Tri-Basin Irrigator

Volume 15, Issue 6 *July 30, 2015*

Program Information

EQIP, CSP, Etc.

EQIP – You can sign-up anytime for 2016 funds at your local NRCS office. A cutoff deadline will be announced later this summer/fall.

CSP: Reminder – Summer Enhancements need to be completed.

NSWCP: Financial assistance is available for underground pipe from the water source to a sprinkler system when converting from a gravity system. Flow meters are also eligible. Sign-up deadline is August 28, 2015 in order to be reviewed at the September Tri-Basin NRD Board Meeting. No work can be completed on the project until after approval and an NRCS design is complete. Applications can be taken at your local NRCS office and must be signed by the owner.

ENERGY EFFICIENCY GRANT: You can sign-up anytime for 2016 funds at your local Rural Development office. A cutoff deadline will be announced at a later date. Contact Rural Development in Kearney at 308-237-3118, Ext. 4.

Calendar of Events

July 30-Aug 1: Gosper County Fair
Aug 3: CNPPID Board of Directors Meeting 9 AM
Aug 4: Nebraska Water Balance Alliance Field Day at Sutherland, NE. E-mail NEWBA2012@gmail.com to RSVP by July 28th. For more info, goto www.nebraskawaterbalance.com.
Aug 11: Soybean Management Field Day north of Holdrege 8 miles and west on 741 Road 1.25 miles. For more info, goto http://ardc.unl.edu/soydays.
Aug 11: TBNRD Tour and Board Meeting 1:30 PM

How Much Water does your Pivot Apply?

An 800 GPM pivot package needs to be reduced 100 GPM for the end gun. That leaves 700 GPM under the nozzles. For a 1290 foot full circle pivot with 120 acres under the nozzles, the following formula and calculations show you how much water you are applying to your crop in inches.

$$\frac{\textbf{GPM * Time (length of irrigation in hours)}}{\textbf{Acres * 452}}$$

$$\frac{\textbf{700 GPM * 72 hours}}{\textbf{120 Acres * 452}} \text{ (3 day circle)} = \frac{\textbf{50,400}}{\textbf{54,240}} = \textbf{0.93 inches}$$

Now take the 0.93 inches pumped and multiply it by 90% efficiency of a good pivot system.

0.93 inches * 0.90 efficiency = 0.84 inches to crop in 3 days.

Go a step further. **0.84 inches / 3 days = 0.28 inches per day.** This equals the 0.28 inch crop water use per day mentioned at the bottom of the right side of this page.

Curtis's Column

UNL Irrigation Apps Available:

- Water Meter Calculator App - See more info above.
- Irrigation Pumping Plant Efficiency Calculator
- Agriculture Irrigation Costs

Goto *http://cropwatch.unl.edu/archive/-/asset_publisher/VHeSpfv0Agju/content/monitor-irrigation-data-from-your-phone* to find out more about these apps and for links to purchase these apps.

TWO Irrigation Management Items to Ponder:

Number 1: Follow-up from the last issue. On Holdrege Silt Loam soils, it appears we are still not getting roots into our 2nd and 3rd foot of depth on average across the NRD. I figure this to be the trend across the NRD. There are a few sensors showing usage to the second and third levels but the majority is not. See Table 1 below. For comparisons, I included the moisture levels during the same time of year for the previous 3 years. I also included the 4th foot moisture levels.

Average Percent Moisture Levels by Year during the Last Week of July

Corn				
Soil Depth	**2012**	**2013**	**2014**	**2015**
2 foot	78%	86%	82%	97%
3 foot	79%	83%	90%	94%
4 foot	78%	79%	97%	100%
Soybeans				
Soil Depth	**2012**	**2013**	**2014**	**2015**
2 foot	72%	88%	88%	100%
3 foot	81%	83%	98%	98%
4 foot	78%	77%	95%	93%

Table 1: Average soil moisture levels per foot during the last week in July over the last 4 years. Averages are calculated from the NAWMN sites across the TBNRD, all on Holdrege Silt Loam soils.

