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These e-Updates are a regular weekly item from K-State Extension Agronomy and Kathy Gehl, Agronomy e-Update 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 Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. Excessive rainfall delays wheat sowing progress in Kansas

Precipitation in the Kansas wheat growing region during the period of October 2 – 8 brought anywhere from <0.6 of an inch in the far western tier of counties to as much as 6.8 inches in portions of northwest, central, and north-central Kansas (Figure 1). This early-October precipitation occurred after above-normal precipitation in late-September, resulting in fields with a full soil moisture profile for most of the state (Figure 2), but also in water-logged soils which are delaying field work (Figure 3).

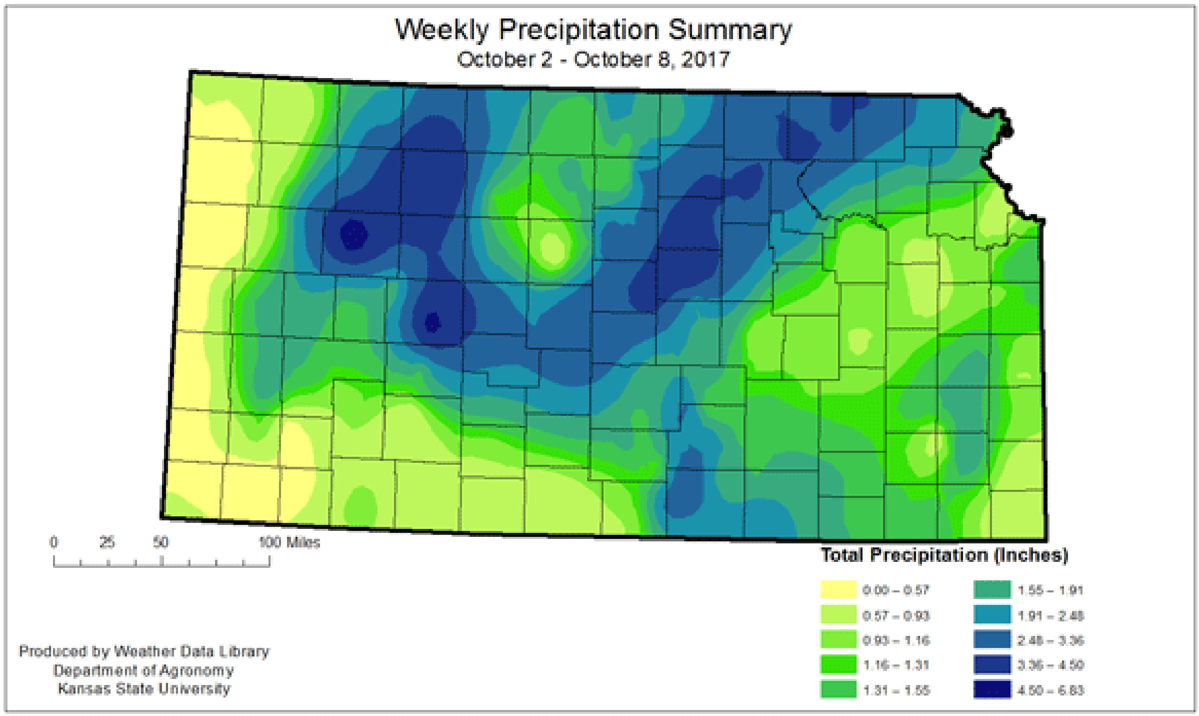

Figure 1. Cumulative precipitation during October 2 – 8, 2017. Map by K-State Weather Data Library.

