Issue 493

K-STATE Research and Extension

Extension Agronomy

eUpdate

02/13/2015

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, Jim Shroyer, Crop Production Specialist 785-532-0397 jshroyer@ksu.edu, or Curtis Thompson, Extension Agronomy State Leader and Weed Management Specialist 785-532-3444 cthompso@ksu.edu.

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1. New K-State experimental grain sorghum lines show very high yield potential

In theory, grain sorghum should yield just as much as corn in Kansas, given the same amount of fertilizer and with substantially less water.

In practice, this has not yet happened consistently. New experimental lines in advanced testing at K-State are about to change that, however. These advancements are thanks in large part to funding from the Kansas Grain Sorghum Commission.

Sorghum has high yield potential, much higher than what we're getting now. We know that. We have been working to find new compatible parental lines that will be able to produce hybrids that can come closer to realizing sorghum's yield potential. At the same time, we need to make sure any new line has an acceptable maturity range, good standability, drought tolerance, good head exsertion, and other necessary agronomic traits.

We began developing these lines in 2009. Our breeding program team in Manhattan, along with Ramasamy Perumal, sorghum breeder at the Agricultural Research Center-Hays, have been selecting and testing the lines since then.

There are many challenges to developing seed parent line for release. We have to find out if it will carry over its good traits into a hybrid once it is crossed with a male line. Then we need to find out if it can perform in different Kansas growing environments and in different types of growing seasons.

All this becomes a challenge in a breeding program with limited land and equipment resources. For that reason, one of our main objectives is to work with private seed companies who are interested in some of these lines. The seed companies will take the lines they like, cross them with their own male lines, and test the resulting hybrids at several locations.

In 2013, hybrids from some of our experimental pollinator lines topped the 200-bushel mark on dryland tests in Manhattan, yielding greater than the top commercial check hybrid there and proving that dryland sorghum can achieve yields comparable with that of dryland corn.

In K-State performance tests that year, dryland corn averaged 184 bushels per acre at Manhattan while dryland sorghum averaged 134 bushels per acre. Some of the new experimental hybrids in our trials either bested or evened out that yield differential between dryland sorghum and corn.

Tests of the experimental lines in 2014 at Hays confirmed the higher yield potential of the new experimental lines compared to the commercial hybrids used as checks, and much higher than the yield of the highest-yielding dryland corn in Ellis County in the 2014 K-State Corn Performance Tests.

We think these new experimental lines represent a real breakthrough in the yield potential of grain sorghum in the near future. According to our release policy, we will be offering these new pollinator and seed parent lines to commercial seed companies. Some of our new lines already have been released. If the seed companies are able to produce agronomically acceptable hybrids from these lines, there should be a new generation of higher-yielding grain sorghum hybrids coming to producers in the near future.

Our team also has several promising new ALS-resistant lines in advanced stages of development.

We cooperated with a private company to have our new ALS lines tested at one of the company's test locations in Texas in 2014. This was a test on poor ground, but 22 of the test hybrids using our new ALS-resistant seed parent lines outyielded all of the company's hybrids in the test by an average of 33 bushels per acre. In addition, in 2013 one of the hybrids from our experimental ALS-resistant pollinator lines yielded more than 200 bushels per acre in Manhattan.

From these results, I am confident there will be no yield drag in ALS-resistant sorghum hybrids from his program. These experimental seed parent lines will be re-tested in 2015, and will be released to private seed companies if results continue to be good.

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2. Topdressing canola: How to maximize the benefits

To maximize the yield potential of winter canola, producers should topdress with nitrogen, sulfur, and possibly boron in the winter. Producers should make topdress applications with consideration for the environmental conditions, the nutrients needed, and the application method.

Environmental conditions

The best time to topdress winter canola is during the rosette stage when the canola is dormant. Most years, this can easily be accomplished by topdressing in February, since temperatures are cold enough to keep canola from actively growing. If nitrogen is applied as a liquid when canola is green and physiologically active, be careful that the rate applied does not cause leaf burn. Both dry and liquid fertilizers are effective products.

Nutrients

A combination of nitrogen and sulfur can be used in the topdressing blend.

Nitrogen. About two-thirds of the total nitrogen needed by the canola crop should be applied as a winter topdress. This can be done at dormancy or just as plants begin to show increased growth, but before the plants bolt. Topdress applications should be based on an updated assessment of yield potential, less profile residual nitrogen, and the amount of nitrogen applied in the fall. Suggested nitrogen rates for five yield levels and a soil with 2 percent organic matter and varying residual nitrate-nitrogen levels is shown in the table below. For soils with 1 percent organic matter, add 15 pounds nitrogen for each yield and nitrate level above and for soils with 3 percent organic matter subtract 15 pounds nitrogen for each yield and nitrate level.

Total nitrogen fertilizer needs for canola as affected by yield potential and soil test nitrogen levels in the southern Great Plains

Profile N test (lbs/acre)	Yield potential (lbs/acre)				
	1,500	2,000	2,500	3,000	3,500
0	75	100	125	150	175
20	55	80	105	130	155
40	35	60	85	110	135
60	15	40	65	90	115
80	0	20	45	70	95
100	0	5	25	50	75

Source: Great Plains Canola Production Handbook, http://www.ksre.ksu.edu/bookstore/pubs/mf2734.pdf

Either solid or liquid forms of nitrogen can be used in the early spring. Once the weather warms and growth begins, applications using streamer bars or solid materials are preferred for broadcast applications to prevent/avoid leaf burn.

Some of the new controlled-release products such as polymer-coated-urea (ESN) might be

considered on very sandy soils prone to leaching, or poorly drained soils prone to denitrification. Generally a 50:50 blend of standard urea and the coated urea -- which will provide some N immediately to support bolting and flowering and also continue to release some N in later stages of development -- works best in settings with high loss potential.

Sulfur. If canola is deficient in sulfur, the consequences can be very serious because the crop needs sulfur to produce oil and protein in the seed. For this reason, soils having less than 20 lbs/acre sulfate-sulfur (10 ppm SO_4-S) in the upper 24 inches should receive supplemental sulfur. A good rule to follow is to keep sulfur to nitrogen availability at a ratio of about 1 to 7. Another simple guideline is to apply 20 pounds sulfur per acre, which will be sufficient for low and medium yield levels. Sulfur can be applied in the fall and incorporated into the seedbed or surface applied with nitrogen in the winter topdressing. Canola growers may consider using elemental sulfur, ammonium sulfate, or a thio-sulfate form of sulfur. Since elemental sulfur must oxidize to become plant available, it should only be applied in the fall. Ammonium thio-sulfate or ammonium sulfate can be applied in the spring or fall, but thio-sulfate should not be topdressed directly on green tissue or placed with seed to avoid short-term phytotoxicity.

