Tri-Basin Irrigator

Volume 24, Issue 9 **September 12, 2024**

Program Information

EQIP: **Sign-up now for 2025 funds.**

CSP: **Sign-up now for 2025 funds.**

NSWCP: **For underground pipe from water source to a pivot replacing gravity irrigation, have your application completed by Thanksgiving for second chance at 2025 funds. Applications must be signed by the owner.**

ENERGY EFFICIENCY GRANT: **Next sign-up deadline is September 30th. For more information, contact Jolene at Rural Development at the Kearney USDA Service Center at 308-455-9840 or at *jolene.jones@usda.gov*.**

Calendar of Events

Oct 7: CNPPID Board of Directors Meeting
Oct 8: TBNRD
Oct 14: Columbus Day – Gov't offices closed

Tips Before Purchasing an SDI System!!!

- EDUCATE YOURSELF about Subsurface Drip Irrigation (SDI). Seek out university and other educational resources. A great place to start is at the following website: *http://www.ksre.ksu.edu/sdi/*. Review the minimum design components. SDI's are not a system for cutting corners.
- Visit with producers that have used SDI. They can be a wealth of information as to what does and doesn't work.
- Interview at least two companies. Ask them for references, credentials, and sites of installed systems. Ask questions about their designs and compare them to the minimum design criteria. Ask them what their roles are in the design, installation, and service. What guarantees are provided.
- Take a water sample to see what is in your water. Know what options there are to treat and the costs involved.

If you need assistance in gathering educational resources or have any questions concerning SDI, contact Curtis Scheele at 308-995-6121, Ext. 3 or at curtis.scheele@usda.gov.

Nitrogen Efficiency Forum

Locally developed nitrogen communication tool to share thoughts, trials, etc. related to nitrogen fertilizer. Goto: *https://nitrogen-efficiency.com/* to read. Register to add your own comments or start a new topic.

FINAL Tri-Basin Irrigator for 2024!!!

The 20th season of the Tri-Basin Irrigator has come to an end. I hope you received helpful information during this past crop season. For 2025, if you would like to receive this newsletter via email, email me at *curtis.scheele@usda.gov*. Or you can call me at 308-995-6121, Ext. 3.

Thank You for receiving the Tri-Basin Irrigator!

May you be blessed by the simple pleasures of life this harvest, winter, and spring!!!

Curtis's Column

USDA United States Department of Agriculture
Natural Resources Conservation Service

Soil Moisture Sensors

As we end the crop season of 2024, I would like to share some thoughts for you to think about with soil moisture sensors. I may come across blunt, but I am only trying to help you think about your situation and hopefully I can save you some money.

On the attachment are sensor summary charts. I just want to give the basic examples of good and poor management with irrigation water along with some comments. When I see charts that end with upward or level trends, basically, not ending the year having utilized free soil moisture, I cringe at the thought of not only dollars spent irrigating, but the loss of water supply and the potential to send more nitrates to the groundwater. Off-season moisture has no room to be stored so it just pushes what's in the soil further down which includes paid-for nitrogen. We already have high nitrates in our water which needs reduced, not added to. We need to utilize more free soil moisture to prevent as much leaching as possible. Yes, irrigation water management can play a huge role in the nitrates found in the groundwater. This is really disheartening knowing that a sensor was in place and not utilized.

I have found soil moisture sensors to be a great asset in scheduling irrigations. If you disagree, then my questions are: Have you looked at the summary chart and the individual sensors? Have you visited with your dealer about why the sensors look the way they do? Do adjustments need to be made? Have you probed the soil to see if moisture levels seem reasonable with the sensors? Have you tried different sensors?

Granted there are some that go off the deep end during the year, etc. but I have seen very few of these. When they do, usually it just takes a visit with the dealer to get it straightened out. Simply saying sensors don't work isn't the answer. Have the dealer look at it. Every time the tractor breaks you don't park it in the trees and give up on it, do you? Does that mean tractors are worthless? No. You take it to the mechanic. The same with sensors. Ask the mechanic, in this case the sensor dealer. If the sensor dealer can't help you, you may need to switch sensor companies or dealers.