Number 2: Silking for corn and full pod for soybeans are the crop stages with the most water use by the crops. They are the most critical periods. As we are currently in or passing that stage in corn and approaching it in soybeans, **the highest average crop water use per day over the last two weeks at peak use crop stage is 0.28 inches for both crops.** One thing to remember is the humidity keeps the water use down. Earlier the predictions were for normal or below normal temperatures this summer. So far that seems to be the case.

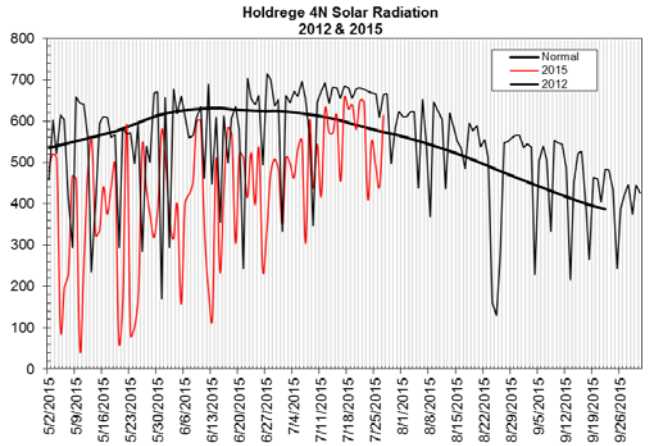
In summary, as we head into the downhill side of crop water use, it appears that there is still moisture in the 2nd and 3rd foot levels. The roots should be at that level using moisture so we can end the year with storage room for off-season moisture.

CNPPID NOTES

2012 & 2015 Net Solar Radiation;

One of the more interesting weather measurements tied to crop production this year is net solar radiation; the balance of incoming and outgoing solar radiation. In useful terms it is the measure of light energy at 2 meters (6.6 ft.) available for plant growth, heating and evapotranspiration. As net solar radiation increases at the earth's surface, we feel it as heat and see it as a higher intensity of sunshine. Clouds reflect and scatter or absorb some of the solar radiation before it reaches the surface. On an average clear day 13% of the incoming solar radiation is reflected or scattered and 70% absorbed at the surface and on an overcast day those values are 51% and 25% respectively (Indiana University, *G109: Weather and Climate*).

Shown below are Holdrege 4N graphs of the daily net solar radiation for our warm, dry and mainly clear 2012 irrigation season and the current wetter and cloudy 2015 season; each is compared to the same normal line calculated as daily averages over a 30-year period.



TRI-BASIN NRD NEWS

Irrigation Season Reminders:

Last year at this time, we were talking to you about meters on storm damaged pivots. We've been fortunate to avoid the wide-spread storm damage that our district saw last year. In fact, the weather has cooperated with our staff this summer. We've been able to get caught up on routine chemigation inspections. Our staff has also been busy taking samples from irrigation wells for our Water Quality testing program. Both of those should be wrapping up in the next couple of weeks.

We would like to remind you to periodically check your irrigation flowmeters to make sure they are working correctly. If you want to make sure a flowmeter is reading accurately, our staff or Curtis Scheele at the NRCS office can check flow rates using an ultrasonic flowmeter.

