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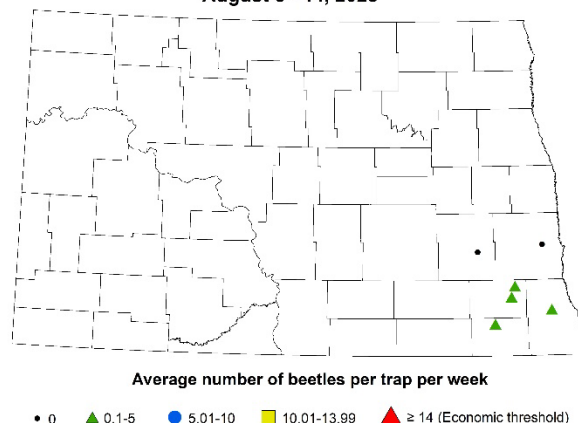


END OF CORN ROOTWORM TRAPPING

The trap catches for corn rootworm beetles declined during August 8-14 (Table 1). The proportion of northern and western corn rootworms captured continue to be dominated by the northern corn rootworms (74%) compared to the western corn rootworms (26%).

Corn stages range from R3 (milk – kernels filled with “milky” fluid) to R4 (dough). All traps were pulled from field this Monday.

Corn Rootworm (CR) Trapping Northern and Western CR August 8 - 14, 2023



The economic threshold (E.T.) for yellow sticky cards is >14 beetles per trap per week. If you are above the E.T., this indicates that a high corn rootworm population is expected the following year in that field, and a corn rootworm management tool will likely be needed in that field to protect the corn crop next spring.

Table 1. Adult corn rootworms (northern and western corn rootworms) per 4 traps per week in ND field corn, 2023

Area	County	Nearest town	July 17-24	July 25-31	Aug 1-7	Aug 8-14	Season Final Total # per 4 weeks
SE	Cass	Mapleton	0	0	0	0	0
SE	Barnes	Cuba	0	0	0	0	0
SE	Ransom	Sheldon	0	7	11	11	29
SE	Ransom	Shenford	0	0	2	4	6
SE	Sargent	Gwinner	0	1	10	5	16
SE	Richland	Mooreton	0	1	12	7	20
Total corn rootworm =			0	9	35	27	71
Percentage of NCR =			0%	22%	77%	74%	69%
Percentage of WCR =			0%	78%	23%	26%	31%

Economic thresholds (ET) is 14 or more adults (individually or in combination) per sticky trap per week

RED SUNFLOWER SEED WEEVIL

Continue to scout late planted sunflower from early flowering R5.1 through end of R5.7 for red sunflower seed weevils. IPM scouts found red sunflower seed weevils in 19% of the sunflower fields scouted and counted of 1-3 weevils per head last week. Highest counts were in central area of the state. Crop stages ranged from R4 to R6.

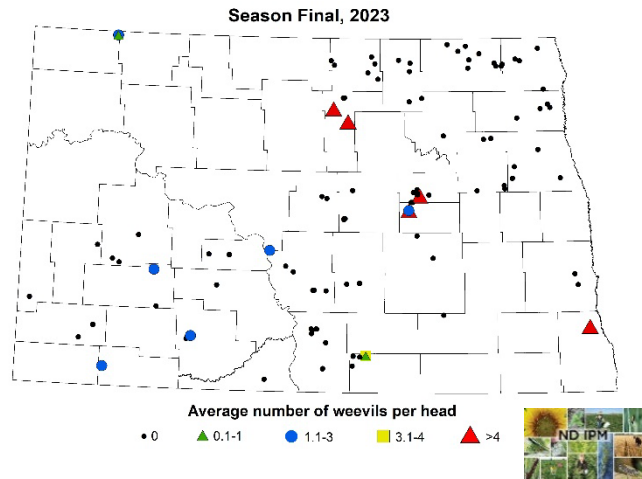
2023 RSSW Threshold Updated

Oilseed sunflower at 23 cents per lb and
22,000 - 18,000 plants per acre
**\$8 insecticide + \$10 application cost per acre –
7 - 8 weevils per head**
**\$9 insecticide + \$11 application cost per acre –
8 – 9 weevils per head**

Confection sunflowers:

1 weevil per head due to the industry standard
for minimal insect damage

Red Sunflower Seed Weevils in Sunflower



WHITE AND YELLOW BUTTERFLIES FLYING IN CROPS

Yellow and white butterflies are very common in ditches, meadows and field crops with flowering weeds or crops this year. This group of butterflies belong to the family Pieridae and are called 'sulphurs and whites.' They are easy to identify by their yellow to orange to white wings with black markings and usually small to medium sized (wingspan of 2¾ inch). Caterpillars are small, <1 inch long, green with white or yellow stripes and short velvetlike hairs.

Pierid butterflies are attracted to flowering crops or weeds in ditches and fields but only feed on nectar. Caterpillars are smaller than many of our other foliage-feeding insect pests like loopers, green cloverworms, thistle caterpillars. So, pierid caterpillars are usually NOT an insect pest of field crops including canola, dry beans, soybeans, sunflowers, sugarbeets, cereal grains and other crops. They do feed on many garden vegetables (cabbage, mustards, broccoli, other Brassicas) and also on alfalfa, clover and legumes in North Dakota. Occasionally, they can be pests of these plants, such as the cabbage butterfly (or imported cabbageworm), which is a pest of vegetable crops.



**Clouded sulfur butterfly
(Gerald Fauske, NDSU)**

Relax and enjoy the beautiful butterflies of North Dakota as they fly around!

LATE SEASON INSECT PESTS IN DRY BEANS AND SOYBEANS

Insect pests including foliage-feeding caterpillars (green cloverworm, thistle caterpillar), grasshoppers, bean leaf beetles and spider mites all have been observed in dry edible beans and soybeans over the past two weeks. So, continue to scout for these insect pests until beans are past the R6 stage (full seed in pods). Most fields reported were not at economic threshold levels, however, the late-planted fields are being hit harder with some pod feeding. Most of the foliage-feeding caterpillars are mature worms, which means that they will be dropping to the soil for pupation and are close to being done feeding as caterpillars. Here's a refresher on their E.T. during pod development:

- ✓ **Foliage-feeding caterpillars:** 10% defoliation, and/or pod clipping or pod feeding is occurring
- ✓ **Grasshoppers:** Use 10% defoliation or 8 - 14 adults per square yard
- ✓ **Bean leaf beetles:** 10% defoliation and/or pod clipping or pod feeding is occurring, or 3-7 beetles per sweep
- ✓ **Spider mites:** Heavy stippling in lower leaves with some stippling into middle canopy. Mite present in middle canopy with scattered colonies in un upper canopy. Lower leaf yellowing common. Small areas with lower leaf loss (Source: University of Minnesota Extension).

For defoliation ratings, check the upper, mid- and bottom layer of foliage since insect damage often occurs mainly in the upper canopy (and is the easier to see which can cause overestimation of the % defoliation).



***Green cloverworms feeding on pink dry edible beans in Walsh County, North Dakota
(photo courtesy of Tarek Schanilec)***

WHEAT STEM SAWFLY GROWER SURVEY

We are conducting a multi-state collaborative project to determine the extent and pest management practices being used against wheat stem sawfly. We need your help to enable us to better understand where the wheat stem sawfly is distributed across the Midwest region, how you are mitigating its impacts, and what just isn't working. Even if you are not currently impacted by the wheat stem sawfly, we still need your help to better understand this pest which is impacting the Midwest. The University of Nebraska-Lincoln IRB Project ID #: 22800 Study Title: *Great Plains Sawfly Survey Project*. The purpose of this research is to determine areas of wheat stem sawfly infestation and determine current practices related to its mitigation on farm yields and profits.

If you are the primary operator of a farm located in MT, WY, CO, NE, SD, ND, MN, IA, or KS, we encourage you participate in this survey. Participation will require approximately 30 minutes of your time.

The survey includes a series of questions related to wheat stem sawfly and your farming practices. Participation will take place online. To minimize the time required to complete the survey, answers to initial questions will determine the questions to follow thereby eliminating questions that do not apply to your farm.

The risks of this survey are limited to the possible identification of individual farms due to limited response rates in a specific county. To mitigate this risk, counties without at least three responses will have geographic identifiers removed below the state level.

