research Field Day

AUGUST 26, 2016
Central Lake College-Field Day

FEBRUARY 16, 2017
Annual IAM Convention

Oakes Irrigation Research Site

FIELD DAY-AUGUST 18

A field day will be held at the NDSU Oakes Irrigation Research Site - Robert Titus Research Farm on Thursday, Aug. 18. The recently expanded 40-acre site located 4.5 miles south of Oakes on North Dakota Highway 1, is a substation of the NDSU Carrington Research Extension Center.

Some highlights for the field day include demonstrating new state-of-the-art lateral move irrigation system with individual sprinkler control, the recently installed horizontal well and cutting-edge unmanned aerial vehicle (UAV) sensing systems.

The field day will begin with refreshments at 8:30 a.m. The tour will run from 9:00 to noon, with lunch following.

OAKES RESEARCH continued on page 2

CENTRAL LAKES COLLEGE – Ag & Energy Research Center

Field Day Events – August 26th

Machinery Demonstrations–This event will take place throughout the entire day courtesy of Midwest Machinery. The opportunity to ride and drive a piece of John Deere equipment is available for all ages.

9:30 & 10:30–CHS Ag Innovation Plot – This event includes a corn demonstration plot testing various in-furrow treatments and nitrogen application rates.

9:00 am–Drone Flight Demonstration – Involves an on-site flight of a Phantom 3 Professional quad copter complete with an NDVI camera.

Kid's Program–Activities for kids ages 5-14 including learning the latest technology in agriculture and hands on experiences.

10:00–1:30–Agronomic Tour – A tour with industry professionals to answer questions of various crop experiments including fertilizer, soil, and in-furrow applied products.

CLC FIELD DAY continued on page 12

OAKES RESEARCH continued from page 1.

Topics that will be covered and the presenters are:

- **Welcome and how the Oakes Irrigation Research Site complements the NDSU Research Extension Center system** - Blaine Schatz, Carrington Research Extension Center director
- **Overview of the Oakes site's projects and how the new irrigation system is being utilized to provide new opportunities for research** – Kelly Cooper, Oakes Irrigation Research Site Manager
- **Potato variety development at the site** - Susie Thompson, NDSU potato breeder
- **Given the fluctuations in corn prices, what are possible agronomic management decisions?** - Greg Endres, area Extension cropping systems specialist at the Carrington
- **Improving white mold management in soybeans, and field pea research at the Oakes site for statewide benefit** - Michael Wunsch, plant pathologist at the Carrington
- **The NDSU soybean variety development program - Ted Helms, NDSU soybean breeder**
- **Horizontal wells and new opportunities for irrigation** - Tom Scherer, NDSU Extension agricultural engineer
- **UAV technologies, including high-resolution (1.25-inch) images taken at the Oakes site, with a demonstration if weather permits** - Paulo Flores, nutrient management specialist, Carrington.

Tour participants also will have the opportunity to review the site's irrigated corn hybrid and soybean performance tests.

For more information, contact the ***Carrington Research Extension Center*** at ***(701) 652-2951*** or visit its ***website at https://www.ag.ndsu.edu/CarringtonREC***

Kelly Cooper, Oakes Irrigation Research Site Manager
(701) 742-2744, kelly.c.cooper@ndsu.edu

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If you would like to attend Aug. 18th, please RSVP with a head count to
Dan Langseth at 320-634-4035 or **dan.langseth@state.mn.us**
and leave a message if there is no answer. Hope to see you all there!

ROSHOLT continued from page 1

rate study plus discuss the design of the current study and why it is important to understanding the incorporation of cover crops into a continuous corn or corn-soybean rotation. This will be a great opportunity to hear more about cover crop impacts to nitrogen management and hear conclusive results from the previous nitrogen management work at the Rosholt Farm. Bring your nitrogen management questions!!

CHS Prairie Lakes Agronomic Plots

CHS Prairie Lakes will showcase production agriculture demonstrations at the 2016 Rosholt Field Day. Varied management, weed control and production techniques will be of great interest to those attending.

Rosholt Farm site is located on State Highway 28 between
Sauk Centre and Glenwood.

For specific tour stop information, Please visit the CHS Prairie Lakes website http://www.chsprairielakes.com/agronomy/2016-innovation-trials-test-plots/

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A DNR project to maintain Sustainable Use of Groundwater and ensure a sustainable economy in the works for Little Rock Creek Area

Groundwater is vital to Minnesota's economy. It provides drinking water for families and water for crops, livestock and industrial uses. Groundwater also supports surface waters that are vital to Minnesota's recreation and commercial interests, as well as its valued fish, wildlife, and native plant resources.

Per MN DNR hydrogeologists the groundwater use in the Little Rock Creek Area within Benton and Morrison Counties has been increasing at a faster rate than the statewide average. There is an increased risk of overusing and contaminating groundwater in the area.

Over the next year, the DNR will develop an action plan to ensure groundwater use remains sustainable, allows for continued irrigation, economic growth, healthy drinking water, and recreational opportunities.

The Regional DNR office under the leadership of Mark Hauck, Area DNR Project Manager (320-345-0017 or mark.hauck@state.mn.us) has organized a Project Advisory Team to share their concerns and solicit public and water user reactions to DNR's proposed water management strategies. Twelve of the 26 member advisory team is irrigating farmers. Last meeting was held on 22nd of June 2016 in the City of Rice. FOR More information on this project and a list of advisory members visit the MN DNR Groundwater Management web page: http://www.dnr.state.mn.us/gwmp/index.html

Permit Needed When Applying Fertilizer (and Pesticide) Through Irrigation System

This is a reminder that you must obtain a permit from the Minnesota Department of Agriculture (MDA) when injecting a FERTILIZER or PESTICIDE through an irrigation system.

A permit for chemigation is required for farms, greenhouses, golf courses, nurseries and other settings where agricultural chemicals are injected / applied through an irrigation system that is directly connected to a water supply. Agricultural chemicals include fertilizers and pesticides. A person operating the system is responsible for obtaining the permit and complying with all regulatory requirements.

An operator of a chemigation system is the individual or entity that intends to chemigate an agricultural chemical through the irrigation system.

For example, a landowner has a permit but decides to rent the land to Farmer A. If Farmer A intends on using the irrigation system to chemigate, then Farmer A must apply for his or her own chemigation permit and cannot operate under the landowner's permit. Also, if the land is subsequently rented to Farmer B who also intends on using the chemigation system then Farmer B must also apply for their own permit and cannot operate under the landowner's or Farmer A's permit. A chemigation system can have multiple permit holders depending on the number of operators who intend on chemigating at the site.

Operators must:

Complete an application form *(www2.mda.state.mn.us/webapp/erenewal/apply.jsp)*

Pay a one-time required fee ($50 for "fertilizer only, or $250 for pesticide only, $250 for fertilizer and pesticide).

By filling out the application, the operator must certify that all antipollution requirements have been met; all antipollution devices are properly installed and functional prior to each use; and, other requirements intended to prevent surface and/or groundwater contamination are followed.

