water spouts

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Upcoming NDSU Field Days

Streeter Central Grasslands Research Extension Center	June 24	(701) 424-3606
Hettinger Research Extension Center	July 7	(701) 567-4323
Dickinson Research Extension Center	July 8	(701) 483-2348
Williston Research Extension Center	July 9	(701) 774-4315
Casselton Agronomy Seed Farm	July 13	(701) 347-4743
Carrington Research Extension Center	July 14	(701) 652-2951
Minot North Central Research Extension Center	July 15	(701) 857-7677
Langdon Research Extension Center	July 16	(701) 256-2582

Estimating the Volume of Pumped Water

If you have an irrigation water permit, do you struggle to determine how much water was pumped during the irrigation season? Here are some tips to make the determination easier:

1. If you have a working flow meter, record the numbers on the volume totalizer before the irrigation season starts. The volume totalizer is a counter similar to the odometer in a car. Some meters record the volume in either hundreds or thousands of gallons. Determining which one usually is easy because the manufacturer will show zeros to the right of the counter. If hundreds of gallons are recorded, then the counter will have two extra zeros. If the counter has three zeros, it records thousands of gallons. If no zeros are shown, then your meter may record in acre-feet or cubic feet per second (cfs).
2. If you have a center pivot, before starting to irrigate, record the numbers on the hour meter in the pivot control panel. The pivot flow rate can be obtained from the center pivot sprinkler chart. At the end of the season, you can estimate the amount of water pumped with this formula:

   Volume pumped = (hours of operation) x (gallons per minute) / 5,430

   For example, say your center pivot ran for 895 hours and the sprinkler flow rate is 800 gallons per minute. Then the volume pumped is approximately:

   (895 x 800) / 5,430 = 131.9 acre-feet
3. This method also applies to diesel or gasoline engines with an hour meter and pump electrical control panel that has an hour meter. Recording the numbers at the start and end of the irrigation season can be used to estimate the volume of water pumped if you know the average flow rate being pumped.

Estimating the volume of pumped water is difficult with irrigation systems having one pump that supplies multiple pivots or multiple wells that supply a single or multiple center pivots. That is why recording the numbers on the hour meter in the pivot panel at the start of the season is important.

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Controlling Wheel Track Ruts Under Center Pivots

Every irrigator with a center pivot knows that the wheel tracks under each tower can turn into ruts in some parts of his or her fields. Variations in soil texture and slope cause ruts to vary in depth across a field. Finding wheel tracks up to 6 inches deep is common even on very sandy soil, but when the wheel track is 12 inches or deeper, that is a time for concern.

Deep wheel tracks are caused by saturated conditions that reduce the weight-bearing capacity of soil. The deepest wheel tracks usually are found where water collects in low spots or under the first and second towers

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from the pivot point. Deep wheel tracks can cause drive wheels on towers to get stuck and trip the safety circuit on a center pivot. They also interfere with tillage and harvest operations.

Major factors that affect the depth of pivot wheel tracks are:

1. The soil type: Usually locations in the field with heavier soils (clay, clay loams) have deeper tracks because they remain wet longer due to higher water-holding capacity and slower drainage. Deep wheel tracks commonly form in the low spots where water accumulates. Often the wheel track acts as a drainage canal where rain and irrigation water runs down the wheel track to the low spot.
2. The number of revolutions the pivot makes in the tracks before tillage levels them
3. The weight supported by each tower: Short spans between towers (130 to 170 feet) have less weight than long spans (180 to 200 feet).
4. The amount of wheel contact area with the soil surface

Control of wheel track ruts is very simple: Control the water that either is applied near the tower or can flow into a track. You can reduce deep wheel track problems using either management or mechanical solutions. Some of the **management** methods you might use are:

1. Schedule irrigation water applications to avoid unnecessary pivot revolutions.
2. Allow the soil surface, especially the soil in the wheel tracks, to dry between irrigation events. Sometimes this option is not feasible after a full crop canopy develops and shades the wheel tracks.
3. Keep tire inflation pressures at the manufacturer's recommended level. This will maintain the proper amount of tire contact area.
4. If you have deep wheel tracks in a perennial crop such as alfalfa, consider cutting and harvesting within the circles. If you have deep wheel tracks in only the low areas of your field, consider filling the bottom of the wheel tracks with crushed rock (1 to 3 inches in diameter). This will provide more load support for the towers.
5. During the season, observe the pivot while it operates. If excessive ponding occurs where the deep wheel tracks are formed, you have to reduce the amount of applied water to that location.

Here are some of the **mechanical** changes you can make to help your pivot system reduce deep wheel tracks:

1. Build a road for the tower wheels. This can be done by running the system to mark the wheel track location, then using a plow, disc plow or blade to build a ridge where the track is located. Be sure to pull soil from both sides of the track.
2. Manufacturers of pivot systems offer a wide range of tire sizes designed to minimize deep wheel tracks. However, if you go to larger tires, you may have to increase the size and strength of the drive mechanism.
3. Put directional sprinklers on either side of a tower. This directs water away from the wheel track. Some growers are using extra long drop tubes on the two sprinkler locations on either side of a tower. The drop tube drags a weighted, directional sprinkler head that sprays water behind the wheels, thus keeping the wheel track dry.
4. Attach track-closing disks to each tower. A disk on each side of the track pushes soil into the track as the tower moves through the field. A problem with using this option is the pivot can be moved in only one direction.
5. The sprinklers near the tower can be located on "boom backs." The boom back allows the sprinkler to apply water to the soil behind the wheel so that the track is dry when the tower passes. As in the previous suggestion, the pivot can be moved in only one direction.