You may benefit from participating in this research by helping to advance efforts of pest management of wheat stem sawfly. Reasonable steps will be taken to protect the privacy and confidentiality of your study data. Records will only be seen by the research team and/or those authorized to view, access, or use the records during and after the study is complete. Following the collection of survey data, identification used to prevent multiple responses from the same location (IP Addresses) will be removed and the only identifier remaining will be your postal zip code and your age.

If you have questions about this project, you may contact **Jeff Bradshaw** at jbradshaw2@unl.edu or **Troy White** at troy.white@unl.edu. If you have questions about your rights or complaints about the research, contact the UNL Institutional Review Board (IRB) at (402)472-6965 or irb@unl.edu. You can decide not to be in this research study, or you can withdraw at any time before, during, or after the research begins for any reason. Deciding not to participate in this survey or deciding to withdraw will not affect your relationship with the investigator, the University of Nebraska-Lincoln, or any of the grant collaborators. You are voluntarily making a decision whether or not to participate in this research study.

Please follow this link to the survey, or use the QR code to access the survey.
https://ssp.qualtrics.com/jfe/form/SV_dciiOcMQk0QVgqO

**Used with permission from Dr. Bradshaw and Dr. White at UNL.*



Top photograph: Wheat lodged from wheat stem sawfly near Grenora in Divide County (C. Keene, NDSU).

Bottom photograph: Wheat stem sawfly larvae inside wheat stem (P. Beauzay, NDSU).



Janet J. Knodel
Extension Entomologist



SCOUTING SOYBEANS FOR DISEASES NOW WILL HELP YOU PROTECT YIELD IN THE FUTURE.

Charcoal rot, sudden death syndrome (SDS), brown stem rot (BSR) and soybean cyst nematode (SCN) are all economically important, **and often show up in late August**. In addition, we can also see Phytophthora and Stem Canker this time of year. Now is the best time of the year to grab a pocket knife, a shovel (or probe), a hand lens and get out in the field. If you find these diseases, management tools are available that may help you protect yield for years to come. Below you will find disease identification resources that will be helpful when scouting the fields.

SOYBEAN DISEASE RESOURCES

We recommend several resources that may help you identify your soybean diseases.

- 1) The 'Soybean Disease Diagnostic Series' jointly created by NDSU and UMN Extension *specifically for our growing region* was just updated last month (some additional photos, updated prevalence information, one additional disease). All diseases common (and some uncommon) in our region are included in the series, with an emphasis specifically on identification. We thank the North Dakota Soybean Council and Minnesota Soybean Research and Promotion Council for support in the creation of this diagnostic guide.
<https://www.ag.ndsu.edu/publications/crops/soybean-disease-diagnostic-series>
- 2) Another helpful local resource is the UMN soybean pest management website. Diseases are separated into leaf, stem and seed/root diseases – and provides important information about symptoms and signs.
<https://extension.umn.edu/soybean/soybean-pest-management>
- 3) The Soybean Research and Information Network is a website of the North Central Soybean Research Program (an excellent soybean-checkoff supported multi-state program). This link takes you to the disease page, but information about insects, agronomics and other information can also be found on the site.
<https://soybeanresearchinfo.com/soybean-diseases/>
- 4) The SCN Coalition is a public private partnership focused on soybean cyst nematode. This information is excellent, with videos, publications and numerous SCN resources. www.thescncoalition.com
- 5) The Crop Protection Network is a website operated by many Extension plant pathologists from across the soybean growing states. The searchable website includes publications, and image library, and information on numerous soybean, corn and small grain diseases. www.cropprotectionnetwork.org

CHARCOAL ROT OF SOYBEANS

Several years ago, severe charcoal rot occurred in several areas in the Southeast and East central RRV (Figure 1). While we do not have a good handle on how prevalent the disease is, we are starting to see the disease appear in 2023.

Infection occurs early in the growing season, but is not often observed until after flowering, and is more severe and obvious when in a hot and dry growing season. The disease is caused by a soil-borne pathogen (*Macrophomina phaseolina*) that infects many crops (corn, sunflower, other legumes, etc.), but we have observed the disease to be most severe in our area on soybeans.

The disease is typically first noticed when patches of soybeans (often large patches) prematurely wilt and die. The leaves will remain ON the wilted and dying plants (Figure 2). Plant tissue on lower stem and tap root may appear gray or silver and 'peeling' away (Figure 3). If you remove the outer tissue ('shaving' tissue gently with a pocket knife works very well) you will see profuse charcoal-colored specs called microsclerotia (Figure 4).



Figure 1. Large patches of soybean-infected charcoal rot. Photo in Cass County in 2018.



Figure 2. Wilted soybeans with leaves still attached



Figure 4. Lower stem with a dusty gray to silver appearance, with outer tissue peeling away.



Figure 3. Lower stem tissue 'shaved away', revealing black microsclerotia

SUDDEN DEATH SYNDROME (SDS) OF SOYBEANS

Sudden Death Syndrome (SDS) was first confirmed in the state in 2018 (Richland County), and in 2020 was confirmed hundreds of miles away in Cavalier County. We don't know exactly how prevalent SDS is in the state, but the Richland and Cavalier County confirmations suggest it is more common than we think. Additionally, the severity of SDS is tightly linked to the presence of soybean cyst nematode (see article below). You can certainly have SDS without SCN, but you are more likely to find (and suffer yield loss) from SDS if you have SCN. I suggest you scout areas of your field known to have high SCN pressure.

The pathogen is a soil-borne root rot pathogen (*Fusarium virguliforme*) that can survive for several years. The pathogen infects soybeans soon after planting, and *wet* conditions favor development of the disease. Thus, for infection to occur and disease to develop, soybeans will have had to have *some* moisture. The pathogen will cause root rotting, but more importantly, produces a *plant toxin* that moves up from the root tissue into the rest of the plant. It is the plant toxin that causes the foliar symptoms.

SDS often shows up in fields in oval/circular spots or clusters of plants in a field (Figure 1). When the disease is becoming severe, yellow patches of soybeans are often visible from a distance.



Figure 1. Area of a soybean field with Sudden Death Syndrome (Photo: Dr. Berlin Nelson).

The first foliar symptoms of SDS are bright chlorotic (yellow) spots that occur diffusely (not connected to one another) between the leaf veins (Figure 2). Soon after, necrotic areas between the leaf veins occur, often bordered by a relatively thin yellow halo (Figure 3). With time, the necrotic areas coalesce, leaving only the veins of the leaves green. In severe cases, leaves may drop, but petioles will remain attached to the plant (Figure 4).

Examination of stem and roots tissue is very important to distinguish SDS from other diseases, particularly brown stem rot (see next article). With a knife, scrape off the outside of the tissue of the lower stem and tap root near the soil line. SDS infected stems have tanning or browning, but the pith (center of the stem) will remain white (Figure 5).



Figure 2. A mix of beginning and advanced foliar symptoms of Sudden Death Syndrome (Photo: Dr. Berlin Nelson).



Figure 3. Progression of symptoms of Sudden Death Syndrome.



Figure 4. Severe symptoms of Sudden Death Syndrome, including leaf drop (note naked petioles) and interveinal chlorosis and necrosis.



Figure 5. Tan to brown soybean root tissue consistent with Sudden Death Syndrome (Photo: Dean Malvick, UMN, extracted from Soybean Disease Diagnostic Series, NDSU Extension Publication-1867).

BROWN STEM ROT OF SOYBEANS (BSR)

Brown stem rot is known to occur in the state, although the exact prevalence is unknown. Like SDS, BSR is often more damaging when soybean cyst nematode (SCN) is present. Like many diseases, BSR is favored by short/no crop rotation.

Brown stem rot is caused by a fungal pathogen (*Cadophora gregata*), that can overwinter/survive in infected soybean stem residue. Infection occurs through the roots in the spring and moves into the stem, impacting the movement of nutrients and water in the plant.

Foliar symptoms do not always occur with BSR, however, if they do they often mimic the interveinal chlorosis seen with SDS. Examination of the stem is critical for identification of BSR. Brown stem rot causes a distinct browning of the pith, while the rest of the tissue will appear white and healthy. The symptom resembles a 'lead in a pencil' look (Figure 1



Figure 1. Lower stem symptoms of Brown Stem Rot (BSR). (Photo: Dean Malvick, UMN, extracted from *Soybean Disease Diagnostic Series, NDSU Extension Publication-1867*).