The MDA would like chemigation permit holders to request that their permits be deactivated if they no longer intend to chemigate at a previously permitted site (ex: retired and renting out land, no longer renting land from the landowner, etc.)

More information on chemigation system requirements such as supply tank setback distances, requirements to maintain low pressure drains, completing and storing chemigation application records, can be found at www.mda.state.mn.us/chemicals/fertilizers/chemigation.

If you have questions contact
MDA Chemigation Consultants
Jim Freilinger at 320-243-7384 or
Jeff Lorentz at 320-223-6547

"This chemigation system is permitted by the Minnesota Department of Agriculture (MDA) to inject liquid fertilizer and has the required operational anti-pollution device back-check valve, a low pressure drain and vacuum relief. The hose attached to the low pressure drain directs any chemigation water away from the well that may get behind the back-check valve when the irrigation system is shutdown."

Irrigation Scheduling and Small Rainfall Events

Dean Steele, NDSU Irrigation and Environmental Engineer

The rain gauge reads 0.12 from yesterday's light rain, you received no rain the day before and you do not expect rain today. Should you enter this amount in your irrigation scheduling program or worksheet? The purpose of this article is to simplify your irrigation scheduling practices by discussing small rainfall events and their impact on the soil water balance used for irrigation scheduling.

Irrigation scheduling – determining when and how much water to apply – is discussed here in the context of irrigation scheduling tools (three methods available online at: https://www.ag.ndsu.edu/irrigation/irrigation-scheduling). These tools contain worksheets in which the user records rainfall and net irrigation, and crop water use either is computed by the program or entered by the user. The model then computes an estimate of the amount or balance of water available to the crop.

The rainfall that enters the soil is net rainfall. The crop canopy intercepts and holds some rainfall, where it evaporates before it enters the soil. Since this rain does not reach the root zone, it does not contribute to the soil water balance and should not be entered into the worksheet. As the first water droplets hit dry foliage, they splatter, with most of the water dropping off. However, some water adheres to the plant and forms a film. Based on computer modeling and lysimeter studies, Allen Thompson, agricultural engineer at the University of Missouri, estimated that a fully developed corn crop can hold between 0.05 and 0.10 inch of water on the leaves and stalks. The amount depends on wind speed, air turbulence and other atmospheric conditions. He suggests neglecting rainfall events smaller than 0.10 inch for irrigation scheduling purposes. This does not mean you should subtract 0.10 from larger rainfall events because you would gain little accuracy by doing so.

To put this amount in perspective, suppose a sprinkler irrigation system applies enough water to supply the irrigated area with 1 inch of water. An efficiency of 85 percent translates into a loss of 0.15 inch. For applications of 0.50 to 0.75 inch, the efficiency may drop to 80 percent, which translates into losses of 0.10 to 0.15 inch. In addition to canopy evaporation, irrigation system inefficiencies include losses from drift and evaporation as water droplets travel through the air. Other factors influence the contribution of small rainfall events to the soil water balance. Even if the top inch of soil is wet from a small rain, evaporation from the soil surface may make this additional water unavailable to the crop.

The rate of evaporation from the soil surface increases when the surface is wet because the ability of water to move through soil increases with the wetness of the soil. Common experience tells us that rainfall is variable with location, even within a single field. When small amounts are measured in a rain gauge, some areas within a field may have received no rain. Thus you simply may want to neglect amounts less than 0.10 inch to avoid the risk of under-irrigating parts of a field. Another way to address this problem is to install more than one rain gauge in each field and schedule irrigations accordingly.

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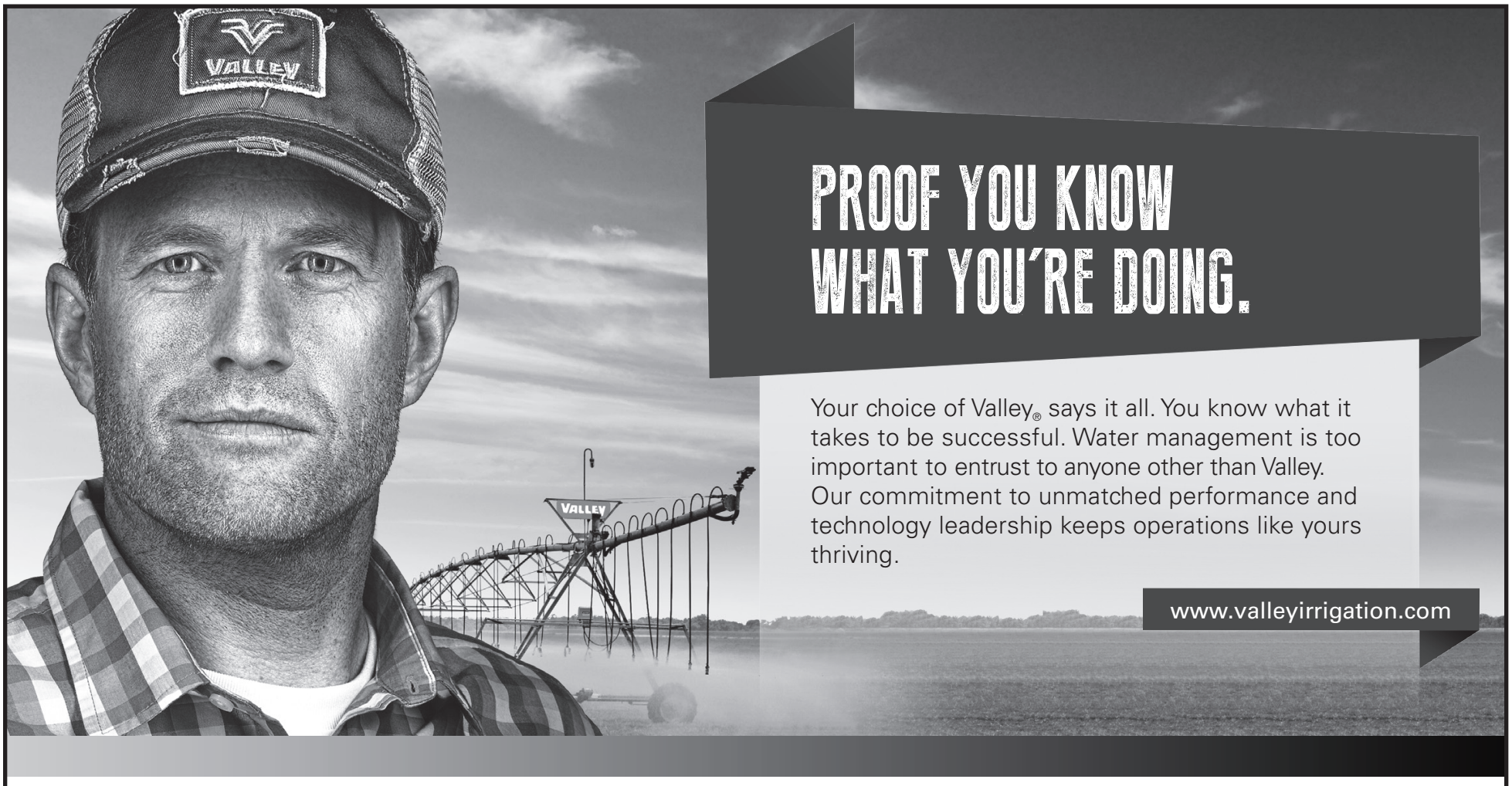
In summary, a general guide is that rainfall amounts smaller than 0.10 inch can be ignored for irrigation scheduling purposes. These small rainfall amounts do not need to be entered into soil water balance calculations.

