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Upcoming 2017 NDSU Field Days and Tours

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Phone Number</th>
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<tbody>
<tr>
<td>Water Day at the State Fair</td>
<td>July 27</td>
<td>701-223-8332</td>
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<tr>
<td>North Dakota Water Users Irrigation Tour</td>
<td>Aug. 2</td>
<td>701-223-8332</td>
</tr>
<tr>
<td>Oakes Irrigation Research Site</td>
<td>Sept. 7</td>
<td>701-742-2744</td>
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Irrigation Development Continues Along the McClusky Canal

In the heart of North Dakota lies the McClusky Canal, a valuable conveyance feature providing water for recreation, wildlife and irrigation. Constructed from 1969 to 1976, the canal was designed to irrigate up to 250,000 acres. Today, irrigation from the McClusky Canal has not reached its full potential, but the Garrison Diversion Conservancy District (Garrison Diversion) is committed to investing in irrigation development and enhancement in North Dakota.

The McClusky Canal, constructed as part of the authorized Garrison Diversion Unit, was designed to carry a maximum of 1,950 cubic feet per second (cfs), or about 875,000 gallons per minute (gpm), to irrigate up to 250,000 acres, along with providing water for municipal and rural water systems. Through several reformulations, the authorized acres were decreased. Currently, 51,700 acres are authorized along the McClusky Canal.

Since 2010, in an effort to utilize the authorized acres along the McClusky Canal, Garrison Diversion has been working with producers to expand irrigation development through the McClusky Canal Irrigation Project. Garrison Diversion provides upfront investment for projects to determine irrigable soils, complete the facility design and complete the bidding process.

An irrigation master plan recently was completed to provide a more comprehensive view of economic impacts and future development along the McClusky Canal. The goal of the irrigation master plan was to identify and prioritize potential irrigation projects and identify factors that potentially could limit future development with respect to existing electrical infrastructure and current funding and state cost-share programs.

The irrigation master plan is an important first step toward using the McClusky Canal to its full potential and will guide the future development of the canal for years to come. The plan will help regionalize the central supply works, which include pump stations, and power and transmission lines to serve as many irrigators as possible at the lowest possible cost.

Because agriculture remains an important element of Garrison Diversion’s foundation, Garrison Diversion will use the irrigation master plan to guide the future development of the McClusky Canal to ensure family farmers continue to have access to reliable, high-quality, affordable water to allow their farms to grow and prosper.
In 2017, 5,500 irrigated acres are under contract (Figure 1), with multiple additional projects in the works for the immediate future. One such project, set to come online in July, will add 540 acres, benefitting two irrigators.

“Our efforts in putting together the irrigation master plan will be rewarded as we push forward with the development of financially feasible irrigation projects,” said Duane DeKrey, Garrison Diversion general manager. “We want to utilize the authorized acres to the fullest extent possible.”

For more information on the McClusky Canal Irrigation Project or the irrigation master plan, give us a call.

Kip Kovar and Kimberly Cook, 800-532-0074
Garrison Diversion Conservancy District
kipk@gdcd.org

North Dakota Water Education Foundation – Summer Water Tours

Clean water is important for the development of 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 $20 per person and includes tour transportation, meals, refreshments, informational materials and a one-year subscription to the North Dakota Water magazine.

Tours offered are:
• Southeastern North Dakota Irrigation Tour – Aug. 2
• Missouri River Expedition – Aug. 16
• Western Area Water Supply Tour – Aug. 30

For more information about each tour and to register, go to www.ndwater.com/programs and click on “Summer Water Tours” on the left-hand menu or send a check to NDWEF, P.O. 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,
701-223-8332
Fax: 701-223-4645
ndwaterusers@btinet.net

Water Use of Commonly Irrigated Crops

During most growing seasons, lack of water in July and August can have detrimental effects on crop yields. 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.

Below is a chart showing the average water use for many of the commonly 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.

<table>
<thead>
<tr>
<th>Crop</th>
<th>July</th>
<th>August</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Corn (grain and silage)</td>
<td>6.6</td>
<td>6.3</td>
<td>12.9</td>
</tr>
<tr>
<td>Pinto beans</td>
<td>7.0</td>
<td>5.8</td>
<td>12.8</td>
</tr>
<tr>
<td>Potatoes</td>
<td>7.0</td>
<td>5.5</td>
<td>12.5</td>
</tr>
<tr>
<td>Soybeans</td>
<td>6.5</td>
<td>5.9</td>
<td>12.4</td>
</tr>
<tr>
<td>Sunflowers</td>
<td>6.6</td>
<td>6.0</td>
<td>12.6</td>
</tr>
</tbody>
</table>

The two most commonly irrigated soil textures are sandy loams and loamy sands; both have about 1.5 inches of plant available water per foot of soil depth. General irrigation management guidelines are provided in the table on the following page.
### Impact of Air in Irrigation Pipelines

Air in irrigation pipelines is not good.

A common misunderstood concept is how air gets into a pipeline and its effect on the operation of the irrigation system.

All irrigators are familiar with the air release valves mounted near the discharge of a pump. When the pump is turned on, the air in the pipeline is discharged from the valve, sometimes watering those unfortunate enough to be standing in front of it.

Many irrigators also are familiar with the air release valves installed at the high point where the pipeline goes over a hill between the pump and irrigation system. Because these are often in the middle of fields, they have to be farmed around and many have been broken off or shut off because they are perceived to be a nuisance and an obstacle to field operations. However, they should be maintained and kept working because they are important for proper operation of the irrigation system.

Air gets into a pipeline three ways. The first is at startup, when the pipeline is being filled. Much of this air will be pushed down the pipeline, where some will collect in the high points of the pipeline, and the rest will be pushed out through air release valves. If no air release valves are at the high points, the air will create a bubble that will not be pushed out by flowing water, even under pressure.

The second source of air is the water. By volume, water, even from a well, contains about 2 percent air. This doesn’t sound like much, but consider that this
would form a 40-foot bubble in a 2,000-foot pipeline, no matter the pipeline diameter. During pumping, the air will leave the water and contribute to the bubble at the high points of the pipeline.

The third source of air is air the pump “sucks,” which usually happens during dry periods because the water level in the well drops near the pump intake. This commonly is associated with older wells with partially plugged screens or a dropping water level of the aquifer. This source can be significant and contribute to the bubble in late July and August when pumping is the greatest.

Can this bubble of accumulated air have an impact on the flow through the pipeline? Absolutely.

The air bubble acts like a pipeline restriction and can reduce the flow rate and increase the pressure at the pump. In addition, sometimes packets of air will be pushed out of the bubble to flow downstream and potentially cause water hammer (a high pressure surge) that can damage pipeline joints and connections. The solution is to make sure the air release valves are working and maintained.

Air in the water also can affect the operation of the sprinklers on a center pivot. If you notice the sprinklers on the pivot sometimes hiss from escaping air, that means air is in water and it probably is accumulating near the top of the gooseneck. This can reduce the flow to the sprinkler head, resulting in uneven water application.

A solution is to install a continuous air release valve near the pivot point, preferably at the start of the first span. A continuous air release valve will let air out of the system, even under pressure. These valves are readily available from irrigation dealers and sprinkler manufacturers.

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