SOYBEAN CYST NEMATODE (SCN)

Soybean Cyst Nematode (SCN) is the 2,000-pound gorilla in the room. Nationally, SCN is estimated to cause more yield loss than the next three to five most important soybean diseases. And, it makes diseases like sudden death syndrome (above) and brown stem rot (above) worse.

Thanks to the *grower-based* SCN sampling program supported by the North Dakota Soybean Council operated by NDSU Extension (*more information on this program will be published in the next issue of the Crop and Pest Report*), we do have a good understanding of where SCN occurs in the state. High levels of SCN (as measured by egg counts) occur throughout the Southeast and East Central parts of the state, with expanding prevalence occurring in areas to the north and west. SCN reproduction is favored by dry and hot growing seasons, *and* these above-ground symptoms are brought on more by drought stress. I expect to see more 'visible' SCN this year.

The soybean cyst nematode (*Heterodera glycines*) is a parasitic worm that feeds and reproduces on soybeans, dry beans and a few weed hosts found in North Dakota. Essentially, it's a parasite, and like any good parasite, the objective is not to 'kill' the host (that is somewhat counterproductive for the nematode). Rather, the nematode flourishes when it takes water and nutrients from the roots.



Figure 1. Severe damage from Soybean Cyst Nematode.

Consequently, soybeans that are infected by SCN are difficult to detect by their above-ground symptoms. It's not until they are experiencing yield losses of 15-30% (or more), that they may turn yellow and/or appear stunted (Figure 1). You *may* be able to observe the white female cysts on the roots and a hand-lens and flashlight helps a lot (Figure 2). They are much smaller than a nodule, and when young appear white to cream colored. As they age, they turn brown, and are extremely difficult to see (Figure 3). **Consequently, soil sampling is the most effective way to find SCN, and the only way to quantify how bad your infestation is. More information on this program will be published in the next issue of the Crop and Pest Report.**



Figure 2. Numerous white to cream-colored cysts of SCN compared to a nodule



Figure 3. Numerous older brown cysts of SCN.

PHYTOPHTHORA ROOT AND STEM ROT

Phytophthora root and stem rot has occurred in SE North Dakota for years, and survey work being conducted this summer will give us a much clearer picture of how widespread the disease is. Phytophthora is favored by wet and warm soils, and can be observed anytime in the year.

In the early season, the disease will attack seedlings, which often wilt and die. Because the pathogen is so heavily dependent on wet soils, the disease commonly shows up in low spots of fields. Notably, in the early season, it is difficult to differentiate *Phytophthora* from *Pythium* and other root rot pathogens which are also active. In the mid- to late-season, the disease is noticeable by a chocolate-brown lesions that appears to be climbing up the stem from the soil line. Roots commonly will have brown lesions and may be degraded. Leaves often wilt, turn yellow and commonly stay attached to the stem. Phytophthora is commonly confused with stem canker, which also forms stem lesions that spread, but typically from a node.



Photo: D. Malvick, Univ. of Minnesota

Figure 1. *Phytophthora* root and stem rot. (Photo: Dean Malvick, UMN, extracted from Soybean Disease Diagnostic Series, NDSU Extension Publication-1867).

STEM CANKER

Stem Canker is another disease that we see in ND, and is thought to be widespread. The disease becomes more noticeable this time of year, and often is first seen when parts or tops of plants begin to die. Symptoms include a reddish-brown lesion that may develop into brown cankers that spread up and down the stem. At the end of the season, small black dots arranged in rows may appear.



Figure 1. Stem Canker (Photo: Dean Malvick, UMN, extracted from Soybean Disease Diagnostic Series, NDSU Extension Publication-1867).

WHITE MOLD

White mold is a disease of many different crops around ND including soybean, dry beans, sunflower and canola. In soybean, the white mold will initially begin the infection during the bloom periods, especially after canopy closure. On the soil surface, the development of small, tan mushrooms called apothecia will form which serve to release spores into the under canopy of the soybean crop (Figure 1). Disease symptoms take multiple weeks to establish after this infection, often showing up around the R5-R6 growth stages when the pods are developing, and seed fill occurs. When white mold does show its ugly head, the first sign will be the presence of white fungal growth, usually around a plant node or pods (Figure 2). Eventually, the stem tissue will begin to bleach, turning a tannish color, and wilting of the top leaves may occur (Figure 3 and 4). If the disease is severe enough, new sclerotia may form on either the outside or inside of the plant stem tissue (Figure 3 and 5). At harvest, these sclerotia will either be collected with the seed or released back into the field as new inoculum for infections in future years (Figure 6).



Figure 1. White mold apothecia are present on soil



Figure 2. Beginning of white mold fungal growth on main stem.



Figure 3. Soybean stem infected with white mold exhibiting the bleaching of stem tissue, presence of fungal growth, and sclerotia present on exterior of stem.



Figure 4. Severe infection of white mold in a soybean field.



Figure 5. Split soybean stem with a white mold sclerotia present.



Figure 6. Soybean seed with white mold sclerotia present after harvest.

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SOIL SAMPLING AFTER THE COMBINE

The first principle of effective soil sampling is obtaining a representative core. If a field is sampled immediately after a combine and before tillage, it is relatively easy to obtain a 0-6 inch core for use in analysis of P, K, soil pH, surface soil EC, organic matter and zinc. It also enables a 0-2 foot core, or a 6 – 24 inch core, whichever is required, that is reproducible and represents the depth it needs to represent. Once a field is tilled, the sampling core may brush aside loose soil and take a deeper depth than the sampler intends to take. Most samples are obtained from a vehicle, and it is difficult drive over an area, back over it again and take the sample in the firm soil that this action produces and make the depth consistent.

One drawback of early sampling is later growth of volunteer grain that takes up nitrate-N that was analyzed from an early soil sample. If volunteers are allowed to grow, taking the sample before a killing frost or before tillage would better represent the residual nitrate-N compared to sampling for nitrate-N before volunteer grain or cover crop growth.

FALL NITROGEN APPLICATION

Fall nitrogen application is possible in North Dakota because the soils are frozen to a considerable depth in better than 90% of years. I remember 2 years in which the soil was not frozen, and one of them was 2022-23. Farms are very large today, and fall nitrogen application enables more timely spring planting and less logistical headaches than having to line up spring fertilizer application or apply anhydrous ammonia. There likely is a small efficient loss in some years due to an unusually long fall, or wet spring from fall nitrogen application, but compared to delays in planting in the spring from the need to apply fertilizer, that efficiency loss may be acceptable to most growers.

There is no risk-free guarantee that all nitrogen applied will be available in the spring, but the guidelines presented here will result in lowest practical risk.

1. No fall nitrogen except the N in MAP/DAP before October 1.
2. No fall ammonia application until soil temperature at a depth of 4 inches measured between 6AM and 8AM falls to 50 degrees Fahrenheit. When 50 degrees is reached, risk is low for application of anhydrous ammonia.
3. From the low risk date of anhydrous ammonia, wait one week to apply banded urea with an air-seeder or other tool, such as a shank strip-till unit.
4. From the low risk date of anhydrous ammonia, wait two weeks to apply broadcast urea or disc-strip-till.
For steps 3 and 4, if the urea application will be less than 2 inches in depth, an NBPT urease inhibitor should be applied at proper rate.

Finally, if the field has areas that flood, or has areas that are prone to leach in the spring, these are not fields on which to apply fall nitrogen. Also, UAN is not a fall fertilizer, since it already contains about ¼ of total N as nitrate. In addition, sulfur of any kind is not a fall fertilizer, and it should be applied in the spring.

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FALL WEATHER BRINGS HORNETS OUT

Extension Entomology office has started getting calls on annoying hornets swarming, or hornet nests in homes or in trees near houses.

Hornets (or yellowjackets) belong to the family Vespidae. All yellowjackets sting and their stinging behavior is considered a defensive reaction when the colony is threatened. They can sting more than once because their stinger stays with the insect. Yellowjackets are more aggressive during August and September and more likely to sting people. Although yellowjackets are actually a beneficial insect feeding on other insects, they often become a pest problem when nests are located near homes, schools, picnic areas, or playgrounds. Pest control is often warranted.