Boron. If deficient, boron is one micronutrient that can have negative consequences on canola yield. Typically boron deficiency is not something we have seen in Kansas. However, if there are micronutrients that could influence yield, then boron would be one of them. The most important thing is to know what your soil sample states. Oklahoma State University is looking more into boron fertility. Applying boron may help to reduce flower abortion and enable efficient pod filling. However, there is not much room for error when comparing adequate boron fertility levels and toxic levels that might result from over application. Because of this, application rates of boron are often 1.0 lbs per acre or less. Soil and foliar applications of boron are effective. Foliar applications can be made with herbicides, and soil applied boron can be either broadcasted or banded. Make sure applications are uniform across the field to avoid toxicity.

Application method

It is important to avoid crushing winter canola with wide applicator tires. Crushed plants will lodge and maturity will be delayed, which can slow harvest and increase the risk of shattering losses. For this reason, applicators with narrow tires are preferred. Do not use high flotation tires. As for the question of whether broadcast or banding is best -- if temperatures are cold and the plants are dormant, topdress fertilizer can be broadcast. If temperatures are mild enough that the canola plants have resumed active growth, it may be best to use streamer bars or some other form of banded application to avoid foliar burn.

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3. How overgrazing can affect wheat

Some fields of heavily grazed wheat are either dead or appear to be dead in southwest Kansas this year. Wheat in other parts of the state may also be affected, but the reports so far have been from the southwest.

Figure 1. Field of wheat in southwest Kansas on February 12, 2015. This field has apparently been damaged by overgrazing. Photos by John Holman, agronomist, Southwest Research and Extension Center, Garden City.

Figure 2. Closeup of wheat showing damage from overgrazing, as of Feb. 12.

Wheat is like any other forage in terms of grazing tolerance. When too much of the topgrowth is removed by grazing, the plants can be weakened and become vulnerable to stresses such as winterkill or drought. The excessive removal of topgrowth deprives the plants of the photosynthates they need for food reserves. This will put a temporary stop to any new root growth.

Perhaps an even more important factor is that excessive grazing of wheat in fall and winter leaves the crowns more directly exposed to cold temperatures, despite the fact that the crown is (or should be) below the soil surface. This could be especially important on plants that have lost some of their winterhardiness during periods of unusually warm temperatures at times this winter.

The following is a discussion of the effects of overgrazing from *Stocking Rate and Grazing Management,* K-State publication MF-1118: http://www.ksre.ksu.edu/bookstore/pubs/mf1118.pdf/ Although the discussion in this publication is referring to perennial forages, the same principles apply to winter annual forages such as wheat.

"How much of the herbage should remain when the animals are removed? As a general rule, no more than 50 percent of the current season's growth should be removed during the growing season. By leaving sufficient leaf area, the plants can produce enough foodstuffs for current growth and to rebuild stored food reserves. To maintain 50 percent of the leaf area, about of the current

season's leaf length can be removed at any one time (Figure 3). Season of use, length of the grazing period, time available for regrowth after grazing, condition of the grazed plants, and current weather conditions influence this decision."

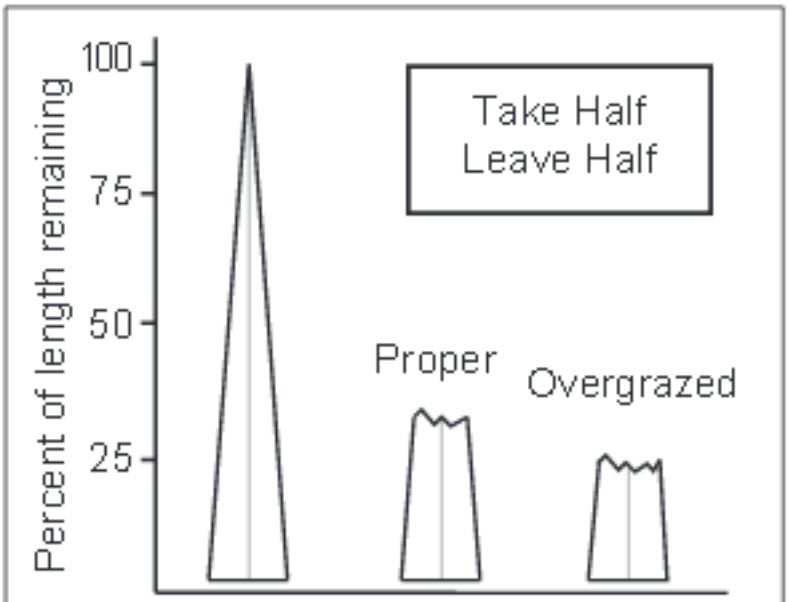

Figure 3. *Removing 2/3 of the current season's leaf length (equivalent to 50% of total leaf area) will not reduce plant productivity.*

A convenient way to measure grazing and leaf area reduction is to set up exclusion cages such as the one in the photo below.

Figure 4. Yearling heifers grazing wheat with exclusion cage to monitor grazing and leaf area reduction.

Wheat that has been grazed too severely is more susceptible to sudden and sharp drops in temperature experienced at times this fall and winter. This year, some of the heavily grazed wheat appears to have been impacted by the rapid cold temperature drop in November, and is suffering winterkill. This damage has been observed on both dryland and irrigated fields.

Not all wheat that appears to be dead has been completely killed, however. If the crown has remained alive, the plants are capable of sending out new tillers as the weather warms up. Some new growth has already occurred.

Figure 5. New growth has begun in some cases where the crowns of the wheat remained alive -- although the plants looked dead.

The only way to know for sure at this point whether the wheat is still alive is to dig up a few plants, including the roots, and put them in a pot inside the house with some water. The plants should start producing some new green growth within 7-10 days at the most if they are still alive.

Figure 6. Closeup of wheat crowns that were grazed. The crown on the left when split open is brown and soft (dead), and the crown on the right is white and alive.

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4. Early reports of wheat rust in southern states

There have been several reports of wheat rust in the southern U.S. This may have implications for growers in Kansas. Below are some highlights of the reports from the last few weeks.

