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Extension Agronomy

eUpdate

10/05/2023

These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy eUpdate Editor. All of the Research and Extension faculty in Agronomy will be involved as sources from time to time. If you have any questions or suggestions for topics you'd like to have us address in this weekly update, contact Kathy Gehl, 785-532-3354 kgehl@ksu.edu, or Dalas Peterson, Extension Agronomy State Leader and Weed Management Specialist 785-532-0405 dpeterso@ksu.edu.

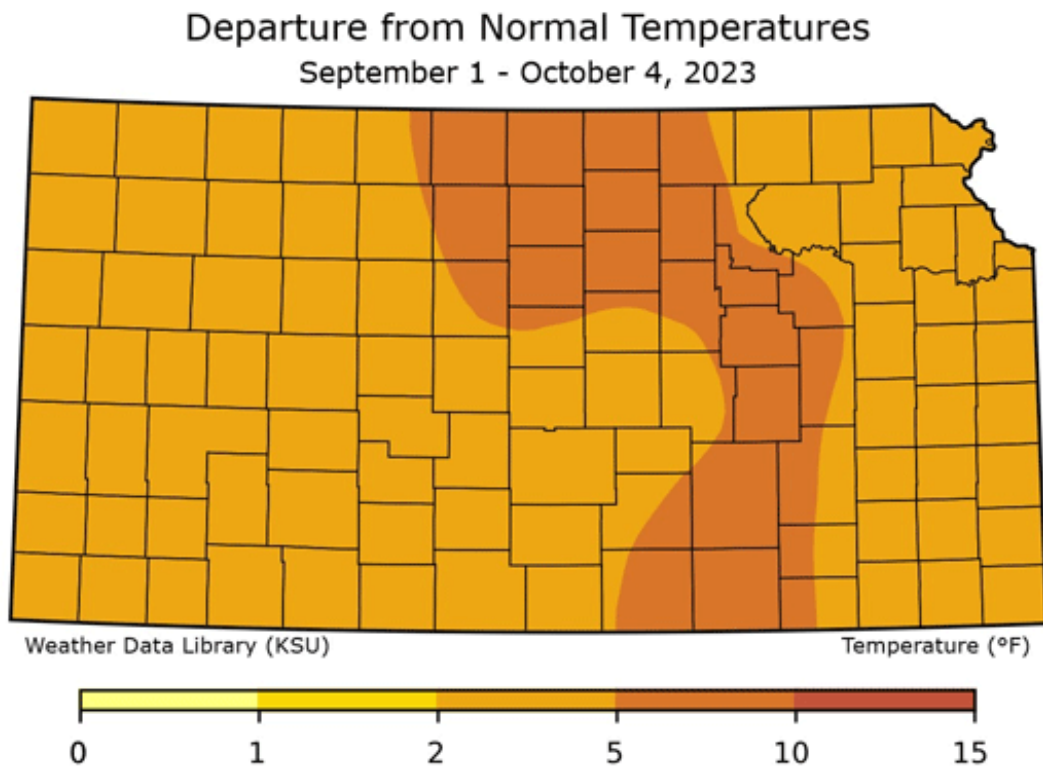
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1. Rate of dry down in sorghum before harvest

The latest [Crop Progress and Condition report](#) from USDA NASS, on October 2, stated that grain sorghum maturity was 60%, ahead of 50% last year and near the average (54%). Harvest is underway at 19% this year, ahead of the 5-year average (11%).

The weather conditions experienced from early September to early October are critical for sorghum as they are related to the grain-filling rate and the determination of final grain weight. Warm and very dry conditions have continued to prevail across all but the southwest portion of the state. The greatest precipitation departures are in the east, where some locations are over 5 inches below normal since September 1 (Figure 1). The southwest, on the other hand, has observed as much as 3 inches above normal precipitation. Temperatures were more consistent statewide, with the entire state running 2-5°F above normal, with the Flint Hills region as much as 10-15°F warmer for the period (Figure 1).