Biology: These wasps are social insects and build nests of paper-like material. Nests generally are located underground in mammal burrows, cavities or in between house siding. In the northern temperate climates, only the mated queen wasp overwinters from the previous year's colony. Queens are inactive during the winter, hiding in protected places like under tree bark or attics. In early spring, the overwintering queen builds a new nest and lays an egg in each cell. Larvae hatch from the eggs and are dependent on the queen for food. The queen forages outside the nest and brings food (caterpillars and other insects) back to the larvae until pupation. Sterile female workers emerge from the pupae and take over nest building and brood rearing, while the queen stays in the nest. During late summer into early fall, adult males and newly produced queens leave their parent colony. The colony dies off, and only newly mated queens will find a protected place to overwinter. That leaves the workers without a job, and these workers wander in search of food becoming an annoying pest for homeowners.

Control: Vespid wasps are active outside the nest during the daylight hours. Nearly the entire colony is in the nest during the evening and night-time hours, so control measures should be applied to the nest then. There are many insecticides labeled for control of hornets and yellowjackets. The difficulty is making the treatment without being stung. Usually, an aerosol spray of one of the many fast-acting wasp killers will quickly kill all workers present in nest. Examples are permethrin, synergized pyrethrins (Spectracide Bug Stop and other brands) or pyrethroid insecticides (such as, esfenvalerate - Ortho Bug-B-Gon Garden & Landscape Insect Killer; lambda cyhalothrin - Spectracide). A slower-acting insecticidal approach is to apply carbaryl (Sevin) dust directly onto the exposed nest and entrance hole. After treatment, check the nest for any activity the following day and re-treat if necessary. Nests should be removed to avoid attracting dermestid beetles at some later time and to keep wasp pupae from possibly reestablishing the nest. If dealing with yellowjacket nests in structures like homes, the nest entrance should never be plugged from the outside. If constrained, yellowjacket workers cannot escape to the outside, and they may locate or chew a new way to escape toward the inside of the home or structure, creating a possible stinging threat for people inside. Yellowjacket nests become an important source of carpet and other dermestid beetle infestations in the home, so the nest should be removed whenever possible. When outside enjoying your picnic, avoid wearing bright colors and perfumes which are attractive to hornets and yellowjackets, and keep garbage away from the picnic table.



Prairie yellowjacket, *Vespula atropilosa* (Whitney Cranshaw, CSU, bugwood.org).

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NORTHEAST ND

After a long interval, parts of the region received considerable amounts of rain ranging from 0.11-1.52 inches. This rain will help certain crops such as soybeans, dry beans, corn and sunflowers to come out of moisture stress. However, crops like small grains, canola, and field pea are past the mature stage and did not benefit from the rain. Conditions remain extremely dry over many parts of the region. These areas received little or no rain over the last week. Small grain harvest is well underway with yields ranging anywhere between 40-100 bu/acre. Many farmers are surprised to see better than average yields considering the dry season. Herbicides are being sprayed to desiccate the weeds. Scab is showing up in fields that were not sprayed this year. Some fields had high levels of infestation despite the low-level risk of the disease this year. White mold occurrence in canola, soybeans and dry beans is low. Pastures continue to remain in very poor condition with some considering selling livestock as they cannot support the number of animals they have for feed. Water quality is becoming a concern as water levels drop in dugouts, streams, and rivers.

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NORTHWEST ND

Farmers continue to harvest crops. Preharvest weed control, application of desiccants and mostly harvesting of crops has been the common denominator in many farms in the northwest in the past two weeks. Field pea, winter wheat, lentil, durum, barley, oats, and spring wheat were mostly the crops harvested in many fields. Harvesting of flax has started. Most chickpea fields have turned color and were desiccated for cutting in the coming days. Most canola fields have turned and will be harvested within a few days once field conditions permit. Crops that mature later like corn, sunflower, safflower, and soybean are in the mid to late reproductive stages. In most sunflower fields, the back of sunflower heads has turned or starting to turn yellow indicating R7 to R8 stage. Corn is at R4 (dough) to R5 (dent) stage. Safflower is at end of flowering. Soybean is at seed development stage (R5 going R6). In these crops, grasshoppers are still a menace for some areas.

Crop yields at the Williston REC dryland farm has so far been varied but overall good. The crops at the center took some yield loss (about 20 to 35%) after the severe thunderstorm and hail event on Aug. 1, which damaged the crops right before cutting. Yield of winter and spring wheat (with 35% hail damage) were 35 to 50 bushels, durum yield was 80+ bushels, peas 20 to 53 bushels (1200 to 3180 lbs./ac), lentils 25 bushels (1500 lbs./ac), and hail damaged flax yielded 15 bushels (900 lbs./ac). Chickpea is yet to be harvested.

Due to hazy and smoky skies from Canadian wildfires coupled with intermittent cloudy days, weather in northwest ND remained cool and didn't really warm up until August 14. Last week have been conducive to drying down of crops and harvesting operations with daytime highs in the 80s to mid-90s. In the past 2 weeks, bare soil temperatures have been steady in the high 60s to low 70s and night time lows have been steady in the 50s. Although not good for drying down of mature crops, the northwest has had four rain events in the past two weeks, beneficial for later maturing crops.

The NDAWN weather station at the Williston REC recorded a total of 0.79 inches of rain in the past two weeks. The latest rain event happened last weekend and harvesting operations paused briefly due to wet field conditions. Once the weather warms up and crop and fields are dry enough, harvesting operations is expected to ramp up. [Ensuring safety](#) on farm and public roads during fall harvest season is of utmost importance.



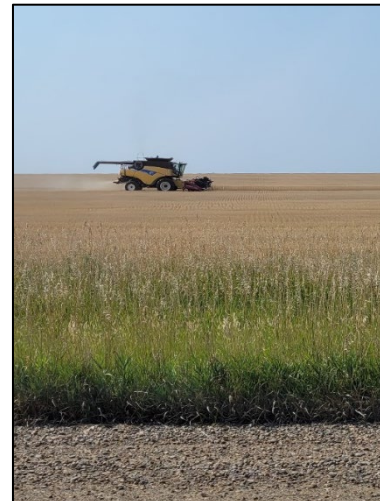
Flowers of safflower at end of flowering. The orange/yellow inflorescences at the top of each compact globular structure (called capitulum), start to senesce to give way for fruit/seed development. A few Canada thistle plants present but some parts of the field have denser thistle populations. Harmony SG, the only herbicide labeled to post emerge safflower will not control Canada thistle. Farmers had to rely on residuals together with burndown herbicides for control of this weed in Safflower and rotations to small grains where effective herbicide options are available. Photo taken from a field in Williams County.



Soybean at seed development stage. Soybean was hail-damaged three weeks prior but has since regrown new leaves. Signs of leaf spot [disease in soybean](#) visible and grasshoppers continue to cause damage. Photo taken at Williston REC dryland research farm (Williams County).



Irrigated corn at mid-dent stage (R5) showing the "milk line", the boundary between the liquid (milky) and solid (starchy) areas of the maturing kernels. Photo taken near the Montana border southwest of Williston (Williams County).



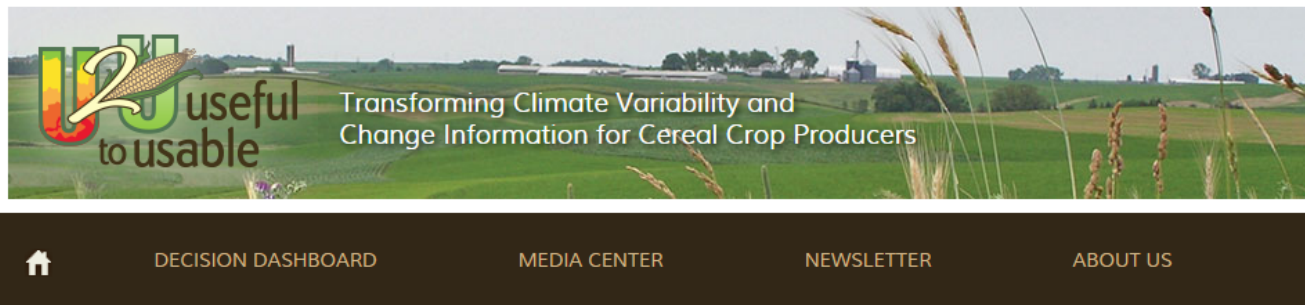
Farmer busy harvesting spring wheat near Alexander, ND (McKenzie County). Combine harvesting, loading harvested grain into trucks for transport and storing grains in bins were the dominant farm operations in the northwestern counties in the past week.

