

Tri-Basin Irrigator

Volume 22, Issue 10

September 15, 2022

PROGRAM INFORMATION

EQIP: SIGN-UP ANY TIME FOR 2023 FUNDS. THE CUTOFF DATE HAS NOT BEEN OFFICIALLY ANNOUNCED. IN RECENT YEARS, IT HAS BEEN MID-NOVEMBER. HAVING AN APPLICATION ON FILE BY THIS NOVEMBER USUALLY MEANS INSTALLATION IN FALL 2023 WITH POSSIBILITY IN SPRING 2022. SO, IF NO APPLICATION, ADD A YEAR TO THIS TIMETABLE. APPLICATIONS CAN BE TAKEN OVER THE PHONE. TYPICAL IRRIGATION ITEMS IN THE TRI-BASIN NRD ARE CONVERTING GRAVITY IRRIGATED LAND TO PIVOTS OR SUBSURFACE DRIP IRRIGATION. SOIL MOISTURE SENSORS ARE ALSO POPULAR. OUTSIDE OF IRRIGATION, PRACTICES FOR RANGELAND AND SOIL EROSION CONTROL ARE ALSO ELIGIBLE.

CSP: SIGN-UP ANY TIME FOR 2023 FUNDS. THE CUTOFF DATE HAS NOT BEEN OFFICIALLY ANNOUNCED. THE CUTOFF DATE WILL PROBABLY BE MID-NOVEMBER, THE SAME AS THE EQIP CUTOFF. APPLICATIONS CAN BE TAKEN OVER THE PHONE.

NSWCP: NEW FUNDS CAME IN JULY. NEARLY ALL FUNDS HAVE BEEN OBLIGATED. SOME FUNDS HAVE BEEN SET ASIDE FOR FLOW METER ONLY APPLICATIONS. IF YOU ARE WANTING TO APPLY FOR PRACTICES OTHER THAN FLOW METERS, YOU COULD GET APPROVED IF SOME CANCELLED OR SLIPPAGE MONEY COMES IN. NO GUARANTEE. APPLICATIONS MUST BE SIGNED BY THE OWNER. NEW MONEY COMES IN JULY OF 2023.

ENERGY EFFICIENCY GRANT: SIGN-UP ANYTIME FOR 2023 FUNDS. THE CUTOFF DATE FOR APPLICATIONS REQUESTING \$20,000 OR LESS IS OCTOBER 31ST. THE CUTOFF DATE FOR ALL SIZED APPLICATIONS IS MARCH 31, 2023. FOR MORE INFORMATION CONTACT JOLENE JONES AT RURAL DEVELOPMENT AT THE KEARNEY USDA SERVICE CENTER AT 308-455-9840.

CALENDAR OF EVENTS

OCT 3: CNPPID BOARD OF DIRECTORS MEETING

OCT 10: COLUMBUS DAY – GOVT OFFICES CLOSED.

OCT 11: TBNRD BOARD OF DIRECTORS MEETING

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.

CURTIS'S COLUMN



Soil Moisture Sensors

As we end the dry crop season of 2022, I would like to share some thoughts for you to think about towards soil moisture sensors. Let's jump right in.

- When investing in sensors, consider convenience of installation and use, cost, remote access capability, availability, consulting support, maintenance, repair, leasing, purchase, sensitivity, calibration factors, and the number and depth of sensors.
- Consulting support. Will the dealer provide guidance in how to read and understand the technology? Hold the dealer to it. Ask questions, dig in and learn. If no support, find a new dealer. Don't waste your money on a tombstone in the middle of your field.
- Consider leasing versus purchase. If you purchase, who repairs if lightening affects the technology. If you lease, ensure the agreement includes maintenance, repair, etc.
- Sensors provide us with trends, moisture levels, root depths, daily water use, etc. They are a very good tool for irrigation water management.
- 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. If you say they don't work, why don't they work? Could it be that they actually don't, or did we not take the time to dig in and learn?
- It is correct, they are only one spot in the field. One spot is better than nothing. You can probe and feel the soil near the sensor, read the sensor to see what it says, then go probe other areas to compare. The bulk of the irrigated soil in the Tri-Basin NRD is Holdrege Silt Loam. If you have differences, install them in the best representative spot. Or one can invest in three sensors if they wish.
- Sensors will be conservative. Dealers don't want to ruin your crop or they will ruin their business. They will make sure you don't under irrigate. Push the limits. Learn.