Stripe rust

Stripe rust has been very active the past few months with reports from Louisiana, Arkansas, Mississippi, and Texas. The first report of stripe rust came from northern Louisiana where Trey Price, LSU wheat pathologist, noted a several foci of the disease in research plots near Monroe (northeastern, LA). These reports were followed by reports of stripe rust from Arkansas. Terry Spurlock, Extension plant pathologist for University of Arkansas, indicates that stripe is present in many counties in eastern Arkansas. Spurlock indicates the disease is severe in many fields. The situation appears to be similar across the border in Mississippi, where stripe rust was reported near Stoneville. There have also been reports of stripe rust activity in Texas. In this case, wheat breeder Amir Ibrahim with Texas A&M reported a small "hot spot" of stripe rust in research plots near Ennis, Texas (just south of Dallas).

Figure 1. Stripe rust. Photo by Erick DeWolf, K-State Research and Extension.

Leaf rust

Bob Hunger, Extension plant pathologist with Oklahoma State University, reported leaf rust in Oklahoma this week. To the best of my knowledge, this is the first report of leaf rust in 2015. The report from Oklahoma indicates that leaf rust was present at low levels in research plots near Stillwater (north central, Okla.). The leaf rust was found in plots of Jagalene, which is known to be susceptible to leaf rust. The severity of the disease was less than 30 percent and affecting lower leaves. The report also indicates leaf rust activity in southwestern Oklahoma as well but there was less detail on varieties affected or disease severity for that area.

Implications for Kansas and other states

These reports of stripe rust and leaf rust in the southern U.S. are important because disease outbreaks in these areas can spread to neighboring states. The weather patterns in North America generally favor the spread rust in two major pathways. Rust outbreaks in Louisiana and Arkansas often spread up the Mississippi and Ohio River Valleys. Rust outbreaks in Texas and Oklahoma often spread north into the central and northern Great Plains. Producers in Kansas should be watching for more reports of disease in the south. If stripe rust or leaf rust continue to develop in the south, we will want to increase our local scouting activities. Scouting will be the key to timely management this spring.

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5. Central High Plains fallow and row crop weed control presentation available online

Didn't make it to the 2015 Cover Your Acres Conference? You still have a great opportunity to get updated on the latest products, rates, and timings for controlling difficult weeds, especially kochia.

Curtis Thompson, K-State Extension Weed Management Specialist, covered these topics in his presentation at the 2015 Cover Your Acres Conference. The presentation is now available online: https://kansasstate.mediasite.com/mediasite/Play/7fec17994d5444948dc78db26d0375e81d

The time is upon us to take a proactive approach to weed management to maintain optimal no-till and crop production practices.

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6. Deadline nearing for KARTA on-farm research grant opportunities

KARTA, the Kansas Agricultural Research and Technology Association, is a non-profit, grassroots organization of producers, industry, and research/extension personnel who share a common desire to maximize the use of technology in production agriculture.

A main component in this mission is helping producers conduct on-farm research. Modern precision agriculture hardware and software has made conducting well-designed on-farm trials a reality. Producers have the opportunity to develop their own project or join a group project. Support in developing, implementing, and analyzing an on-farm research project is available from fellow KARTA members and K-State Research and Extension agents and faculty. The main goal of these projects is not so much in the research outcome as in helping producers use the tools they have to answer questions relevant and specific to their operations.

$11,000 in funding is available for on-farm research projects through KARTA. Recipients must be a member or join KARTA and agree to present their findings at the annual conference. More details can be found on the research tab of the KARTA website at www.kartaonline.org

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7. Prescribed burning workshops scheduled for February and early March

K-State is conducting several Prescribed Burning Workshops during February and early March. Dates and locations are:

Date	Location	Address	Time	Contact
Feb.18	Scott City	WM Carpenter 4-H Building, 608 N Fairground Road	Noon	John Beckman Scott Co. Ext. 620-872-2930
Feb. 23	Howard	Ext. Meeting Room, 130 S. Pennsylvania	10 a.m.	Richard Fechter Rolling Prairie Dist. Ext. 620-515-0149
Feb. 24	Larned	J.A. Haas Exhibit Building, 400 E. 18th Street	9 a.m.	Jess Crockford Kansas Prescribed Fire Council 620-664-4882
Feb. 25	Pratt	4-H Building, 61 Lake Road	10 a.m.	Zac Eddy Pheasants Forever 620-549-3480 x110
Feb. 25	Osage City	Old Depot, 504 Market Street	10 a.m.	Rod Schaub Osage Co. Ext. 785-828-4438
Feb. 26	Jewell	Community Center, Delaware Street, Hwy 28	10 a.m.	John Forshee River Valley Dist. Ext. 785-632-5335
March 5	Viola	WSU Field Station, 28900 West 87 Street South	9 a.m.	Jess Crockford Kansas Prescribed Fire Council 620-664-4882

Each meeting normally lasts about 5 hours. There may be a charge for materials and lunch. People will need to contact those listed in the chart above to ask about charges.

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8. K-State Canola Risk Management Schools scheduled for March 5 and 10

Winter canola has proven to be a profitable crop for producers in Kansas in recent years, leading to an exciting future and a need for further education.

Year after year, producers in Kansas continue to plant record acres indicating strong interest in winter canola as a rotational crop. At K-State Research and Extension, we are committed to providing both new and experienced producers the tools necessary to manage the agronomics and marketing of winter canola.

Producers will have the opportunity to learn more about successful winter canola production practices and risk management at two production schools in March.

Topics will include stand establishment; planting date; fertility; variety selection; winter survival; pest, disease, and weed control; harvest management; insurance; and marketing.

Dates and locations in Kansas include:

March 5 – Concordia, Heavy's BBQ meeting room, 103 W. 7th St. 10 a.m. Lunch will be sponsored by Wilbur-Ellis. RSVP to the Cloud County Extension office 785-243-8185 by Monday, March 2.

March 10 – Kingman, Kingman County Activities Center; 10 a.m. Lunch will be sponsored by American Ag Credit. RSVP to the Kingman County Extension office 620-532-5131 by Friday, March 2.

The schools are free and open to the public. To ensure adequate food and program materials are available, the organizers are requesting that participants pre-register.

Risk management schools fulfill the requirements of the USDA-Risk Management Agency sponsored project "Extending Risk Management Education to New and Experienced Canola Producers in Kansas and Colorado."

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9. Comparative Vegetation Condition Report: January 27 - February 9

K-State's Ecology and Agriculture Spatial Analysis Laboratory (EASAL) produces weekly Vegetation Condition Report maps. These maps can be a valuable tool for making crop selection and marketing decisions.

Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5NIggw
http://www.youtube.com/watch?v=tUdOK94efxc

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 26-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.

NOTE TO READERS: The maps below represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact Nan An at nanan@ksu.edu and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROS Data Center where we obtain the raw data used to make the maps. These maps are provided for free as a service of the Department of Agronomy and K-State Research and Extension.

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

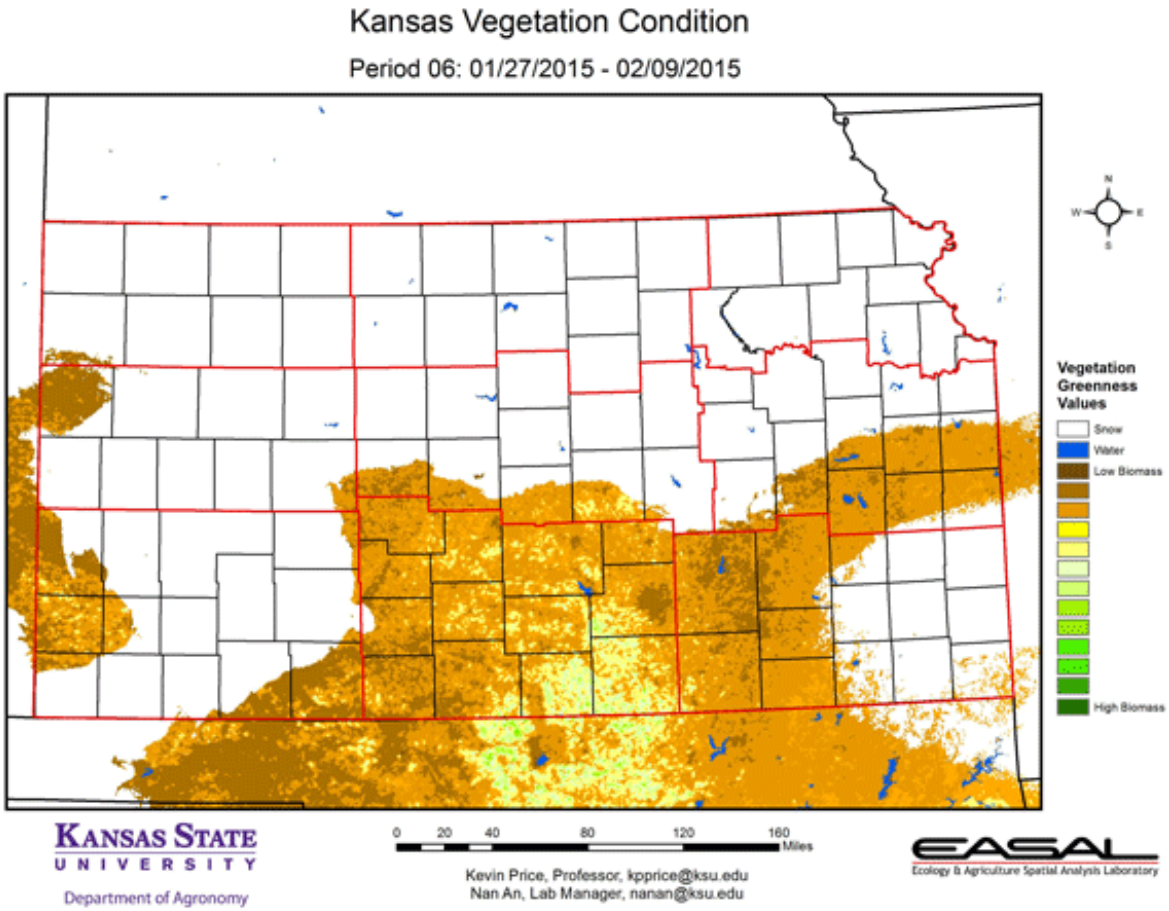

Figure 1. The Vegetation Condition Report for Kansas for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow during this period was limited in coverage. Only the northeast had more than a trace. Moisture was similarly limited.

