



**K-STATE**  
Research and Extension

## Extension Agronomy

# eUpdate

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*04/01/2016*

These e-Updates are a regular weekly item from K-State Extension Agronomy and Steve Watson, 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 Steve Watson, 785-532-7105 [swatson@ksu.edu](mailto:swatson@ksu.edu), Jim Shroyer, Crop Production Specialist 785-532-0397 [jshroyer@ksu.edu](mailto:jshroyer@ksu.edu), or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 [cthompso@ksu.edu](mailto:cthompso@ksu.edu).

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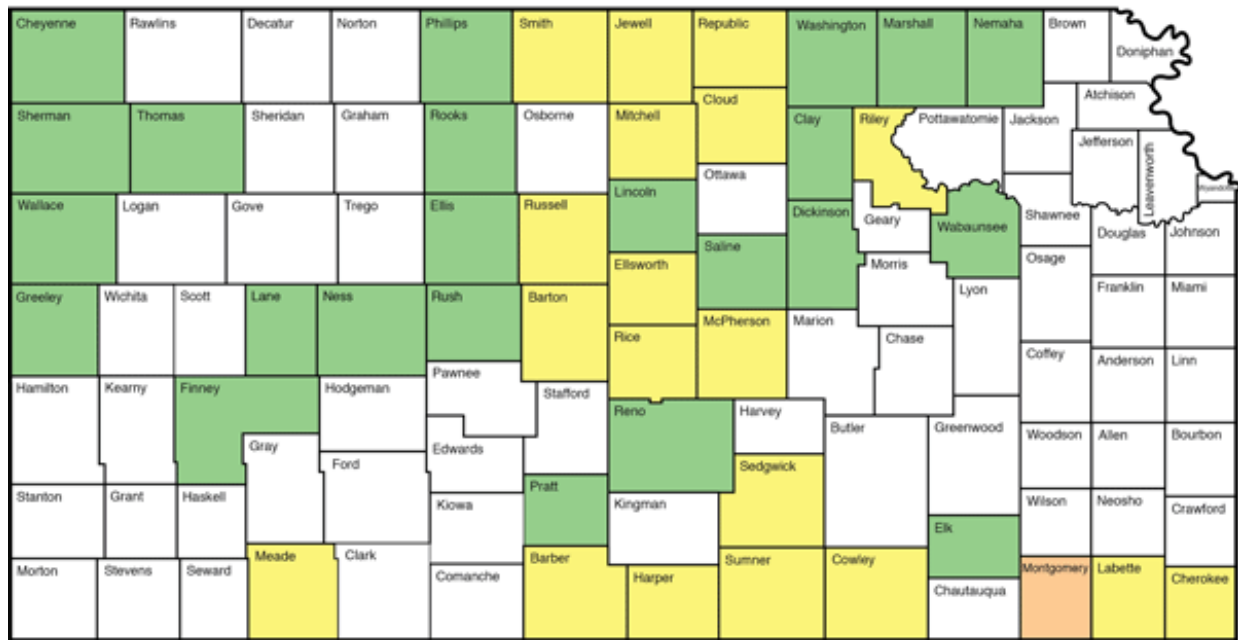
<b>1. Update on the risk for wheat stripe rust .....</b>	<b>3</b>
<b>2. Wheat development update and initial freeze damage assessment.....</b>	<b>5</b>
<b>3. Planting conditions as of late March/early April.....</b>	<b>11</b>
<b>4. Agricultural Mobile Apps: A review and update of general agriculture apps.....</b>	<b>15</b>
<b>5. Updated publication on wheat fungicides released.....</b>	<b>21</b>
<b>6. K-State Cover Crop Field Day, HB Ranch, May 13.....</b>	<b>22</b>
<b>7. Comparative Vegetation Condition Report: March 22 - 28.....</b>	<b>23</b>

## 1. Update on the risk for wheat stripe rust

The Kansas wheat crop is progressing rapidly through the jointing stages of development in much of the state. Wheat in the southeast portion of the state is at or fast approaching flag leaf emergence. The crop is generally considered to be two or three weeks ahead of schedule.

Scouting reports indicate that stripe rust has become established in the 2016 wheat crop. This past week, stripe rust was reported in many counties in central and eastern Kansas (Figure 1).

### Distribution of Wheat Stripe Rust April 1, 2016



#### Disease Risk

- Stripe rust not observed
- Stripe rust observed on lower leaves
- Stripe rust observed on upper leaves

Disease observation map based on reports from: E. De Wolf, R. Lollato, D. Shoup, L. Haag, S. Duncan, E. Adee, M. Buchanan, G. Crumie, A.J. Forster, S. Campbell, J. Carr, J. Coltrane, J. Falk-Jones, J. Green, D. Hallauer, R. Hein, J. James, A. Johnson, K. Larson, C. Long, T. Maxwell, C. Miller, M. Ploger, Z. Simon, S. Wick.

The disease is still at low levels in most fields with a few exceptions in southeast Kansas. This early establishment of stripe rust increases the risk of severe yield loss and growers should continue to monitor the situation carefully. If weather conditions become favorable, the disease could spread rapidly from the lower leaves, where is now established, to the upper leaves critical for grain development.

Growers should check their fields for stripe rust as the crop approaches flag leaf emergence and heading. Fields with stripe rust still in the lower canopy at heading are at a moderate risk for severe yield loss. This means that fungicide applications are likely to result in a profitable yield response (>4 bu/acre) 50-60% of the time. A field is at high risk for severe yield loss if the disease is established on the upper leaves prior to heading. Fungicide applications are likely to result in a profitable yield response 60-90% of the time under these conditions. Variability in fungicide response can primarily be attributed to differences in local weather conditions and susceptibility of the wheat variety.

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Growers in most areas of the state have some time to gather more information about the status of disease and costs of fungicide application before making the decision to spray. Fields with good yield potential may benefit from a fungicide application if the disease continues to spread.

More information about making fungicide decisions in wheat can be found in the K-State Research and Extension publication, *Evaluating the Need for Fungicide Applications in Wheat*, at: <http://www.bookstore.ksre.ksu.edu/pubs/MF3057.pdf>

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## 2. Wheat development update and initial freeze damage assessment

### **Wheat stage of development**

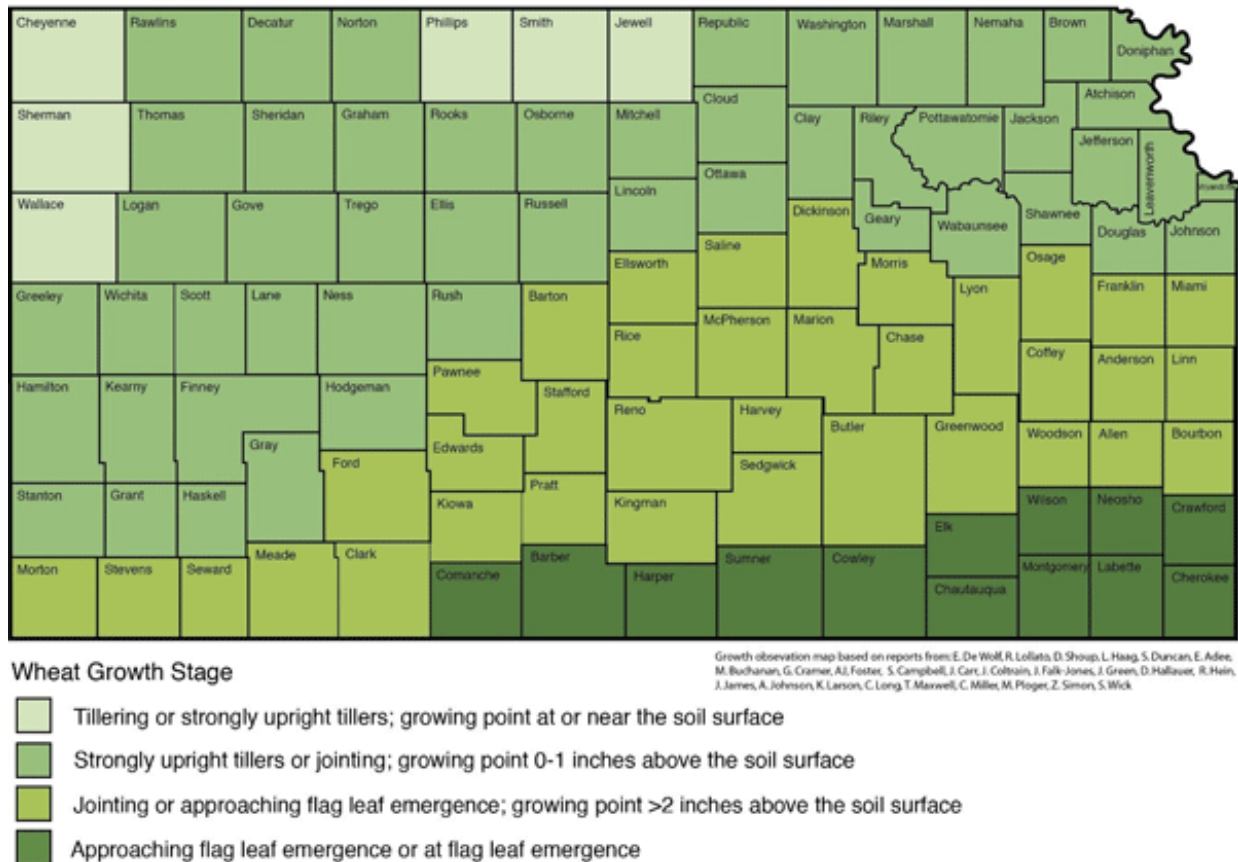
An estimated map of average wheat developmental stage by county -- created with the contribution of county Extension agents, area Extension agronomists, crop specialists, and calculations of accumulated growing degree days -- is shown in Figure 1. The actual wheat developmental stage is field-specific, varying within county by variety and planting date (among other management practices). Therefore, there may be differences between Figure 1 and actual wheat development from different individual fields.