The attachment to this newsletter show a couple of charts of a sensor on a pivot in 2022. My goal with the attachment is to show you some things about sensor charts and what they can tell you. Hopefully, this will shed some light and help you come up with questions to quiz your dealer with.

I would like to give tons of credit to the producer in allowing me to use his sensor chart in an effort to really dig in and educate you all about soil moisture sensors. All in an effort to hopefully be better stewards of our groundwater resource, increase our profit, and to ensure our kids and grandkids can enjoy the same irrigation benefits we get to benefit from today.

If you have any questions, you can call Curtis Scheele at 308-995-6121, Ext. 3 or email him at curtis.scheele@usda.gov.

FINAL Tri-Basin Irrigator for 2022!!!

Another season of the Tri-Basin Irrigator has come to an end.

In closing, I hope you received helpful information during this past irrigation season. For 2023, if you would like to receive this newsletter via email, email me at curtis.scheele@usda.gov.

Thank You for receiving the Tri-Basin Irrigator! Until next season, may you be blessed with a safe and wonderful harvest, winter, and spring!!!

CNPPID NOTES



Irrigation Maintenance Season Begins

The irrigation season is complete at Central Nebraska Public Power & Irrigation District. The 2022 irrigation season was very busy from the beginning to the end of the season. The lack of moisture, snow or rain during the winter months allowed the wind to blow any trash off of the fields and into the Central's canals. The cleaning of the canals prior to delivering irrigation water to the customers took much longer than previous years, as most all the trash in the canals had to be mechanically removed and hauled away in many locations. Central was able to have their canals ready to deliver water to their customers prior to the scheduled irrigation season. Once irrigation started, the season never really slowed down with the lack of precipitation across the district.

Now that the irrigation season is complete, Central will begin their off-season maintenance work on their conveyance system which consist of a combination of around 500 miles of canals and pipelines. This maintenance work consists of preparing for any excess flow diversions for ground water recharge, cleaning and reshaping of the canals, repairs to structures, pipelines, riser cans, pump sites, road crossings, flow meters, delivery point screens, canal roads, removing trees along the canals, installing new delivery points for the 2023 irrigation season, etc.

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TRI-BASIN NRD NEWS



Conservation Tree Planting

It is not too early to think about planting conservation trees next spring! Windbreaks and shelterbelts provide many benefits, including reducing soil erosion along field boundaries. We can provide tree planting services for your windbreak, as well as bundles of trees that you can plant yourself. You can contact Tri-Basin NRD or your local NRCS office to determine the type and number of trees and shrubs you will need. Cost share is available to landowners planting a minimum of 550 feet. The form for ordering hand plant trees will be available later this fall on our website, www.tribasinnrd.org.



NEBRASKA EXTENSION EXTRAS



Controlling Harvest Compaction

The best defense against field compaction is prevention. This might mean running grain carts down the same row middles as the combine. Since over 80% of soil compaction damage is done with the first pass of weighted tire loads; establishing traffic lanes within fields will significantly reduce overall field compaction. Once a traffic lane has been driven and firmed up; subsequent passes will have little effect on total field compaction. Further, by using the same traffic lanes year after year, soil structure & water infiltration will be improved in the un-trafficked areas.

Pre-harvest planning, such as adding auger extensions on the combine, may keep grain cartwheel track lanes lining up with the harvester tracks. Planning how to reduce heavy grain trucks movement across fields has advantages as well; since the axle loads and tire pressures are not suitable for soils especially when wet. Harvest managers may also evaluate how to reduce grain cart fill and unload more often. Establishing grain cart pathways such as tramlines across fields and reduced turning around in the middle of the field may further reduce overall field compaction. If moisture conditions shift to wet; then, combine operators may consider unloading at the ends of fields; rather than on-the-go. Finally, use wide tires with lower pressures.

Fall Soil Sampling

Now may be a good time for soil sampling for soybean cyst nematodes and nutrient analysis. The challenge may be collecting a representative sample. For example, soybean cyst nematodes need live soybean roots for their numbers to expand. So, the temptation may be to gather soil samples from the middle of pocket zones with no soybean plants with disappointing lab results. Instead, gather your soil samples (soon after the soybean harvest) on the edge of "hot spot zones" where drone photos and/or combine observations have indicated possible cyst nematodes.