Departure from Normal Precipitation

September 1 - October 4, 2023

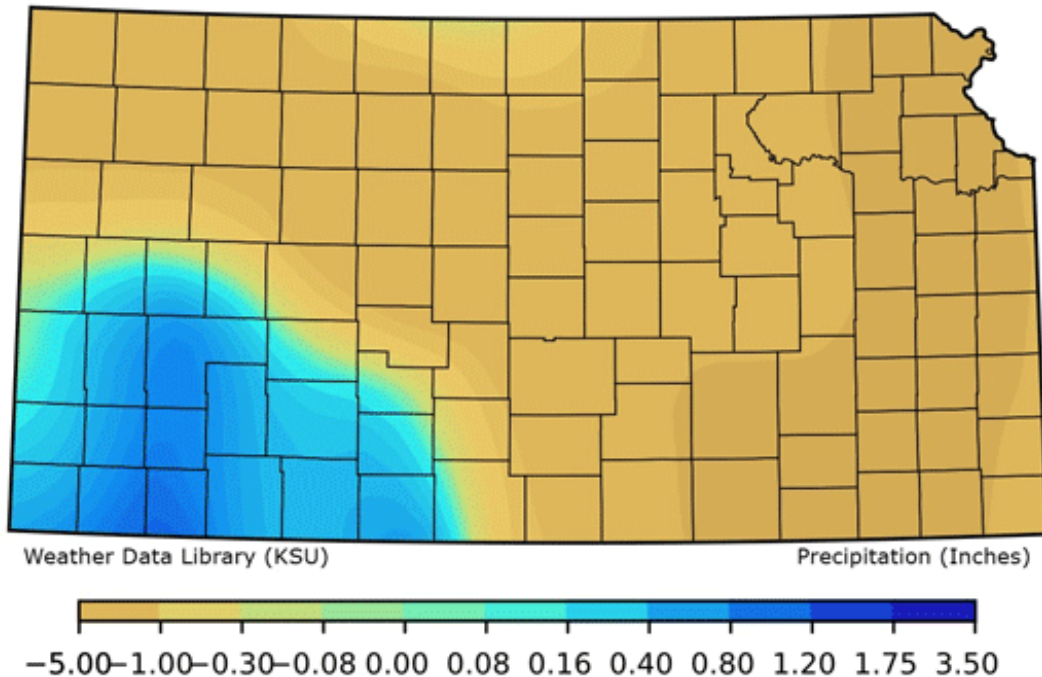


Figure 1. Departure from normal temperatures (top map); b) Percent of normal precipitation (bottom map) from September 1 – October 4, 2023. Maps by Kansas Weather Data Library.

In recent years, a common question from producers is related to the dry down rate for sorghum when approaching the end of the season. Based on previous information, the average dry down rate depends on the weather, primarily temperature and moisture conditions, but data from modern hybrids is limited. The weather outlook for the remainder of October and into November favors the continuation of below-normal precipitation for the state. With normal precipitation in November much less than in October, this could mean almost no moisture. This would favor a faster dry down rate than average, but any sorghum impacted by freeze (should an event occur) will present challenges in the dry down rate.

From a crop perspective, the overall cumulative GDD from flowering to maturity is about 800-1200 (based on 50 degrees F as the base temperature), with the shortest requirement in GDD for short-season hybrids. Before maturity, from the beginning of grain filling (soft dough until maturity), grain moisture content within a grain will go from 80-90% to 25-35%, where black-layer is usually formed (Figure 2). From maturity (seen as a “black-layer” near the seed base; Figure 2) to harvest time, sorghum grain will dry down from about 35 to 20 percent moisture, but the final maximum dry mass accumulation and final nutrient content will have already been attained at maturity.