Wheat is well advanced along the southern border of Kansas. The majority of the fields from Cherokee County in southeast Kansas to Comanche County in western south central Kansas are now past the second node, rapidly approaching flag leaf emergence or already showing flag leaves emerging out of the whorl.

The majority of the fields in the region immediately north of the south border counties is between jointing (Feekes 6) and second node, and some more advanced fields are approaching flag leaf emergence. Wheat development is not as advanced in northern and western regions of Kansas, where the majority of the crop is either just now at the point where the growing point is reaching ground level or is approaching jointing. A few isolated portions of northwest and north central Kansas have not yet reached jointing due to colder temperatures experienced in these regions.

# Estimated Wheat Growth Stage

## April 1, 2016



**Figure 1. Estimated wheat growth stage by county. Actual growth stage will vary within county, depending on variety and planting date.**

### Initial freeze damage assessment

Our two latest reports on potential of freeze injury to wheat in Kansas suggested that most of the freeze damage following March 19-20 and March 27-28 freezes would be expected to occur in south central and southwest regions of the state (see Agronomy eUpdate articles in issues [556](#) and [558](#)). These regions had a combination of more advanced crop development (usually past jointing at the time of the freeze) and experienced air temperatures below 24 degrees F for a prolonged period of time.

Assessments of freeze damage performed by the K-State Extension team has shown consistent leaf tissue damage (Figure 2) throughout the region between Dickinson, Sumner, Meade, and Finney counties. In some cases, leaf damage was worse in heavy-residue no-till situations (Figure 3) where seed-soil contact at sowing may have been impaired by the heavy residue.

Additionally, varieties differ in their sensitivity to cold stress. Figure 4 shows that WB-Cedar, a variety that is released early from winter dormancy, showed more leaf injury symptoms to the freezing temperatures than WB-Grainfield, which greens up later. In most cases, though, the freeze damage to the leaf tissue did not affect the growing point. Leaf injury should be mostly cosmetic damage if the growing point was not affected.

In the southern-most counties of Kansas, bordering Oklahoma, the wheat sustained some level of tiller loss following the last two freeze events (Figure 5). Damaged growing points were observed at different incidence levels from Sumner through Meade counties. On average, the growing point was dead in 1 to 3 tillers in every about 15 tillers from Sumner through Barber Counties, and the incidence of dead tillers slightly increased west of Barber County. From Comanche County to Meade County, an average of about 3 to 5 of every 15 tillers were dead. In some cases, the newly emerging leaf was already dead, which is a good indicator of tiller loss (Figure 5). Very little tiller loss, if any, was found in Sedgwick, Reno, Barton, Barton, Hodgeman, or Finney counties.

It is still early try to predict any yield losses associated with freeze damage in the southern counties at this point, but most of the scouted fields should not sustain significant yield losses. It is important to keep in mind that the wheat plant naturally produces more tillers than the number of tillers the plant actually uses to produce grain yield. Therefore, some level of tiller loss is normal and occurs on a yearly basis. Some tiller loss may even benefit the wheat crop in years when the spring turns out dry and there is not enough moisture to sustain a lush canopy.

If weather conditions are cool and moist, favoring wheat recovery, remaining healthy tillers will be more than enough to sustain yields relative to a crop free of freeze injury. Unfortunately, the weather so far this spring has been drier than normal for most of western and northern Kansas, and the 10-day forecast does not predict substantial precipitation in the region. At this point, producers should probably be more concerned with the dry conditions experienced in great portion of Kansas than with possible yield losses from the latest two freeze events.

Another issue of concern for Kansas wheat producers at this point is the increasing incidence of stripe rust across the state. For more information about stripe rust conditions in Kansas and the need for foliar fungicides, please see the accompanying article in this issue of the Agronomy eUpdate: "Update on the risk for wheat stripe rust."



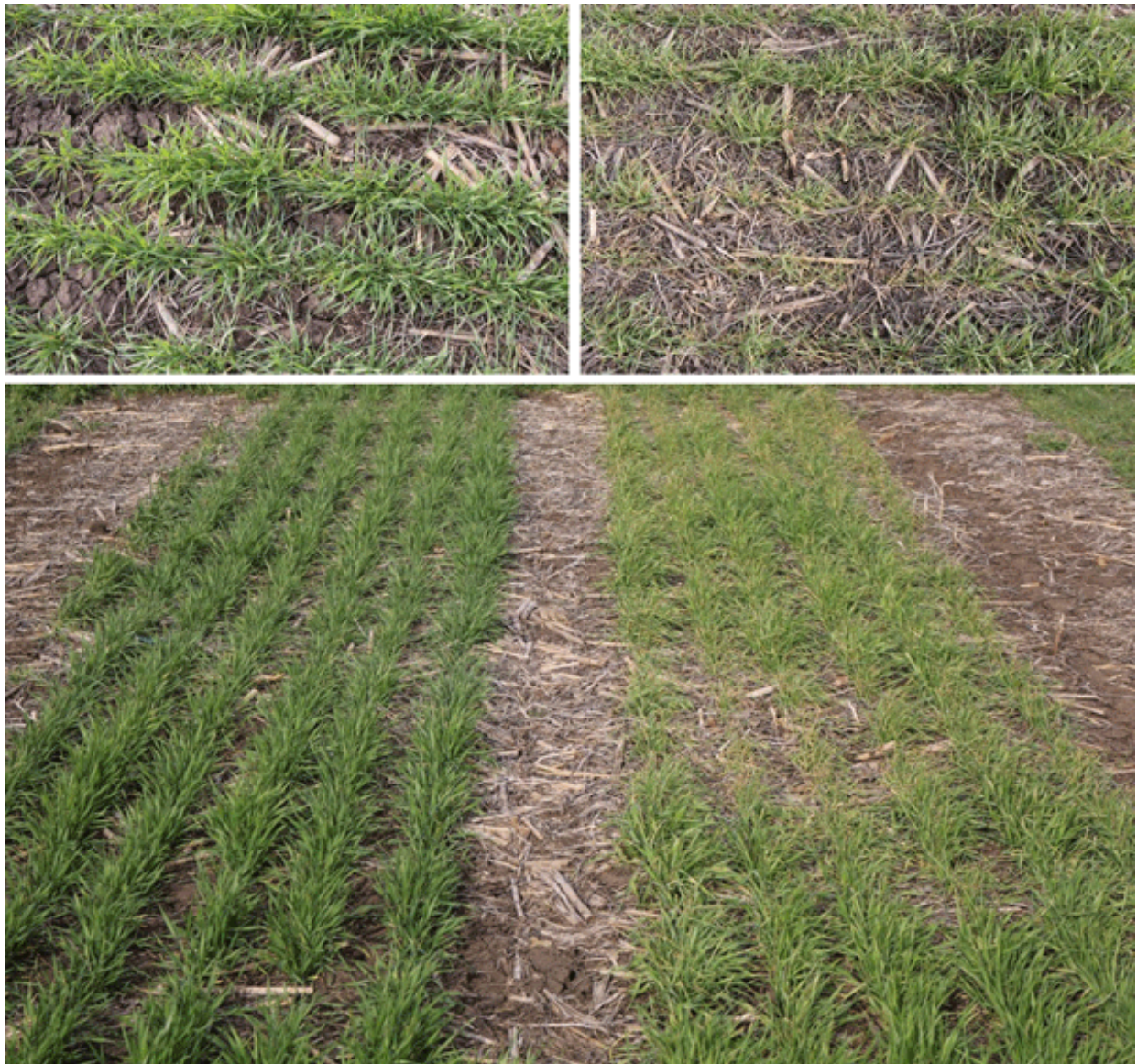
**Figure 2. Leaf tip burn caused by below-freezing temperatures. Photo by Romulo Lollato, K-State Research and Extension.**



**Figure 3. Effect of residue amount in the severity of freeze damage. Areas in the field where the wheat is greener (less leaf damage) had considerably less residue than the remaining portions of the field. Photos from Dickinson County by Romulo Lollato, K-State Research and**



