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water spouts

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Upcoming

2022 NDSU Field Days

Details for the field day at each location listed below will be posted to their websites.

- Aug. 4 **CREC Oakes Irrigation Research Site** – Oakes (8:30 a.m.-Noon CDT)
- Aug. 9 **NDSU Horticulture Research and Demonstration Gardens** – Fargo (3-7 p.m. CDT, plants, local foods and outdoor spaces)
- Aug. 25 **Northern Plains Potato Growers Association Potato Field Day** – various locations (7 a.m. CDT breakfast and research presentations at Hoverson Farms, Larimore; noon lunch and field research tour at Forest River Colony, Inkster; 5:30 p.m. barbecue and research presentations of chips and fresh potatoes, Oberg Farms, Hoople)
- Sept. 10 **NDSU Horticulture Research Farm near Amenia**, pre-registration required (10 a.m.-3 p.m. CDT, trees and ornamentals)

Oakes Irrigation Research Site Field Day Set for August 4

Remote irrigation management utilizing drip tape, white mold in soybeans, bio-stimulants to supply corn nitrogen and new potato varieties are some of the main topics that will be covered during this year's field day at the NDSU Oakes Irrigation Site - Robert Titus Research Farm on Thursday, Aug. 4.

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

Topics that will be covered and the presenters are:

- Overview of the Oakes site's projects – Kelly Cooper, agronomist at the Oakes Irrigation Research Site
- New potato varieties - Susie Thompson, NDSU potato breeder
- Automated irrigation of melons, watermelon and squash using drip tape – Uday Vaddevolu, Oakes Irrigation Research Site
- Bio-Stimulants for nitrogen in corn – Szilvia Yuja, CREC soil scientist
- Drought tolerant corn varieties and monitoring soil moisture with sensors, Mike Ostlie, CREC Director and Agronomist and Dean Steele, Associate Professor, NDSU Department of Agricultural and Biosystems Engineering
- White Mold Studies in Soybeans - Michael Wunsch, CREC plant pathologist
- Outdoor roundtable discussion

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

For more information, contact the NDSU Oakes Irrigation Research Site at 701-742-2744 or visit its website at <https://www.ndsu.edu/agriculture/ag-hub/events/oakes-irrigation-research-site-field-day>.

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Oakes Irrigation Research Site Manager

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NDSU

EXTENSION

Project Safe Send – Pesticide Disposal

Farmers, ranchers, pesticide dealers and applicators, government agencies and homeowners with unusable pesticides can bring them to any of the Project Safe Send Sites listed below.

Project Safe Send is a safe, simple and non-regulatory program that helps people safely and legally dispose of unusable pesticides free of charge. Since 1992, more than 11,000 people have brought in more than 5.7 million pounds of pesticides to Project Safe Send.

The program accepts old, unusable or banned pesticides, including herbicides, insecticides, rodenticides and fungicides. For a list of accepted items, click on **Accepted Pesticides**. The collected pesticides are shipped out of state for incineration. Project Safe Send is funded through product registration fees paid by pesticide manufacturers.

People are urged to check their storage areas for any unusable pesticides and safely set them aside for Project Safe Send. If the containers are deteriorating or leaking, pack them in larger containers with absorbent materials. Free, heavy-duty plastic bags are available from the North Dakota Department of Agriculture.

2022 Project Safe Send Sites

8 a.m. to noon (local time) at North Dakota Department of Transportation (NDDOT) facilities

Tuesday, July 26	Dickinson	1700 3rd Ave W Ste 101
Wednesday, July 27	Beulah	205 Hwy 49 S
Thursday, July 28	Bismarck	218 S Airport Rd
Friday, July 29	Ashley	520 7th St. SW

For more information on transporting your pesticides safely, go to the Project Safe Send website at www.nd.gov/ndda/pesticide-program/project-safe-send

If bringing more than 1,000 pounds, please contact me to pre-register. Each participant is limited to 5,000 total pounds and one shuttle. Chlorpyrifos will not be accepted.

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Soil Water Deficit is Highly Variable across North Dakota

Plants need water to grow. This water is extracted from the soil by the roots of the plants. However, the amount of water held in the soil for plant use depends on the soil texture. For example, a sandy loam does not hold as much plant available water as a silty clay loam soil. Water gets into the soil via precipitation or irrigation. When crop water use exceeds the amount of water received on a field, it depletes the soil water reservoir. This creates a soil water deficit. If the deficit in the root zone exceeds a certain level, crop growth can be affected.