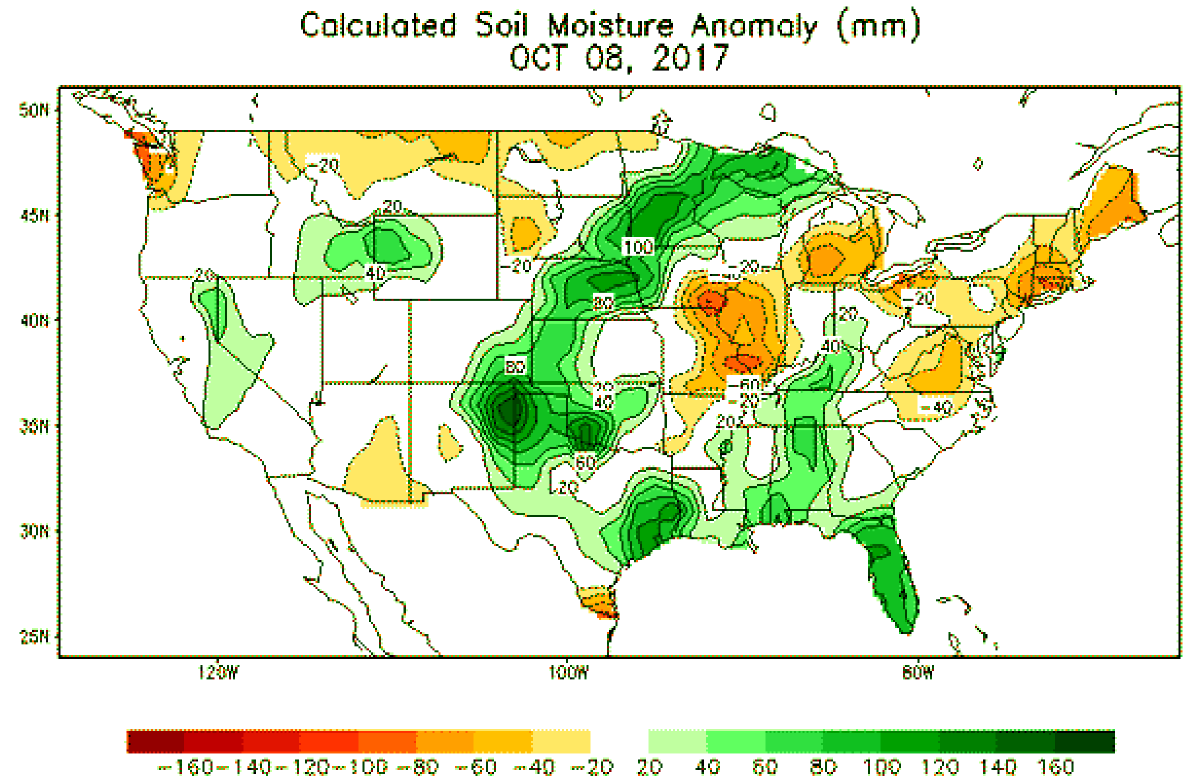

Figure 2. Calculated soil moisture anomaly across the United States as of October 8, 2017. Central and western Kansas shows anywhere from 1.6 to 3.2 inches of positive anomaly. Map by Climate Prediction Center (http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/US/Soilmst/Soilmst.shtml#)

Figure 3. Water-logged fields in northwest Kansas as of early October 2017. Photo courtesy of Justin Gilpin, Kansas Wheat Commission.

These suboptimal conditions for field work caused by the excessive rains resulted in a delay in sowing progress in Kansas. Historically, according to crop reports by the USDA-NASS, 35% of Kansas wheat is usually sown by October 5, and 41% by October 11. This year, the crop stands at only 14% sown (Figure 4).

