Tri-Basin Irrigator

Volume 18, Issue 7 *August 16, 2018*

Program Information

EQIP and CStwP:

EQIP – Signup deadline for 2019 funds will be November 16, 2018.

CStwP – We are nearing the finish of writing our 2018 contracts.

NSWCP: Funds are available for irrigation, rangeland, and erosion control practices. Stop by your local NRCS.

ENERGY EFFICIENCY GRANT: Signup deadline for 2019 funds will be October 31, 2018. For more information contact Kelley at Rural Development at the Kearney USDA Service Center at 308-237-3118, Ext. 4 or at 308-455-9837.

Calendar of Events

Aug 23: West Central Research Field Day @ N. Platte, NE
- Registration deadline for meal count is August 20th.

For more info, goto: https://go.unl.edu/water-crops-field-day

Sept 4: CNPPID Board of Director's Meeting – 9 AM

Sept 11: TBNRD Board Meeting – 7:30 PM

Sept 11-13: Husker Harvest Days – For more info, goto https://www.huskerharvestdays.com/en/home.html

How Much Water is 1 Inch?

We are headed towards last irrigation. This is an excellent time to save up to an inch of water, leaving room for off-season moisture and not pushing nitrogen into the groundwater.

If you haven't already started utilizing the FREE subsoil moisture, you need to start. Monitor your crop stage, moisture levels, and root depth. Use the predicting example on this page. Do not be quick to put on that last water just to finish the year. You may never need it. Continue to monitor the situation as the year progresses and apply water if needed.

In order to learn if that last irrigation you made was worth it or not, here is a suggestion I have. When you want to run that pivot to get that last 0.5-1.0 inch on, just run it half way around. By not watering a portion of the pivot, this will teach us if that last watering made a difference in yield. How will one know this if it's not tried on a field where one can compare the extra water versus the non-extra water. If you do this, I would like to see the results. Potentially, this could be an easy way to save a 0.5-1.0 inch of water per year without utilizing any other form of irrigation water management.

If we can save 1 inch of water just on our last irrigation, how much water is that? A 130-acre pivot running a 3 day circle with an 800 gpm well will pump 1 inch of water. Across the pivot that equates to 3.5 million gallons of water. The City of Holdrege averages 1.5 million gallons per day. So what does this mean? If all pivot acres across the TBNRD could save 1 inch of water, that is enough water to supply the entire TBNRD population over the next 18 years. That is how much 1 inch of water is. This is of course based on the City of Holdrege's average water use.

Curtis's Column

USDA United States Department of Agriculture
Natural Resources Conservation Service

Predicting Last Irrigation:

Needed info: **1.** Available Water Capacity (AWC) of soil, **2.** current amount of plant available water to a four foot depth (unless roots are not that deep due to compaction, too much water early, etc.), **3.** current crop stage, and **4.** normal water use from current crop stage to maturity. This prediction assumes no rainfall to crop maturity. If rainfall occurs, the process must be reevaluated.

The following is a chart for normal water use requirements from various crop stages to maturity.

	Growth Stage	Approx. Days to Maturity	Water Use To Maturity
Corn	Dough (R4)	34	7.5"
	Beg. Dent (R4.7)	24	5.0"
	¼ Milk Line (R5)	19	3.75"
	½ Milk Line (Full Dent)	13	2.25"
	¾ Milk Line	7	1.0"
	Maturity (R6)	0	0.0"
Soy Beans	Full Pod (R4)	37	9.0"
	Beg. Seed (R5)	29	6.5"
	Full Seed (R6)	18	3.5"
	Leaves Beg. To Yellow (R6.5)	10	1.9"
	Beg. Maturity (R7)	0	0.0"

You can get a copy of NebGuide G1871 "Predicting the Last Irrigation of the Season" online at *http://extensionpublications.unl.edu/assets/pdf/g1871.pdf*.