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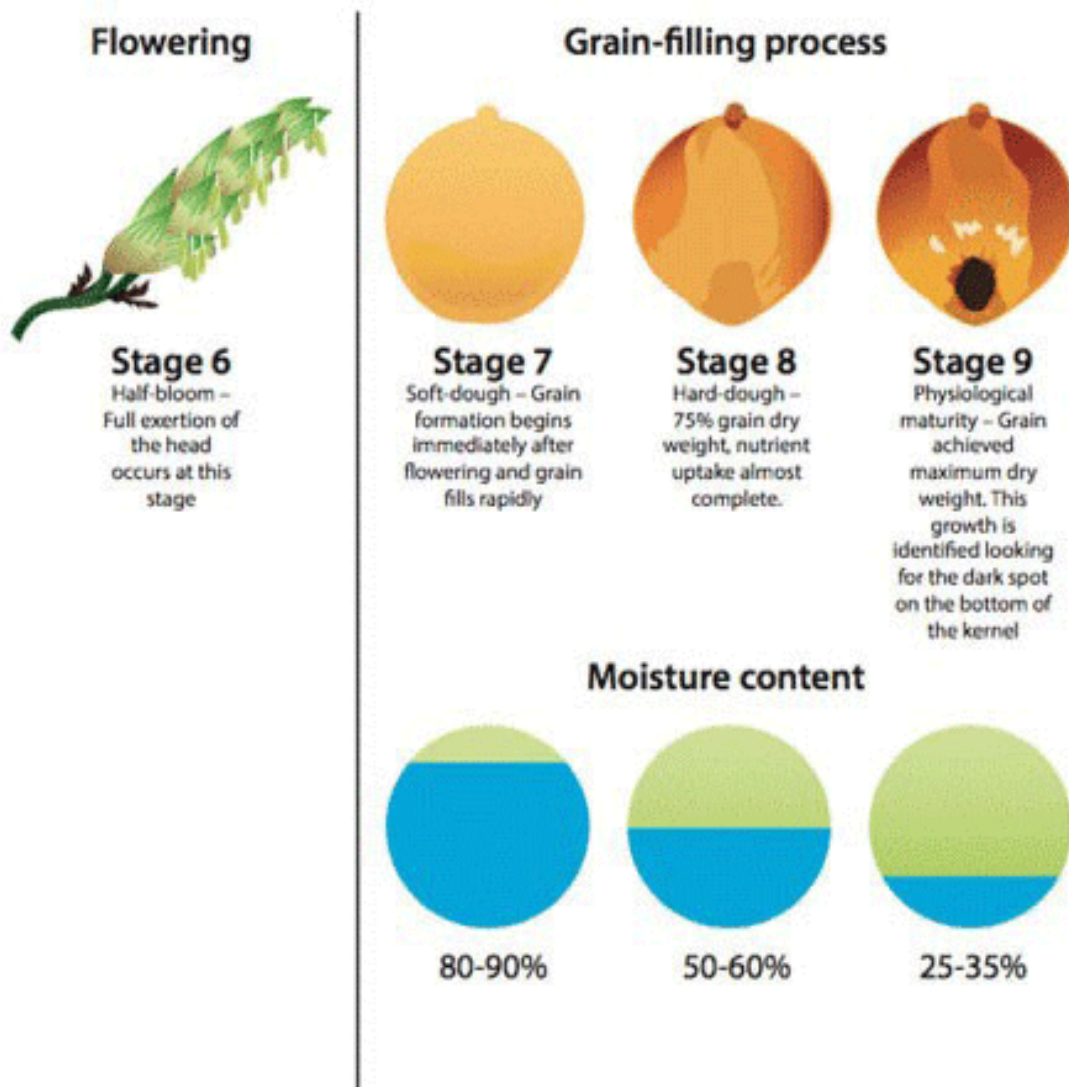


Figure 2. Sorghum growth stages from half-bloom and grain filling (including soft dough, hard dough, and physiological maturity). Infographic representing changes in grain coloration and moisture content during grain filling period until black layer formation (maturity). For further reference on sorghum growth and development, please check: <https://bookstore.ksre.ksu.edu/pubs/MF3234.pdf>. Graphic by K-State Research and Extension.

Grain water loss occurs at different rates but with two distinct phases: 1) before “black-layer” or maturity (Figure 2), and 2) after black-layer. For the first phase, Figure 2 presents the changes in grain moisture from soft dough until the physiological maturity of sorghum.

To answer the rate of dry down question from many of our producers, a study was conducted to investigate the effect of the grain dry down rate from the moment of “black-layer” until commercial harvest grain moisture is reached. For the conditions experienced in 2019, 2021, and 2022 (from early September until Mid-October), the overall dry down rate was around 0.7% per day (from 31-34% to 16-17% grain moisture) – taking an overall of 30 days.