**Extension.**



**Figure 4. Effect of variety maturity in the severity of freeze damage. The greener variety in the left side of this picture (WB-Grainfield) was less vulnerable to below-freezing temperatures because of its later stage of growth than WB-Cedar (right side), which is showing apparent damage to the leaf tissue. Photos from Riley County by Romulo Lollato, K-State Research and Extension.**



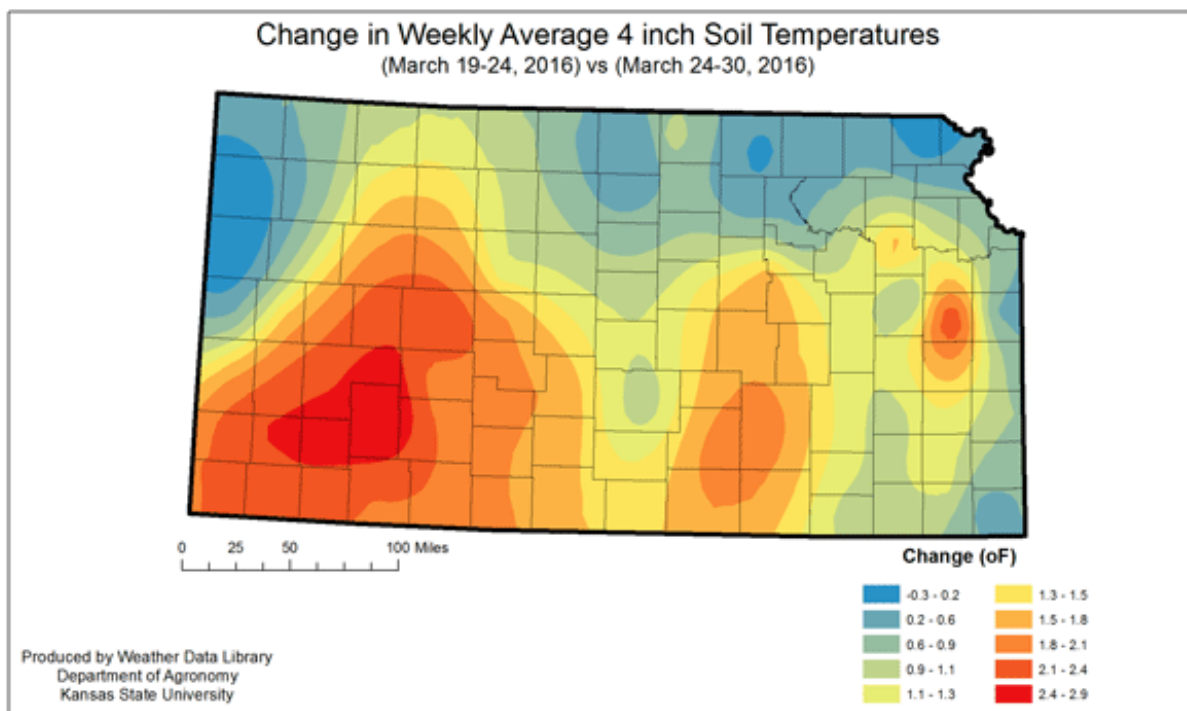
**Figure 5. Typical symptoms of freeze damage to the newly emerging leaf (upper left) and growing point (upper center and right) versus healthy developing wheat heads (bottom photos). Photos from Meade, Harper, and Barber counties by Romulo Lollato, K-State Research and Extension.**

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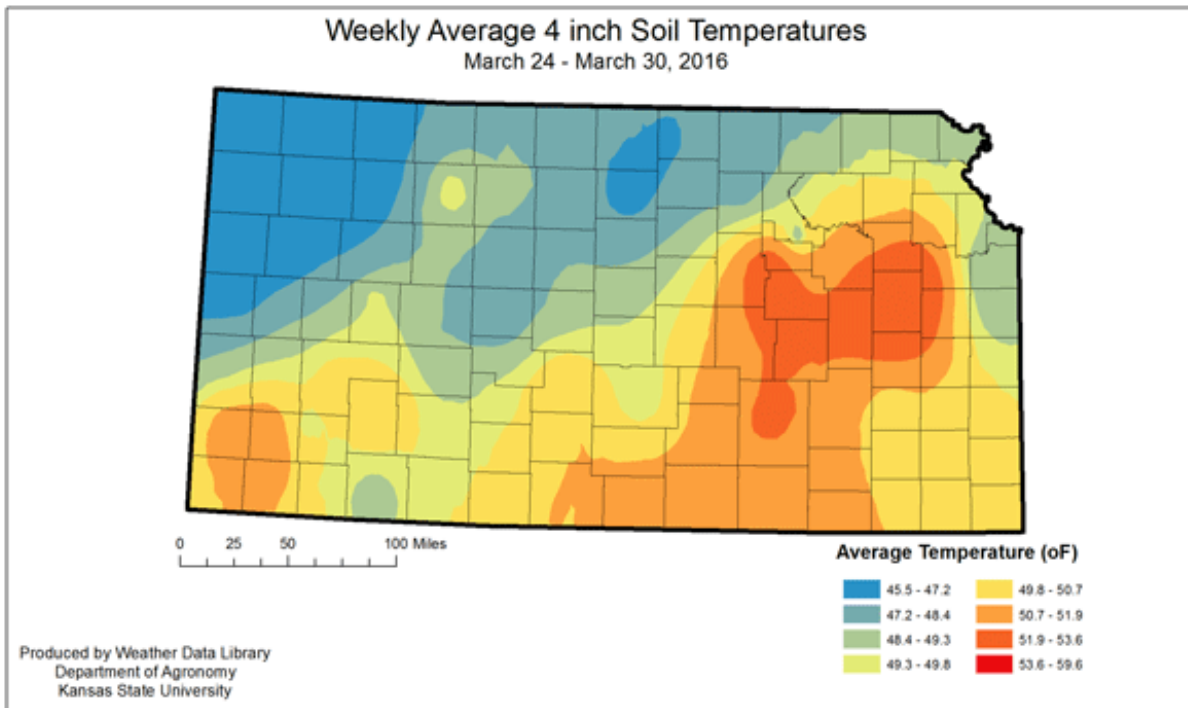
### 3. Planting conditions as of late March/early April

An article in the [March 25, 2016 Agronomy eUpdate](#) discussed average soil temperatures for the week of March 19 – March 24 and average last spring freeze dates. Over the past week, changes in soil temperatures have been noticeable for the southwestern section of the state, rising by 2 to 3 degrees F overall (Fig. 1). Soil temperatures in the northern section of the state decreased slightly compared to the prior week. The remainder of the state saw a change in soil temperatures of about a degree.



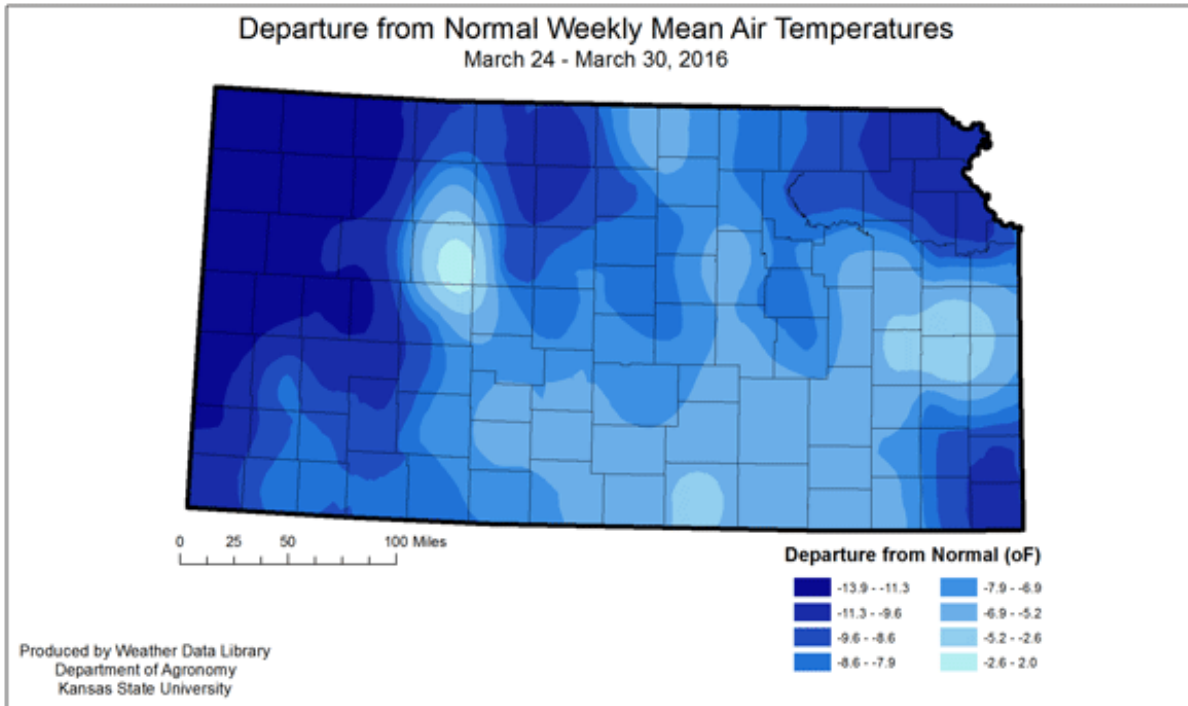
**Figure 1. Change in weekly average soil temperatures at the 4-inch depth from the week of March 19-24 to the week of March 24-30, 2016.**

Absolute soil temperatures at the 4-inch depth are still below 50 degrees F across much of the state (Fig. 2). A small area of east central Kansas has temperatures in the low 50s, but no area has soil temperatures close to 55 F – the near-optimal temperature for beginning corn planting. The lack of precipitation in southwest Kansas was a big factor in the dramatic increase in soil temperatures in the district during the past week.