Predicting Last Irrigation Example

Crop: Corn Growth Stage: Beg. Dent Moisture: 80%
Water Use To Maturity (see chart on left side of page: 5.0 in.
Soil Type: Holdrege Silt Loam = an AWC of 2.25 in. per ft.
(Soil information available at your local NRCS office)

1. AWC x root zone (4 ft. depth) = **9.0 in. Total AWC**
2. Maximum water depletion of 60% x 9.0 in. = **5.4 in. of maximum water depletion in 4 ft. root zone**
3. Current soil water already depleted (measured) = **1.80 in.**
   80% avg. soil moisture to 4 ft. (20% avg. depletion)
   0.20 x 2.25 in./ft. x 4 ft.
4. Remaining plant available water = **3.6 in.**
   (5.4 maximum water depletion minus 1.8 already depleted)
5. Irrigation requirement = **1.40 inches of irrigation water needed for plant to reach maturity.**
   (5.0 in. of water to reach maturity minus 3.6 in. of water available)

Note: This all assumes no rainfall. Should rainfall occur, the process needs to be repeated. It's also recommended to periodically check soil moisture & crop stages and repeat this process through crop maturity.

CSP Participants

1. **For those needing cover crops this fall, see your NRCS office.**
2. **Make an appointment at your local NRCS office to bring your records in early, especially if you want paid in 2018 tax year.**

CNPPID NOTES

E67 Telemetry Project viewed on TBNRD tour ;

Our E67 Canal Telemetry Project was one of five stops on the annual Tri-Basin NRD tour of new area projects this week. We talked about the use and potential of telemetry as a precision management tool in our area. The E67 project is a joint effort of The Nebraska Environmental Trust, McCrometer, Inc., Central and Nebraska Extension. Telemetry allows producers to make their daily irrigation decisions with precise field data that can be viewed on a computer, tablet or smart phone. They receive an hourly soil water balance for each of their fields, irrigation system flow rate and volume applied, seasonal totals, their remaining contract water available and detailed weather data from the two new local weather stations. The project hardware was installed over three years, 2015-2017. In 2018, the focus is on quality control standards and calibration to be sure we provide producers a tool that will be reliable in their operations for many years ahead.

TRI-BASIN NRD NEWS

TBNRD Reminders Before Irrigation Season Ends:

Drain Your Chemigation Check Valve:
When you are preparing your irrigation systems for colder weather, remember to drain your main line check valve to prevent freezing. This will extend the life of the check valve and may help prevent check valve failure.

Irrigation Water Samples for Nitrogen Management Reports:
If you have crop ground in Phase 2 or Phase 3 of Tri-Basin NRD's Groundwater Quality Management Area, remember to take irrigation water samples. The sample results you get this year will be used in completing your 2019 Nitrogen Management reports.

Year End Flow Meter Readings for Water Use Reports:
As the irrigation season winds down and you are picking up irrigation pipe or bedding down irrigation engines, remember to record the ending meter readings for your Water Use reports.

NEBRASKA EXTENSION EXTRAS

Timing Last Corn Irrigation:

The last few irrigations of the season may be the most important water management decisions of the year. According to Steve Melvin, Nebraska Extension Irrigation Educator, unneeded irrigation may waste 1 to 3 inches of water and 2 to 5 gallons of diesel (energy equivalent of electricity or natural gas) per acre. Therefore, the objective is to leave the field(s) as dry as possible without lowering yields.

Many corn fields will likely reach physiological maturity or "black layer" kernel development soon. When this condition usually occurs, the grain moisture lowers to 30 to 35% moisture; and the kernels have reached maximum dry weight. Thus, the irrigation season comes-to a close.

Black layer begins on ear tips and progresses down the ear to the base. Although hybrids may vary on their physiological maturity, black layer usually occurs 55 to 65 days after corn silking or 33 days after the corn ear kernels reach the "dent" stage of development.

For more information, click the UNL CropWatch link: *https://cropwatch.unl.edu/2018/how-schedule-last-few-irrigations-season*

Nebraska Extension also has three free tools available for determining the last few irrigations. 1) Extension publication G1871, "Predicting the Last Irrigation for the Season" 2) UNL CropWater mobile App to reduce over irrigation. This App calculates water stored using watermark sensor information and predicts end use water needs. And, 3) UNL CornSoyWater App which provides free "last irrigation" recommendations.