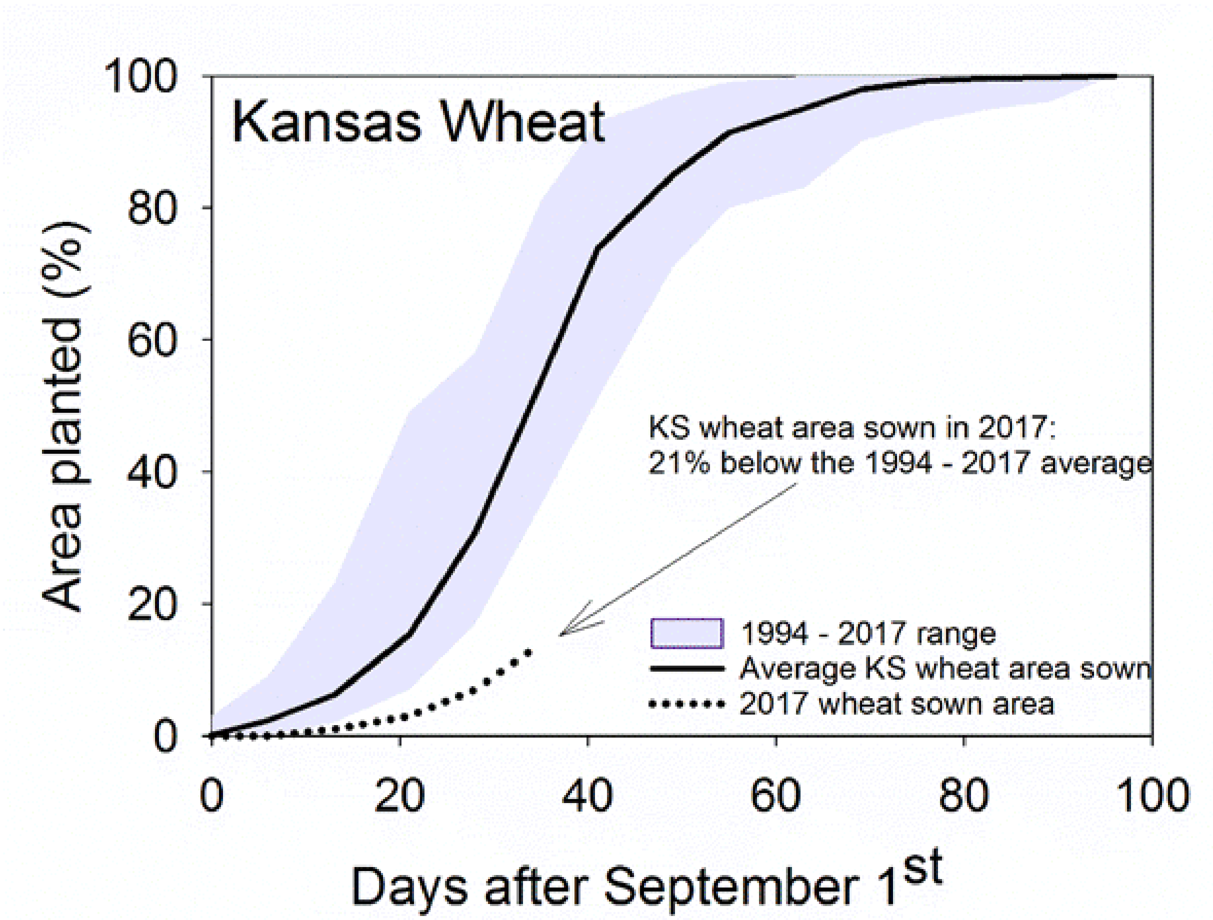

Figure 4. Wheat sowing progress in Kansas during 2017 (dashed line) compared to the 1994 – 2016 average (solid line) and range (purple area). Wheat area sown in the current year is 21% behind the long-term average, and is the lowest percent observed since 1994, considerably below the range observed in the period. Graph based on USDA-NASS crop report of progress as of October 2, 2017.

In addition to already delayed sowing, most of Kansas fields are too wet to allow for any field work, which will likely cause a further delay in sowing progress and could cause some fields to be planted after the optimum sowing window for the region. If producers are forced to delay sowing past their optimal window, fall growing dynamics will change with less time to tiller. This sowing delay might require some management adjustments to maximize crop productivity.

Management adjustments to consider as sowing is delayed past the optimum sowing window include:

- Increase seeding rate: Planting late will decrease the crop's fall tillering potential. Tillering is related to temperature and moisture availability, with higher temperatures resulting in more tillers. As planting is delayed, the crop will have less time to tiller in the fall, thus relying more on the primary tillers. As a consequence, we recommend increasing plant population if sowing is delayed past the optimum window. Every week planting is delayed past the end of the optimal planting date range should be compensated by increasing seeding rates by about 150,000 – 225,000 seeds per acre (or 10 to 15 lbs per acre) in western Kansas, or 225,000 – 300,000 seeds per acre (15 – 20 lbs per acre) in eastern Kansas. Final seeding rate should not be above 90 pounds per acre in western Kansas and 120 pounds in eastern and central Kansas for grain-only wheat production.