Make sure the sensors are set up properly and working for you. I have seen a sensor that was so conservative, you would have irrigated all year long and probably lost yield due to over-irrigation. Now it may have needed the dealer to adjust some things, not sure. Maybe the company/dealer wanted it that way. You would irrigate, be happy, and accept the yields. Bottomline is, you need to communicate with the dealer and find out what is going on. It's your investment and livelihood so you need to make it work for you. Ask the questions, quiz the dealers.

Sensors provide us with trends, moisture levels, root depths, daily water use, etc. They are a very good tool for irrigation water management. Just like anything new, you will have to develop a trust towards sensors. Be patient. Invest in them with an open mind and a willingness to dig in and learn. Just like the trust you developed in the technology on your equipment, your cell phone, etc.

It is correct, they are only one spot in the field. One spot is better than nothing. How many soil samples do you take in a pivot to make a fertilizer recommendation? If you are using technology to help in this area, hmm?, what about irrigation technology to help you with irrigation?

CNPPID Notes

Central Irrigation Staff Needs Your Help!

Central is asking for your help during our maintenance season. Moving a fence after it's up is no fun, especially during the winter months!

We're asking that neighbors be mindful of fencing on Central property, so we don't have to ask them to move fence while we do our work. We do understand that it is convenient for some folks to use our maintenance roads along their fields to place electric fence. However, it becomes more work and frustration for everyone if a fence needs to be moved or if repairs are needed to the canal roads and banks caused by cattle.

So, we're asking that folks are cognizant about fencing and keep fences and cattle off the maintenance roads and out of the canals. We would also like to remind those with pivot crossing permits that they are responsible for filling in the pivot tracks.

We appreciate your help and hope you have a safe and bountiful harvest this year!

Visit www.cnppid.com or follow @CNPPID on Facebook, Instagram and Twitter for updates throughout the year.

Tri-Basin NRD News

Chemigation Inspections

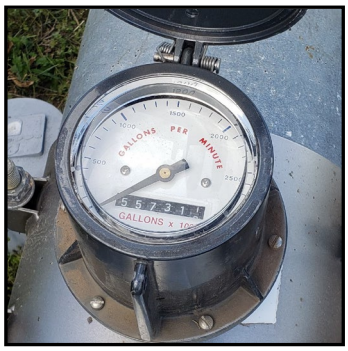
2024 follow-up inspections must be scheduled as soon as possible.

Flow Meter Readings

Irrigation Water Management (Water Use) Forms are ready to pick up in our office or you can call us at 308-995-6688 to mail them to you. When picking up irrigation pipe or bedding down irrigation engines, remember to record the ending meter readings.

Tri-Basin Staff to Inspect Meters

It is time for Tri-Basin NRD staff to begin annual irrigation meter inspections. Each year, we take readings from meters in about a-third of the district. This year we will be doing inspections in townships with Ranges of 13W, 17W, and 21W, and in 5-22 of Gosper County (Union Township).



If you have irrigation wells in these townships and you put your meters in storage for the winter, please call the Tri-Basin NRD office at 308-995-6688 to schedule an inspection.

Nitrogen Management Papers

Phase II and III Groundwater Management areas, be sure to call or stop in after harvest to get your Nitrogen forms.

Nebraska Extension Extras

Free Soybean Cyst Nematode Testing

Soybean Sudden Death Syndrome with later growing season yellowing (chlorotic) leaves (leading to pre-mature plant death) is strongly correlated with Soybean Cyst Nematodes (SCN). However, soybean yellowing can also be associated with drought, soil compaction, nitrogen deficiency, charcoal rot, herbicide injury, and seedling blights.

