



Extension Agronomy

eUpdate

11/14/2014

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. Wheat response to cold temperatures

The sudden sharp drop in temperatures across Kansas this week will certainly cause the wheat crop to go into dormancy. Whether it will injure the wheat to any degree depends on several factors.

The moisture level in the topsoil will be important. Soil moisture was generally good in most of the state going into October. But the warm temperatures in October caused some of the wheat in the state to put on excessive amounts of topgrowth, which dried out the soil.

The cold temperatures will be more likely to cause injury to wheat if the plants were showing drought stress symptoms. Also, dry soils will get colder more easily than wet soils.

Last fall, there was a severe cold snap in early December that helped lead to winter injury on some wheat. But soils were generally both dry and fluffy last fall and winter, leaving the wheat somewhat exposed to damage. This year, even where soils have become a little dry they are generally much firmer than last year. This should help the wheat withstand cold temperatures a little better.

Another important factor in wheat's response to the cold is whether the wheat had time to become properly cold hardened. Although the weather was warm overall in October and early November, there may have been enough cold nights to have allowed the wheat to develop cold hardiness.

The extent of the unusually large and rapid drop in temperatures from well above normal to well below normal is a concern. If the wheat did not develop sufficient cold hardiness, it would become more susceptible to injury from the recent cold snap. We likely won't know for sure until next spring as the wheat comes out of dormancy.

The first thing we'll be seeing is a lot of burndown of the wheat from these cold temperatures. If the wheat was bigger than normal, the plants may look "rough" with a lot of brown dead-looking foliage on the soil surface.

That doesn't mean the plants are dead, however. The important factor will be whether the crown below the soil surface remains alive. Having a well-developed secondary root system will help the plants survive.

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2. The economic return to soil test information

Fall after harvest is an excellent time for soil sampling and testing. This year, with lower grain prices, many producers may be looking for places to cut costs. However, cutting back on soil testing could result in lowering profits.

Having accurate soil test information is critical to making the right decisions regarding fertilizer input. Fertilizer cost has remained steady while grain prices have dropped this fall. Therefore, making good use of fertilizer input becomes critical to maximize profits.

Previous research by former K-State agricultural economists Terry Kastens and Kevin Dhuyvetter simulated 10,000 observations from farm production fields to evaluate the economic value of accurate soil test information. Each field was assigned a random value for soil test P (STP) and soil test N (STN), and different scenarios for expected yields and prices for grain and fertilizer. The random values represent what a producer might guess the soil N or soil P level is without having results of a soil test for confirmation.

The resulting yields from nutrient rates applied based on the guesses made without accurate soil test information were compared with the yields obtained when applied nutrient rates were based on actual soil test levels of N and P. Results from this study show that when the guess on soil N and P levels turned out to be exactly correct, and equal to the actual levels, there was no effect on profit from having the actual soil test information – except for the cost of taking and analyzing the soil tests.

However, if the guess is not correct, and the actual soil N or P level is much lower or much higher than the initial guess, the producer would have lost a significant amount of money per acre. In other words, the overall return to accurate information on soil nutrient levels can be significant.