- Place starter phosphorus (P) fertilizer with the seed: Phosphate-based starter fertilizer promotes early-season wheat growth and tillering, which can help compensate for the delayed sowing date. Additionally, P is less available at colder soil temperatures, which can result in P deficiency under cold weather conditions. When planting late, producers should strongly consider using about 20-30 lbs per acre of P fertilizer directly with the seed, regardless of soil P levels. This placement method is more effective at that time of year than other application methods. The later the planting date, the more fall root development is slowed. The closer the fertilizer is to the seed, the sooner the plant roots can get to it.

- Use fungicide seed treatment or plant certified seed*:* Late-planted wheat is sown into colder soils, which generally increases the time needed for germination and emergence. As a consequence, there is increased potential for seed and soil-borne diseases that affect seedlings and early-season wheat development. Fungicide seed treatments can protect the seed and seedling during the extended time it is subjected to potential seedling diseases, improving stand establishment under poor growing conditions. It is important that the seed treatment thoroughly coat the seeds to ensure good protection. For fungicide seed treatment options, please refer to the most current version of K-State fungicide seed treatment chart available at: https://www.bookstore.ksre.ksu.edu/pubs/MF2955.pdf

- Variety selection: It is probably too late to make any changes in which wheat variety to plant this fall. However, a few points to consider when it is known that wheat will be planted late (e.g. when planning to sow wheat following soybeans) are tillering ability and maturity. A variety that has good tillering ability may offset some of the consequences of late planting as it might still be able to produce one or two tillers during the fall, whereas a low- tillering variety may produce none. Also, late- planted wheat is typically behind in development going into the winter, which might translate into slower development in the spring. This delay can result in plants being exposed to moisture stress and especially heat stress during grain filling, reducing the duration of the grain filling period. Thus, selecting an early-maturity variety with good yield potential may offset some of the consequences of late planting by decreasing the chances of a grain filling period subjected to warmer temperatures.

On a final note, a couple positive points about the sowing progress delay are:

- The majority of the state has good soil profile moisture, which will not only ensure good stand establishment, but also possibly contribute to wheat grain yield.
- Late-planted fields are less likely to be infected with wheat streak mosaic, as the wheat curl mite populations would be more active in warmer temperatures generally observed under early planting. Thus, we are probably decreasing the risk of another wheat streak mosaic outbreak due to the delayed planting.

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2. Mesonet freeze monitor returns: Freeze warnings for portions of western Kansas

The cold is coming. Freeze warnings have been issued for portions of western Kansas for the first time this fall. The Kansas Mesonet's Freeze Monitor (mesonet.ksu.edu/freeze) will be available again for the 2017 fall frost/freeze season. This tool focuses on displaying the coldest temperatures observed across Kansas during the previous 24 hours. It answers the frequent question: How cold did it get last night? It also tracks the first fall freeze date for each station for comparison to local climatology. Data will update every five minutes on both the map (Figure 1) and table (Figure 2).

Important for producers and gardeners, the lowest temperatures below freezing are also addressed, as some crops and commodities have lower thresholds for damage. This feature allows users to select options to view maps/data of the duration below freezing (32 degrees F) and also the number of hours below 24 degrees F. While both are of interest, the lower threshold is of great importance to wheat growers later into the fall season.