Timing Last Soybean Irrigation:

Soybeans are different in crop water use compared to corn as they approach maturity. And, the soybean irrigation season usually extends at least one month longer compared to corn or sorghum.

Also, if hot dry windy conditions occur in September, daily crop water use in soybean may actually increase; compared to corn water use which usually drops as the crop matures. Since the soybeans adjust water usage based on day length and environmental conditions, it is very important to monitor soil water in soybeans closely until they reach maturity.

Dr. Jim Specht, Nebraska Extension Soybeans Specialist emeritus, says that soybeans will continue needing moisture until the soybean seeds reach physiological maturity.

How do irrigators know when this is occurring? The key indicator is soybean reproduction stage (R7). (see chart below) During R7 is when the thin pod-wall membrane separate from the seeds within the pods. From the R5 (beginning seed enlargement) to R7 is usually 29 days with water needed to maturity being 6.5 inches. However, hot weather can dramatically speed the process with higher daily water usage.

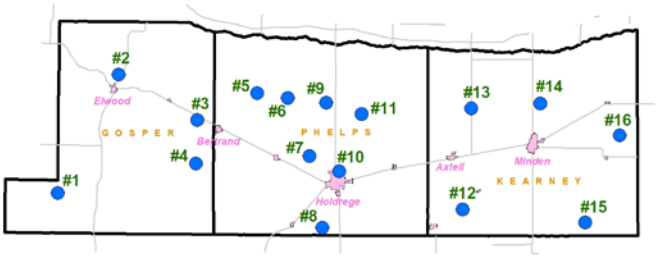
→ R6.9 →R7.0 → R7.1→ R7.5 → R8.0

NAWMN Crop ET Information

Additional Information and other ET resources can be found at websites listed under "ET Information Sites" below.

Inches of Crop Water Use (ET) = Evaporation x Kc

	July 30 – Aug 5		Aug 6 – Aug 12	
Site	Evaporation	Rain	Evaporation	Rain
1	0.90	0.58	1.00	0.00
2	1.20	1.55	1.60	0.10
3	1.10	0.65	1.20	0.00
4	1.40	0.43	1.50	0.00
5	1.30	1.18	1.40	0.12
6	1.10	1.50	1.20	0.16
7	1.30	0.90	1.60	0.45
8	1.10	0.83	1.60	0.34
9	1.40	0.69	1.40	0.76
10	1.05	1.40	1.50	1.60
11	1.40	0.60	1.40	0.80
12	1.30	0.73	1.60	0.70
13	1.20	0.58	1.40	0.44
14	0.90	0.84	1.10	0.34
15	1.40	0.60	1.60	0.10
16	1.10	0.73	1.60	0.08



2018 Map of NAWMN Sites across the Tri-Basin NRD.

Crop Coefficients (Kc)

Corn Stage	Kc	Soybeans Stage	Kc
2 leaf	0.10	Cotyledon (VC)	0.10
4 leaf	0.18	1st Node (V1)	0.20
6 leaf	0.35	2nd Node (V2)	0.40
8 leaf	0.51	3rd Node (V3)	0.60
10 leaf	0.69	Beg. Bloom (R1)	0.90
12 leaf	0.88	Full Bloom (R2)	1.00
14 leaf	1.01	Beg. Pod (R3)	1.10
16 leaf	1.10	Full Pod (R4)	1.10
Silk – Beg. Dent	1.10	Beg. Seed (R5)	1.10
¼ Milk Line	1.04	Full Seed (R6)	1.10
Full Dent (½ Milk)	0.98	Yellow Leaf (R6.5)	1.00
¾ Milk Line	0.79	Beg. Mat. (R7)	0.90
Black Layer	0.60	Full Mat. (R8)	0.20
Full Maturity	0.10	Mature	0.10

Crop Stage Information

Corn (R4-Dough to R5-1/4 Milk Line stage): Stress at R5 will reduce yield by kernel weight, not kernel number. At the beginning of R5, kernels have about 55% moisture.

Avg. daily water use from Aug 6 – Aug 12 was 0.15"-0.25".