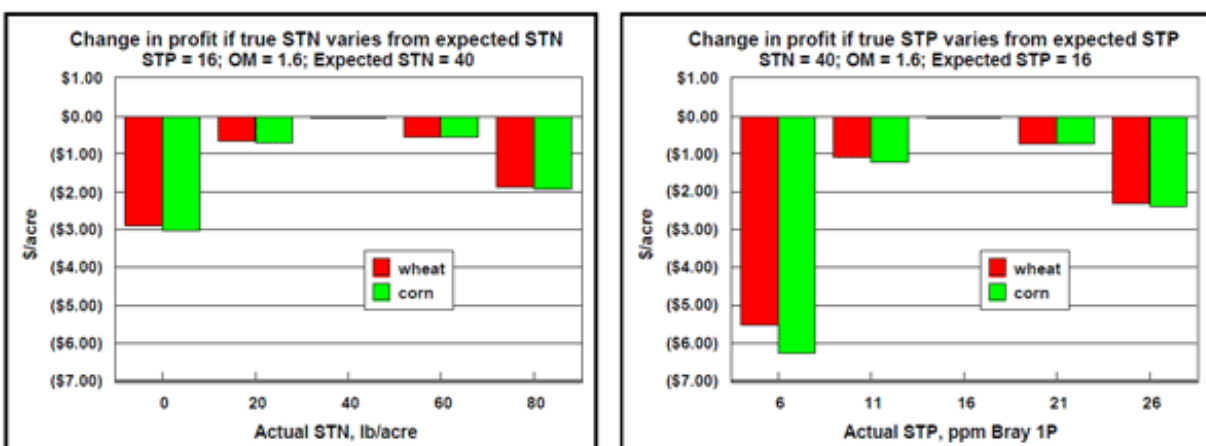


Figure 1. Losses can be expected if nutrient levels (N or P) in the field are significantly lower or higher than what a producer thinks the levels would be without having the benefit of accurate soil test information. Actual nutrient levels in the field can only be assessed with soil sampling.
Source: Kastens and Dhuyvetter, KSU, available at:

[http://www.agmanager.info/crops/prodecon/precision/Soiltest\(revJan2005\).pdf](http://www.agmanager.info/crops/prodecon/precision/Soiltest(revJan2005).pdf)

Considering other variables such as fertilizer and grain price, results show that returns to soil sampling are generally greater when grain prices are lower. This is because potential returns to inputs are tighter at lower crop prices.

If actual soil test levels of N or P are higher than what you expect, producers can realize a significant savings by reducing or eliminating unnecessary nutrient applications. This situation is not uncommon for N, where some fields may have high levels of residual N from previous crops.

On the other hand, if producers overestimate how much N or P is in the soil and actual soil test levels are much lower than expected, yields and income could be increased by applying the higher, correct amount of nutrients needed. In this case, the difference in final income per acre will depend on the cost of the needed nutrients, the yield response from applying the needed nutrients, and crop prices.

If producers are applying a “farm-wide” uniform rate, they may be missing the opportunity to maximize profits for each field. Furthermore, by sampling and fertilizing based on management zones within a field, or based on historical yield map data, producers can further increase the return per area.