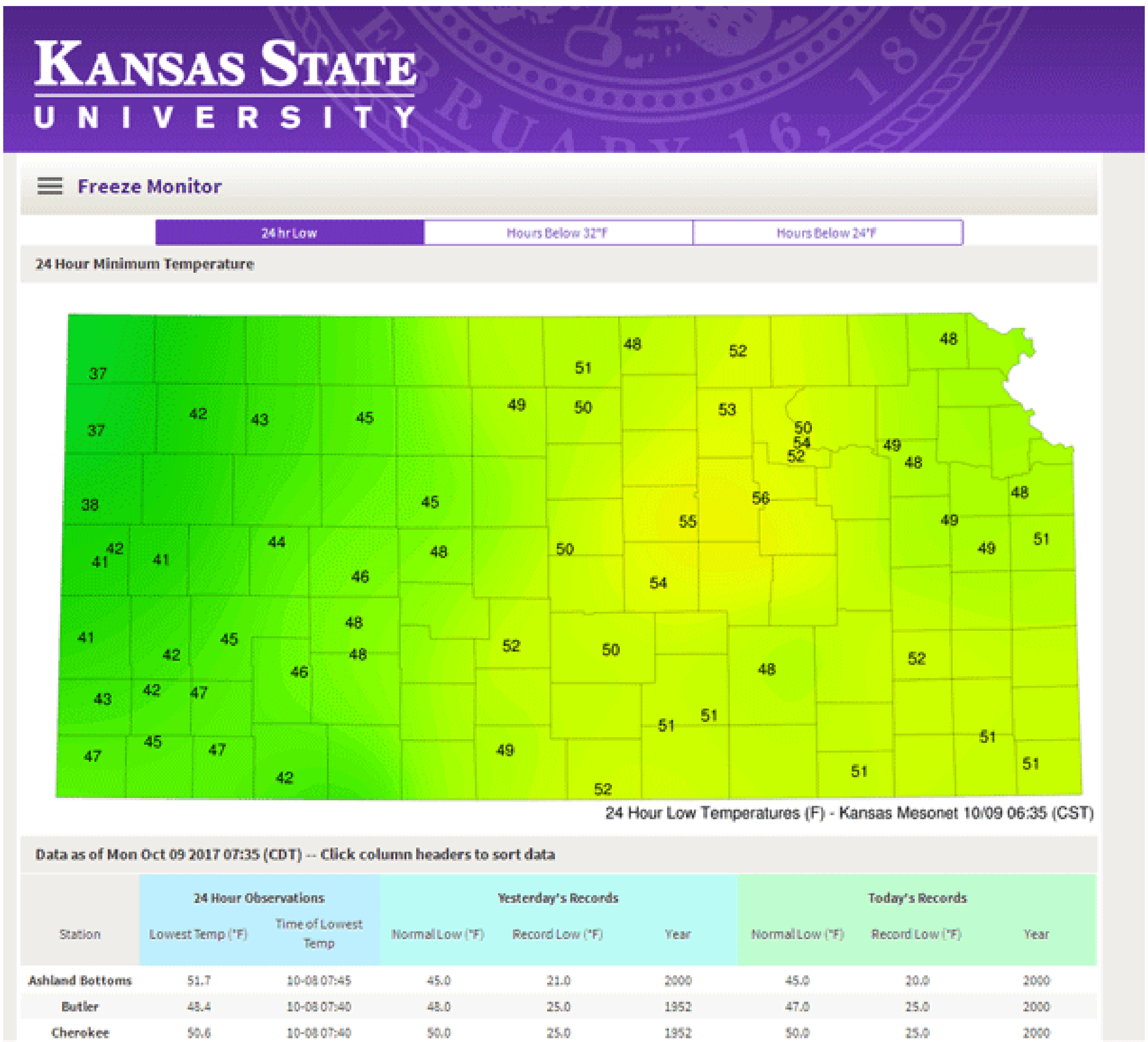

Figure 1: View of the Freeze Monitor webpage: mesonet.ksu.edu/freeze

The data displayed in the tables below the maps can be sorted. By clicking on the header of a particular column, it 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 earliest freeze and earliest climatological freeze data. This table can also be copied from the browser and pasted into a spreadsheet for further analysis.