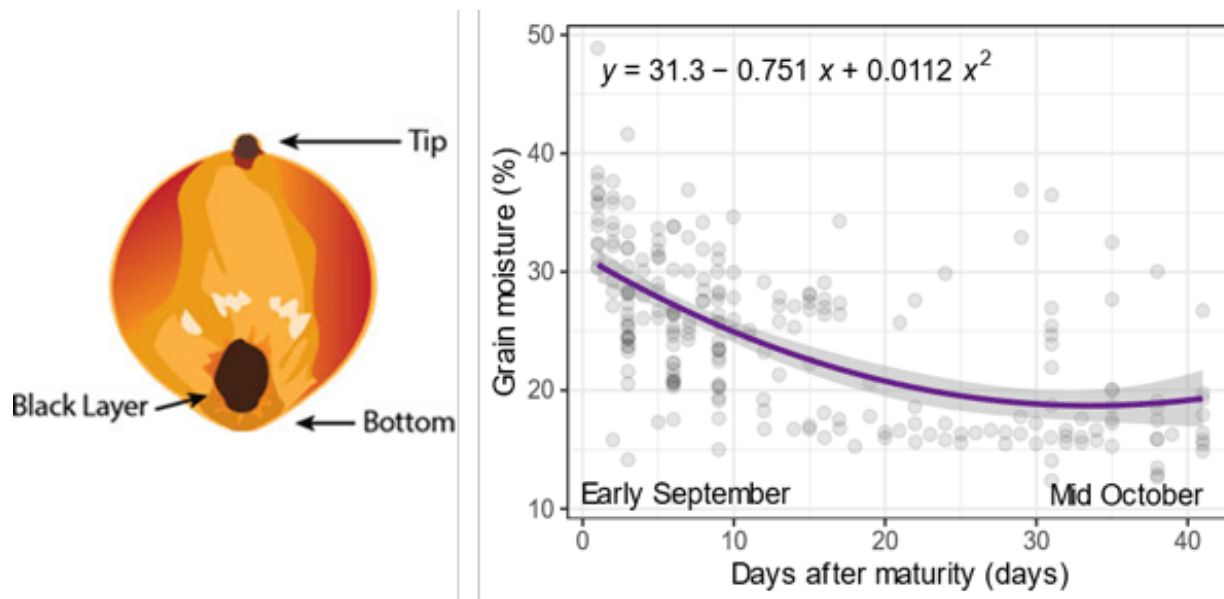


Figure 3. Grain moisture dry down across different sorghum hybrids for a study located near Manhattan, KS (2019, 2021, and 2022 growing seasons). The graphic in the left panel illustrates the black layer stage of grain for sorghum. Graphics from K-State Research and Extension.

This dry down process can be delayed by:

- Low temperatures
- High humidity
- High grain moisture content at black layer (38-40%)

It is expected that the dry down rate will decrease to around <0.5% per day for late-planted sorghum entering reproductive stages later in the growing season. A similar decrease is also expected for sorghum that was exposed to late-season stress conditions (e.g., drought, heat, and freeze). Under these conditions, maturity may be reached with high grain water content, and the last stages after black layer formation could face lower temperatures and higher humidity. These main factors should be considered when the time comes to schedule harvest.

You can track temperature and humidity levels on the Kansas Mesonet website at <http://mesonet.k-state.edu/weather/historical/> by selecting the station and time period of interest.

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2. Kansas Mesonet fall freeze and winter cold tool available

With freezing temperatures in the forecast for much of northwest and north-central Kansas, the Kansas Mesonet’s Freeze Monitor (<https://mesonet.k-state.edu/airtemp/min/hoursbelow/>) is now available for the 2023 fall frost/freeze season. The Freeze Monitor is a handy tool to check conditions in your area. Have freezing conditions been recorded? How does it compare to the average? How many hours below freezing was your area?

The average freeze date (32°F) in northwest Kansas is as early as the last week in September (Figure 1). However, southeast Kansas does not usually see freezing temperatures until the end of October (Figure 1). You can find the average first freeze dates by location here: <https://mesonet.k-state.edu/airtemp/min/hoursbelow/#tab=table-tab&mtIndex=6>. The “Table” tab lists the average dates on the right side (Figure 2). Average dates for the first occurrence of 24 °F temperatures are even later (Figure 3).

Figure 1. Average fall freeze dates for Kansas. Source: Kansas Weather Data Library.

Table	Data from Thu Oct 05 2023 08:00 -- Click column headers to sort data						
Chart	Station	Days Since 24°F		This Fall	Fall Freeze Climatology		
Calculate		Days	Date	First 32°F	Average Date	Record Earliest	Record Latest
Download	Ashland 8S	180	2023-04-08		10-15	1995-09-22	1937-11-14
Resources	Ashland Bottoms	181	2023-04-07		10-16	2003-10-01	1998-11-10
	Belleville 2W	164	2023-04-24		10-20	2004-10-02	2016-11-12
	Bunker Hill 3NE	>365	M		10-17	1995-09-22	1998-11-04
	Butler	191	2023-03-28		10-20	1995-09-22	2016-11-12
	Cherokee	199	2023-03-20		10-25	1942-09-27	2004-11-25
	Cheyenne	164	2023-04-24		10-08	1983-09-22	1963-10-28
	Clay	181	2023-04-07		10-16	1995-09-22	1998-11-11
	Colby	164	2023-04-24		10-07	1983-09-22	1963-10-28
	Coming 2NW	191	2023-03-28		10-13	1995-09-22	1998-11-11
	Elmdale 1SE	191	2023-03-28		10-17	1995-09-22	1902-12-03
	Flickner Tech Farm	164	2023-04-24		10-20	1995-09-22	2016-11-12
	Garden City	181	2023-04-07		10-14	1995-09-22	1973-11-01