**Figure 2. Average soil temperatures at 4-inches for the week of March 24-30, 2016.**

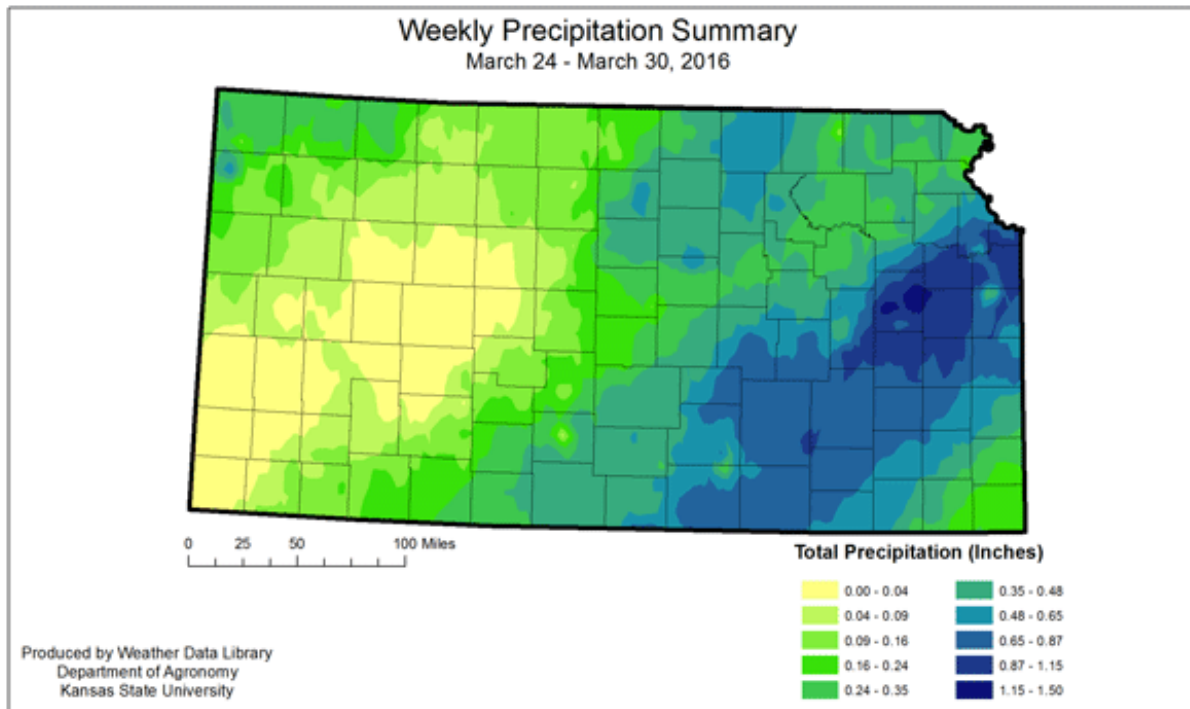
Colder-than-average air temperatures for the last week in March (Fig. 3) will slow the warming pattern in soil temperatures.



**Figure 3. Departure from normal weekly mean air temperature during the period of March**

## 24-30.

For the coming days, the amount of precipitation expected will play a critical role in speeding up or slowing the progression of soil temperatures around the state, more precisely in the northern section. Wet soils in a no-till situation are slower to warm. Dry soils will change in temperature more rapidly, and match air temperatures more closely.



**Figure 4. Weekly precipitation for the week of March 24-March 30, 2016.**

Soil moisture is not the only factor affecting soil temperatures. The absolute change in soil temperatures is also governed by the residue cover (quantity and distribution), tillage system, and landscape position. For summer crops, uneven soil temperatures around the seed zone can produce non-uniform crop germination and emergence. Non-uniform stands can affect maximum attainable yield, especially for corn.

Please be sure to consider these factors during the next several weeks before planting your crop. More information about effects on plant stands and uniformity will be provided in upcoming issues of the Agronomy eUpdate newsletter. Make sure to check our electronic resources:

Department of Agronomy: <http://www.agronomy.ksu.edu>

Extension Agronomy: <http://www.agronomy.k-state.edu/extension/>

Mesonet and other weather information: <http://www.mesonet.ksu.edu>

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## 4. Agricultural Mobile Apps: A review and update of general agriculture apps

This article provides a review and update of some of the current “general agriculture apps.” These apps provide weather data, general agronomic information, electronic magazines, and information from public-private institutions, among several other features.

While these apps can often help you make decisions, always make sure to check with your crop consultants, Extension agents, and Extension specialists.

Stay tuned for more in this series of annual reviews and updates on Ag-Apps from our KSUCROPS Crop Production team (led by Dr. Ciampitti) and the K-State Department of Agronomy. The final article in this series will be included in the next edition of the Agronomy eUpdate.

NOTE: These apps are all available as of the time this article is published. Alterations or changes in availability could occur, affecting the ability to access these apps.

For this series of articles, we have grouped Ag-Apps into the following 10 classifications:

- **ID Apps:** For identification purposes (weeds, insects, diseases, and nutrients)
- **CALC Apps:** For calculating purposes (nutrient removal calculations, tank mixes, volume to spray, etc.)
- **SCOUT Apps:** For scouting purposes or for geo-positioning (soil sampling, recording notes, soil types, etc.).
- **ECON Apps:** For checking grain prices, market evolutions, fertilizer price trends, news and finances.
- **FIELD GUIDE Apps:** For diagnosing crop production issues in the field, primarily related to field guides (crop management: insect, disease, weed, and more).
- **LIVESTOCK Apps:** Apps related to the animal side, nutrition, health, and information on markets.
- **IRRIGATION Apps:** Apps related to field crop irrigation and water application.
- **MACHINERY Apps:** Apps for associated with agricultural equipment preparation, inventory, providing information of the machine.
- **GENERAL AG Apps:** GAG (general Ag-Apps) for general use, weather-related, for meetings, for reading magazines, among several other Apps’ properties.
- **NON-AG Apps:** For general use from e-readers to calculators, email, calendar, picture editing, and more.

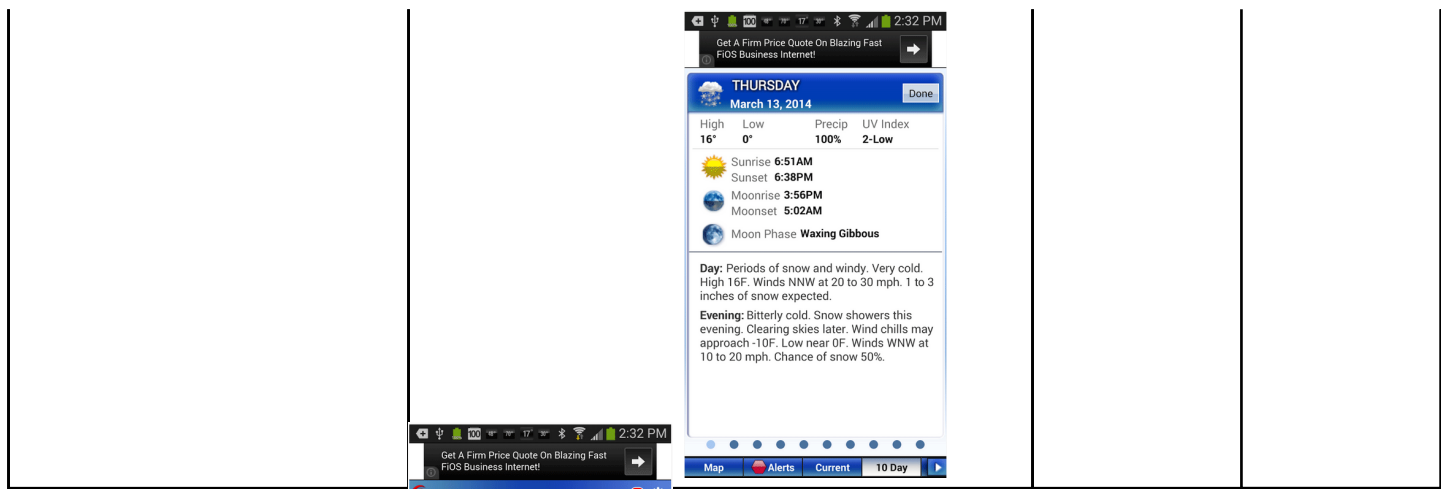
## 9. General Agriculture Apps

Apps for agricultural equipment selection and operation.