Taken with permission from NDSU Extension Water Spouts Issue #287 July 2016

Dean Steele, NDSU Irrigation and Environmental Engineer, (701) 231-7268 or Dean.Steele@ndsu.edu



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The Impact of an Extra Inch of Irrigation Water

Tom Scherer, NDSU Extension Agricultural Engineer

At this time of year, the temperature is hot, the crop is fully developed and total seasonal crop water use exceeds rain plus stored soil moisture. Have you ever wondered what impact each inch of applied irrigation water has on the final yield?

Fortunately, through the years, many researchers have performed experiments to determine water productivity. Water productivity is the crop response to water at critical growth stages. It is the slope of crop water use versus yield graph and indicates the additional amount of yield for each additional inch of water.

In the following table are yield estimates obtained from several research reports (mainly from North Dakota, Minnesota and South Dakota) for each crop. The table shows a range of yield responses probably due to soil types, growing conditions, crop varieties and geographic locations where the research was performed.

These numbers assume that stored soil moisture and rainfall are less than the required seasonal crop water use during the growing season and that the difference is provided by irrigation. You can look at seasonal crop water use estimates using the North Dakota Agricultural Weather Network (NDAWN) website at *https://ndawn.ndsu.nodak.edu/*. Go to "Applications" on the left-side menu and select "Crop Water Use," then "Tables."

Here is something to remember about these yield increase estimates: They are only accurate for irrigation water applied to bring the growing season crop water use total to its maximum. Applying more water than the seasonal crop water use plus the water lost due to the application

efficiency of the irrigation system will have a very small yield return per inch applied. It is the law of diminishing returns.

Taken with permission from NDSU Extension Water Spouts Issue #287 July 2016 Tom Scherer, NDSU Extension Agricultural Engineer, (701) 231-7239 Thomas.Scherer@ndsu.edu

water spouts

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Crop	Yield increase per inch of applied water per acre	Water use for the growing season (inches)
Wheat	4 to 5 bushels	15 to 16
Corn	8 to 14 bushels	18 to 20
Corn silage	1.25 to 1.75 tons	18 to 20
Alfalfa	0.2 to 0.25 ton	22 to 24
Pinto beans	250 to 300 pounds	15 to 17
Potatoes	2,200 to 2,900 pounds	17 to 19
Soybean	4 to 5.5 bushels	17 to 18
Sunflower	170 to 190 pounds	15 to 16
Sugarbeet	1.5 to 1.7 tons	21 to 23

Mark your Calendars

2017 Annual IAM Convention

Community Center at Freeport, MN

Thursday - February 16, 2017

For more information contact

IAM president-Alan Peterson: alpetefarm@frontiernet.net

or Jerry Wright: wrightsj@charter.net

IAM webpage: www.mnirrigator.org/

Successful "Irrigation" Water Use Reporting in MPARS

by Jan Ouren, Mn DNR Water Appropriation Permit coordinator

The Minnesota DNR Permitting and Reporting System (MPARS) is now in its third year. Thank you all for your patience through its growing pains. Your suggestions helped make it better. Response to this new system has been overwhelmingly positive. Reporting the amount of water used during the year helps the DNR manage Minnesota's groundwater and surface water resources for current and future generations. Accurate and up-to date numbers reported by you, greatly improves the accuracy of analyses using this information.

MPARS offers easy, convenient, online reporting and is used by 90% of water use reporters. If you have internet access and haven't used MPARS, we encourage you to give it a try. Step-by-step instructions to create a user account and log-in are at: www.mndnr.gov/mpars/signin.

MPARS is your resource for reported statistics back to 1988. The system accepts requests to change your permit authorization, property ownership, and add or replace wells. Preliminary well assessments and new permit applications are available online too. Information and items entered into the system are stored and available under Water Use, Communication or Attachment tabs.

MPARS is there for you and helps you track water use reporting and fee payments. MPARS e-mails reminders to submit your annual report and will let you know if your report is late. The system allows you to submit reports and pay fees as you are done irrigating. You do not have to wait for a report form. This is convenient to anyone going away for the winter or wanting water use fees included with current-year farm expenses. Reports can be completed in one sitting or started and submitted on your time-frame. More than one person (water use reporter, accounts payable staff, landowner, agent, or lessee) may create user accounts and be connected to permits for action or review.

MPARS helps avoid errors and lets you know of missing information.

Here are some pointers to help you avoid the most common reporting errors.

- Report gallons used in each month in whole numbers. MPARS doesn't understand decimal numbers. For instance, 1.5 million gallons should be entered as 1,500,000. The system will not translate hours of use, inches per acre, or meter readings into gallons for you; it expects you to calculate readings into gallons. Contact us if you aren't sure of the formula to use. Know your flowmeter and be sure to include the correct number of zeros. Most flowmeter faces will show if the meter expects 2 or 3 zeros at the end.
- Report for the correct year by noting the report's due date. 2016 reports are due February 15, 2017. If you report after January 1, both past year and current year reports are available.
- Continue beyond the Summary Screen to submit and finalize the report and choose payment options. This screen shows all entered information, estimates the fee and allows report editing. Reports are submitted after continuing past the Summary screen. On the final screen you check a box of agreement and click a final green "Submit" button.

MPARS payments are flexible, secure, and convenient. You are able to pay online or print an invoice to mail with a check payment. By law water use fees must be received by the DNR on or before February 15 the year following the use. Avoid unnecessary permit termination by reporting and paying fees on-time. Payment options are available from the Financial Tab of the account overview screen.

- Electronic funds transfer (EFT) and Credit/Debit card payment is accepted through a 24-7 service by a secure bank vendor and almost instantly show paid in your MPARS account. Paying fees online saves time, printing, and postage costs. EFT payments protect bank routing and account numbers. When paying for multiple permits, you can combine all the fees into a single transaction. The system is flexible allowing you to choose which fees to add to a payment for each of your accounts.
- Fee payment by check is available even if you report online. Reporters can print an invoice after completing each water use report or MPARS can create a Consolidated Invoice that lists and totals all fees waiting for payment on your user account. Invoices are PDF files for you to print or e-mail to someone else paying the fee.

MPARS has human helpers who understand that even though the system is designed to be user-friendly and self-directed, you might have questions or need help. Reach live help during office hours by calling (651) 259-5678 or e-mailing *mpars.dnr@state.mn.us*.