[Charlemagne "Charlie" Lim](#)

Extension Cropping Systems Specialist
NDSU Williston Research Extension Center

SOUTH-CENTRAL/SOUTHEAST ND

According to NDAWN, accumulated rain received in this region during Aug 1-21 ranges from less than 1 inch at numerous northeast locations to 6.1 inches at Brampton (Sargent Co.), with the Carrington Research Extension Center (CREC) receiving 1.45 inches and Oakes Irrigation Research site at 5.7 inches. While average daily water use is estimated at about 0.2 inch, the recent rain generally has helped maintain yield potential of our actively growing row crops.



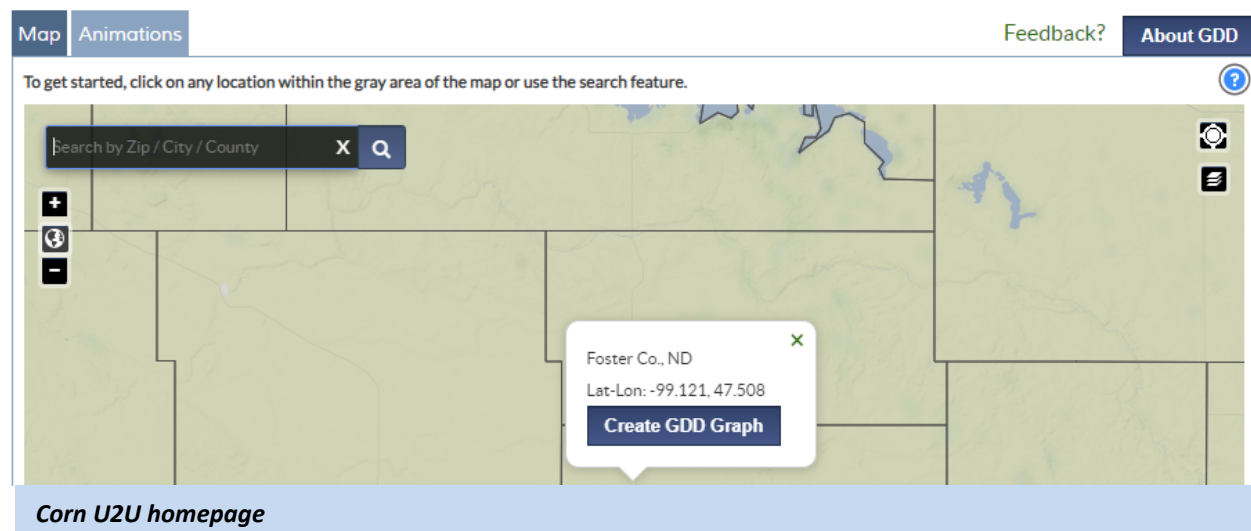
U2U Decision Support Tools - Corn GDD

Welcome to the Corn Growing Degree Day (GDD) decision support tool.

This tool puts current conditions into a 30-year historical perspective and offers trend projections through the end of the calendar year. GDD projections, combined with analysis of historical analog data, can help you make decisions about:

- Climate Risks – Identify the likelihood of early and late frosts/freezes.
- Activity Planning – Consider corn hybrid estimated physiological maturity requirements, along with GDD projections when making seed purchasing and other growing season decisions.
- Marketing – Look at historical and projected GDD when considering forward pricing and crop insurance purchases.

While this tool is not meant to be a crystal ball, data and information derived from the tool can be used to make helpful inferences about current conditions, especially when combined with personal experience and localized knowledge. Please note that data is currently limited to states within the U2U project area plus Kentucky & Tennessee.



CREC winter cereal variety trials have been harvested with the following results (trial averages):

- Winter wheat – grain yield = 57.5 bu/A (range of 39.6 to 66.5 bu/A among 19 cultivars); test weight = 62.3 lb/bu; and protein = 12.8%.

- Winter rye – grain yield = 52.8 bu/A (range of 43.0 to 80.4 bu/A among 15 cultivars); test weight = 55.7 lb/bu.

Data is or soon will be available at <https://vt.ag.ndsu.edu/>, as well as spring cereal data as trials are harvested and seed processed.

Mid-May planted dryland corn at the CREC has begun to dent (R5 stage) and should reach physiological maturity in about three weeks. An electronic tool to estimate corn black layer dates is U2U (Useful to Useable). Simply search the internet using the keywords 'corn U2U'. After selecting field location, planting date and relative maturity, the tool should quite accurately predict black layer date.

The majority of the region's soybean are developing seed (R5-6 stages). Late-May planted dry bean are nearing or at physiological maturity. Most sunflower have dried ray flowers (R6 stage) or back of heads losing green color (R7 stage).

NDSU Row Crop Tour – August 31 at Carrington REC

Farmers, crop advisers and agricultural industry representatives are invited to view field research trials and receive NDSU production recommendations on corn, soybean and dry bean during the annual row crop field tour on Thursday, Aug. 31, at the CREC.

Registration begins at 4 p.m. with educational exhibits (e.g. soybean cyst nematode soil sampling materials, view living weed exhibit) and refreshments. The tour begins promptly at 4:30 and includes the following topics presented by NDSU crop scientists and industry representatives:

- Status of region's corn and soybean, and end-of-season management considerations
- Silage corn
- Dry bean variety performance
- Rhizobia bacteria for nitrogen production with soybean and dry bean
- White mold management in soybean and dry bean
- Cover crop considerations in soybean and dry bean

Continuing education credits will be available for certified crop advisers.

A supper sponsored by the North Dakota Corn and Soybean Councils, and Northharvest Bean Growers Association will follow the tour.

For more information about this educational event, visit ndsu.ag/row-crop-tour or call the Carrington center at 701-652-2951.



Michael Wunsch, plant pathologist, discussing white mold management during 2022 tour.

[Greg Endres](#)

Extension Cropping Systems Specialist
NDSU Carrington Research Extension Center



WEATHER FORECAST

Summary

It's been two weeks since the last report, and I'd like to summarize where we're sitting going into late August, and draw your attention to some useful tools and graphics at the [NDAWN.INFO website](https://ndawn.ndsu.nodak.edu). Despite some hot and humid days recently, average air temperatures for the past two weeks have been below normal across ND (Figure 1). Total rainfall for the two week period (Figure 2) was rather sparse, and was below normal for most areas of ND except in the northwest, southwest, and southeast (Figure 3).