**General Agriculture Apps**

Name of App and Source	Picture	Brief description	and cost
<p>Farming Weather Forecast and Services</p>  <p>New Holland Agriculture</p>		<p>This app provides weather forecast dedicated to agriculture, evapotranspiration, degree days, an almanac to compare averages the same period.</p>	<p>FREE</p>
<p>The Weather Channel</p>  <p>The Weather Channel Interactive</p>	 <p>Radar maps with future radar</p> <p>Most trusted forecasts</p>	<p>This app provides accurate weather information and precise forecasts</p>	<p>FREE</p>
<p>Intellicast Weather</p>  <p>WSI Corp.</p>		<p>This app provides forecast information for the next 24 hours 10 days, tracks severe storms using advanced radar, and even plots earthquakes in real-time.</p>	<p>FREE</p>





MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

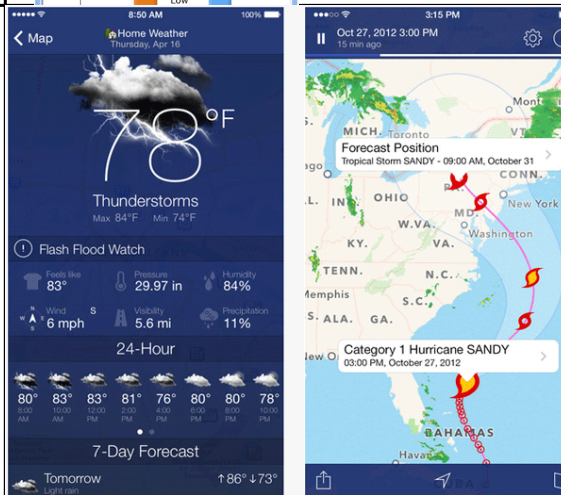
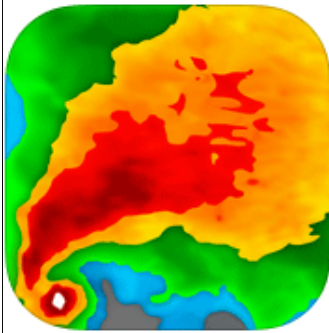
General Agriculture Apps

Name of App and Source

Picture

Brief description and cost

NOAA Radar Pro

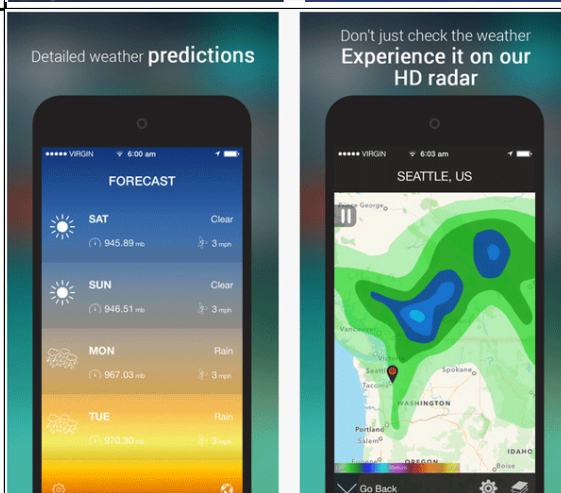


This app provides real-time animated weather radar images, with severe weather warnings and alerts.

\$2.99

Apalon Apps

iWeather



This app is very interactive and easy to use, giving you all you could need to know about the weather.

FREE

DTN: Ag Weather Tools

This app provides weather data, plus a rain gauge to track historical rain data on each field.

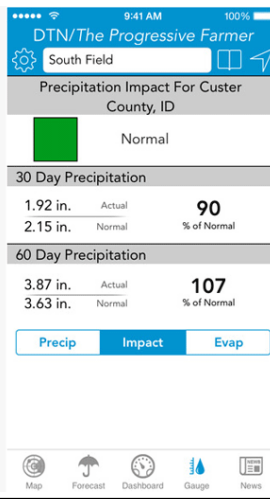
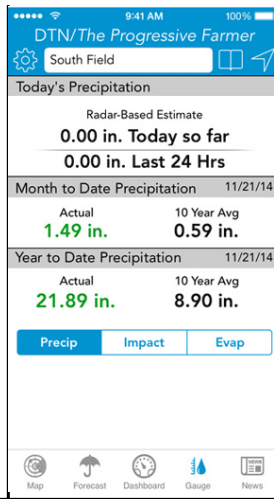
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FREE

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General Agriculture Apps

Name of App and Source

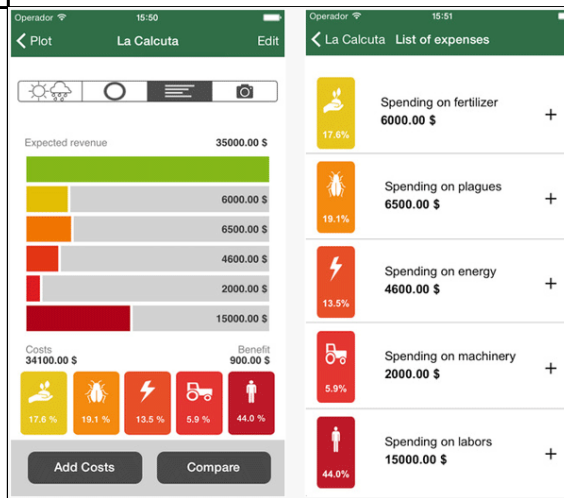
Picture

Brief description and cost

vrain



Visualnacet S.L.



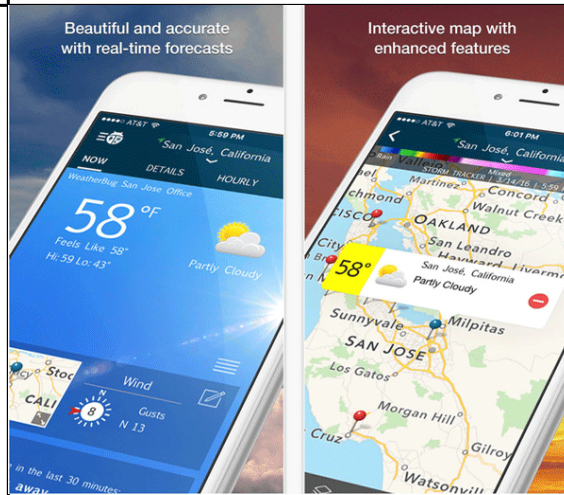
vrain is a useful app for providing the weather forecast and accumulated rainfall collected in your field.

FREE

Weather Bug



Earth Networks, Inc.



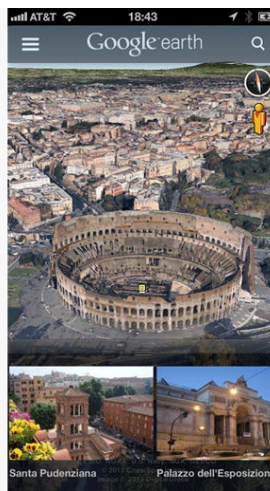
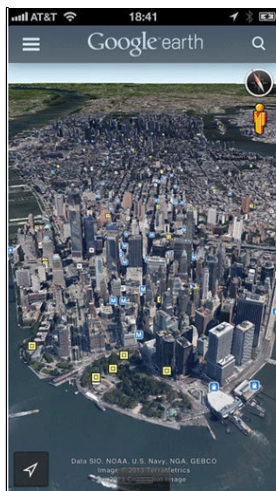
This app provides useful information related to the weather, radar maps, forecasts, and storm alerts.

FREE

Google Earth



Google, Inc.

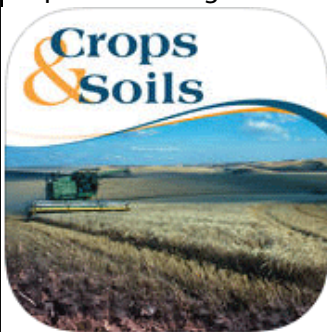


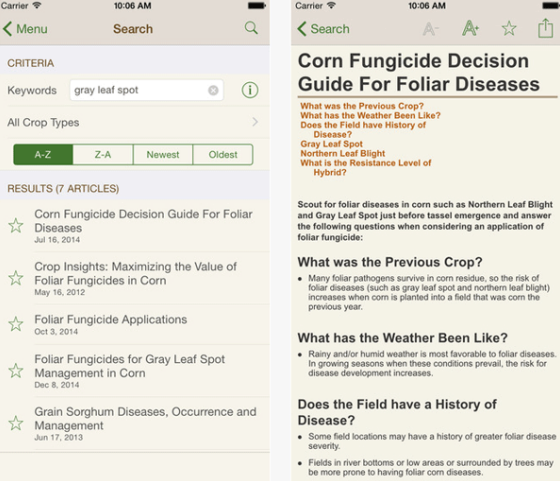


This app allows you to search for cities, places, and businesses. Browse layers including roads, borders, places, and photos.