When collecting field soil samples for lab nutrient analysis, it is recommended to take a minimum of 12-15 cores to reduce potential soil variability. Remember to be consistent with soil depth. For example, lab results from a 6" soil sample depth, which test at 55 ppm Nitrate-N; whereas, if the sample depth was extended to a 10 inch depth, the lab results might indicate 40 ppm of Nitrogen-N content.

Another recommended sampling technique is using a zigzag pattern across the field zone. Also, avoid unusual spots with soil color/textures different than the remaining the field. If needed, provide separate composite samples for their spots. For grid sampling, collect cores within a 10 foot radius of the previous grid central point.

FREE UNL Nutrient Management Suggestions

UNL Nebraska Extension NebGuides: "Nutrient Management Suggestions for Corn" - EC117 and "Fertilizer Recommendations for Soybean" – G859 are available free at: <https://www.cropwatch.unl.edu>

FREE Soybean Cyst Nematode Analysis

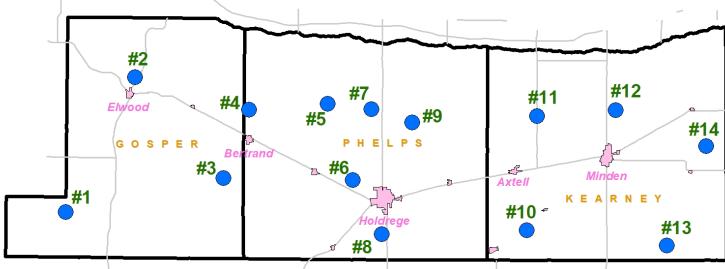
Now may be the time to get your bags ready to collect soil samples soon after harvest. The Nebraska Soybean board & UNL are providing free "Soybean Cyst Nematode Analysis." Submit to: UNL Plant & Pest Diagnostic Clinic; 448 Plant Science Hall; Lincoln, NE 68583. Bags are available free-of-charge in Nebraska Extension offices.

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) =
Evaporation x Kc

Site	Aug 29 – Sept 4		Sept 5 – Sept 11	
	Evaporation	Rain	Evaporation	Rain
1	2.20	0.09	1.90	0.45
2	2.10	0.58	1.10	0.36
3	1.80	0.11	1.10	0.57
4	1.90	0.00	1.00	0.52
5	0.60	0.10	1.00	0.45
6	1.70	0.08	1.40	0.86
7	1.90	0.13	1.10	0.68
8	1.60	0.11	1.30	0.36
9	1.70	0.00	0.90	0.80
10	0.50	0.04	1.00	1.20
11	1.70	0.05	1.60	0.69
12	1.90	0.00	1.10	0.72
13	1.90	0.00	1.10	0.85
14	1.60	0.09	1.10	0.64



2022 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
1/4 Milk Line	1.04	Full Seed (R6)	1.10
Full Dent (1/2 Milk)	0.98	Yellow Leaf (R6.5)	1.00
3/4 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 to R6-Black Layer stage): Black Layer signals the end of the kernel growth for the season. Many husks and leaves are no longer green although the stalks may be. Average kernel moisture at R6 is 30-35%. Avg. daily water use from Sept 5 – Sept 11 was 0.08"-0.28".

Soybeans (R6.5-Full Seed / Yellow Leaf to R8-Full Maturity stage): R7 is when 0.0 inches of moisture is needed for yield. At R8 (Full Maturity), is when 95% of the pods have reached their mature pod color.

Avg. daily water use from Sept 5 – Sept 11 was 0.03"-0.27".

Sept 5-Sept 11 (14 of 14 NAWMN sites reporting): Average weekly rainfall was 0.65 (range 0.36 to 1.20). Average weekly ET for corn was 1.03 and for soybeans was 1.05.

CROP ET INFORMATION

NAWMN: <https://nawmn.unl.edu/ETdata/DataMap>

TBNRD: <https://www.tribasinnrd.org/tbawmn>

CNPPID: <https://www.cnppid.com/weatheret-data/>

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

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

Email: CNPPID: 308-995-3555

CORN STAGE		DESCRIPTION
R5.5	Full Dent - 1/2 Milk Line	The milk or starch line is 1/2 way down the kernel working towards the cob. Top 1/2 is hard and bottom 1/2 is softer near the cob.
R5.8	3/4 Milk Line	The starch line is 3/4 the way down the kernel.
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
R6.5	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.
R8	Full Maturity	95% of the pods have reached their mature pod color.

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>.