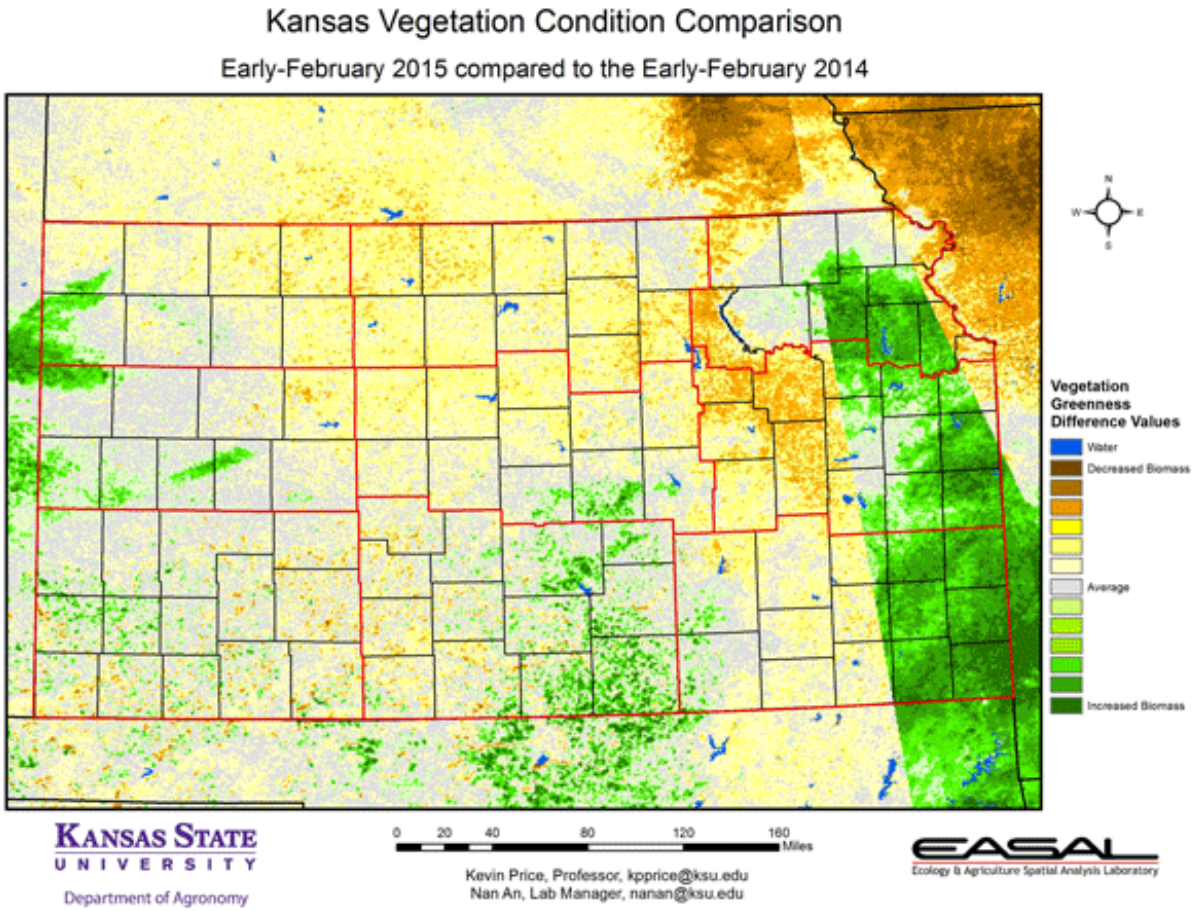

Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that cloud cover in the east resulted in a splice line. Higher NDVI readings are limited to south central Kansas.

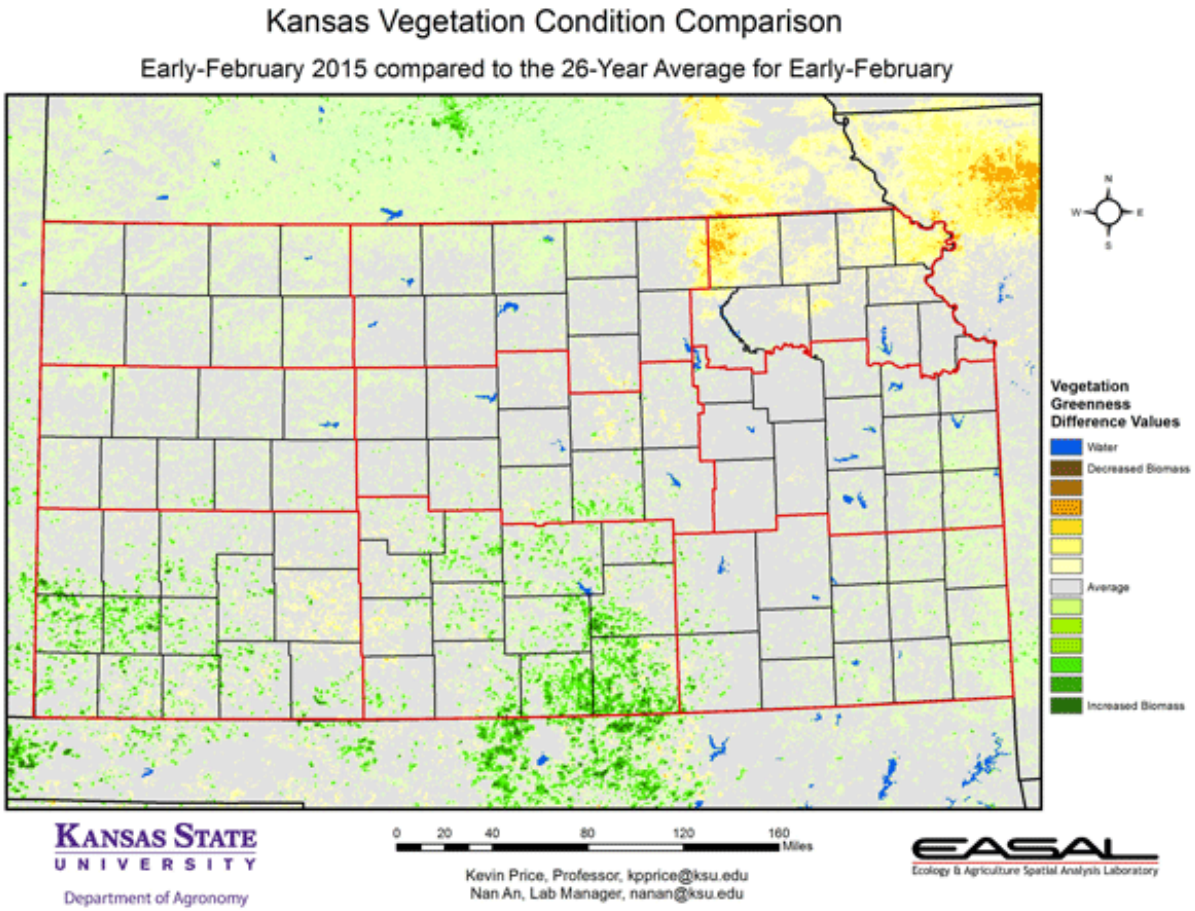

Figure 3. Compared to the 26-year average at this time for Kansas, this year's Vegetation Condition Report for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the southern part of the state has above-average NDVI readings. Wheat in this region shows signs of greenup.