One way to look at the status of crop development across the state and the need for irrigation is to look at the estimated soil water deficit. I define soil water deficit as the difference between the total crop water use and precipitation received over a period of time. Of course, this definition assumes that all the precipitation received on a field infiltrates into the soil, which is often not the case. However, even with this limitation, it provides an estimate of the water status of crops.

Crop water deficit maps are available on the North Dakota Agricultural Weather Network (NDAWN) website: <http://ndawn.ndsu.nodak.edu/>. They are located under the “Applications” menu for crop water use maps. A water deficit map for corn is shown in figure 1. Since corn planting dates were late this year, I selected an emergence date of May 15th (which may be early for some areas). The

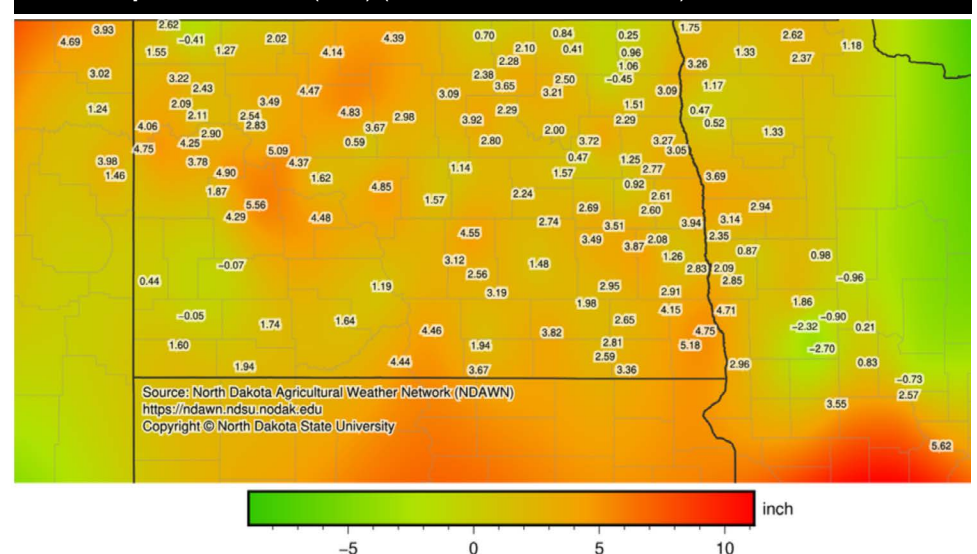
map shows the soil water deficit for corn from May 15 to July 17. Positive numbers mean the corn water use has exceeded the precipitation amount received at each NDAWN station. Negative numbers indicate precipitation has exceeded corn water use. As you can see, the soil water deficit varies greatly over the state with a high that exceeds 5 inches in Richland County to a negative 2.7 inches in Ottertail County in Minnesota. This map only shows the rain received at the NDAWN weather station locations, therefore there may be local areas with more or less deficits than shown. Generally, any location where the deficit is 3 inches or less for corn means that sufficient precipitation has been received up to this point in the growing season.

However, this may not be true for a water sensitive crop like potatoes.

From now until the end of August we are entering the high-water use period for most crops (the “fruiting” stage). It is important to actively manage irrigation systems to ensure very little water stress by monitoring soil water on a regular basis (every 2 weeks). This can be done by using the Checkbook method of irrigation scheduling, using soil moisture sensors or using the tried and true “soil feel” method.

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Corn Crop Water Deficit (inch) (2022-05-15 — 2022-07-17)



How Long Does It Take to Apply an Inch of Water With a Pivot?

Knowing how long it takes to apply a certain amount of water with a center pivot is a very important part of irrigation management. When dealers install a new center pivot or when they re-nozzle an existing pivot, they provide a chart showing the application amount for various settings of the percent timer. The percent timer determines the speed of the pivot and thus, for a given flow rate, the amount of water applied. Sometimes the chart is misplaced or lost for a particular center pivot. Often the flow rate to the pivot will change from what it was when the original chart was made. Over time, the flow rate may decrease, which increases the time to apply the desired amount. If you know the following four parameters, you can calculate an application-time chart for any center pivot.

- 1) Area of coverage (this includes the area covered with an endgun)
- 2) Desired depth of application (water into the soil)
- 3) Flow rate to the pivot
- 4) Sprinkler application efficiency

Use this equation to calculate the application time:

$$T = \frac{453 \times \text{Area} \times \text{Depth}}{Q \times E_A}$$

Where T is the application time in hours, Area is the coverage area in acres, Depth is the desired application depth in inches, Q is the system flow rate in gallons per minute and E_A is the application efficiency. An example of calculating an application amount chart for a 128-acre pivot is shown in Table 1.