	Sept. 15, 2022, 8:00 AM	1 Year Ago
Capacity of Lake McConaughy	36.7%	NA
Inflows to Lake McConaughy	912 cfs	976 cfs
Flows on the North Platte at North Platte	377 cfs	294 cfs
Flows on the South Platte at North Platte	94 cfs	161 cfs
Flows on the Platte at Overton	89 cfs	491 cfs

If you spend time praying for people instead of talking about them, you will get better results.

- Unknown

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>.

<u>Location:</u>	<u>Sept 1 – Sept 14</u>	<u>May 1 – Sept 14</u>
Elwood 0.26 mi. S:	0.57	10.72
Bertrand 6.1 mi. SE:	1.25	11.41
Holdrege 0.99 mi. E:	0.90	12.33
Minden 7.2 mi. W:	0.69	10.82
Minden 5.8 mi. E:	1.28	9.76

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
308-955-6688



Nebraska Extension

1308 2nd Street
Holdrege, NE 68949
308-995-4222

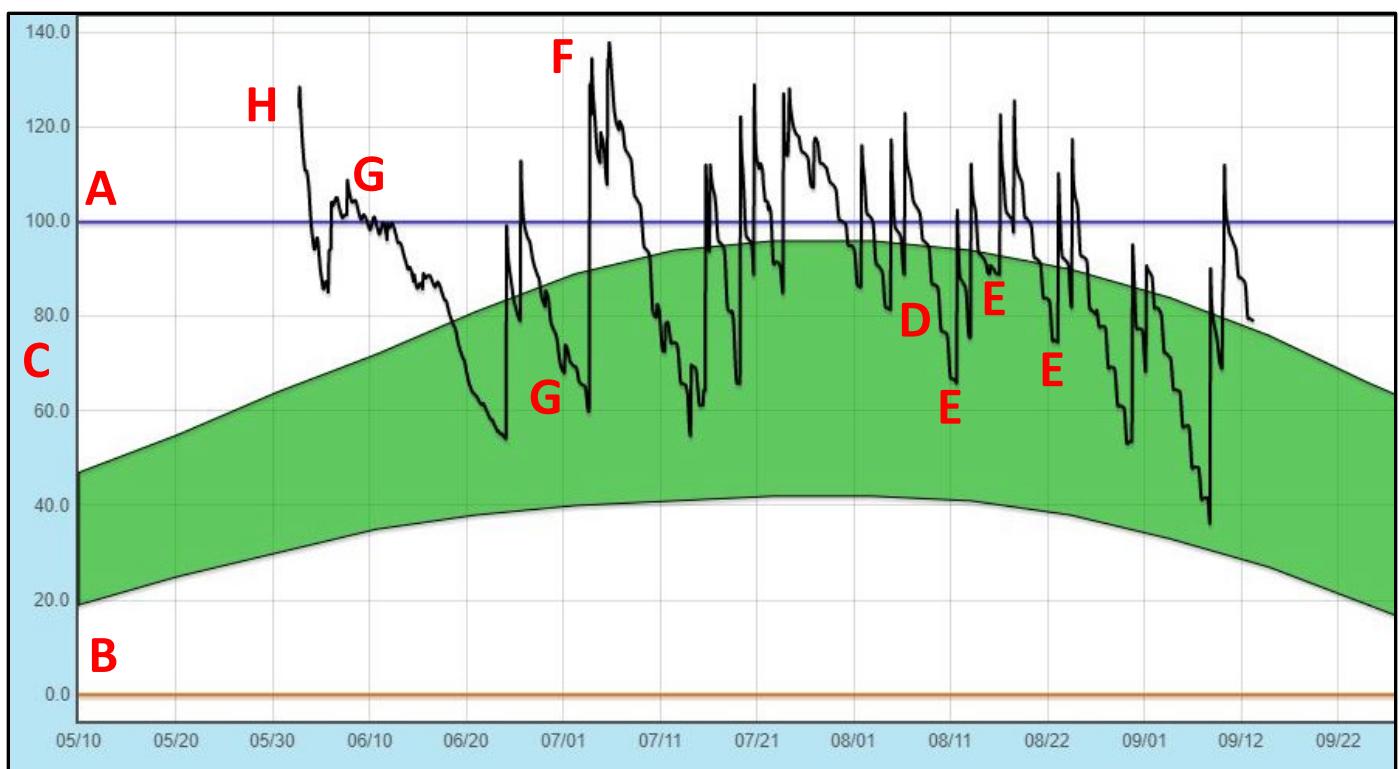


PO Box 146
Elwood, NE 68937
308-785-2390

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

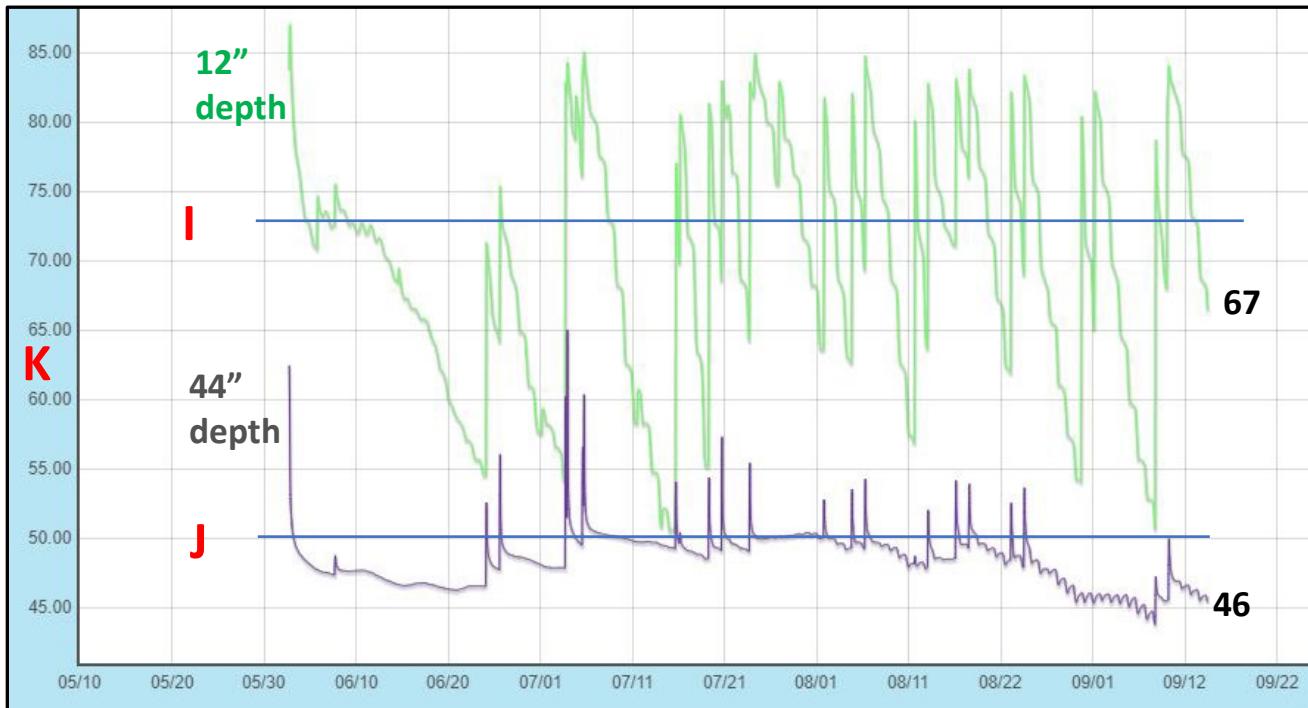
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This 2022 soil moisture sensor information is from a reversible swing arm pivot. The sensor is located on the main pivot, in the 6th span out from the pivot point. Pivot package is set up for 950 GPM when swing arm and endgun are all putting out water. - First chart: summary of all sensors, second chart: two individual sensors.