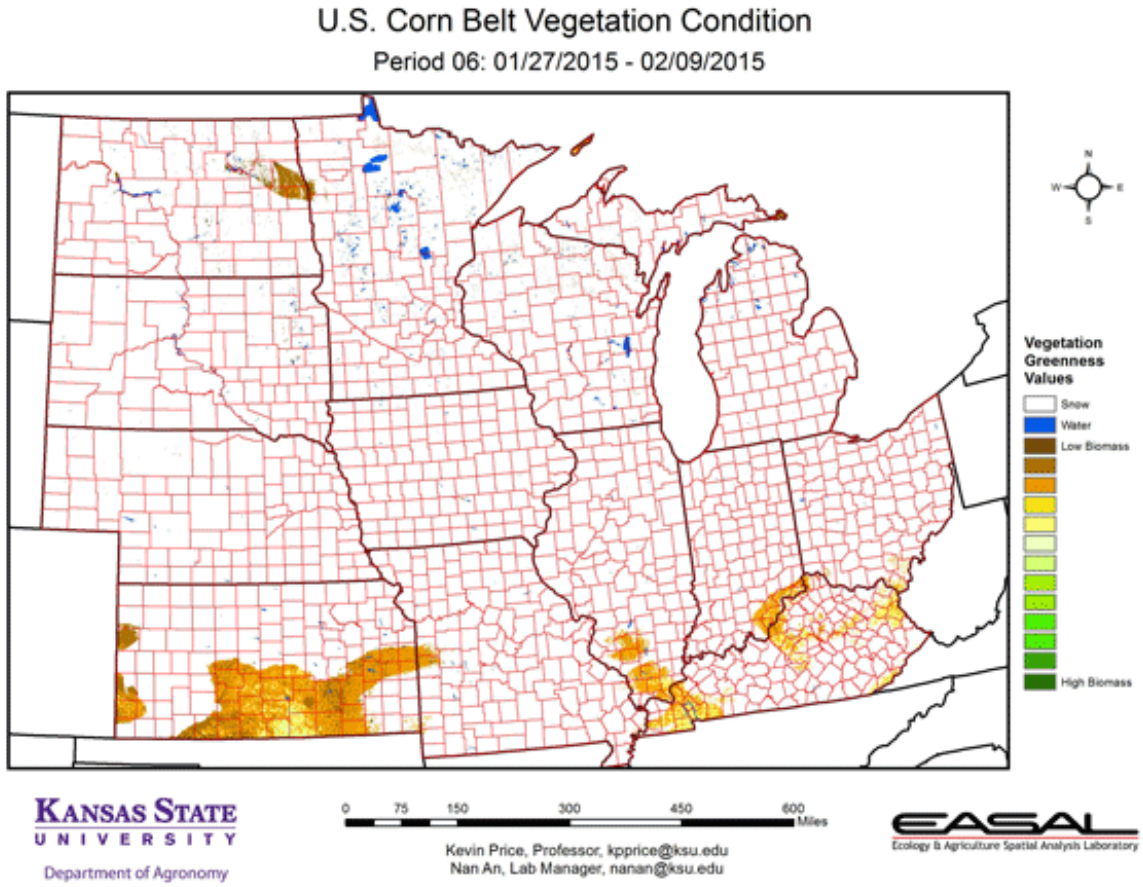

Figure 4. The Vegetation Condition Report for the Corn Belt for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the region had snow cover. This is in contrast to earlier winter conditions, and has slowed drought expansion in the north.

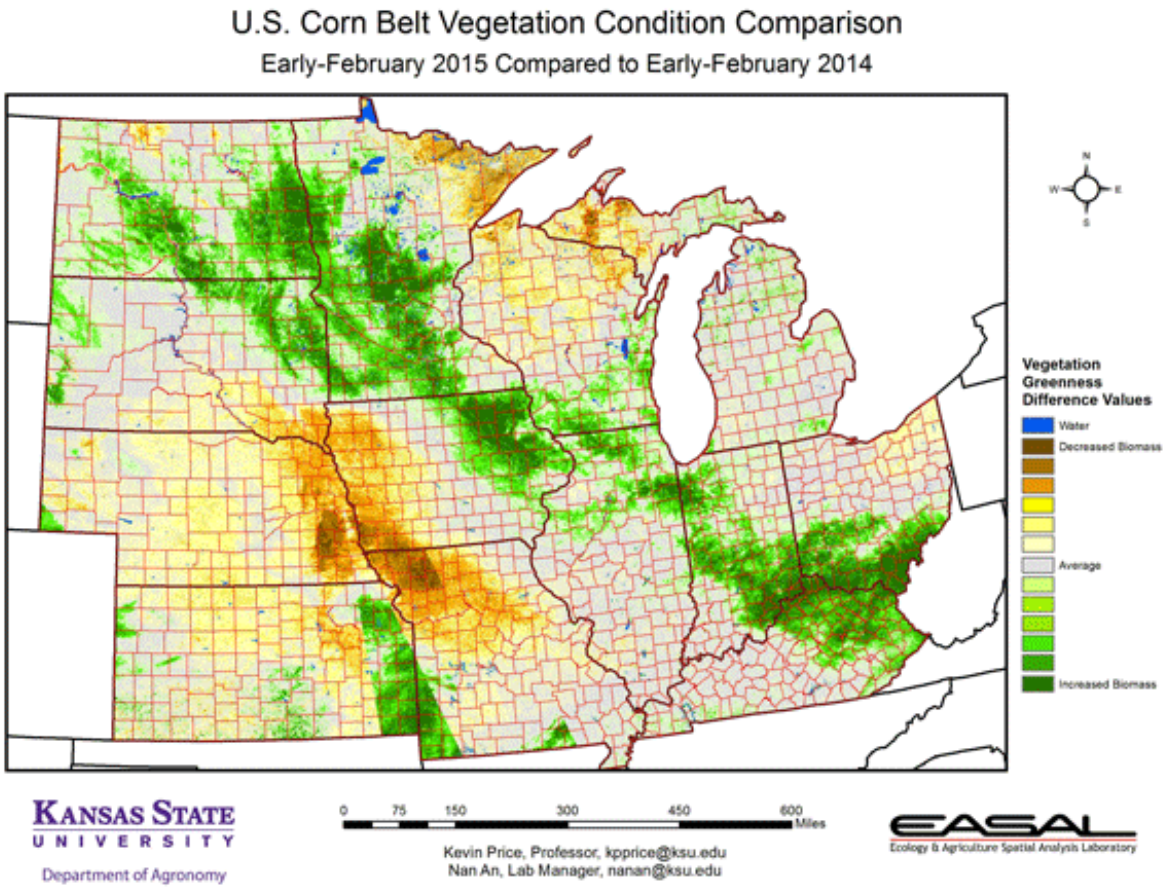

Figure 5. The comparison to last year in the Corn Belt for the period January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows, aside from the splice line in eastern Kansas, higher NDVI values this year follow the area of greatest snow cover.