Soybeans (R4-Full Pod to R5-Beginning Seed stage): Demand for water and nutrients is large throughout the rapid seed filling period. Environmental stress from now til shortly after R6 (Full Seed) needs to be avoided.

Avg. daily water use from Aug 6 – Aug 12 was 0.16"-0.25".

Aug 6-Aug 12 (16 of 16 NAWMN sites reporting): Average weekly rainfall was 0.37 (range 0.00 to 1.60). Average weekly ET for corn was 1.59 and for soybeans was 1.45.

ET Information Sites

NAWMN Sites:
https://www.cnppid.com/weatheret-data/nebraska-agricultural-water-management-network/
https://nawmn.unl.edu/ETdata/DataMap
CropWatch: https://cropwatch.unl.edu/gdd-etdata
CNPPID: https://www.cnppid.com/weatheret-data/
Water Use Hotline: 1-800-993-2507

Corn Stage		DESCRIPTION
R4.7	Beg. Dent	Kernels at base of ear are beginning to dent.
R5	1/4 Milk Line	All or nearly all kernels are dented. Milk line or starch line appears shortly after denting as a line across the kernel when it is viewed from opposite the embryo side and will advance toward the base of the kernel (toward the cob).
R5.5	Full Dent - 1/2 Milk Line	The starch line is 1/2 the way down the kernel. Top 1/2 is hard and bottom 1/2 is softer near the cob.

Soybean Stage		DESCRIPTION
R6	Full Seed	At least one pod whose cavities are completely filled with green seeds is present at one of the four uppermost main stem nodes that have fully developed leaves.
R6.5	Full seed - yellow leaf	Leaves begin to yellow, beginning in the lower canopy and progressing upwards.

Lake and River Levels

CNPPID Reservoir Elevation and Platte River Flow data listed below and other locations can be found on CNPPID's website at *http://cnppid.com/wp-content/uploads/2016/06/lakeRiverData.html*.

	August 16, 2018, 8:00 AM	*1 Year Ago*
Capacity of Lake McConaughy	**81.7%**	**NA**
Inflows to Lake McConaughy	**942 cfs**	**1880 cfs**
Flows on the North Platte at North Platte	**375 cfs**	**844 cfs**
Flows on the South Platte at North Platte	**206 cfs**	**201 cfs**
Flows on the Platte at Overton	**298 cfs**	**2370 cfs**

Websites of Interest

Soil Health: *www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/*

Climate	*agclimatenebraska.weebly.com*
NRCS Nebraska	*www.ne.nrcs.usda.gov*
Central Irrigation District	*www.cnppid.com/*
TBNRD Home Page	*www.tribasinnrd.org/*
Farm Service Agency	*www.fsa.usda.gov*
UNL Cropwatch	*cropwatch.unl.edu*
UNL Extension	*extensionpubs.unl.edu/*
K-State SDI Website	*www.ksre.ksu.edu/sdi*
No-till On The Plains	*www.notill.org*

Rainfall

Rainfall amounts listed below and other locations come from NeRAIN which can be found at website *https://nednr.nebraska.gov/NeRain/Maps/maps*.

Location:	Aug 2 – Aug 15	May 1 – Aug 15
Arapahoe 9.8 NNE:	**0.70**	**12.84**
Bertrand 6.1 mi. SE:	**1.23**	**15.84**
Funk 4.1 mi. NNE:	**1.21**	**12.43**
Minden 0.855 mi. W:	**1.19**	**12.58**
Minden 8.8 mi. ESE:	**0.96**	**12.26**

Average Rain for May–August in Holdrege = 14.21 Inches

****** If you wish to receive this newsletter via e-mail, or have any questions, comments or ideas, feel free to contact Curtis Scheele at the NRCS office in Holdrege or you can email him at curtis.scheele@ne.usda.gov. ******

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309 Smith Street
PO Box 41
Elwood, NE 68937-0041
308-785-3307, Ext. 3

1005 South Brown Street
Minden, NE 68959-2601
308-832-1895, Ext. 3

Central Nebraska Public Power & Irrigation District

415 Lincoln Street
PO Box 740
Holdrege, NE 68949
308-995-8601

Tri-Basin Natural Resources District

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