- A. Sensor charts have a 100% Full Capacity Line. 100% moisture.
- B. Sensor charts have a Refill Line. Depending on your sensor, you and/or your dealer can set this wherever you want. This particular one is set at 70% moisture. Visit with your dealer to know what moisture level your refill line is set at. Ask and know what this line represents. Have them change it to where you want it if that will help you out with scheduling irrigations. Make it work for you. Change this line to be your target for irrigating.
- C. Sensor charts may have numbers like this on the side. Usually, they are a reference number; they don't really pertain to an actual irrigation number you would be familiar with. They simply relate to themselves on the chart for a lack of better terms. For this sensor where the number 0 = 70% moisture and the number 100 = 100% moisture, that means incrementally, each line represents 6% moisture. So, the 40-line on this chart equates to 82% moisture (70 + 12). This all changes based on what the Refill Line and the Full Capacity Line are set at. This can be completely different for different sensors. Discuss with your dealer. If they can't explain it, then it might be time to change dealers.
- D. Stair stepping downward is daily water use. Each stair step is one day of water use. It levels off or slows down at night and drops the most during the day. In knowing how much water is used from the soil each day, one can project how many days it will take to reach a target on your chart for turning on the irrigation system. The hotter, drier, windier days will drop more than cooler, cloudy, or humid days. - When irrigating or it rains, the lines will spike up. When you irrigate or it rains, you can see how many days you just filled the soil with moisture by comparing to the stair stepping prior to the irrigation. Letter "D" indicates 5 days of water use prior to irrigation. The left "E" would be the start of an irrigation on this chart. Watching where that irrigation ends, look at "D" stair stepping and see how many days you just filled the profile. A side note: When on the computer looking at this chart, you can run the cursor along the line; you can watch the days and times at the locations of your cursor along the line. This is a handy tool.
- E. These two irrigations (upper and right two "E"s) were started before the moisture level reached an equal point prior to the irrigation event after the letter "D" stair stepping phase (farthest "E" to the left's irrigation event). Question is, if the first "E" irrigation (left "E") was at that moisture level, why didn't we wait to irrigate the next two irrigations when the moisture level was at that same level? Why irrigate when it was wetter? My only thought is one did not utilize the sensor chart to aide scheduling those irrigations. A hot dry year like 2022, one tends to listen to the hype of "gotta keep'em runnin" instead of reviewing the investment made to help make the irrigation decision. This year was dry. In a normal year, if one would have waited and caught a rain, one could have saved an irrigation or two.

- F. These double irrigation spikes you see throughout the year are from the reversable pivot. First spike, the pivot coming in, the second spike, the pivot going out.
- G. The little spikes can happen when the roots reach the next depth of sensor. Example is roots are at the 24 inch sensor and have now reached the 28 inch sensor. This now gives extra water to the root depth summary.
- H. The summary line rarely got below 88% moisture (Line 60). For the year in general, this sensor hung around full capacity on average. Again, Line 60 is a reference line and its value is based on what the Full Capacity Line and Refill Line are set up for. On this chart it equals 88% moisture.



- I. On the 12-inch depth sensor, note on the left side near the letter "I", a small level area. That level area indicates full capacity, 100% moisture. When this sensor line stair steps it is using moisture from the soil. Stair stepping will start once the roots have reached that depth in the profile. A side note: Most of these types of sensors have moisture sensors every 4-6 inches down to a depth of 48 inches. The blue level line is not a chart line, it is simply a line added to this page to show where 100% full capacity is; at the 12-inch depth. In analyzing the year, the 12-inch depth hovered around 100% full capacity.
- J. On the 44-inch depth sensor, note on the left side near the letter "J", that level area is there but it's lower than where the blue line is located. Again, the blue line here is not a chart line, it's a line added to this page representing 100% moisture profile. This profile is based on the level area of the sensor as shown for most of the year. That's the level it settles to after irrigation and rains. The reason it is lower in the beginning is probably due to soil moisture utilization at the end of last year. The dry winter never provided enough moisture to replenish the soil at this 44-inch level. Irrigations and any rains this year eventually filled the profile back to 100% full capacity as indicated by the level area or the blue line. Once you see the stair stepping later in the year, towards the right side, that means the roots reached the 44" depth and started utilizing soil moisture.
- K. On the left side, again these numbers are only reference numbers. They only reference what they relate to. 100% full moisture profile is different at each depth so you need to treat each depth individually in using these numbers. 100% on the 12-inch depth is around 73 and the 100% on the 44-inch depth is 50. So, if you wanted to estimate the current percent moisture level of each sensor, simply take the number at the right end of the line and divide by the 100% full profile line. For example, on the 12-inch, divide 67 by 73. That equates to 92% moisture. On the 44-inch, divide 46 by 50. That equates to 92% moisture.

A level line means moisture is not being added or removed from the profile. This can mean it's too dry to allow any more removal of moisture from the profile. It can be an equilibrium point of moisture in matches moisture out. It can be a full profile that the roots have not gotten to yet.

Tons of credit go to the producer in allowing use of his sensor charts in an effort to really dig in and educate you all about soil moisture sensors. All in an effort to hopefully be better stewards of our groundwater resource, increase our profit, and to ensure our kids and grandkids can enjoy the same irrigation benefits we get to benefit from today.