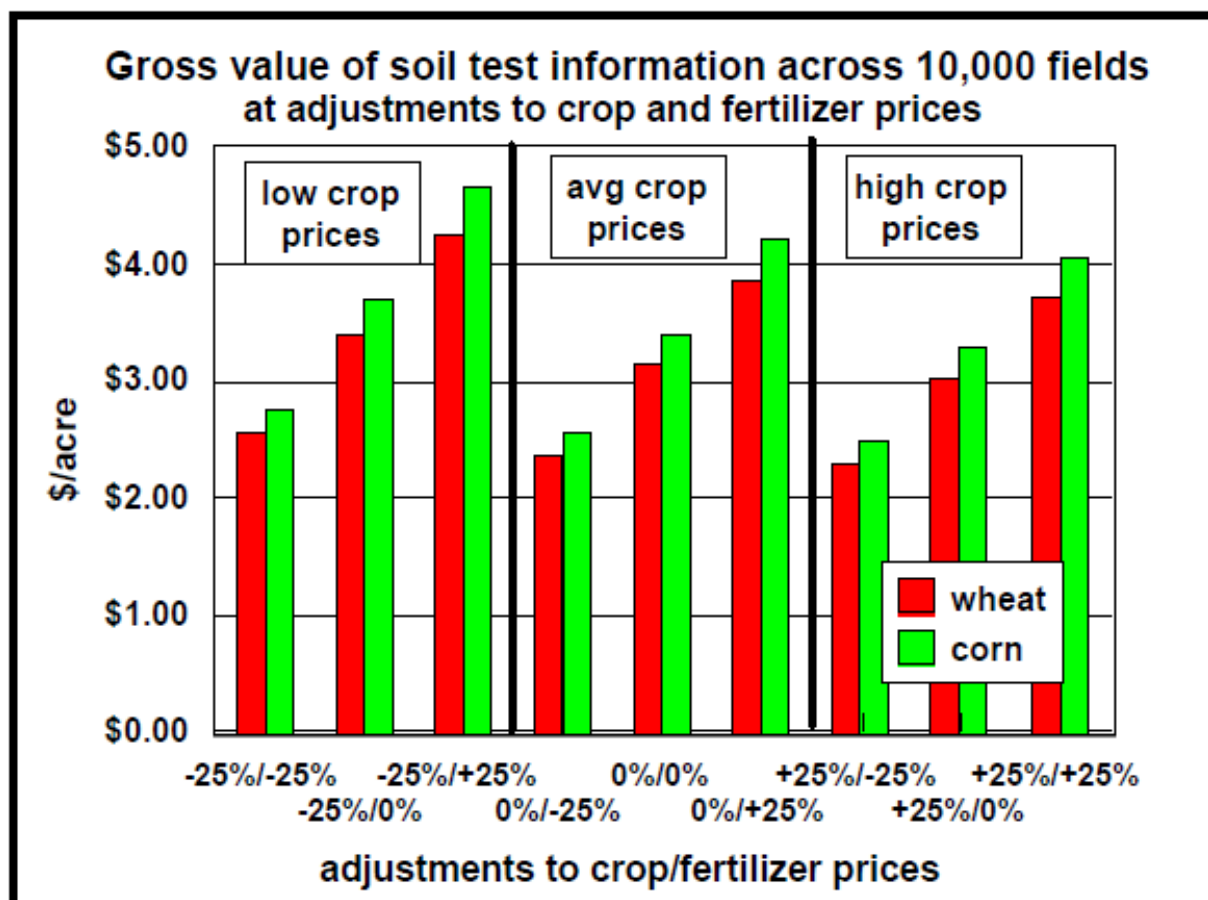


Figure 2. Returns to soil sampling are greater when crop prices are lower. This is because only fields with a greater potential yield increase per unit of N or P would be fertilized when crop prices are low and fertilizer prices are stable.

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3. Kansas Wheat Yield Calculator

The Kansas Wheat Alliance (KWA) has released the Kansas Wheat Yield Calculator app for Android and Apple devices.

The app uses the number of tillers on the plant, row spacing and several other factors when making a yield prediction. The user can choose from three different formulas used by KWA, Kansas State University, and crop insurance adjusters -- or choose to have the products averaged.

The app was developed by Ray Asebedo, K-State graduate student in agronomy, and Trevor Rife, graduate student in plant pathology, with the support of the Kansas Wheat Alliance. Asebedo and Rife set out to develop an app that was intuitive and diverse in its potential use.

"We designed this app to be used throughout the growing season. In the fall, you can use it to assess whether you have enough fall tillering to meet your yield goals and determine if adjustments in your spring management are needed to ensure yield goals are met efficiently," Asebedo said.

"Throughout the spring, from early spring greenup to flag leaf and through heading, you can use this app to assess how your winter wheat crop is developing and how the yield potential might be changing under different environmental conditions. This information can have a direct impact on your agronomic and economic management decisions."

The app can average yields across fields, Rife added. "You can take multiple samples in a single field. And you can have multiple fields where you can store each of those samples and get complete field averages across different fields and locations," he said.

Asebedo and Rife said they may make the app variety-specific in the future. But for now, variety is not a factor in the calculations used to estimate yields.

The app is currently available in its more basic form, said Asebedo.