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Growing Grapes in North Dakota

The North Dakota Grape Growers Association (NDGGA) has been in business since 2006. The first grapes were planted in North Dakota in 2003 before the formation of the NDGGA. Wild grapes always have grown in North Dakota and many people have domestic grapes in their backyards. However, the NDGGA is working to move quickly toward commercial grape production for wine, jams, jellies and juices. The commercial growers are planting cold-climate varieties. The vines have come from Minnesota, Wisconsin, Washington, New York and other cold-climate states. As of April, the NDGGA has more than 100 members. Most of the members are from North Dakota and some are from Minnesota, South Dakota and Montana.

The largest vineyard in North Dakota is seven acres. An acre of land will hold approximately 400 to 600 vines. Within the association membership, about 41,389 vines are listed. If we assume an average of 400 vines per acre, that's the equivalent of 100 acres in the membership.

After new vines are planted, they should start producing during the fourth year. Once in production, each vine should yield about 15 pounds of grapes annually.

Grape vines are deep-rooted. Rain, along with stored soil moisture, usually provides sufficient water for good production. When established, the roots will go down as far as 30 inches. However, during the first and second years, water is more critical to getting the vines started. Usually water is applied to each individual vine as it is planted and sometimes drip irrigation is used. Once established, grape vines typically will do very well on their own unless strong winds and hot temperatures prevail. If wilting occurs in these conditions, supplemental water will be needed.

The vines like sunshine on their dark-colored leaves. Having a vineyard that is sloped to the south so the east-to-west sun can cover the grapes most of the day is good. Slopes to the south also help plants by draining cold air away from the vines.

Pruning in early spring and harvesting in the fall are the two labor-intensive events but the ambiance and vines make the work much easier. We have some growers who have volunteers to work in the vineyard. Usually a great meal and some wine will aid the work.

You can connect with the grape growers association on its Web site at *www.ndgga.org*. The site will show a gallery of pictures, resources, events and officer list, as well as e-mails, and it has a spot where you can download a membership application.

The NDGGA holds an annual meeting and educational program each winter. It also has worked with petiole testing to analyze nutrients in member grape vineyards. Summer bus tours and NDSU research meetings are available with information as well. The bus tour this summer will be in northeastern North Dakota and northwestern Minnesota. The tour will take you to vineyards and wineries.

The NDGGA has been busy this winter working with legislators to provide an even better organization. A new committee of advisers will be assembled and funding has been obtained by grants and memberships for the startup organization.

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North Dakota Legislation Related to Irrigation in 2009

Five bills affecting irrigation were introduced during the 2009 legislative session. Three of the bills passed and two failed in the originating chamber.

House Bill 1286

This bill initially proposed to exempt the requirement of a water permit for the irrigation of commercial gardens using 15 gallons per minute or less on an area not exceeding 15 acres. It later was amended by the House, where it passed on a vote of 89-3. It again was amended in the Senate to change the definition of "domestic use" to allow the irrigation of noncommercial gardens, orchards, lawns, etc., not exceeding five acres. The definition of "irrigation" also was amended to mean the use of water on more than five acres.

The bill passed the Senate by a vote of 47-0 and the House concurred with the bill as amended by the Senate. Gov. Hoeven signed it on April 24 and it will go into affect on Aug. 1, 2009. Thus, a conditional water permit from the office of the state engineer in not required until the irrigated acreage for any purpose exceeds five acres instead of the previous limit of one acre.

House Bill 1289

At the request of several members, the North Dakota Irrigation Association initiated the introduction of this bill that amends the sales tax law to exempt repair parts and replacement parts for irrigation equipment from the state sales and use taxes. The repair and replacement parts for all other major farm equipment are exempt from sales and use taxes and this created an anomaly in the statutes. The bill sponsors were Reps. Duane DeKrey and Kenton Onstad, along with Sens. Ryan Taylor and Terry Wanzek.

The bill passed the House on a vote of 90-4 after receiving a "do pass" from the House Finance and Taxation Committee. The Senate Finance and Taxation Committee heard the bill and recommended "do not pass" on a vote of 5-2. However, the Senate passed the bill on a vote of 28-19, which resulted in the bill being reconsidered and referred to the Senate Appropriations Committee, where it received a vote of "no recommendation" after a hearing. The Senate then passed the bill on a vote of 26-20. Gov. Hoeven signed it on April 21 and it goes into effect on July 1.

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House Bill 1321

This bill was initiated by the Central Dakota Irrigation District and authorizes the use of mail ballots for irrigation district general and special elections and establishes a procedure for conducting the election. The sponsors were Reps. Wrangham, DeKrey, J. Kelsh and Nottestad and Sen. Freborg. The House and Senate Committees on Political Subdivisions both voted unanimous "do pass" recommendations. It passed the House on a vote of 92-0 and passed the Senate on a vote of 46-1. Gov. Hoeven signed the bill on April 8 and it goes into effect on Aug. 1, 2009.

Bills that failed: Senate Bill 2292 and Senate Bill 2440.

Senate Bill 2292 proposed to change some of the requirements for a water permit application. The bill proposed to require that a water permit applicant identify the aquifer and its depth; notify all fee title landowners within a two-mile radius of the proposed point of diversion; and if the applicant is not the owner of the land identified as the point of diversion, provide proof that the land owner has given permission to use the land for the water appropriation. The bill failed on vote of 45-1.

Senate Bill 2440 required a permit from the commissioner of agriculture for each site within a well head protection area on which pesticides or fertilizer were applied through an irrigation system. The permit would be effective for three years and cost $30 per site. Also, the commissioner was required to provide a report to the Legislative Council regarding the status of rules for chemigation adopted after June 30, 2009. The bill failed on a vote of 22-24.

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