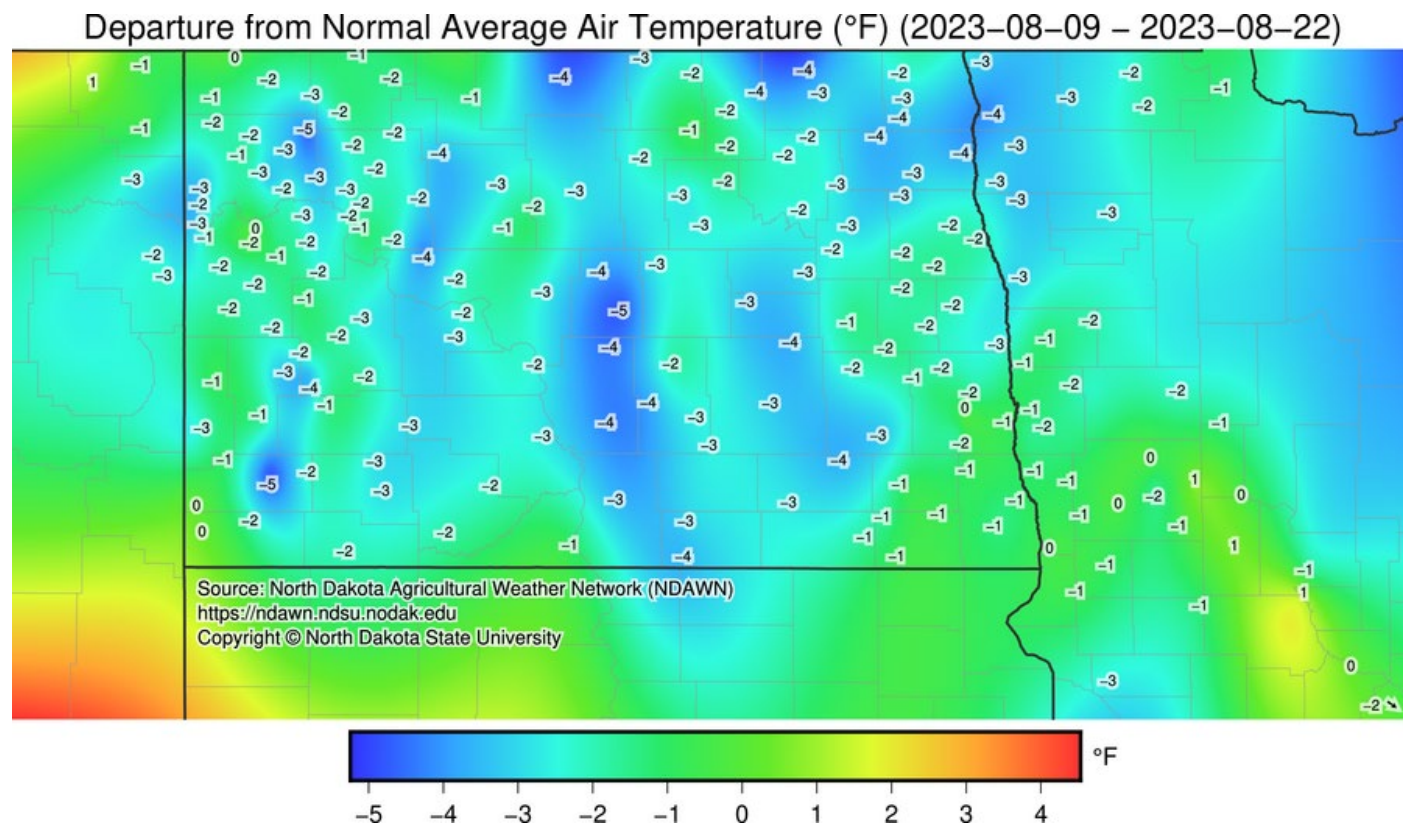


Figure 1. Average air temperature departure from normal from August 9 through August 22.

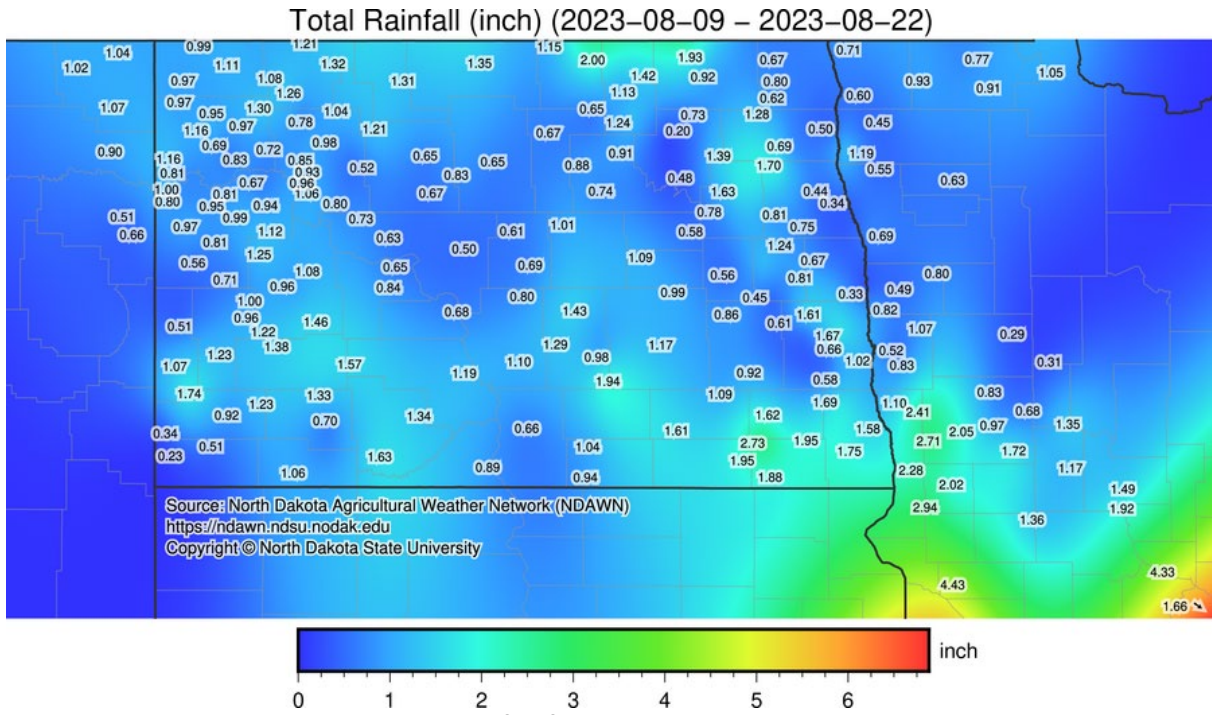


Figure 2. Total rainfall from August 9 through August 22.

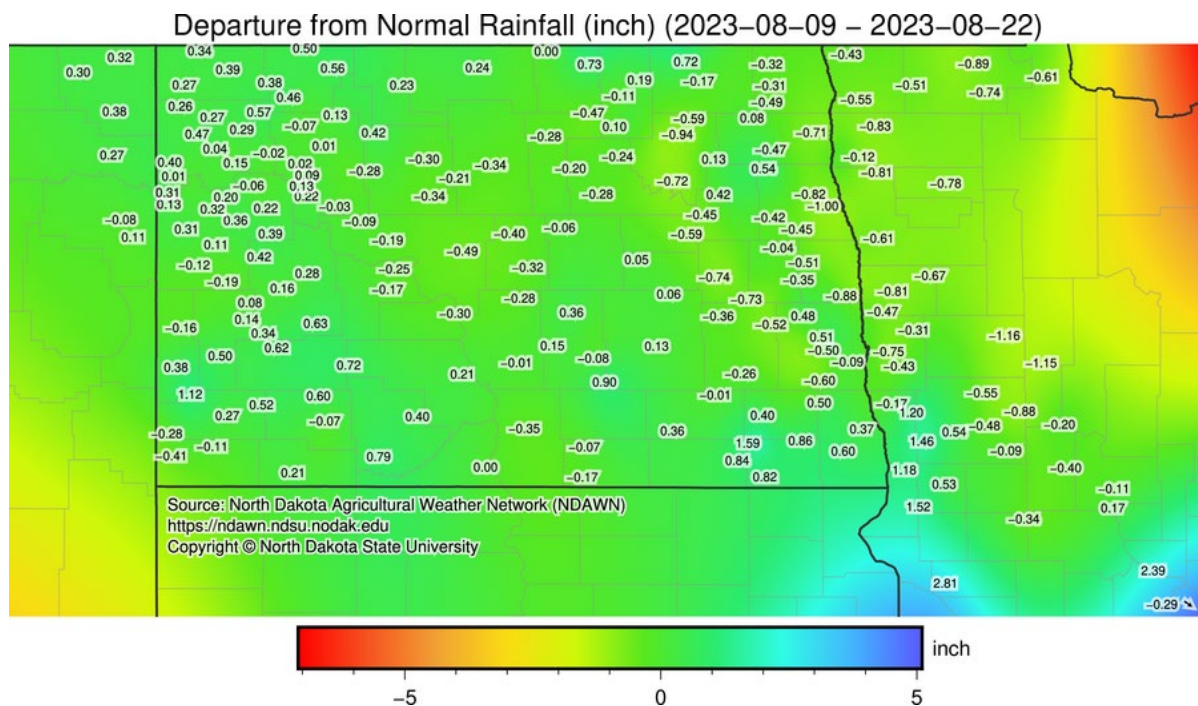
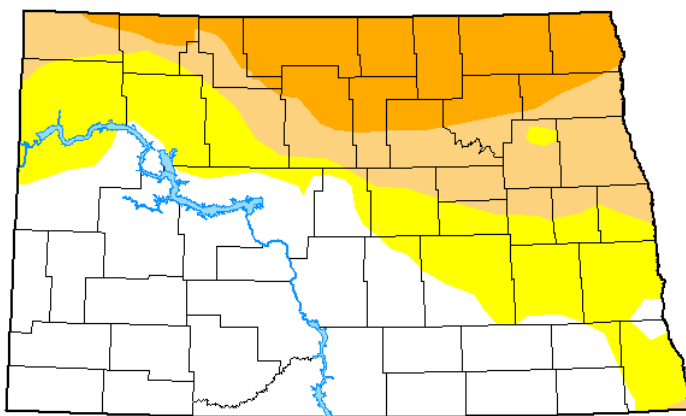


Figure 3. Rainfall departure from normal from August 9 through August 22.