"We have significant updates planned on the horizon, the first being yield estimations by taking a photo rather than counting tillers. This will significantly speed up the yield estimation process and allow producers to assess more fields in less time. Next, we will be incorporating nutrient management algorithms to help producers optimize their nutrient management practices for more profit per acre," he explained.

"This is an exciting process and we are just starting to scratch the surface of the possibilities," he said.

The app has several practical uses for producers, added Daryl Strouts, president of KWA.

"I think the calculator can be a comparative thing so that a farmer can use this tool over time and make management changes in between," said Strouts. "If the farmer's irrigating, maybe turn the water on, or if he needs a bit more fertilizer, he can do that. Then, he can go back and see later if the changes he made have made any difference."

The app is available now at no charge. For more information on the app and links to download it, see: www.kswheatalliance.org/

[Download for Android](#)

[Download from Apple Store](#)

Steve Watson, Agronomy eUpdate Editor

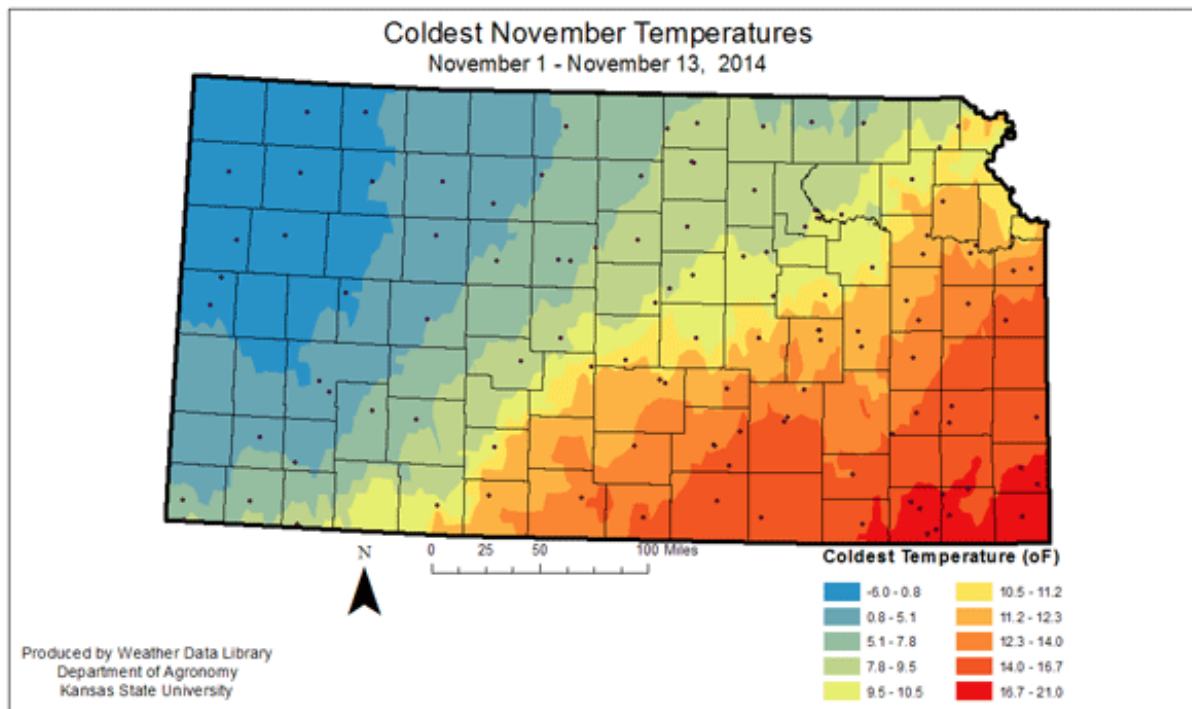
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4. How cold did it get in Kansas from November 10-13?