FREE

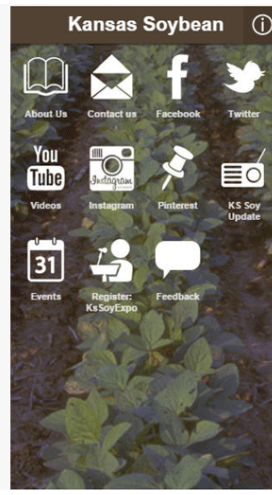
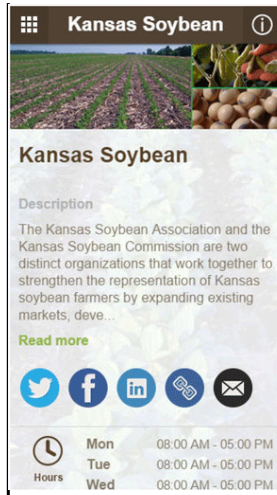
MOBILE AGRICULTURAL APPS – REVIEW from KSUCROPS ©Kansas State University

General Agriculture Apps

Name of App and Source	Picture	Brief description and cost
<p>Crops &amp; Soils magazine</p>  <p>Alliance of Crop Soil &amp; Environmental Sci. Soc., Inc.</p>		<p>This app provides a simple view of the “Crops &amp; Soils” magazine for certified crop advisers, agronomists, and soil scientists working in the agricultural discipline.</p> <p>FREE</p>
<p>Pioneer GrowingPoint</p>  <p>DuPont Pioneer</p>		<p>This app provides agronomy information in a synthesized approach. You can access hundreds of agronomy articles and photos from DuPont Pioneer.</p> <p>FREE</p>
<p>Kansas Soybean</p>		<p>Connect with the Kansas Soybean</p>



Kansas Soybean



Association and Kansas Soybean Commission, representing Kansas soybean farmers.

FREE

The next issue of the eUpdate will feature the last classification of apps (Non-Ag Apps) from our KSUCROPS Crop Production team and the K-State Department of Agronomy!

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## 5. Updated publication on wheat fungicides released

Many wheat growers may be thinking about fungicide applications to control stripe rust and other leaf diseases this spring. K-State Research and Extension just released a publication that could help growers decide which products might a good fit for their needs.

The publication *Foliar Fungicide Efficacy for Wheat Disease Management* can be found at:  
<http://www.bookstore.ksre.ksu.edu/pubs/EP130.pdf>

This publication presents the results of years for testing of these fungicide products in head-to-head comparisons from Kansas and many other states. The publication is not intended to be an exhaustive list of all available options but does cover most of the products widely marketed in the state.

In general, growers have access to many products that can provide very good to excellent control of stripe rust, leaf rust, and other common leaf diseases. There are some important differences with respect to control of Fusarium head blight (wheat scab). In this case, fungicides belonging to the triazole class of fungicides are the best option, with Prosaro and Caramba providing the best available suppression (only 40-50% control in many tests).

There are also significant differences in product price. With low wheat prices, it could be important for growers to do their homework before pulling the trigger on any possible fungicide application this year. Historically, the cost of fungicide products range from about \$2 to \$15 per acre, with generic tebuconazole (Folicur), and propiconazole (Tilt) products being the lowest-cost options.

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## 6. K-State Cover Crop Field Day, HB Ranch, May 13



K-State will hold a Cover Crop Field Day at its HB Ranch location south of Cedar Bluff Reservoir on Friday, May 13. The field day will begin at 10 a.m. To get to the HB Ranch field, take exit 135/Ogallah on I-70 and go south on Hwy 147. HB Ranch is located about 4 miles south of Cedar Bluff Reservoir on Hwy 147. From Brownell, drive 5 miles north of Hwy 147.

During this field day and tour, K-State researchers will discuss ongoing research efforts at the HB Ranch evaluating cover crop management options in dryland wheat-based production systems.

Topics and speakers:

- K-State cover crop research – John Holman, Agronomist, Southwest Research-Extension Center
- Cover crops plot tour at HB Ranch – Augustine Obour, Soil Scientist, KSU Ag Research Center-Hays
- Growers perspective – Brice Custer and Larry Manhart
- Cover crops and soil health – Candy Thomas, USDA-NRCS
- Grazing cover crops – Sandy Johnson, Livestock Specialist, Northwest Research-Extension Center

A lunch will be provided at no cost. Funding for this field day is provided in part by the USDA Ogallala Aquifer Program and a USDA-NRCS Conservation Innovation Grant.

## 7. Comparative Vegetation Condition Report: March 22 - 28

The weekly Vegetation Condition Report maps below can be a valuable tool for making crop selection and marketing decisions.

The objective of these reports is to provide users with a means of assessing the relative condition of crops and grassland. The maps can be used to assess current plant growth rates, as well as comparisons to the previous year and relative to the 27-year average. The report is used by individual farmers and ranchers, the commodities market, and political leaders for assessing factors such as production potential and drought impact across their state.

The Vegetation Condition Report (VCR) maps were originally developed by Dr. Kevin Price, K-State professor emeritus of agronomy and geography. His pioneering work in this area is gratefully acknowledged.

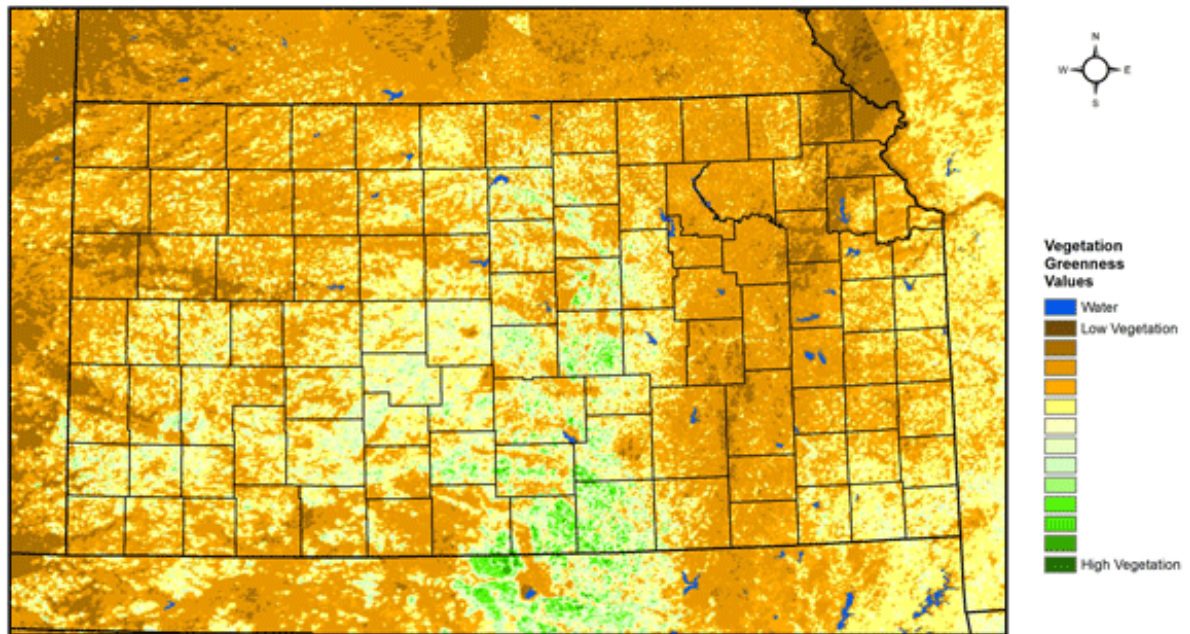
The maps have recently been revised, using newer technology and enhanced sources of data. Dr. Nan An, Imaging Scientist, collaborated with Dr. Antonio Ray Asebedo, assistant professor and lab director of the Precision Agriculture Lab in the Department of Agronomy at Kansas State University, on the new VCR development. Multiple improvements have been made, such as new image processing algorithms with new remotely sensed data from EROS Data Center.

These improvements increase sensitivity for capturing more variability in plant biomass and photosynthetic capacity. However, the same format as the previous versions of the VCR maps was retained, thus allowing the transition to be as seamless as possible for the end user. For this spring, it was decided not to incorporate the snow cover data, which had been used in past years. However, this feature will be added back at a later date. In addition, production of the Corn Belt maps has been stopped, as the continental U.S. maps will provide the same data for these areas. Dr. Asebedo and Dr. An will continue development and improvement of the VCRs and other advanced maps.