Figure 2. First freeze date averages for all Mesonet stations as found on the “Table” tab. Source: Kansas Mesonet.

Average Date of First 24 °F Freeze

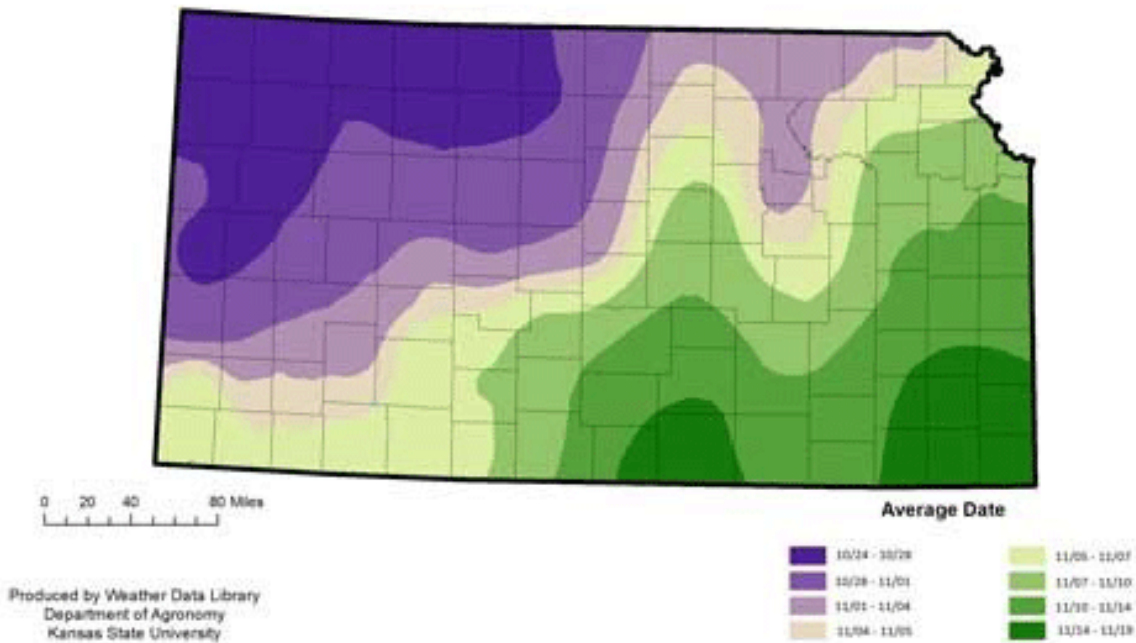


Figure 3. Average 24°F freeze dates for Kansas. Source: Kansas Weather Data Library.

Historically, almost all parts of the state have recorded freezing temperatures as early as September. Earliest first freeze on record in Kansas is September 3, 1974, when many stations dropped below freezing. This year, with the forecasted near-freezing temperatures on the 7-8th of October, this would be almost exactly average for portions of the northwest and north-central.

The Freeze Monitor tool displays the coldest temperatures observed across Kansas during the previous two weeks (the most recent freeze event during the previous two weeks is displayed). It answers the frequent question: How cold did it get? (Figure 4). It also tracks the first fall freeze date for each station for comparison to local climatology in a table (<https://mesonet.k-state.edu/airtemp/min/hoursbelow/#tab=table-tab&mtIndex=6>) as seen in Figure 2. Data updates every twenty minutes on both the map and the table.

Another tool important for producers and gardeners is the duration below freezing, as some crops and commodities have lower thresholds for damage. This feature address the common: Was it cold long enough to damage crops question, allowing users to select options to view maps/data of the “[hours below 32°F](#)”, “[hours below 24°F](#)”, and the “[hours below 12°F](#)”). While all three are of interest, the lower two thresholds are of great importance to wheat growers later into the fall/winter season.