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Corn development and yield forecast: Stress now reduces kernel number

by Jeff Coulter, Extension Corn Specialist

Much of the corn in Minnesota has finished pollinating and kernels are in the blister to milk stage. Kernels enter the blister stage at about 12 days after tassel emergence and the milk stage at about 20 days after tassel emergence. Stress to corn during the blister and milk stages from dry and/or hot conditions can diminish grain yield, primarily by reducing the number of kernels per plant.

Once kernels enter the dough stage, about four weeks after tassel emergence, kernel number is established and yield reductions caused by stress are due to a decrease in kernel size.

To evaluate the impact of this season's weather on corn yield potential and its spatial variability across the Corn Belt, including three locations in Minnesota, yield forecasts were made on July 27 by University of Nebraska researchers as part of a multi-state project: http://cropwatch.unl.edu/2016/2016-corn-yield-forecasts-july-27

Updated yield forecasts will be available in mid-August.

For more educational resources on corn production, visit Extension's corn production website at www.extension.umn.edu/corn

IRRIGATION MANAGEMENT RELATED WEB SITES

University of Nebraska - Lincoln
http://water.unl.edu/

North Dakota State University
https://www.ag.ndsu.edu/irrigation

University of Minnesota
http://www.extension.umn.edu/agriculture/irrigation/

University of Wisconsin
http://fyi.uwex.edu/cropirrigation/

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PINE EDGE DAIRY–SARTELL
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Minnesota Ground Water Data on the Web

Minnesota's invaluable water resources are monitored by a variety of local, state, and federal agencies. These agencies operate observation networks, often volunteer-based, that collect data related to the quality and quantity of Minnesota's lakes, streams, wetlands, and ground water.

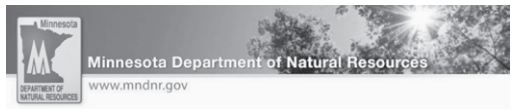
Nearly all of the water resource data gathered by the observation networks are made available to interested parties via the Internet. Many of the data, especially those related to water quantity are available from the Minnesota Department of Natural Resources - Division of Ecological and Water Resources Web site ***http://www.dnr.state.mn.us/waters/cgm/index.html*** ***and*** ***http://www.dnr.state.mn.us/waters/index.html***

SOME OF THE DATA SETS FOUND AT THIS WEB SITE INCLUDE:

Ground Water Level Data–hydrographs and tabular data for wells in the DNR Waters Observation Well Program are available on website. Hydrographs like below illustrate the historical record of aquifer water levels measured within a water table and buried aquifer observations wells:

Ground Water Use Data–maps and tabular data depicting water use information assembled by the DNR Waters Water Appropriation Permit Program.

Stream Flow Data–maps of weekly stream flow and links to other stream flow data resources. The products are prepared by the DNR Waters Stream Hydrology Program.



THANK YOU

to all IAM Volunteers at local associations for their time, expertise and creative energy. Making IAM a stronger organization for all members.

–IAM Board of Directors

Water Use of Irrigated Crops

By Tom Scherer, NDSU Extension Agricultural Engineer

During most growing seasons, lack of water available to plants in July and August can have detrimental effects on yield. Irrigation can overcome those effects to ensure that you harvest the best yield possible. In general, you could say that July is for vegetative growth and August is for developing the "fruit" of the crop. In other words, good irrigation water management is very important during these two months.

Chart 1 shows the average water use for many of the full season irrigated crops in North Dakota. Note that for all these crops, the water use is about 70 percent of the growing season total from emergence to harvest.

The corn water use for the first 20 days of July (assuming a May 10 emergence date) is shown in figure 1 obtained from the North Dakota Agricultural Weather Network (NDAWN) website.

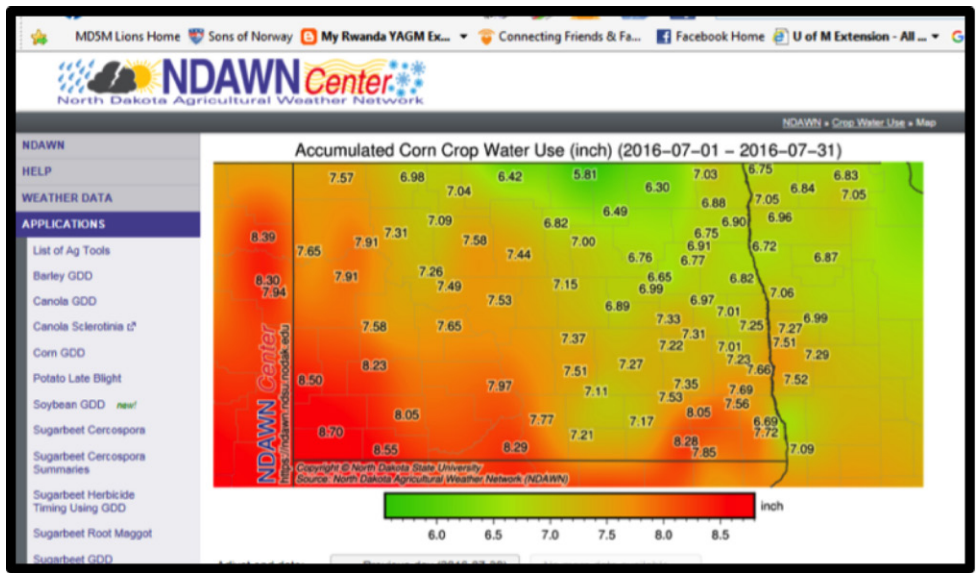
(Note - The ETs in the Figure have been updated for full month of July by MN Irrigator co-editor Jerry Wright as well as an additional figure showing the ET for the whole season)

Also note that corn in the western half of North Dakota will easily surpass the average water use for July and the eastern part of the state is using about the average amount (assuming the corn is irrigated). However, irrigation management is highly dependent on the texture and depth of soil. Generally, sandy loams and loamy sands (the two most common irrigated soil textures) have about 1.5 inches of plant available water per foot of soil depth. The storms that have passed through the state the last couple of weeks have provided some very timely rain amounts but with hot weather, crop water use will be greater than average. So be watchful, you may have to start irrigating sooner than expected.

More site-specific crop water use estimates can be obtained from the NDAWN Website: http://ndawn.ndsu.nodak.edu. Click on Applications on the left side of the page and select crop water use on the pull-down menu.