The coldest weather of the season has penetrated Kansas. Based on preliminary data, the coldest low temperatures ranged from -10 degrees F in the northwest to 21 degrees F in the southeast. As would be expected, soil temperatures have dropped significantly in the last week, with the greatest drops seen in the northwest. Despite the extreme cold, to this point no new monthly record low temperatures have been recorded, although Sharon Springs broke a daily record with 9 degrees F on the 11th. Additional new records are likely, as more data is received.



Soil Temperature Changes vs Low Temperatures for the last 7 days

Cheyenne County

Air Temper4" Soil
ature

min

Average

Rush County

Air Temper4" Soil
ature

min

Average

Riley County

Air Temper4" Soil
ature

min

Average

Cherokee County

Air Temper4" Soil
ature

min

Average

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Date	°F	°F	°F	°F	°F	°F	°F	°F
7-Nov	31.0	50.8	40.7	55.3	30.9	52.4	30.2	50.1
8-Nov	31.2	52.3	40.5	55.7	33.4	53.3	31.8	51.1
9-Nov	30.7	53.2	33.2	55.3	33.2	52.6	29.7	49.7
10-Nov	13.7	46.2	21.7	54.2	29.2	54.2	38.6	52.6
11-Nov	5.6	36.8	13.2	51.0	20.6	48.5	24.5	50.3
12-Nov	-1.0	29.9	12.7	47.5	15.9	43.6	19.9	45.1
13-Nov	-7.1	28.9	6.6	44.9	11.5	40.8	18.2	42.0

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5. Comparative Vegetation Condition Report: October 28 - November 10

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=CRP3Y5Nlggw>

<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 25-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:

Kansas Vegetation Condition

Period 45: 10/28/2014 - 11/10/2014

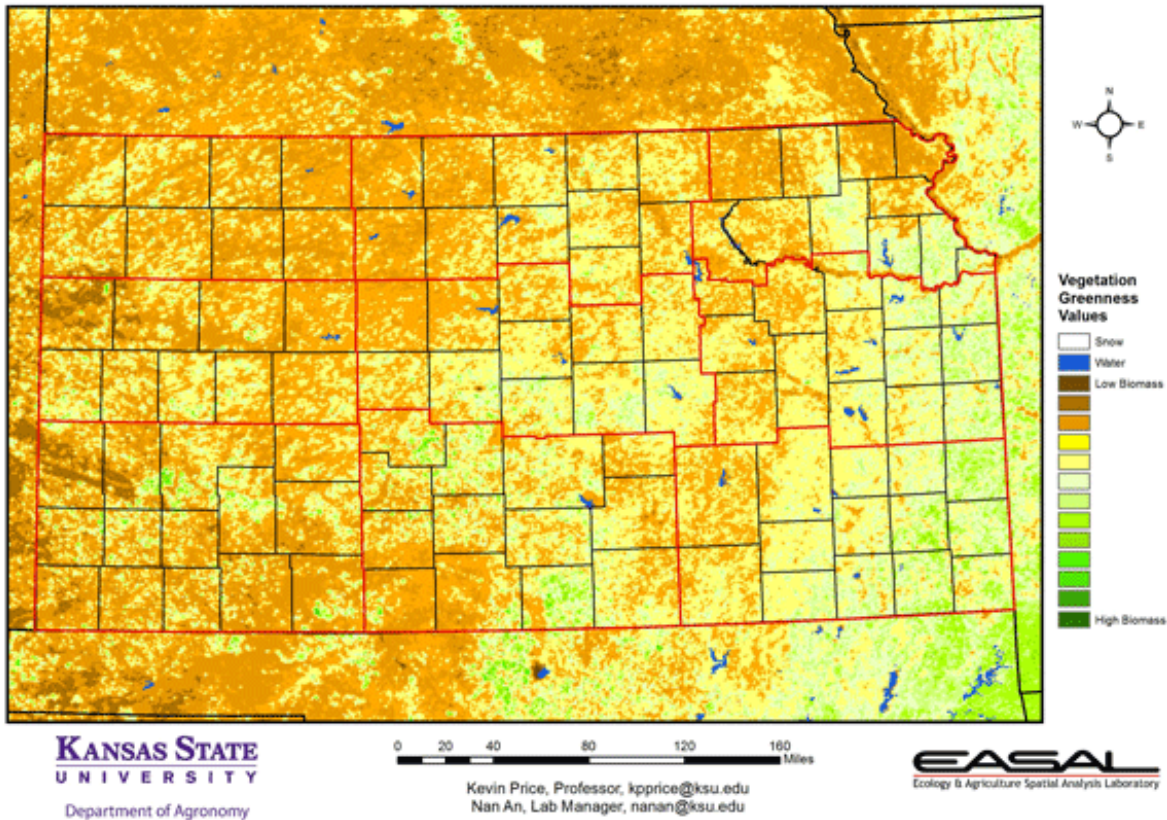


Figure 1. The Vegetation Condition Report for Kansas for October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that biomass production is limited, with the highest activity levels in the Southeastern Division, as cooler temperatures dominated the region.