Table 1. Average application amount (inches) for a full rotation of a 128-acre pivot with an application efficiency of 85%. For example, with 700 gpm it takes 100 hours to apply 1.03 inches of water in one rotation of the center pivot.

Pivot Rotation Time (hours)	FLOW RATE (gallons per minute)					
	500	600	700	800	900	1,000
10	0.07	0.09	0.10	0.12	0.13	0.15
15	0.11	0.13	0.15	0.18	0.20	0.22
20	0.15	0.18	0.21	0.23	0.26	0.29
25	0.18	0.22	0.26	0.29	0.33	0.37
30	0.22	0.26	0.31	0.35	0.40	0.44
35	0.26	0.31	0.36	0.41	0.46	0.51
40	0.29	0.35	0.41	0.47	0.53	0.59
45	0.33	0.40	0.46	0.53	0.59	0.66
50	0.37	0.44	0.51	0.59	0.66	0.73
55	0.40	0.48	0.56	0.65	0.73	0.81
60	0.44	0.53	0.62	0.70	0.79	0.88
65	0.48	0.57	0.67	0.76	0.86	0.95
70	0.51	0.62	0.72	0.82	0.92	1.03
75	0.55	0.66	0.77	0.88	0.99	1.10
80	0.59	0.70	0.82	0.94	1.06	1.17
85	0.62	0.75	0.87	1.00	1.12	1.25
90	0.66	0.79	0.92	1.06	1.19	1.32
95	0.70	0.84	0.98	1.12	1.25	1.39
100	0.73	0.88	1.03	1.17	1.32	1.47

The application efficiency is the ratio of the volume of water that actually gets into the soil to the volume of water that is pumped. Weather conditions during the day can significantly affect this value. In the morning, when there is no wind, the application efficiency might be over 90% for a pivot. By mid-afternoon, when the air temperature is high, the relative humidity is low and the wind is greater than 15 mile per hour, the application efficiency might drop to 50%. An application efficiency of 85 percent has been shown by research to be a good average value to use for North Dakota conditions.

The values in Table 1 will be correct if mechanical aspects of the sprinkler system are not creating problems. However, plugged nozzles, nozzle wear, sprinklers not rotating properly, pump wear which causes a reduction in pressure or flow rate or both, and leaks in the piping are some of the more common mechanical problems associated with sprinkler systems.

The only way to truly find out the application amount under a pivot is to measure it. A mini can-test can be performed by using four or five identical rain gages. For a typical seven or eight-tower pivot, the first rain gage should be located somewhere between the second and third tower with the rest located between the remaining towers. To continually monitor the application amounts of the pivot, the rain gages could be left in place throughout the growing season.

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County commissions, North Dakota State University and U.S. Department of Agriculture cooperating.

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This publication will be made available in alternative formats for people with disabilities upon request, 701-231-7861.

Overspray from Irrigation Systems not allowed on Roads

In 1989, the North Dakota Legislature passed a law concerning irrigation systems and roads. Section 61-14-16 of the North Dakota Century Code states:

“No person may place, erect, or operate a sprinkler irrigation system, center pivot irrigation system, or other irrigation works or equipment upon or across any highway, street, or road or in such a manner as to willfully allow water from the irrigation works or equipment to flow or fall upon any highway, street, or road.”

A person violating this section is guilty of an infraction. If you notice that the roads near your pivot are wet after irrigation, check the end gun on/off settings. In the past, wet roads or a motorist driving into the water stream from an end gun have caused accidents.

This law does not apply to the transportation of irrigation works or equipment upon a highway, street or road. This means a moving irrigation system can be run across a road as long as it isn't spraying water.

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North Dakota Water Education Foundation – Summer Water Tours

Access to substantial quantities of clean water is important for development in North Dakota, and the best way to learn about water projects is to see them in person via a tour.

These tours provide a firsthand look at North Dakota's critical water issues. Registration is \$30 per person and includes tour transportation, meals, refreshments, informational materials and a one-year subscription to North Dakota Water magazine.

Tours offered are:

- August 3 – **Water Supply for North-Central North Dakota** (tour begins and ends in Minot)

For more information about each tour online, go to <https://ndwater.org/events/> or mail a check made out to NDWEF to PO Box 2254, Bismarck, ND 58502. Please indicate which tour or tours you want to attend and include the number of people. For more information, give us a call or send an email.

North Dakota Water Education Foundation
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