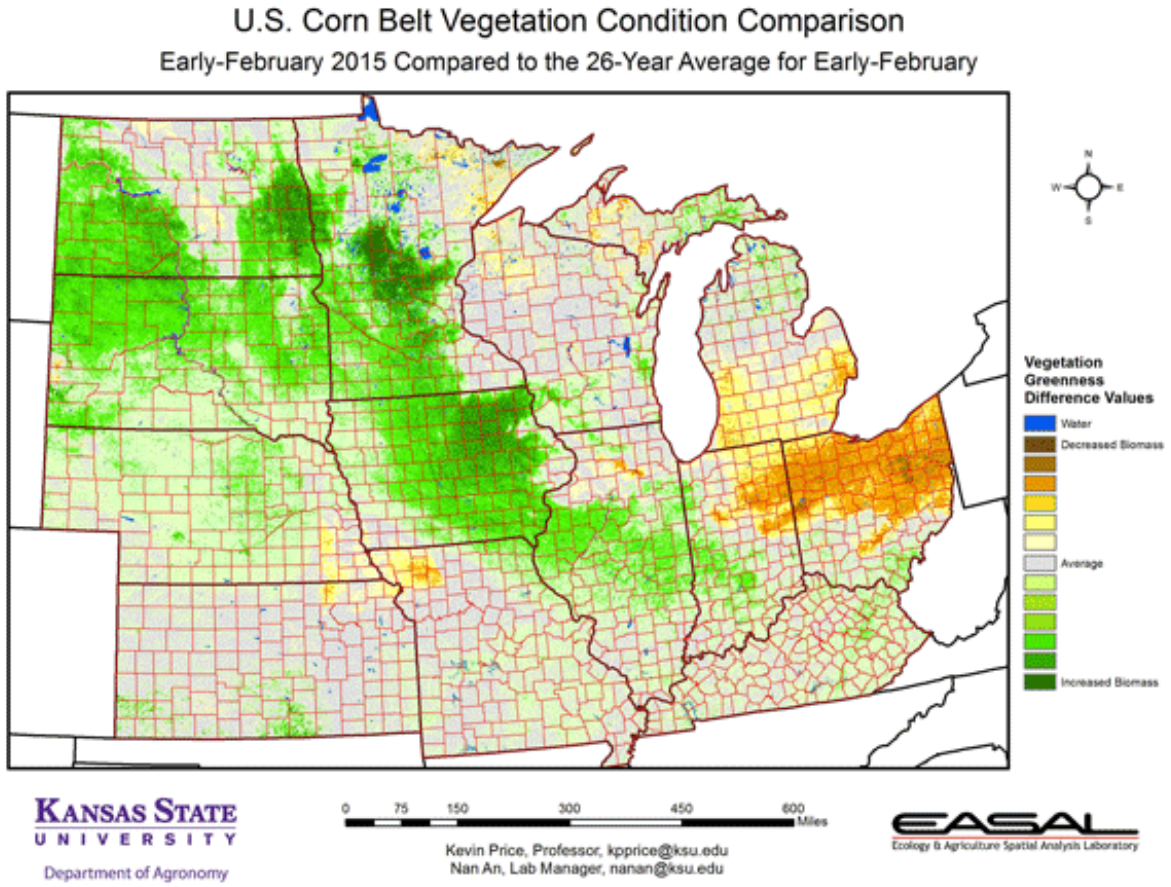

Figure 6. Compared to the 26-year average at this time for the Corn Belt, this year's Vegetation Condition Report for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the northwestern parts of the region have above-average NDVI readings.

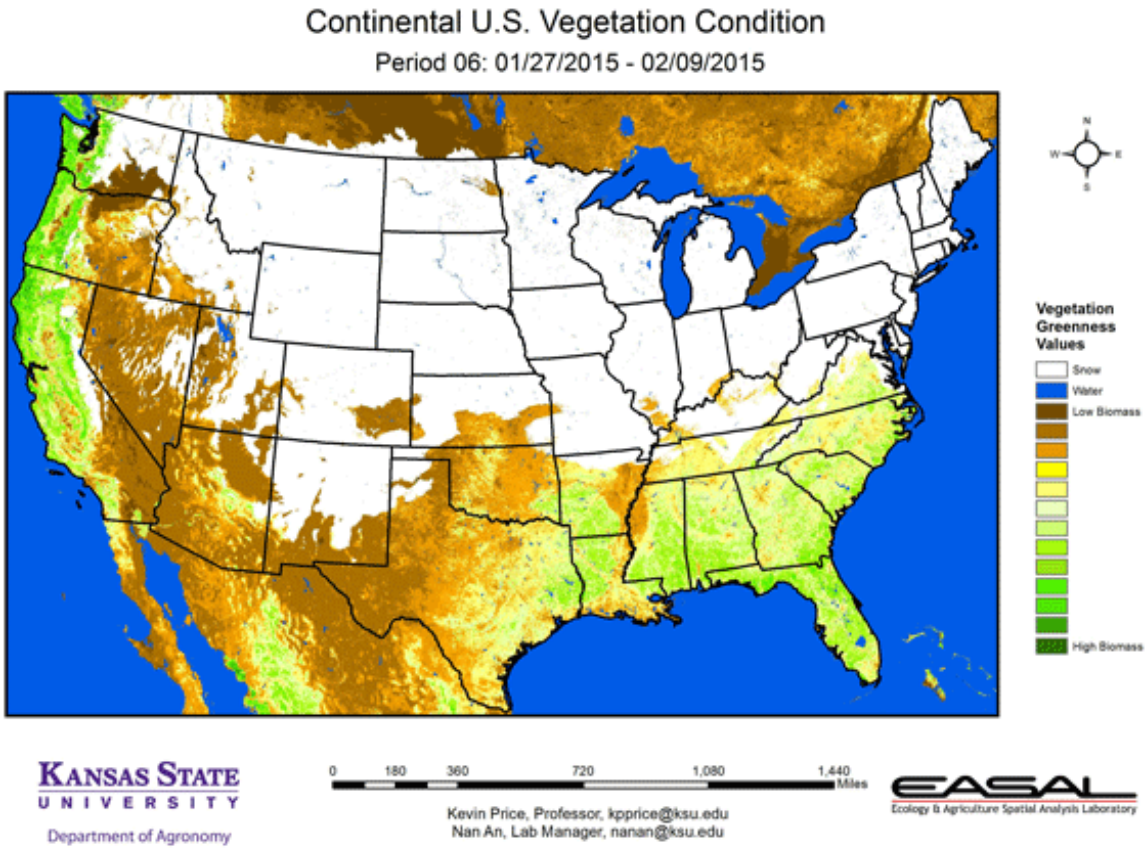

Figure 7. The Vegetation Condition Report for the U.S. for January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow did not penetrate as far south as in earlier periods. Thelack of snow in the Pacific Northwest is particularly noteworthy.