Data as of Mon Oct 09 2017 07:35 (CDT) -- Click column headers to sort data

	24 Hour Observations		Yesterday's Records			Today's Records		
Station	Lowest Temp (°F)	Time of Lowest Temp	Normal Low (°F)	Record Low (°F)	Year	Normal Low (°F)	Record Low (°F)	Year
Ashland Bottoms	51.7	10-08 07:45	45.0	21.0	2000	45.0	20.0	2000
Butler	48.4	10-08 07:40	48.0	25.0	1952	47.0	25.0	2000
Cherokee	50.6	10-08 07:40	50.0	25.0	1952	50.0	25.0	2000
Cheyenne	37.1	10-09 07:00	39.0	20.0	1915	38.0	24.0	2000
Clay	53.0	10-08 07:40	45.0	21.0	2000	45.0	26.0	1964
Colby	42.0	10-09 07:35	39.0	17.0	2000	39.0	19.0	2000
Garden City	44.8	10-08 07:55	43.0	22.0	2000	42.0	24.0	2000
Grant	42.4	10-08 08:05	42.0	28.0	2000	41.0	27.0	2000
Gray	45.6	10-08 07:45	45.0	19.0	2000	45.0	21.0	2000
Gypsum	55.3	10-08 07:55	46.0	25.0	2000	45.0	23.0	2000
Hamilton	40.8	10-08 07:45	43.0	25.0	2000	42.0	24.0	2000
Harper	52.4	10-08 07:55	50.0	30.0	2000	49.0	27.0	2000
Haskell	46.7	10-08 08:05	45.0	23.0	2000	45.0	21.0	2000
Hays	44.9	10-08 07:55	45.0	17.0	1894	44.0	22.0	2000
Haysville	51.3	10-08 07:50	47.0	26.0	2000	47.0	26.0	2000
Hiawatha	48.1	10-09 02:15	46.0	22.0	2012	46.0	36.0	2012
Hill City	45.2	10-08 08:00	41.0	14.0	2000	40.0	24.0	1925
Hodgeman	48.2	10-09 07:35	44.0	20.0	2000	43.0	21.0	2000
Hutchinson 10SW	50.1	10-08 07:50	46.0	23.0	2000	46.0	20.0	2000
Jewell	51.4	10-08 07:40	44.0	19.0	2000	43.0	19.0	2000
La Crosse	48.0	10-09 07:30	44.0	18.0	2000	43.0	22.0	2000
Lake City	48.5	10-08 07:55	49.0	26.0	1952	48.0	31.0	1952
Lakin	41.9	10-08 08:05	44.0	27.0	2000	44.0	27.0	2000
Lane	44.4	10-08 07:55	42.0	20.0	2000	42.0	22.0	2000
Leoti	41.1	10-08 08:10	40.0	22.0	2000	39.0	22.0	2000
Lorraine	50.1	10-08 07:50	45.0	21.0	2000	44.0	23.0	2000
Manhattan	53.7	10-09 02:35	46.0	18.0	1952	46.0	20.0	2000
McPherson 1S	53.6	10-08 07:45	47.0	23.0	2000	46.0	25.0	2000
Meade	42.0	10-08 07:50	46.0	28.0	2012	46.0	24.0	2000
Miami	50.9	10-09 07:00	47.0	27.0	2000	47.0	23.0	2000
Mitchell	49.5	10-08 07:45	46.0	22.0	2000	46.0	25.0	2000
Ness City	45.6	10-08 07:55	42.0	15.0	2000	41.0	15.0	2000
Olathe	47.8	10-09 06:35	49.0	27.0	2000	49.0	26.0	1915
Osborne	49.4	10-08 08:05	42.0	15.0	2000	42.0	14.0	2000
Ottawa	48.5	10-08 07:40	48.0	25.0	1952	47.0	24.0	2000

Figure 2: Select headers (highlighted) to sort the table data from lowest to highest.

For cold temperatures occurring further into winter, the Freeze Monitor will still be active but the maximum and minimum temperatures can also be viewed on their particular pages along with the maximum wind gusts: http://mesonet.k-state.edu/weather/maxmin/.

The Freeze Monitor is updated in the spring, as a new growing season arrives, to show the spring freeze climatology.

The Freeze Monitor is available at: http://mesonet.k-state.edu/freeze/

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