Taken with permission from NDSU Extension Water Spouts Issue #287 July 2016

Tom Scherer, NDSU Extension Agricultural Engineer, (701) 231-7239 Thomas.Scherer@ndsu.edu, www.ag.ndsu.edu/extension-aben/irrigation/water-spouts



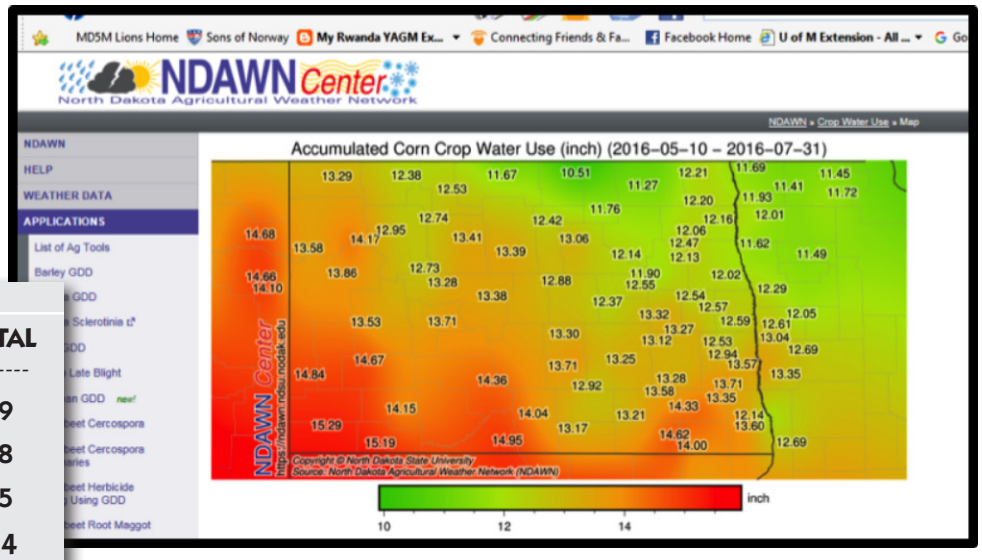


CHART 1

AVERAGE WATER USE	JULY	AUGUST	TOTAL
	---------- *inches* ----------		
Corn (grain and silage)	6.6	6.3	12.9
Pinto beans	7.0	5.8	12.8
Potatoes	7.0	5.5	12.5
Soybeans	6.5	5.9	12.4
Sunflowers	6.6	6.0	12.6

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MN DNR Establishes a Groundwater Management Area (GWMA) in North & East Metro

Groundwater is vital to Minnesota's prosperity. The Minnesota Department of Natural Resources (DNR) has established a Groundwater Management Area (GWMA) in the North & East Metro. The boundary includes all of Ramsey and Washington counties, the southern portion of Anoka County, and a portion of Hennepin County. The GWMA planning process produced a plan to guide our actions in the area. Formal designation of the GWMA was completed this past winter when the Commissioner of the DNR approved the plan, thereby putting this GWMA in the implementation phase. The approved plan provides a framework within which DNR will work with water users such as municipalities to promote conservation, protect surface waters and water quality, improve the groundwater appropriations permitting process, and resolve any conflicts that might arise among users.

More information about the GWMA is posted on the DNR project website: *http://www.dnr.state.mn.us/gwmp/index.html*

THE IMPLEMENTATION TEAM

The DNR formed a Project Advisory Team (PAT) to provide advice and feedback during the beginning of the GWMA planning process. The PAT included citizens representing cities, permitted users, private businesses, conservation districts, and other state and local agencies. The Project Advisory Team met regularly from October 2012 through May of 2015. Meetings were open to the public. Guests attending were encouraged to participate in the meetings.

Many members of the advisory team for the implementation phase of the groundwater management area also served as members of the Project Advisory Team that put together the plan, but there are new members as well. The Advisory Team consists of 23 people, mostly representatives of large water appropriators, including cities and industrial users, as well as counties, watershed districts, private associations, and other governmental agencies. This team will provide ongoing insights to the DNR as it implements a five-year plan.

DNR HOLDS PROJECT ADVISORY TEAM MEETING

The newly formed advisory team met for the first time in late May 2016 to continue discussion on the implementation of the GWMA Plan and to hear updates on efforts by the Minnesota Department of Natural Resources and others to sustainably manage groundwater in the north and east metro area.

Other DNR staff who will be involved with implementation of the plan were introduced. THEY INCLUDE:

District appropriations hydrologist JOE RICHTER, who handles permits and works with local government on water supply planning;

MARY COBURN, who is reviewing well records and working to assure that all groundwater appropriations have required permits;

Area hydrologists KATE DREWRY and ***JEN SORENSON***, and ***support hydrologist JASON SPIEGEL***.

Jason Moeckel, a section manager for DNR's division of Ecological and Water Resources, gave a brief update on legislative actions related to groundwater, then provided an overview of DNR's "*Thresholds Report*," an effort to more clearly define when groundwater appropriations may present unacceptable risks of damage to streams, lakes and wetlands. The evidence suggests that exceeding a 10 percent reduction in August base stream flows (when conditions usually are driest), would likely cause unacceptable impacts. The challenge is to translate that sustainability threshold into an amount of water that can be pumped before impacts occur. DNR is developing a groundwater model that will be used to inform permitting decisions in the Little Rock Creek watershed near Rice, MN. A similar approach could be used in the N&E Metro GWMA.

DNR water policy consultant Suzanne Rhees provided information about state efforts to encourage use of stormwater in lieu of groundwater by waiving annual water use fees. She also mentioned that the Department of Health is expected to deliver a report to the legislature next year regarding potential for re-use of gray water.

DNR water conservation specialist Carmelita Nelson reported that all 13 municipalities in the White Bear Lake area are developing conservation strategies that will be included in their water supply plans, which are due to be updated by the end of the year. The cities are jointly aiming to reduce water use by about 1 billion gallons per year, with each city reducing consumption by at least 10 percent.

DNR hydrologist Joe Richter updated the group on permit activity within the area over the preceding six months. From November 2015 to May 2016, 42 permit actions took place. More than half of those were temporary permits for activities such as construction dewatering. Eight new permits were issued, and eight exiting permits were amended.

Mary Coburn, another DNR hydrologist, reported on efforts to assure that all appropriations are properly permitted. Contacts have been made with feedlot operators to make sure they understand and are in compliance with requirements. Coburn also has been undertaking a review of well records, and has found that many wells listed as active no longer are being used or have been sealed.

Following a short break, the team broke into small groups to discuss groundwater management issues in light of the plan and its implementation. Among concerns reported back to the larger group were recommendations that greater efforts were needed around education about groundwater and conservation.

UPCOMING MEETINGS

The next meeting of the N&E Metro Project Advisory Team is scheduled for Friday, November 18, 2016.

More information about the planned meeting and the agenda will be posted on the project webpage.

Individuals do not need to be on the Advisory Team to attend. The Advisory Team meetings are open for interested parties to observe and time is available to provide comments and ideas.

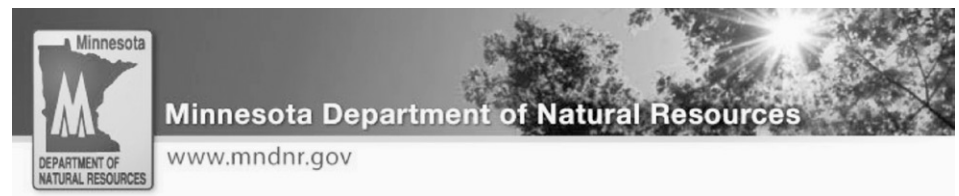
OPPORTUNITIES FOR YOU TO ENGAGE

We continue to seek your engagement during the implementation of the N&E Metro GWMA Plan.