In contrast to brown stem rot disease and white mold soybean disease, split sudden death syndrome diseased soybeans stems have a white pith in the inner core. However, the only positive way to identify SCN is by a soil test; since SCN are microscopic worms which burrow into soybean roots. The Nebraska Soybean Board through Soybean Checkoff Dollars are again providing **free** soil test analysis for SCN with free soil sample bags available through Extension offices. When collecting suspect field problem samples within circular spots; take probes from the outer infected ring where ***live*** plant roots are still supporting SCN growth.

More free resources are at: http://www.theSCNcoalition.com.

Delayed Maturing Soybeans

Area soybean fields maturity is delayed about two weeks compared to normal. Whether due to more cloudy days or replanted fields, soybean growers may consider using herbicide applications to 'burndown' tough green weeds and/or soybean stems as a harvest aid. Our Nebraska Extension EC-130 "2024 Guide for Weeds, Disease, and Insects Management in Nebraska" on page 153, lists three possible labelled harvest aid products: Aim®; Sharpen®; and Gramoxone® (or Helmquat®).

Both, Aim® and Sharpen®, have shorter 3 days PHI (pre-harvest intervals or days from application until harvest). For Aim, apply when 70% of pods are brown; and Sharpen label requires fully developed soybeans prior to application with more than 50% leaf drop.

Gramoxone SL® (paraquat) has a 15-day grazing restriction. Paraquat offers a rapid kill (usually less than 48 hours). Label requires that 65% of soybean pods are brown prior to chemical application.

Green Bean Seeds at Harvest

Delayed soybean maturity runs the risk of frost damaged grain. When soybeans are killed pre-maturely before R-7 physiology maturity, chlorophyll "green" pigmentation may be present within soybean seeds. Although protein and oil content likely will not be impacted, discounts at the elevator can occur if the grain has over 10% seeds of other colors than yellow.

Why are green soybeans in grain discounted? When green chlorophyll remains in the seeds, the higher fatty acids may cause the soybean oil to turn rancid and reduce shelf life of the oil. The good news is that if soybeans are round and killed in the later seed-filling stages, the green color is usually confined to the seed coat. This means that sunlight, field drying or time in storage will likely lessen the 'green seed' discount. However, if the soybean death occurs during early to mid-seed-fill, the green color may remain throughout the interior of the seed. Then, green seed color probably will not disappear even in long-term storage.

Estimating Harvest Losses

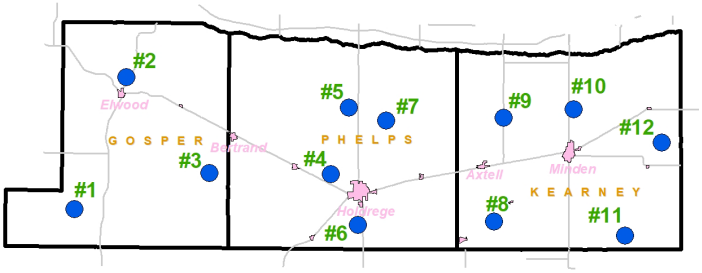
Harvest loss estimates begin with average seed size estimates. Usually, there are 3,500 seeds per pound; so 1 soybean per square foot = 1 bushel per acre; using a 1-inch PVC one-foot square frame in a representative area, stop the combine and back up 10 to 15 feet. Use a frame to count seeds, on the ground & compare losses ahead & behind the combine.

NAWMN Crop ET Information

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

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

	Aug 26 – Sept 1		Sept 2 – Sept 8	
Site	Reference ET	Rain	Reference ET	Rain
1	1.50	1.48	1.40	0.11
2	1.50	1.25	1.10	0.00
3	1.30	0.70	1.30	0.20
4	1.40	0.61	1.30	0.04
5	1.20	0.23	1.30	0.15
6	1.60	0.73	1.30	0.04
7	1.40	0.42	1.30	0.02
8	1.40	0.81	1.30	0.00
9	1.90	0.39	1.20	0.00
10	1.20	0.82	1.10	0.00
11	1.10	0.60	1.60	0.01
12	1.30	0.57	1.10	0.00



2024 Map of TBAWMN 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 (R5-1/4 Milk Line stage to R5.8-3/4 Milk Line stage): A lot of fields are at ½ to ¾ milk line stage. There are some still at ¼ milk line. Black Layer is the end of the kernel growth for the season. 0.0 inches needed for yield at Black Layer.