D0 - D2 drought conditions prevail across northern and eastern ND as of August 15 (Figure 4). Check out the [drought page](#) at NDAWN.INFO for ND, MN and US drought conditions. There are also links to Drought Outlook, Vegetation Drought Response Index, Palmer Drought Index and Crop Moisture Index, and USDA Topsoil Moisture graphics. While the drought monitor graphics broadly depict drought conditions, the Vegetation Drought Response Index graphics provide much finer detail, and include graphics for croplands (Figure 5) and rangelands (Figure 6), as well as depicting where more moist conditions exist. Don't forget to check the [soil temperature and moisture pages](#) for current conditions at various soil depths, as well as the [weekly soil temperature and moisture change pages](#) for changes in soil temperature and volumetric water content. I'll make another plug here for our readers to participate in the [Condition Monitoring Observer Reports \(CMOR\)](#) system. Reports can be submitted using your desktop or laptop computer or through a smart device app. The website provides a [training video](#) and a [factsheet](#) on how to use the app. Reports should be submitted by noon each Monday. Public drought condition reporting is critical for drought monitors, especially during the growing season when conditions can change rapidly.

U.S. Drought Monitor North Dakota



August 15, 2023

(Released Thursday, Aug. 17, 2023)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	46.68	53.32	31.04	15.35	0.00	0.00
Last Week 08-08-2023	42.42	57.58	30.27	7.31	0.00	0.00
3 Months Ago 05-16-2023	81.38	18.62	6.79	0.00	0.00	0.00
Start of Calendar Year 01-03-2023	0.00	100.00	79.69	17.35	0.00	0.00
Start of Water Year 09-27-2022	1.13	98.87	71.59	12.21	0.00	0.00
One Year Ago 08-16-2022	75.85	24.15	0.53	0.00	0.00	0.00

Intensity:

None	D2 Severe Drought
D0 Abnormally Dry	D3 Extreme Drought
D1 Moderate Drought	D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

Author:

Lindsay Johnson
National Drought Mitigation Center



droughtmonitor.unl.edu

Figure 4. Drought conditions for North Dakota as of August 15.

Vegetation Drought Response Index

Croplands: North Dakota

August 20, 2023

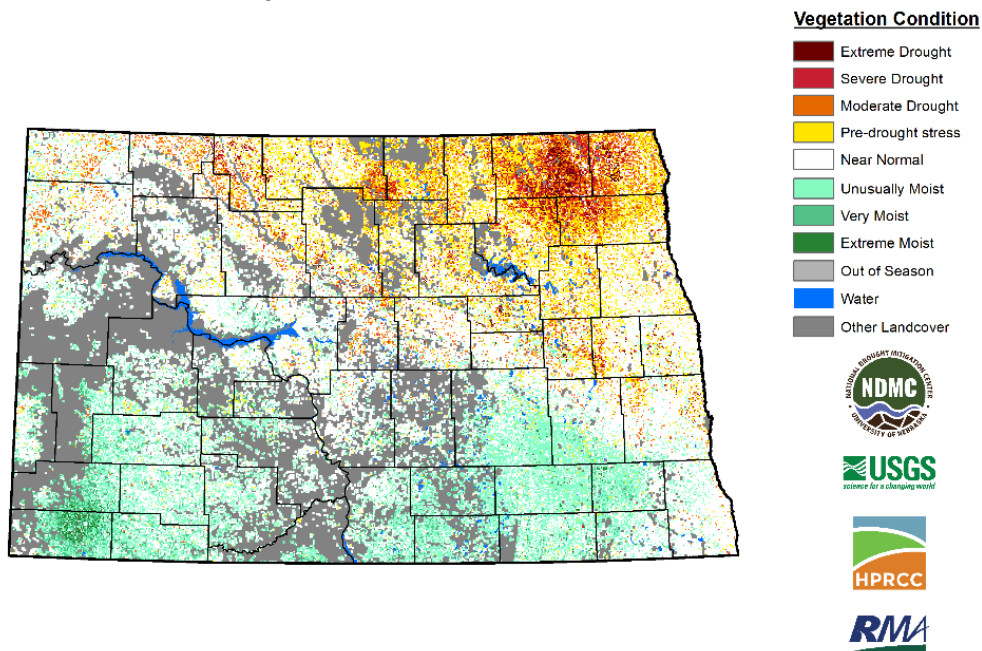


Figure 5. Vegetation Drought Response Index for croplands in North Dakota as of August 20.

Vegetation Drought Response Index

Rangelands: North Dakota

August 20, 2023

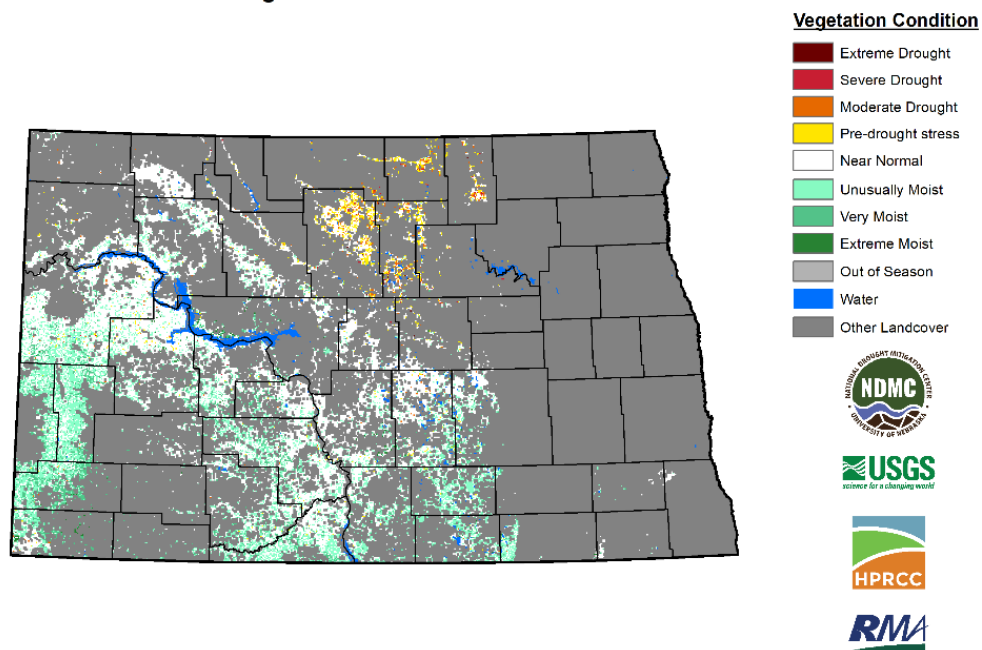


Figure 6. Vegetation Drought Response Index for rangelands in North Dakota as of August 20.

Lastly, be sure to check out the [graphics for growing degree days](#) at NDAWN.INFO. You can select from our main crops and a range of planting dates, and also a GDD forecast for the coming week using either a base temperature of 32°F or 50°F. For the most accurate degree day accumulations for your crops in your locations, please visit the main [NDAWN website](#). Under 'Applications' from the menu, select your crop(s) GDD models, select the nearest NDAWN station, enter your planting date, and select any departure comparisons.