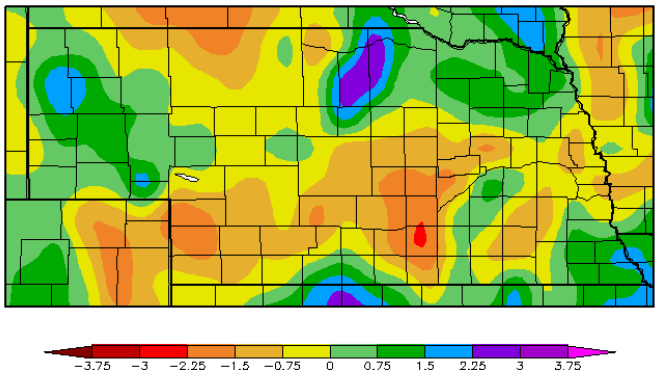
If you have a meter repaired during the irrigation season, it is a good idea to note the meter reading before operating that irrigation equipment. If we have that meter reading, it will be easier to reconcile any movement of the propeller when it was detached from the system. If you have questions about reinstalling your flowmeter or your meter readings, contact our office at 1-877-995-6688.

NEBRASKA EXTENSION EXTRAS

Climate Outlook:

Even though we have had a fairly wet late-spring/early summer, the recent dry weather and warm temperatures have started to show in non-irrigated crops and pastures. Most of the precipitation has been further to the south into Northern Kansas. The area is 0.5" to 2" below normal over the most recent 30 day period. Over the last 14 days, Phelps County has been the driest area, receiving 0.5-1.0" inches of precipitation. Overall, the temperatures have been seasonal and just slightly above normal. Over the last two weeks, average temperatures have been 1-2°F above the normal daily average temperature of 75°F. Since July 1, Holdrege has had eight days above 90°F and has had an average daily high of 86°F and average daily low of 63°F.

Figure 1. June 28-July 27 Depart. from Norm. Precipitation

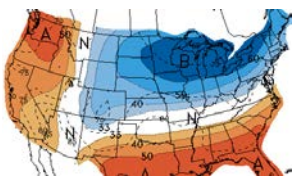


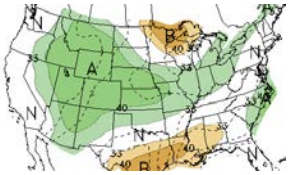
The short-term forecast through the weekend will see the continuation of seasonal temperatures (upper 80s to low 90s) and slight chances of precipitation. Chances remain low due to the uncertainty of when and where the thunderstorms will develop, not necessarily IF the storms develop.

A trough will deepen over the Great Lakes the first part of next week and will moderate our temperatures. The predominant, upper-level flow will come from the northwest, but south winds at the surface will still keep temperatures near to slightly below normal. Highs will be in the 80s most of next week, but will warm from west to east as the trough progresses eastward. The climate prediction center has increased chances for below normal temperatures next week, as well as increased chances for above normal precipitation. We will again be situated in the transition zone between the cool air in the eastern half of the U.S. and the western half of the U.S. This is very similar to the pattern we saw in June, which brought some significant moisture to Nebraska. We may see this pattern again, but the question will be where the systems line up. The bulk of the precipitation will come in afternoon/evening thunderstorms that will move from northwest to southeast across the state.

- Tyler Williams, Nebraska Extension Educator

Figure 2. August 4th-10th Temp. and Precipitation Outlook



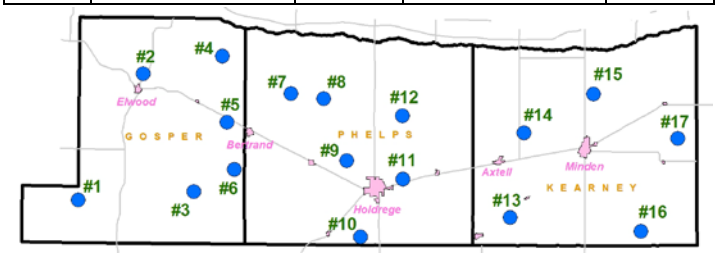


NAWMN Crop ET Information

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 13 – July 19		July 20 – July 26	
Site	Evaporation	Rain	Evaporation	Rain
1	1.80	0.78	1.70	0.46
2	1.30	0.40	1.50	0.35
3	1.80	0.35	1.60	0.33
4	1.80	0.28	1.30	0.23
5	1.70	0.26	1.30	0.35
6	1.50	0.26	1.30	0.24
7	1.60	0.30	1.50	0.24
8	1.50	0.37	1.40	0.28
9	1.30	0.38	1.40	0.19
10	1.40	0.98	1.50	0.18
11	1.60	0.70	1.50	0.10
12	1.50	0.48	1.20	0.10
13	1.30	0.53	1.40	0.05
14	1.30	0.00	1.60	0.09
15	1.30	0.43	1.30	0.53
16	1.50	0.80	1.60	0.02
17	1.40	0.75	1.30	0.70