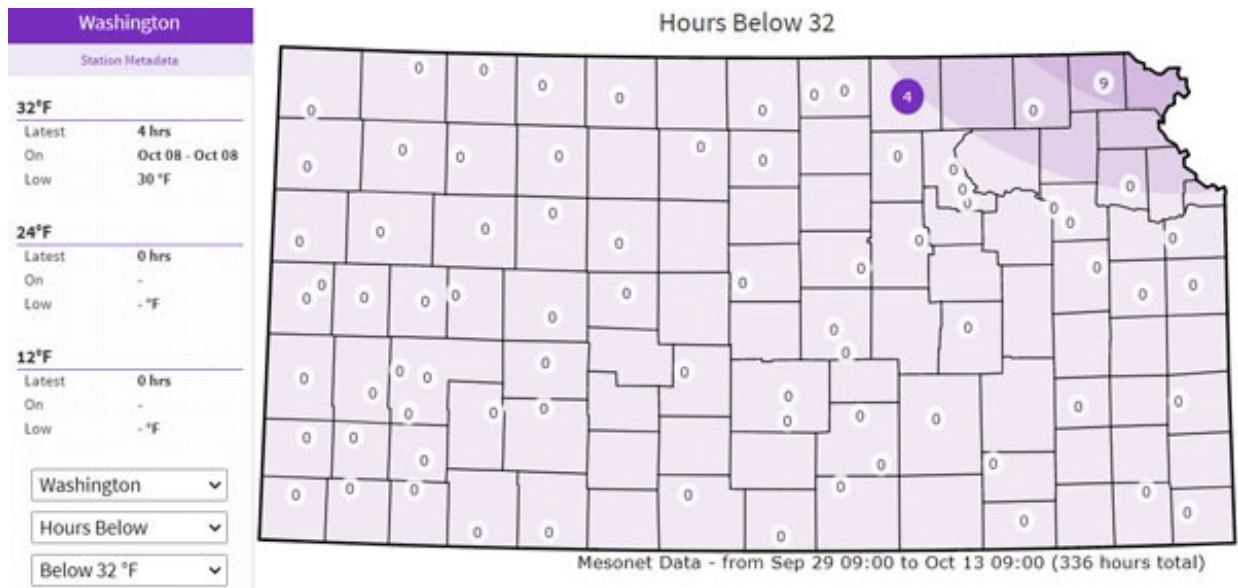


Figure 4. View of the Freeze Monitor webpage on October 13, 2022. Washington (selected station) is showing a freeze event that occurred on October 8, 2022. The map represents the latest freeze events at these locations since September 29, 2022. Source: <https://mesonet.k-state.edu/airtemp/min/hoursbelow/#tab=table-tab&mtIndex=0>

As the growing season concludes, the freeze monitor can also answer the question: How long have we been above freezing? The freeze monitor also has the ability to track the duration of days since the last freeze or below the 24°F and 12°F threshold. This is great for the first freeze and determining the length of the growing season. You can find "days since" using this link: <https://mesonet.k-state.edu/airtemp/min/hoursbelow/#tab=table-tab&mtIndex=6>. Much of the state hasn't seen a freeze since late April in the state of Kansas – a growing season between 150-160 days for 2023 (Figure 5).