Outlook

Looking at forecast ensembles, there are a few features of interest. High pressure will continue to dominate across the southern Great Plains, and we'll be along the northern boundary of that high. Another high pressure system looks to stay parked in the Pacific Ocean south of the Gulf of Alaska, and a deep low pressure system stays put over the Aleutians, but gets pushed eastward by another low later this weekend. The result is a series of low pressure systems traversing the Canadian arctic, with high pressure building in the central and northern Great Plains. Bottom line is that we don't have much in the way of precipitation chances, and temperatures should be above normal. Having said that, we do have a chance of rain in the wee hours of Friday morning, and another brief chance Sunday morning (west) into Sunday afternoon and evening (east). The shortwaves that are bringing us those rain chances won't have much moisture to work with. The 7-day quantitative precipitation forecast shows the potential for up to 0.5 inches of rain in northeastern ND across northern MN during this timeframe (Figure 7). That will be good for harvesting small grains and canola, but not so good for alleviating drought conditions. The 6 to 10 day outlooks show a strong probability for above normal temperatures (Figure 8) and below normal precipitation chances (Figure 9). for our region.

[Patrick Beauzay](#)

State IPM Coordinator

Research Specialist, Extension Entomology

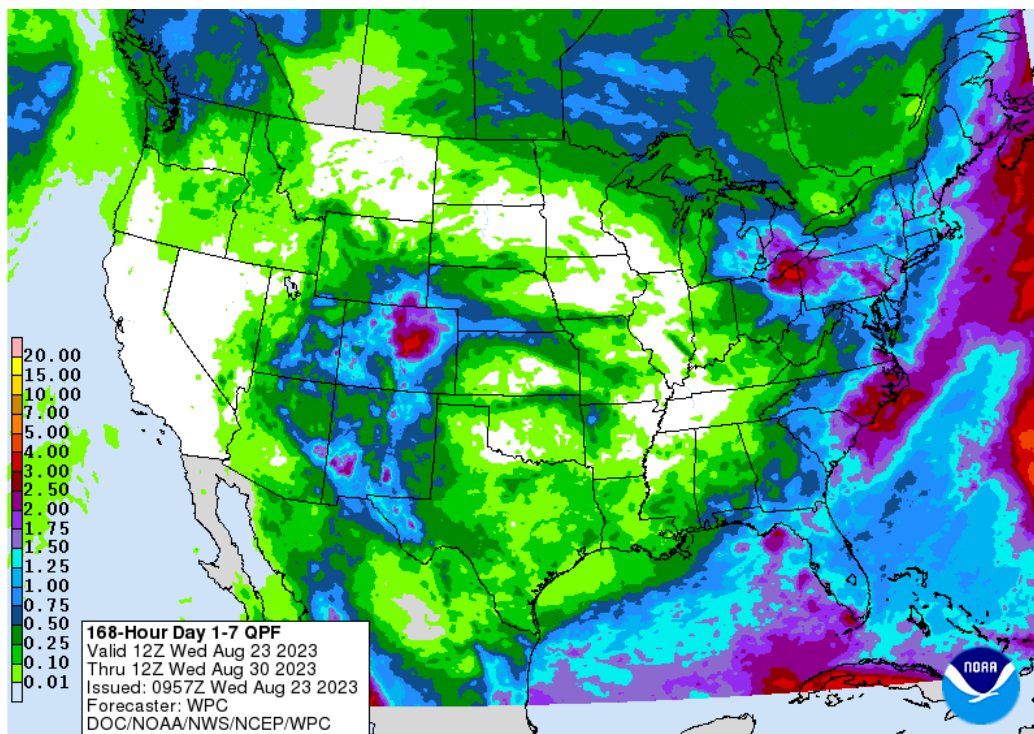


Figure 7. Precipitation potential from 7:00 AM August 23 through 7:00 AM August 30.

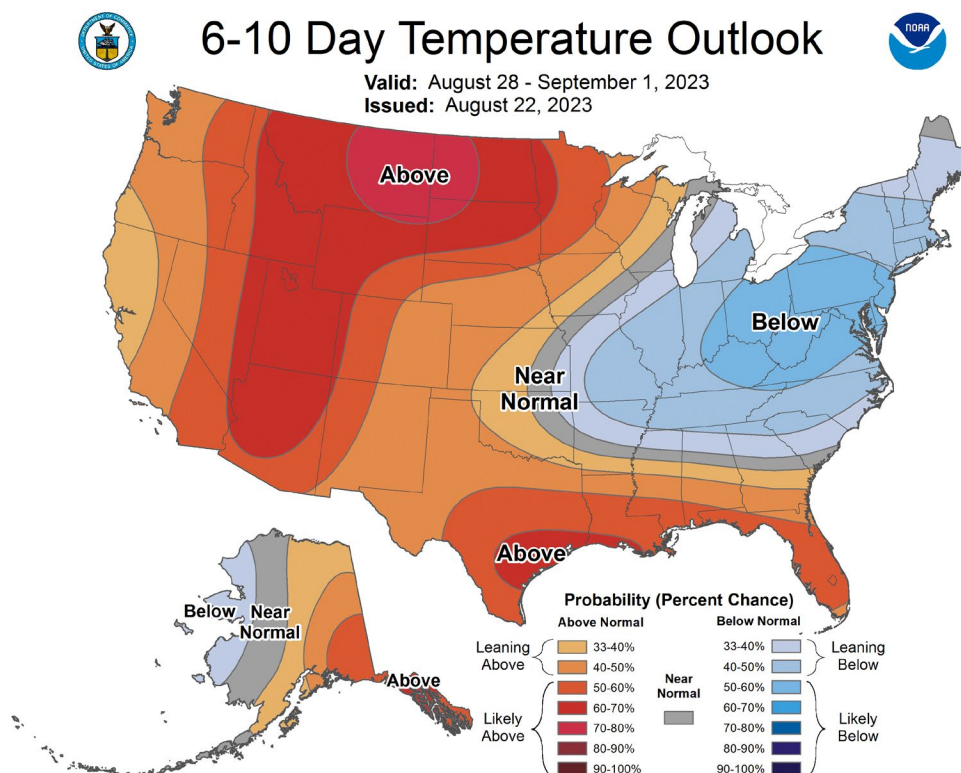


Figure 8. Temperature outlook for August 28 through September 1 for the continental United States and Alaska.

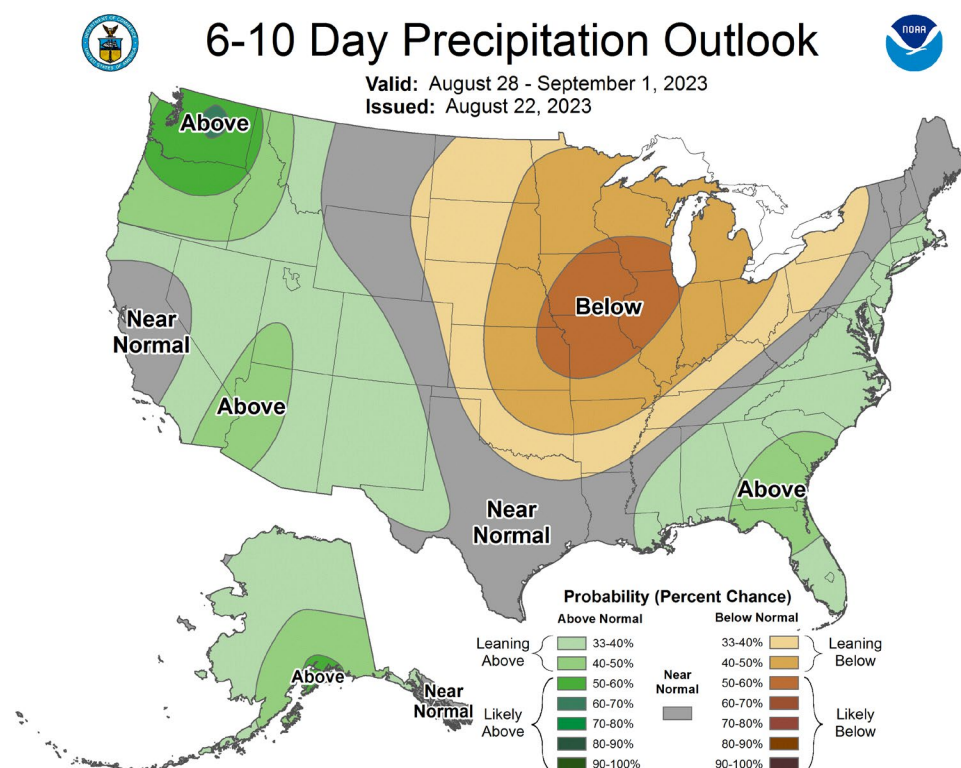


Figure 9. Precipitation outlook for August 28 through September 1 for the continental United States and Alaska

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