- **Project Advisory Team** meeting is scheduled for November 18, 2016. DNR Central Office, 500 Lafayette Road, St. Paul, 8:30 – 11:30 am
- Individuals interested in receiving meeting notifications and project updates for the **N&E Metro Pilot GWMA** can sign up by following this link and entering their email address,
- **Provide your comments and ideas directly to the DNR**. Direct your communications to *NEMetroGWMA.DNR@state.mn.us*
- **Project Updates Available** - For information about the project, updates have been posted on the project webpage.

CONTACT INFORMATION

If you have questions about this project, please contact Paul Putzier, DNR project manager at 651-259-5692; paul.putzier@state.mn.us or visit the project webpage.



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IAM webpage: www.mnirrigator.org/

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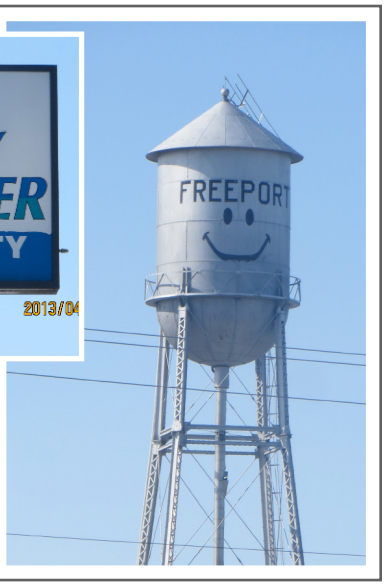

CLC FIELD DAY continued from page 1.

10:00 am–Local Foods Tour–A tour of various demonstration and experimentation projects implemented on the farm included fruit, vegetable, wine tasting, and floriculture.

12:30 pm–Lunch Program –Federal and State Legislators; Agricultural Updates; Soil Health and Midwest Machinery Technology

1:30 pm–Oil Press Demonstration–A tour of the use of renewable energy crops and the process from seed to oil.

1:30 pm–Irrigator Workshop—Presentations by industry professionals detailing irrigation technological advancements and demonstrations.

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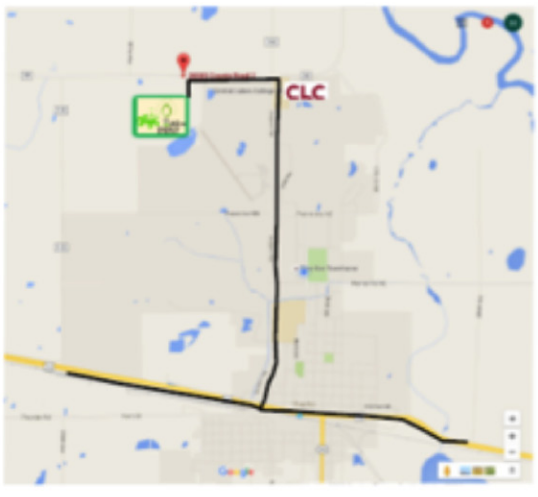

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DRONE FLIGHT DEMO
9am & 1:30pm

Involves an on-site flight of a Phantom 3 Professional quad copter complete with an NDVI camera.

AG INNOVATION PLOT - 9:30am & 10:30am

This event includes a corn demonstration plot testing various in-furrow treatments and nitrogen application rates.

CHS

AGRONOMIC TOUR - 10am & 1:30pm

A tour with industry professionals to answer questions of various crop experiments including fertilizer, soil, and in-furrow applied products.

- MDA N-rate Trial • Talc USA
- UMN Fertilizer Studies • Variety Trials
- West Central Chemical
- USDA Sunflower Research
- Monty Soil Health Research
- Agzyme Soil Health Research

11am - BYRON TOUR

- Cover Crops • Ground Water Quality
- Land Conversions • Crop Rotations

12:30pm - LUNCH PROGRAM

- Federal and State Legislative Agricultural Update • Soil Health
- Midwest Machinery Technology

KID'S PROGRAM - 10am

Activities for kids ages 5-14 including learning the latest technology in agriculture and hands on experiences.

- Tractor Driving • AgCentric Activities
- Garden Activities

1:30pm - IRRIGATOR WORKSHOP

Presentations by industry professionals detailing irrigation technological advancements and demonstrations.

LOCAL FOODS TOUR - 10am

A tour of various demonstration and experimentation projects implemented on the farm included fruit, vegetable, wine tasting, and floriculture.

Hazelnuts, Blueberries, Raspberries, Cherries, Apple Orchard Vineyard, Enology – Wine Tasting High Tunnel, Greenhouse, Community Gardens, Living Legacy Gardens

1:30pm - OIL PRESS DEMO

A tour of the use of renewable energy crops and the process from seed to oil.

Living Legacy Gardens

LIVING LEGACY GARDENS
1:30pm - ICE CREAM SOCIAL

FOR MORE INFORMATION CONTACT:

Melody Weber—218.894.5123, mweber@clcmn.edu | Tiffany Hulinsky—218.894.5141, thulinsky@clcmn.edu

WWW.CLC.EDU/AG-ENERGY-CENTER

DNR - Groundwater Thresholds Project

January 15, 2016

Minnesota has abundant groundwater resources, but they are not unlimited.

The Groundwater Thresholds Project examines the effects of groundwater use on streams, lakes, and wetlands.

The project report includes recommendations for statutory definitions, as well as recommendations for thresholds for negative impacts to surface waters from groundwater use.

Report can be downloaded at website http://www.dnr.state.mn.us/gwmp/gw_thresholds/index.html

Report Conclusions

- Minnesota is in the "urgency room" not the "emergency room" in terms of water use management.
- The state's water management policies, statutes, and rules are strong and conceptually sound. However, the state's water management statutes could be improved by clarifying terminology and better recognizing the interconnected nature of surface water and groundwater.
- There is a strong scientific basis for maintaining the natural dynamic patterns of surface water bodies by establishing protected flows for individual streams, protection elevations for individual basins, and target hydrographs for wetlands.
- Over the next five years, the DNR intends to set protected flows, protection elevations, and target hydrographs for water bodies in places where demand for water may be exceeding sustainable supplies. The changes to statute recommended in this report would help support that work.