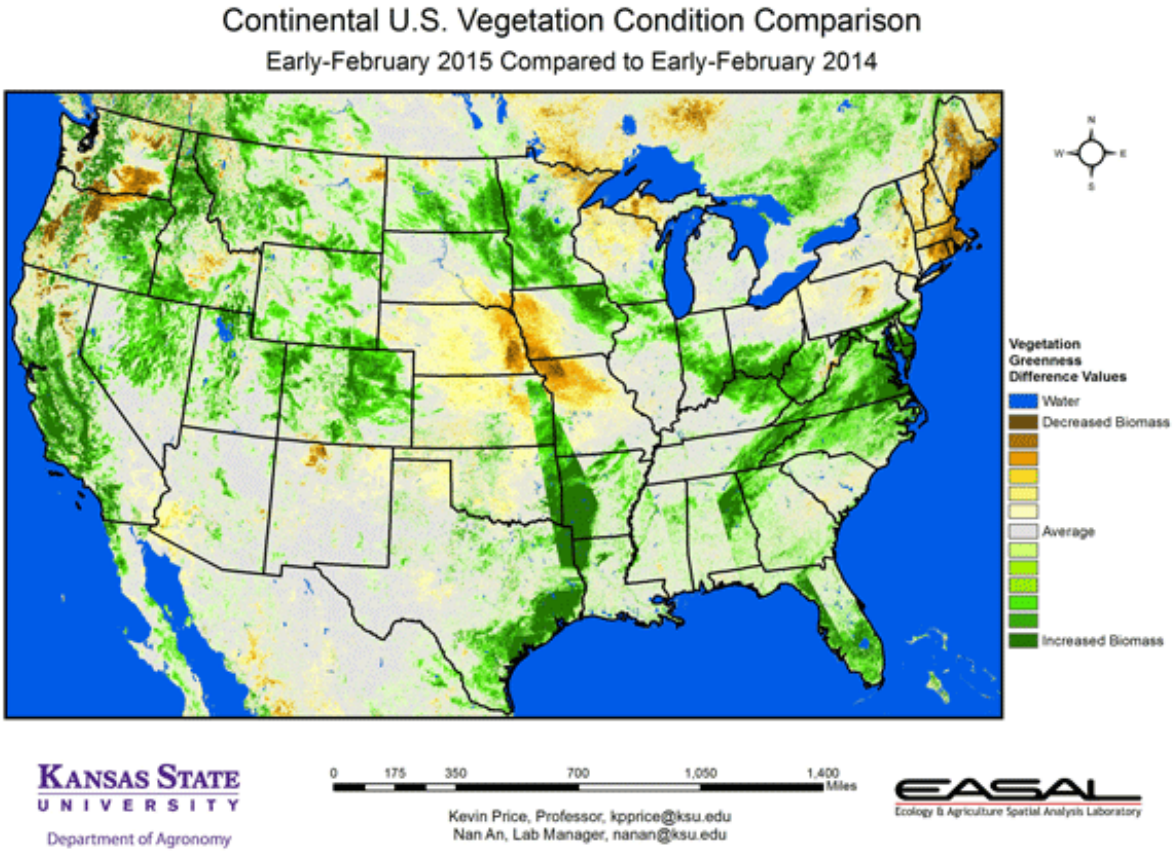

Figure 8. The U.S. comparison to last year at this time for the period January 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the country has higher NDVI values. The extreme snow in New England has resulted in lower NDVI readings in that area this year.

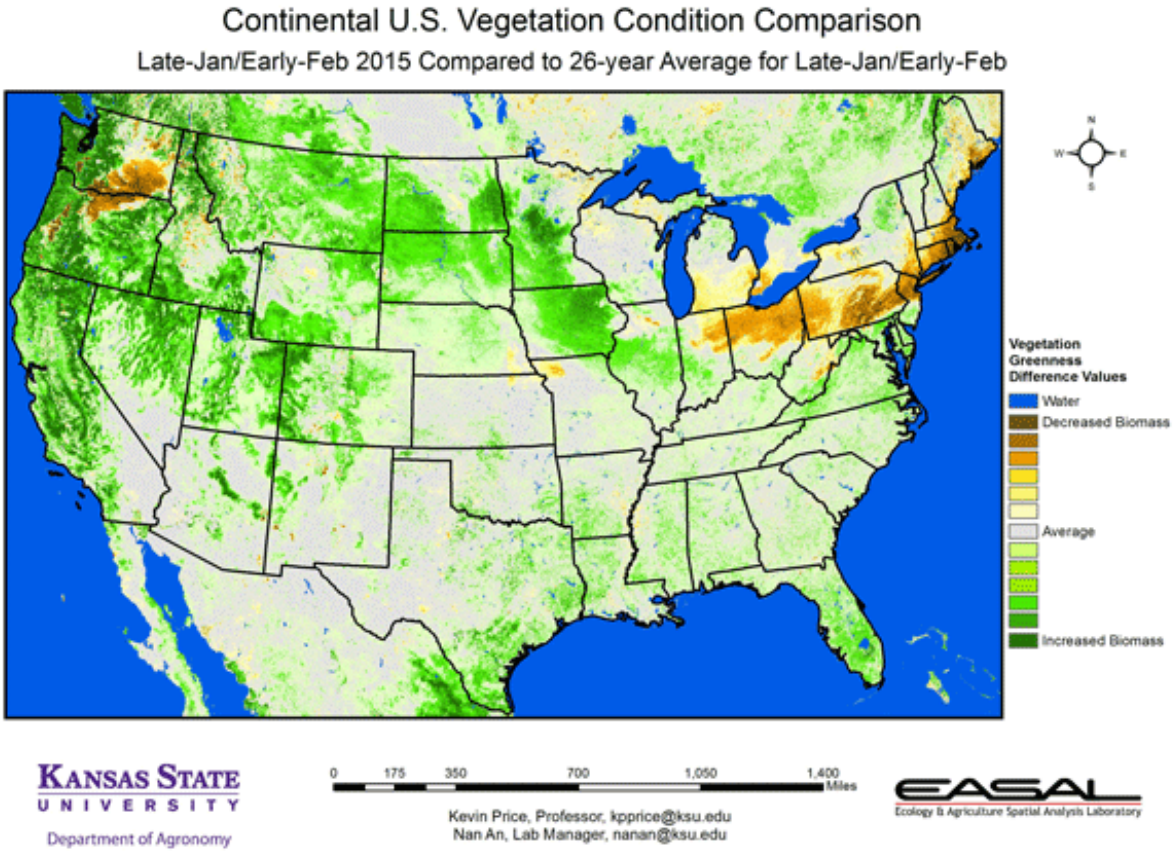

Figure 9. The U.S. comparison to the 26-year average for the period 27 – February 9 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the Pacific Northwest has above-average NDVI values. Moisture has been above average, but **has been in the form of rain rather than snow. This provides for increased photosynthetic activity at the present, but the lack of snow means limited availability of runoff in the spring. This is likely to increase drought stress.**

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