Days Since 32

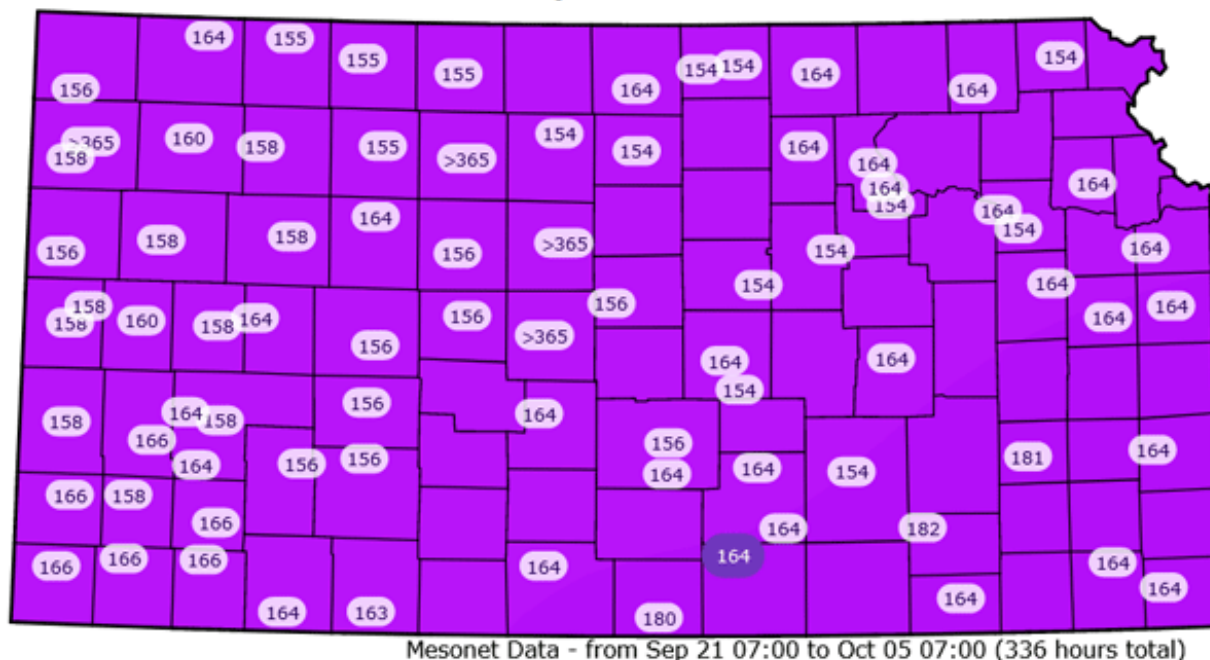


Figure 5. Number of days since last freeze as of October 5, 2023. Find this information here: <https://mesonet.k-state.edu/airtemp/min/hoursbelow/#tab=table-tab&mtIndex=6>.

The data displayed in the tables below the maps can be sorted. Clicking on the header of a particular column will sort the table by that column. This makes it much easier to see what area was the coldest in the state, as well as the earliest freeze and earliest climatological freeze data. There are a number of download options, including table and chart data, and images of the maps (Figure 6).