Kansas Vegetation Condition Comparison

Early-November 2014 compared to the Early-November 2013

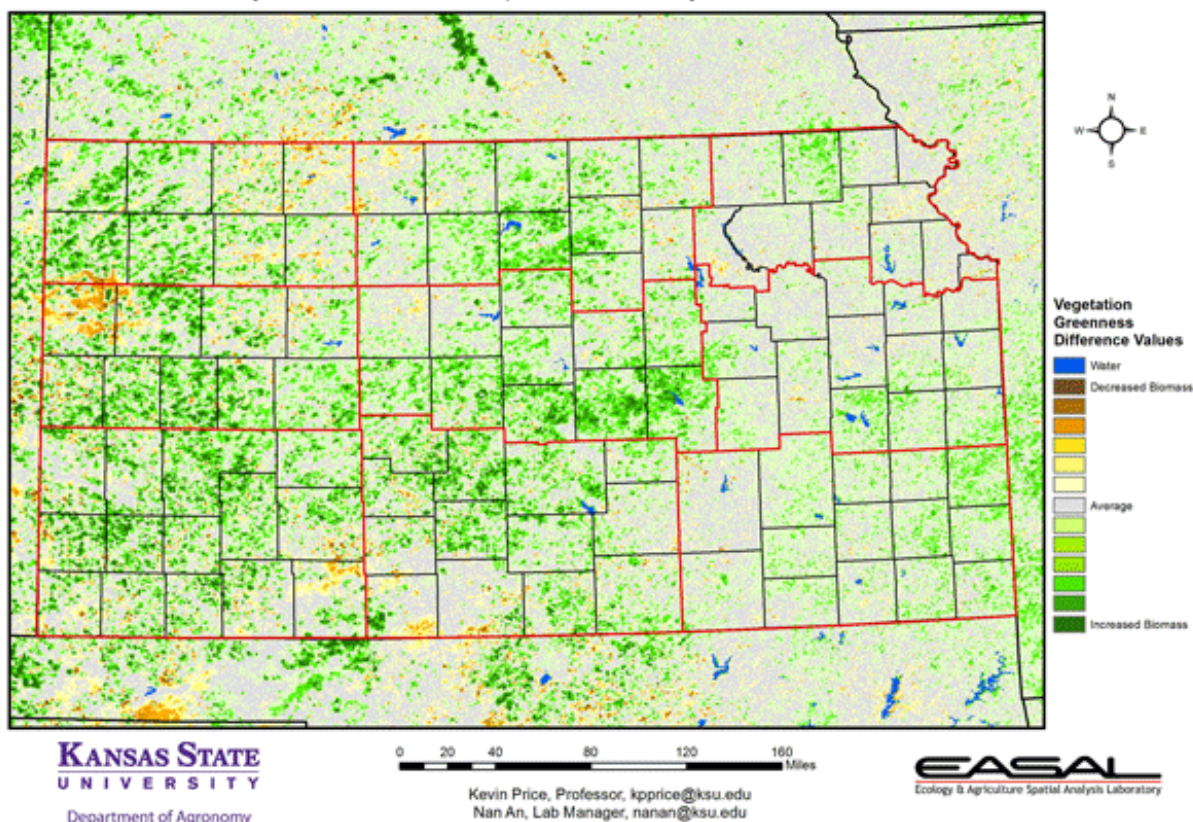


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that biomass production is higher than at this point last year in the western and central divisions. Winter wheat emergence is 98 percent complete in the northwest but only 56 percent complete in southeast Kansas.

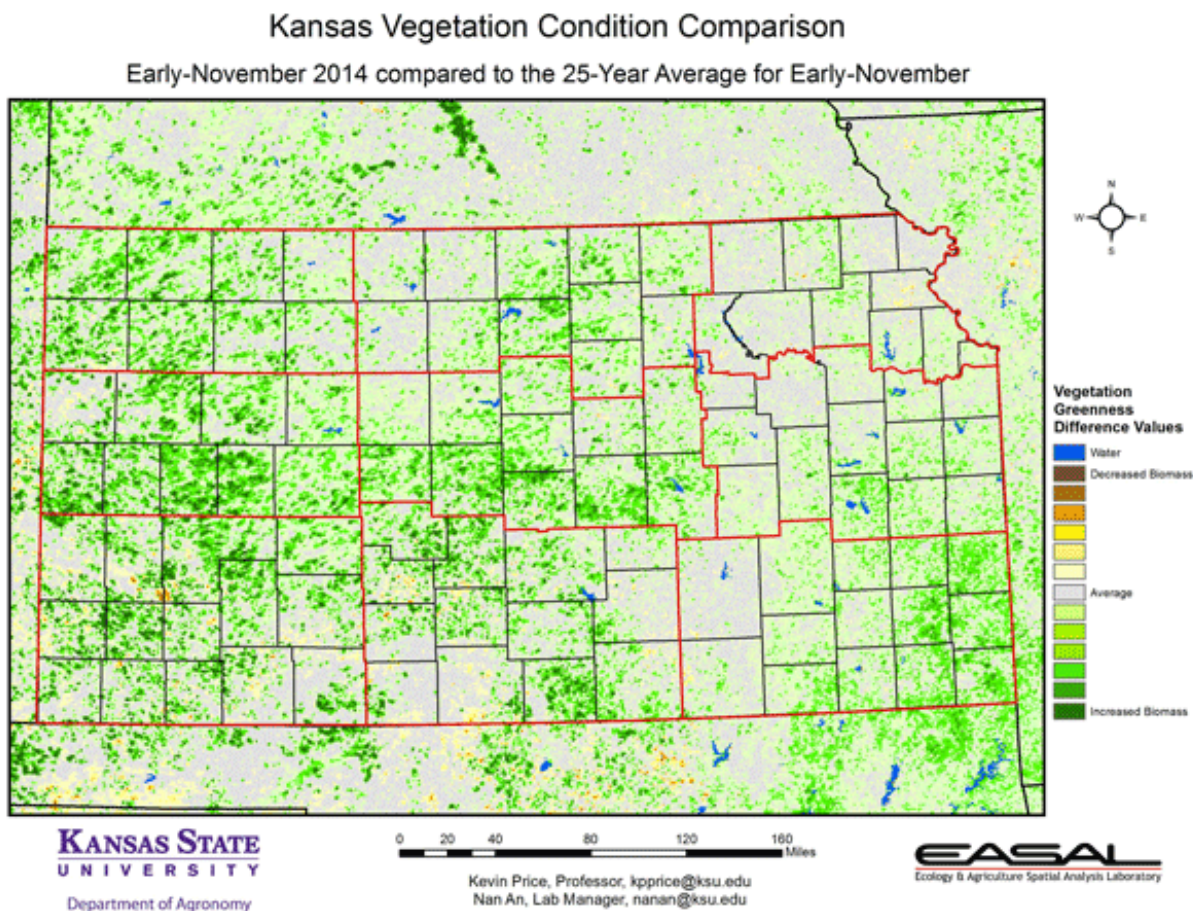


Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for October 28 – November 10 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows above-average photosynthetic activity across most of the state.