The maps in this issue of the newsletter show the current state of photosynthetic activity in Kansas, and the continental U.S., with comments from Mary Knapp, assistant state climatologist:

# Kansas Vegetation Condition

Period 13: 03/22/2016 - 03/28/2016



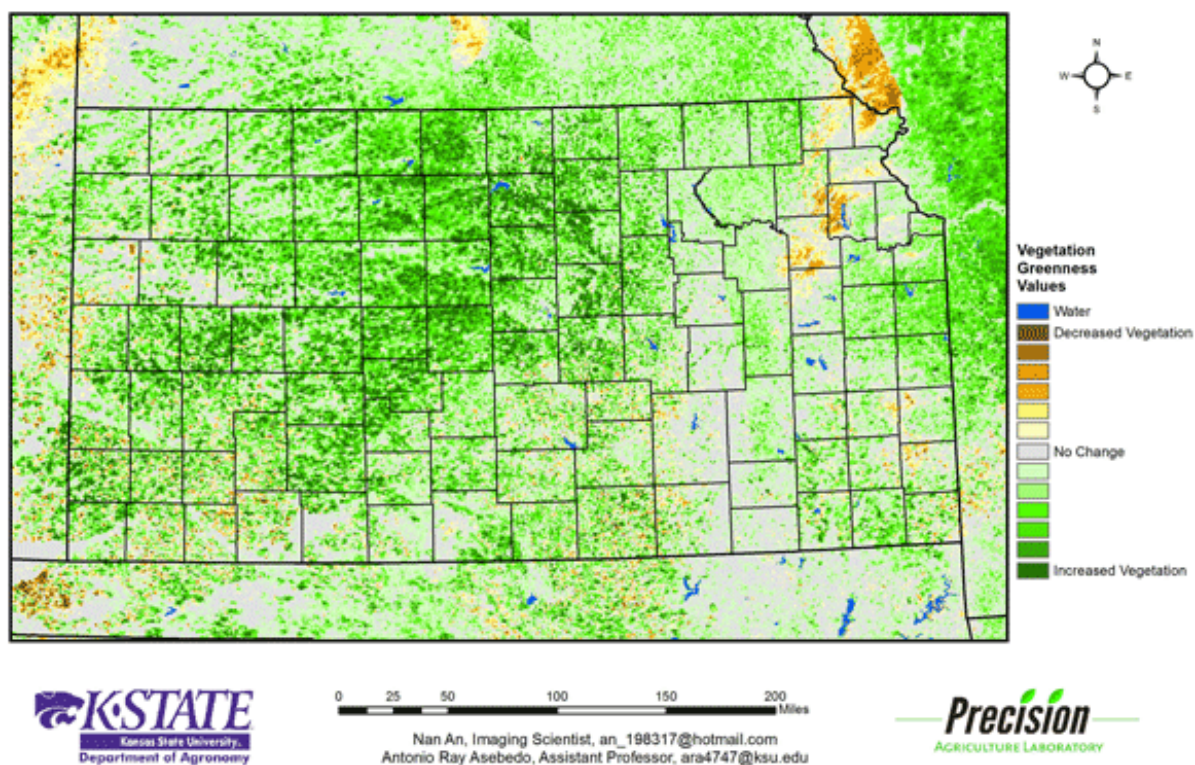
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Nan An, Imaging Scientist, an\_198317@hotmail.com  
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**Figure 1. The Vegetation Condition Report for Kansas for March 22 – 28 from K-State’s Precision Agriculture Laboratory shows little expansion of the area of highest plant production. The highest NDVI values are still in Sumner and Harper counties. Some higher activity is also visible in the Barber County. This is likely due to the removal of surface residue in the burn area.**

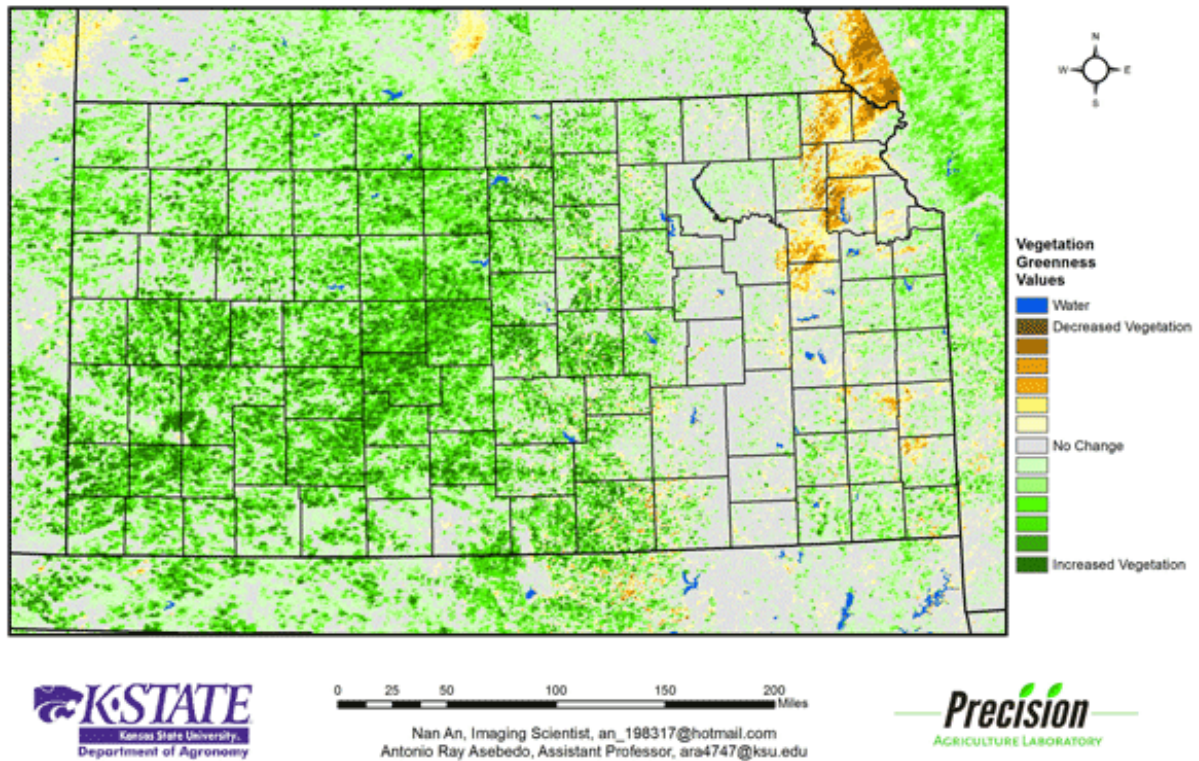


## Kansas Vegetation Condition Comparison Late-March 2016 compared to the Late-March 2015



**Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for March 22 - 28 from K-State's Precision Agriculture Laboratory shows much higher photosynthetic activity continues in the western two thirds of the state. There is also a pocket of higher NDVI values in southeast Kansas, where warm temperatures and recent rains continue to favor plant development.**

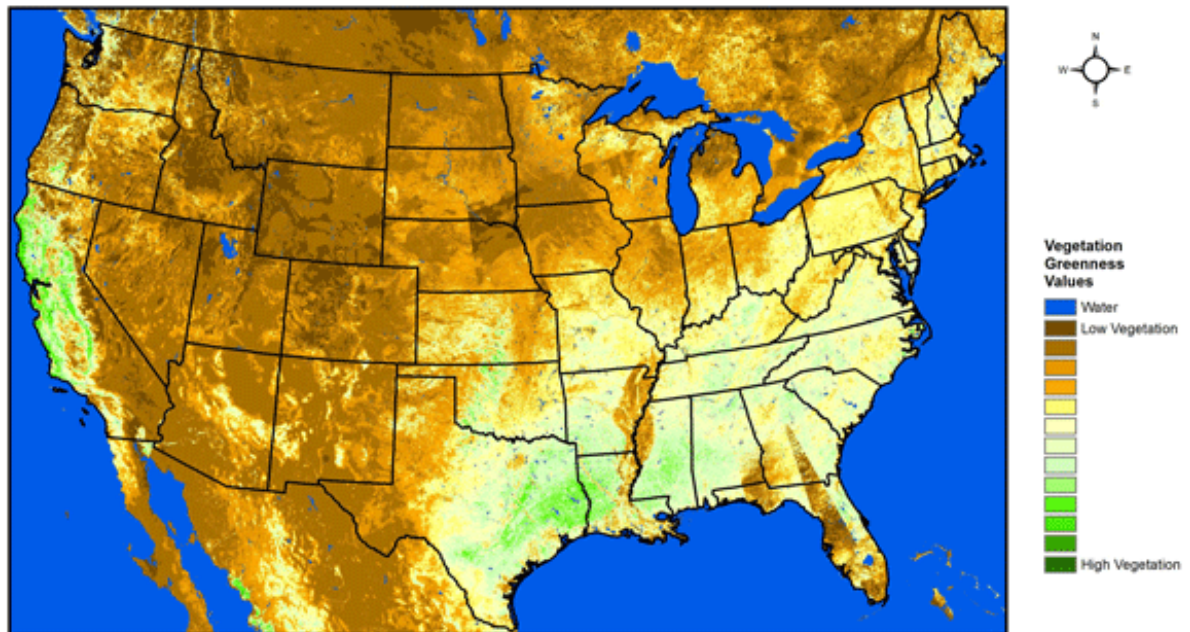
Kansas Vegetation Condition Comparison  
Late-March 2016 compared to the 27-Year Average for Late-March