Avg. daily water use from Sept 2 – Sept 8 was 0.12"-0.24".

Soybeans (R6-Full Seed to R6.5-Full Seed/Yellow Leaf stage): Rapid leaf yellowing over the plant begins shortly after R6. Root growth is complete after R6.5. Stress from R6 to R6.5 may cause large yield reductions. 0.0 inches needed for yield at Beginning Maturity.

Avg. daily water use from Sept 2 – Sept 8 was 0.16"-0.25".

Sept 2-Sept 8 (12 of 12 TBAWMN sites reporting): Avg weekly rainfall was 0.05 (range 0.00 to 0.20). Avg weekly ET for corn was 1.06 and for soybeans was 1.23.

Crop ET Information

TBAWMN Sites: https://www.tribasinnrd.org/tbawmn

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

Texting: TBNRD: 308-995-6688 or UNL: 308-995-4222

CORN STAGE		DESCRIPTION
R5.5	Full Dent - 1/2 Milk Line	The starch line is 1/2 way down the kernel. Top outer 1/2 is hard and bottom inner 1/2 is softer near the cob.
R5.8	3/4 Milk Line	The starch line is 3/4 the way down the kernel working towards the cob.
R-6	Black Layer	The starch line has advanced to the cob. Physiological Maturity. Black layer formed, kernel moisture is between 25%-35% moisture. 0.0 inches needed for yield.

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.
R7	Beginning Maturity	At least one (normal) pod that has attained its final mature color (tan or brown, depending on variety) is present on any main stem node. 0.0 inches needed for yield.

Lake and River Levels

CNPPID Reservoir Elevation and Capacity as well as 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*.

	September 12, 2024 - 8:00 AM	*1 Year Ago*
El. & Cap. – Lake McConaughy	**3229.2 ft - 49.3%**	**3228.2 ft - NA%**
Inflows to Lake McConaughy	**1120 cfs**	**1200 cfs**
Flows on the North Platte at North Platte	**367 cfs**	**629 cfs**
Flows on the South Platte at North Platte	**158 cfs**	**206 cfs**
Flows on the Platte at Kearney	**111 cfs**	**365 cfs**

Websites of Interest

NRCS Nebraska	*www.ne.nrcs.usda.gov*
Farm Service Agency	*www.fsa.usda.gov*
TBNRD Home Page	*www.tribasinnrd.org/*
Central Irrigation District	*www.cnppid.com/*
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*
Soil Health:	*www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/*
NE State Irrig Assoc	www.nebraskastateirrigationassociation.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 29 – Sept 11	May 1 – Sept 11
Elwood 1.81 mi. NW:	**0.19**	**16.40**
Loomis 0.2 mi. SW:	**0.48**	**18.49**
Holdrege 1.7 mi. W:	**0.13**	**14.82**
Minden 7.2 mi. W:	**0.18**	**12.46**
Minden 5.8 mi. E:	**0.18**	**14.19**

Average Rain for May-Sept in Holdrege = 16.38 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@usda.gov. ******