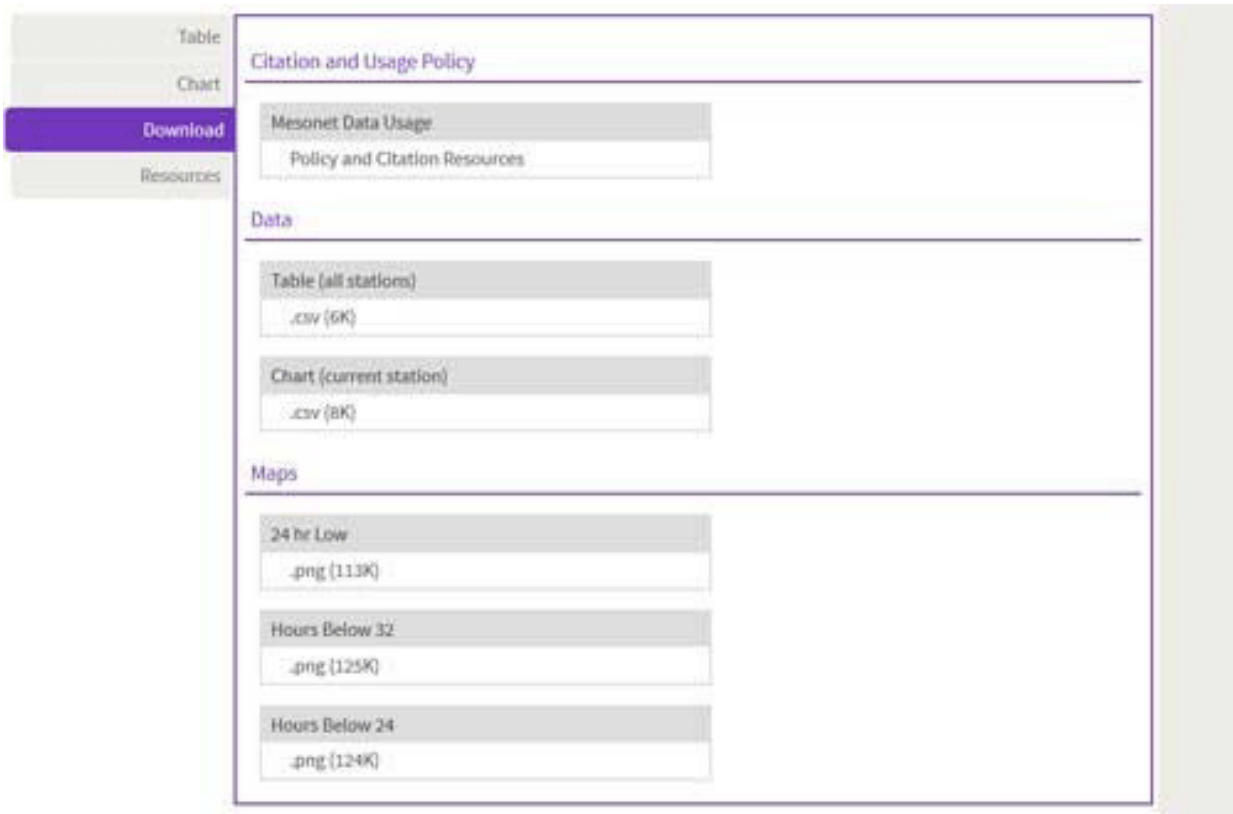


Figure 5. Download options on the Freeze Monitor website.

The Freeze Monitor is operational through the winter and available to be used for the 24°F and 12°F thresholds in addition to 32°F. The product will be updated as we near the spring to present the spring freeze climatology.

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3. 2023 Kansas Soybean Yield and Value Contest

The Kansas Soybean Association is calling all soybean farmers in Kansas to enter their competitive soybean crop into the Kansas Soybean Yield Contest by December 1.



Continuing in 2023, the Kansas Soybean Association will sponsor three participants to attend the Commodity Classic in Houston, TX, in late February 2024. First place in both contests, as well as one randomly drawn participant who entered both contests, earn the trip. Airfare, parking, accommodations, and registration will be covered.

The Kansas Soybean Commission sponsors a monetary prize for the top three finishers in each district, as well as an additional \$1,000 for the overall dryland and irrigated winners and any who top

the 114.3 bushel-per-acre record. The amounts per district are that first place receives \$300, second place receives \$200, and third place receives \$100. All participants receive a T-shirt for entering.

Districts are determined by region, tillage method, and irrigation status, with a total of 18 districts in consideration. No-till on the Plains supplies additional awards in the no-till categories. Farmers may enter multiple categories but only one entry per field.

Eligible fields must consist of at least five contiguous acres as verified by the Farm Service Agency, GPS printout, or manual measurement. A non-relative witness, either Kansas State Research and Extension personnel or a specified designee, must be present at harvest and should ensure that the combine grain hopper is empty prior to harvest. Official elevator-scale tickets with moisture percentage and foreign matter included must accompany entries to be considered.

The statewide Kansas Soybean Value Contest which analyzes protein, oil, and other soybean qualities, is also open for entries. Entrants submit 20-ounce samples, which Ag Processing, Inc. evaluates to determine the value. Monetary awards are also given to the three highest-value entries. Farmers may enter both the yield and value contests.

The results of the contests will be announced at the 2024 Kansas Soybean Expo in Topeka.

A full guide of contest rules and regulations, as well as the digital entry form, are available at kansassoybeans.org/association/contests/. Questions may be directed to the Kansas Soybean office by phone at 877-KS-SOYBEAN (877-577-6923) or local KSRE offices.

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4. Kansas Bankers Association Conservation Awards Program – Nominations due Nov. 10

Nominate a deserving Kansas producer or landowner for the 2023 Kansas Bankers Association Conservation Awards Program. This year, the Kansas Bankers Association, K-State Research and Extension, and the Kansas Department of Wildlife and Parks have announced six award categories:

- **Energy Conservation**
- **Water Quality**
- **Water Conservation**
- **Soil Conservation**
- **Windbreaks**
- **Wildlife Habitat**

The purpose of this program is to stimulate a greater interest in the conservation of the agricultural and natural resources of Kansas by giving recognition to those farmers and landowners who have made outstanding progress in practicing conservation on their farms. In 2021, over 200 Kansas producers and landowners were recognized through this program.

Submit this form to the County Extension Office or District Biologist for Kansas Wildlife, Parks, and Tourism (Wildlife Award only) no later than **November 10, 2023**.

A committee of conservation professionals will submit the names of the selected recipients to the KSU Agronomy Extension office (or KDWPT for Wildlife Award) by December 8, 2023.

For more information, see: <https://www.agronomy.k-state.edu/extension/kansas-bankers-award/>

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