**Figure 3. Compared to the 27-year average at this time for Kansas, this year's Vegetation Condition Report for March 22 – 28 from K-State's Precision Agriculture Laboratory shows that the area of above-average photosynthetic activity continues to increase. The largest areas with the greatest increase are in central and south central Kansas. Even with the recent cool weather, temperatures continue above normal across the state, with the warmest departures in the southwest. The impact of the recent freeze is not yet visible.**

## Continental U.S. Vegetation Condition

Period 13: 03/22/2016 - 03/28/2016



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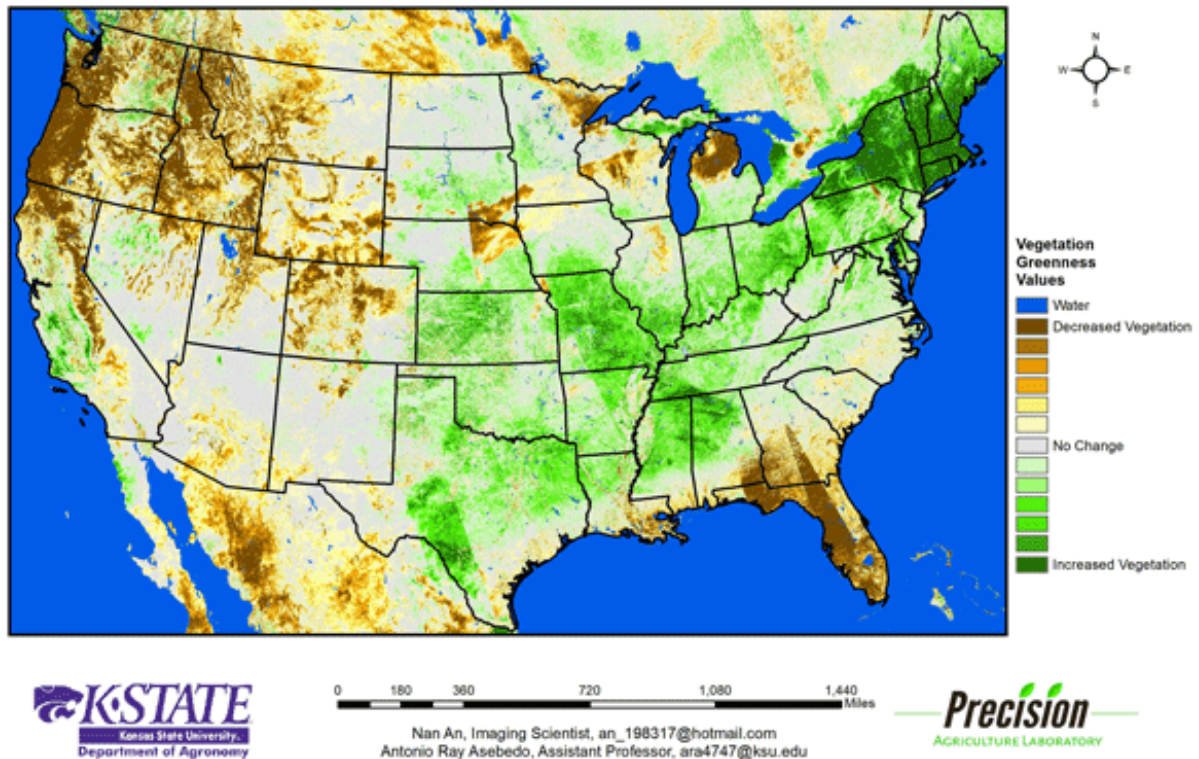
**Figure 4. The Vegetation Condition Report for the U.S for March 22 – 28 from K-State’s Precision Agriculture Laboratory shows higher NDVI values across Central California, where recent rains have been plentiful. For the rest of the continental U.S. it shows that the highest photosynthetic activity is in east Texas through central Oklahoma. Heavy rains last week have reduced vegetative activity in the lower Mississippi River Valley. Persistent clouds have resulted in a strip of below-average activity from central Georgia through central Florida.**

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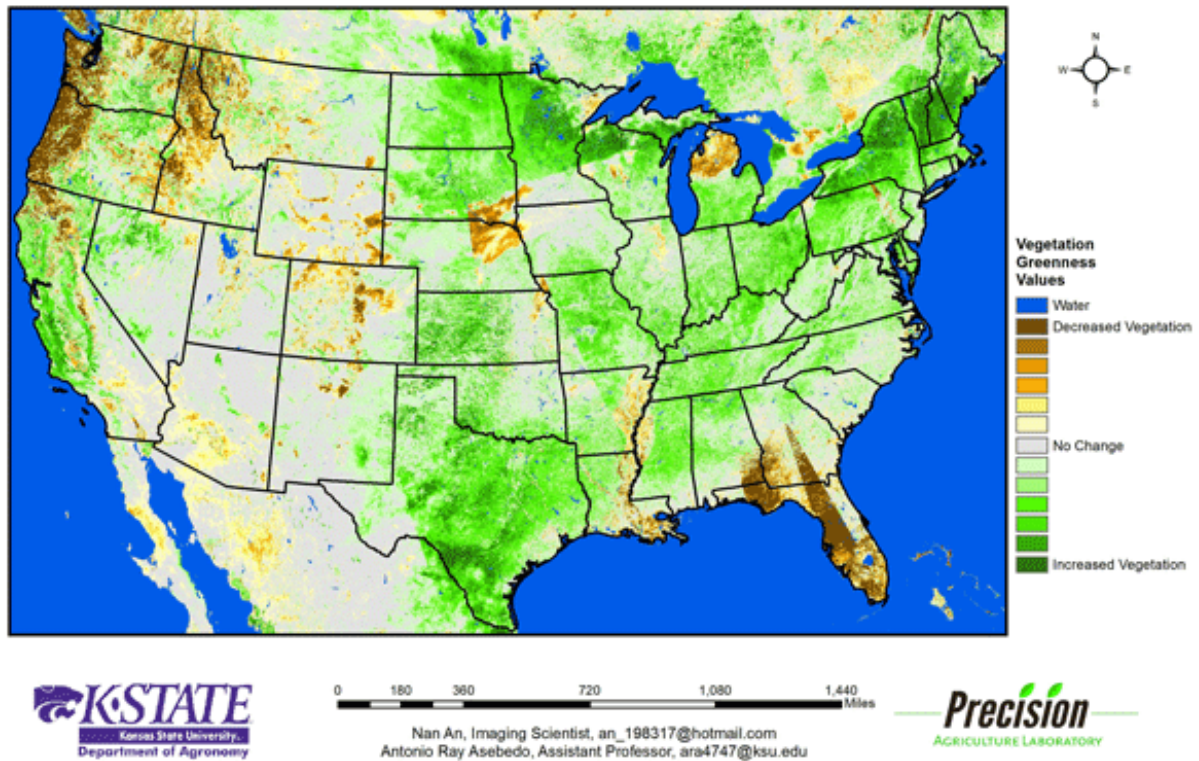
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Continental U.S. Vegetation Condition Comparison  
Late-March 2016 Compared to Late-March 2015



**Figure 5. The U.S. comparison to last year at this time for the period March 22 – 28 from K-State’s Precision Agriculture Laboratory shows that lower NDVI values are most evident in the Pacific Northwest. Much higher NDVI values are visible from the Great Lakes to New England, and in the Central and Southern Plains. Along the northern tier of states, snow continues to be the major influence. The Northeast continues to see a low snow season, while the Pacific Northwest has a higher snow pack than last year. In the Plains, warmer temperatures than last year have fueled early progress in the vegetation, despite recent cold weather. Persistent clouds have resulted in a strip of lower activity across northern Nebraska as well as through central Florida.**

Continental U.S. Vegetation Condition Comparison  
Late-March 2016 Compared to 27-year Average for Late-March



**Figure 6. The U.S. comparison to the 27-year average for the period March 22 – 28 from K-State’s Precision Agriculture Laboratory shows continued higher photosynthetic across the Plains. The increased vegetative activity in eastern Montana and North Dakota continues to be of concern. Snow pack in these areas is below average and abnormally dry conditions continue to expand in the region. Warmer-than-average winter temperatures across the Northern Plains is also spurring plant development. The below-average vegetative activity in the Southeast is largely due to last week’s heavy rainfall, while the lower NDVI values in the Pacific Northwest are indicative of the current snowpack conditions.**

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