USDA - Natural Resources Conservation Service

1609 Burlington Street
PO Box 798
Holdrege, NE 68949-0798
308-995-6121, Ext. 3

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

1723 Burlington Street
Holdrege, NE 68949
308-995-6688

Nebraska Extension

1308 2nd Street
Holdrege, NE 68949

308-995-4222

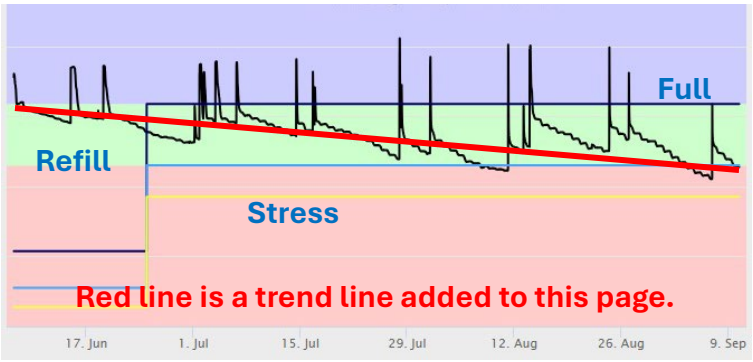
PO Box 146
Elwood, NE 68937

308-785-2390

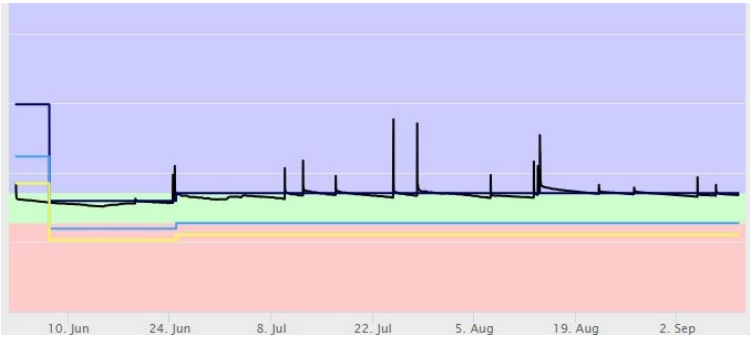
424 North Colorado
PO Box 31
Minden, NE 68959
308-832-0645

Soil Moisture Sensor Summary Chart Examples with Notes

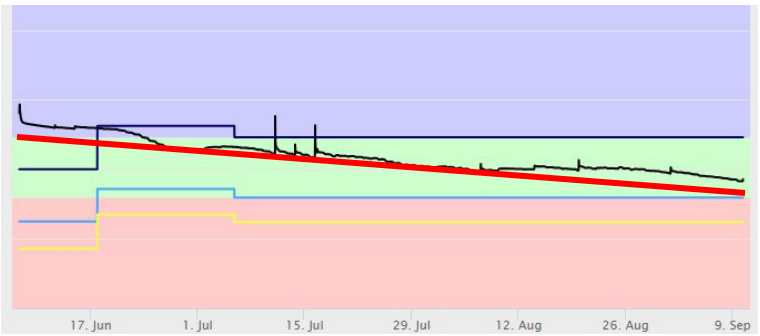
Below are summary charts from various sensors across the Tri-Basin NRD. The summary charts show one line that represents the average soil moisture in the soil profile. Hopefully, they are representing a full 3-4 foot root depth. However, if the roots are only 2 feet deep, they may only represent 2 feet. This can vary by sensor company as some will average the entire profile regardless of root depth and some will average based off root depth. - Up spikes are additions of moisture to the profile via irrigation or rain. Stair stepping down is moisture being withdrawn from the profile with each step representing one day. If you know how much moisture your soil can hold and your percent moisture levels, you can use these charts to calculate actual crop water use per day. - Most soil moisture sensors have a Full Capacity Line (100% moisture) and a Refill Line (this percentage is determined by the dealer; however, it can be reset to where the producer wants it). - I do not know if the charts below are corn or soybeans. Let's not use that as an excuse. Both crops can utilize free soil moisture throughout the year. I simply want to show the very basics in what good and poor irrigation water management looks like. Rain can make a good irrigator look bad. - Look at your charts at home and see how they compare to these. You know if you irrigated or not. All of the below charts are from the 2024 crop season.



The chart on the left shows good management of irrigation water. It has a gradual downward trend for the year. Near the end of the year, the profile is dried down to the refill line from a full profile at the beginning of the year. Free soil moisture was utilized. There is room to store off-season moisture which will help prevent leaching of valuable nitrates into the groundwater. The red line is a trend line that was added to this page. It is not a part of the chart.