2015 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 (R1-Silking to R3-Milk stage): Silking is the peak water use stage for corn. Stress at milk stage, although not as severe as at silking, can still have a profound effect on yield.

Avg. daily water use from July 20 – July 26 was 0.20"-0.27".

Soybeans (R3-Beginning Pod to R4-Full Pod 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. R4 (Full Pod) is the most crucial period.

Avg. daily water use from July 20 – July 26 was 0.19"-0.24".

July 20-July 26 (17 of 17 NAWMN sites reporting): Average weekly rainfall was 0.26 (range 0.02 to 0.70). Average weekly ET for corn was 1.62 and for soybeans was 1.51.

ET Information Sites

NAWMN Sites:

* http://www.cnppid.com/news-info/weatheret-data/nebraska-agricultural-water-management-network/
* https://nawmn.unl.edu/

CropWatch: http://cropwatch.unl.edu/gdd-etdata

CNPPID: http://www.cnppid.com/news-info/weatheret-data/

Water Use Hotline: 1-800-993-2507

Corn Stage		DESCRIPTION
R2	Blister	The kernels are white on the outside and resemble a blister in shape. The silks are beginning to dry out and darken in color.
R3	Milk	The kernels display a yellow color on the outside. Inner fluid is milky white. Silks are brown and dry or becoming dry.

Soybean Stage		DESCRIPTION
R3	Beginning Pod	At least one pod of 3/16" length is present at any one of the four uppermost main stem nodes that have a fully developed leaf. Pods of greater length at the lower nodes is possible.
R4	Full Pod	At least one pod of 3/4" length is present at one of the four uppermost main stem nodes that have fully developed leaves.
R5	Beginning Seed	At least one pod containing small seeds is present at one of the four uppermost main stem nodes that have fully developed leaves.

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://www.cnppid.com/news-info/reservoirriver-data/.

	July 28, 2015, 8:00 AM	1 Year Ago
Capacity of Lake McConaughy	96.5%	62.7%
Inflows to Lake McConaughy	1,511 cfs	562 cfs
Flows on the North Platte River at North Platte	349 cfs	438 cfs
Flows on the South Platte River at North Platte	1,980 cfs	421 cfs

Without a family, man, alone in the world, trembles with the cold.

- Andre Maurois

Websites of Interest

NRCS Nebraska	www.ne.nrcs.usda.gov
Central Irrigation District	www.cnppid.com
TBNRD Home Page	tribasinnrd.org
Farm Service Agency	www.fsa.usda.gov
UNL Cropwatch	cropwatch.unl.edu
UNL Extension	www.extension.unl.edu/home
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 http://nerain.dnr.ne.gov/NeRAIN/docs/report.asp.

Location:	July 16 – July 27	May 1 – July 27
Arapahoe 6.9 NW:	0.19	10.47
Bertrand 6.1 mi. SE:	0.00	13.37
Funk 4.1 mi. NNE:	0.09	9.98
Minden 0.855 mi. W:	0.61	10.26
Minden 8.8 mi. ESE:	0.48	11.82

Average Rain for May-July in Holdrege = 11.32 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. ******

USDA - Natural Resources Conservation Service

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Holdrege, NE 68949-0798
308-995-6121, Ext. 3

309 Smith Street 1005
PO Box 41
Elwood, NE 68937-0041
308-785-3307, Ext. 3

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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