Report Recommendations

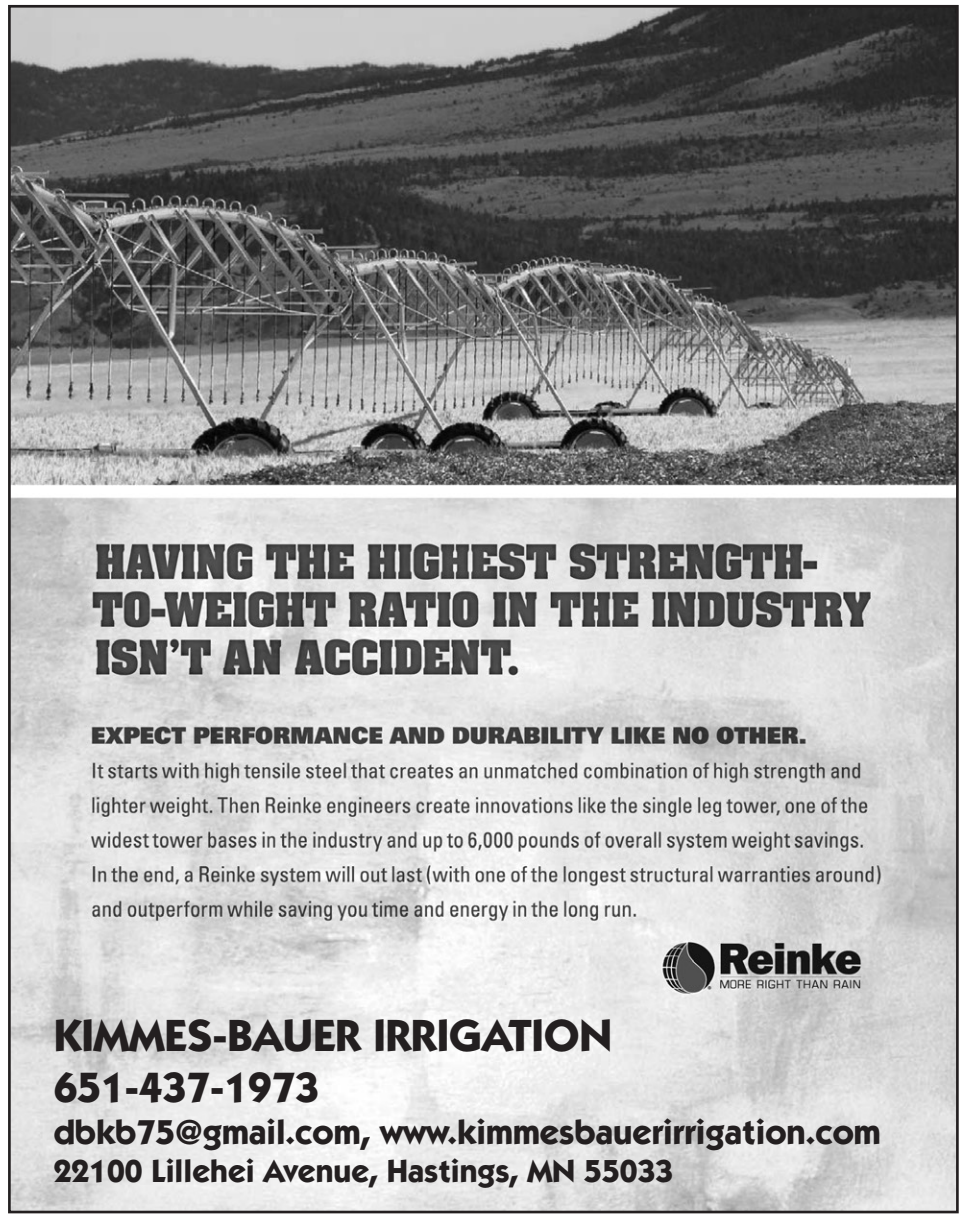
Add the following definitions to statute 103G:

- Negative impact to surface waters, in relation to water appropriations, is a change in hydrology sufficient to cause ecosystem harm or alter riparian uses long-term.
- Ecosystem harm, in relation to water appropriations, is a change in the biological community and ecology in a manner that results in a less desirable and degraded condition.
- Sustainable diversion limit, in relation to water appropriations, is a maximum amount of water that can be removed directly or indirectly from a surface water body in a defined geographic area on an annual basis without causing a negative impact to the surface water body.
- Combine many of the provisions in section 103G.285, which deals with surface water appropriations, and 103G.287, which deals with groundwater appropriations, into a single "Water Appropriations" section.

A "threshold" is the point at which negative impacts occur. The report recommends the following approaches for determining thresholds for streams, lakes, and wetlands:

- **Streams:** we recommend a sustainable diversion limit of not more than 10% of the August median base flow of a stream in most circumstances, but recognize a diversion limit of up to 15% may be appropriate in some areas where water uses are less dependent on a consistent supply.
- **Lakes:** we recommend an approach that establishes sustainable diversion limits for two categories of lakes - lakes connected to stream systems that outflow much of the time, for which the diversion limit of the outflowing stream would be used, and lakes with infrequent surface outflow.
- **Welands:** begin testing the feasibility of establishing target hydrographs for various wetland types, with a focus on areas of the state experiencing heavy demand for groundwater.

Information copied from the DNR webpage at
http://www.dnr.state.mn.us/gwmp/gw_thresholds/index.html



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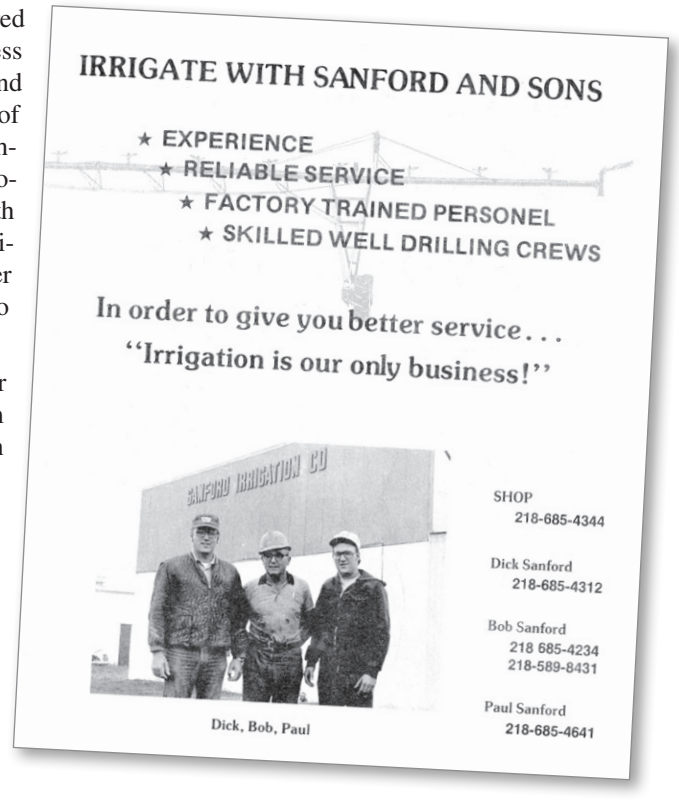
Founder "Bob" of Sanford Irrigation Co. Lived to be 101

Robert "Bob" Paul Sanford, 101, of Fergus Falls, formerly of Elbow Lake, passed away on Friday, April 29, 2016, at Minnesota Veteran's Home in Fergus Falls.

Sanford Irrigation Co. of Elbow Lake had its origins in the 1920's when irrigation was used on the family strawberry and vegetable garden. Bob had vivid memories of selling strawberries to chefs on the passenger trains that would stop specifically to purchase the berries. (Strawberry shortcake was Bob's favorite dessert.)