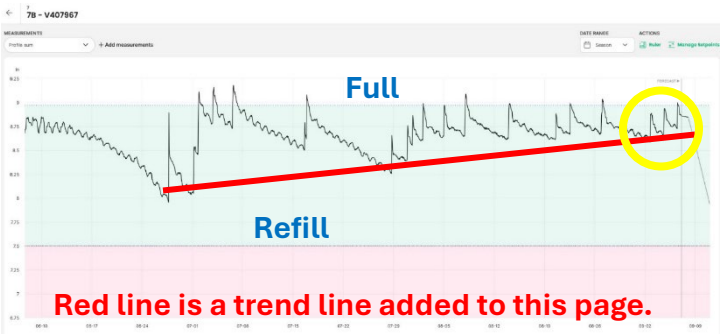


The chart on the left shows poor management of irrigation water. There is no utilization of free soil moisture. Basically, this profile stayed at the 100% moisture level all year long. There is no room to capture off-season moisture. Any off-season moisture will leach valuable nitrates to the groundwater or cause erosion from runoff. - Now this could be a hailed-out field which kept the probe in all year and had no water use. But, if not, then water management is poor.



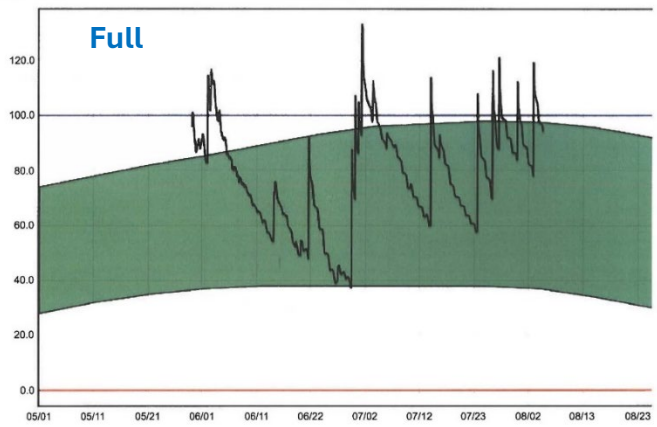
The chart on the left shows good management of irrigation water. It again shows a gradual trend downward for the year. Could they have dried down a little more? Maybe. But a good job nonetheless.

Soil Moisture Sensor Summary Chart Examples with Notes



The chart on the left shows poor management of irrigation water. The moisture profile at the end of the year will basically be the same as the beginning of the year. Upward trend in last half of the year indicates increasing soil moisture. I am guessing soybeans. It looks like 3 quick irrigations at the end of the year, which granted, helps soybeans. However, there is moisture in the profile to supply the soybeans so why irrigate. This is a good example of sensors giving a view of what is in the soil profile in order to make good irrigation decisions. Think of the dollars spent to irrigate and leave no room for off-season moisture that may not show an increase in net profit. If anything, put that last irrigation on a half pivot and see if there is a difference. Learn from it.

The chart on the left shows good management of irrigation water. The profile was probably full to start the year. Near the end, some free soil moisture was utilized. The last irrigation could have probably put on half the water or less.



The chart on the left shows some good and poor management of irrigation water. Dried the corn down prior to tassel (good). Irrigated through the peak corn period (good) which did increase soil moisture levels (didn't need to increase so much, put on a little less water, keep it more in the middle of the green, maybe rains pushed it up to near the Full 100% Line). This chart only goes through the first week of August so time to dry down, hopefully ending at the bottom of the green at years end (good). If did not dry down and kept moisture high at seasons end, then poor management.

The chart on the left shows good management of irrigation water. Dried the corn down prior to tassel. Maintained moisture levels through the peak corn period. Drying down to the bottom of the green optimum area or even the refill level at years end.