About 1958 Bob ventured into the irrigation business full time, drilling wells and installing various types of irrigation systems throughout west central Minnesota. By the mid-1970's both his sons joined the business and introduced center pivot irrigation systems to the area.

Bob received the Irrigator of the Year award from the Irrigation Association of Minnesota. He was active in the business until 2004, when he was nearly 90, and the business was sold to Amundson Peterson Equipment.



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Center Pivot "END GUN" Maintenance Check-UP

Jerry Wright, Agricultural Engineer

During this busy time of irrigation now is a great time to examine the performance of your end gun. Has it been shutting off at the right time as it approaches a road? Has it been doing a good job at applying water where you want it? By mid-summer check out how uniform does the current crop look under the wetted zone of the end gun?

There continues to be a lot of concern from some folks these days about having end guns spraying water directly onto a road surface, even the edge of the road. This not only is a waste of water but in many cases it is creating a great endangerment to on coming traffic.

It is the owner and operator's responsibility to manage their center pivot and end guns so as there is no direct water discharge to a road surface regardless if it is a state highway or a graveled township road. Some townships have considered creating an ordinance regarding this situation.

If one of your end guns is not functioning properly, contact your local irrigation equipment repairman immediately to come out and fix the problem.

If involved with a domestic-DNR Well Interference "Complaint"

Contact your IAM Local Representative
or Alan Peterson, IAM President 320-743-2551
or alpetefarm@frontiernet.net

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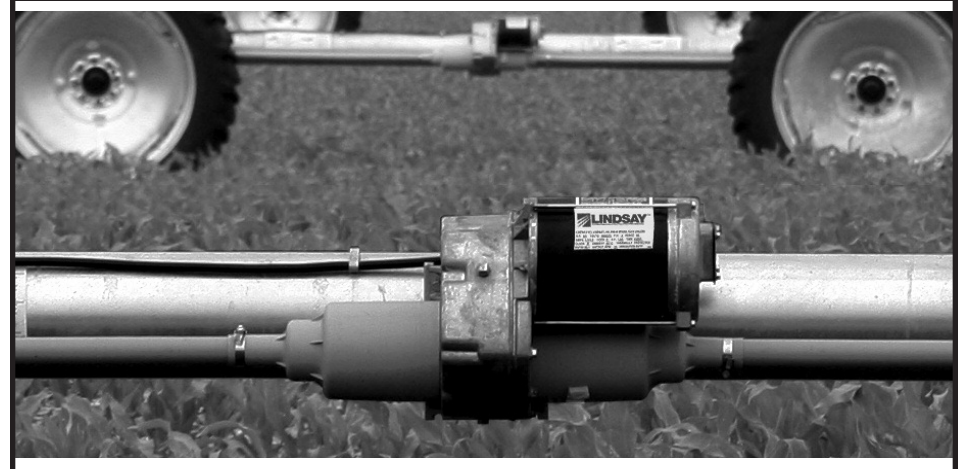

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Mark your Calendars

2017 Annual IAM Convention

Community Center at Freeport, MN

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For more information contact IAM president-Alan Peterson:
alpetefarm@frontiernet.net

or Jerry Wright: wrightsj@charter.net

IAM webpage: www.mnirrigator.org/

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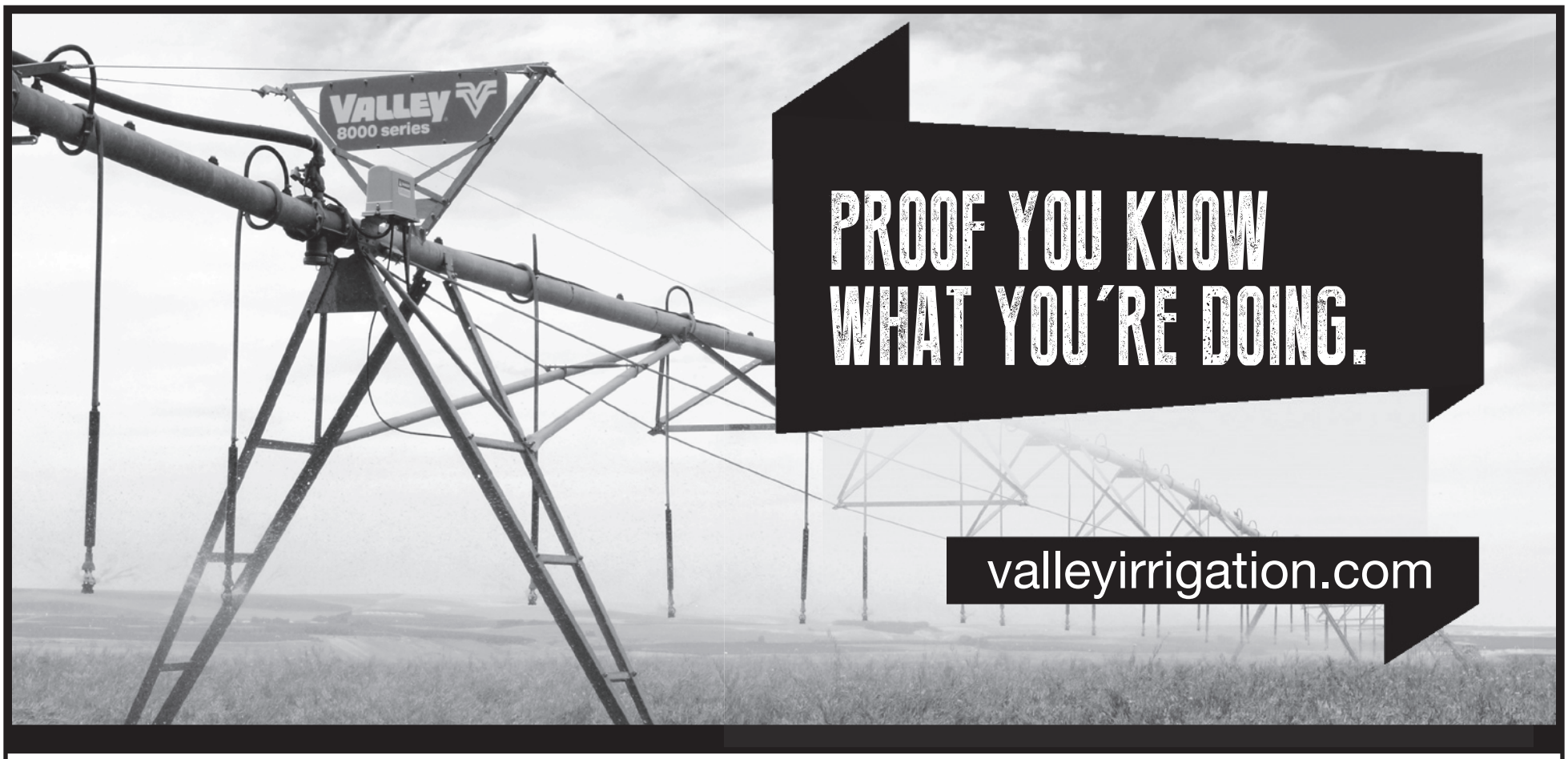

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