U.S. Corn Belt Vegetation Condition

Period 45: 10/28/2014 - 11/10/2014

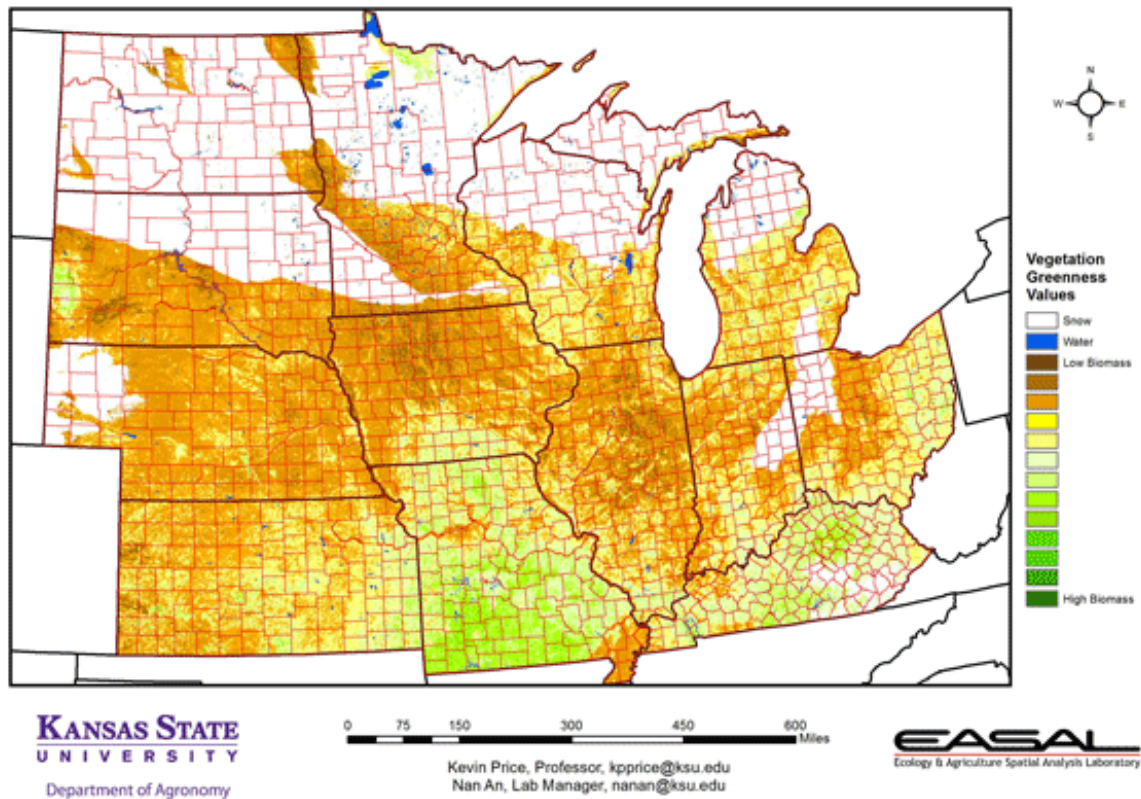


Figure 4. The Vegetation Condition Report for the Corn Belt for October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that active photosynthetic activity is limited to southwestern Missouri, while snow covers much of the northern Plains. Heaviest snow totals were reported in Minnesota and northern Michigan, with amounts greater than 12 inches common.

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U.S. Corn Belt Vegetation Condition Comparison
Early-November 2014 Compared to Early-November 2013

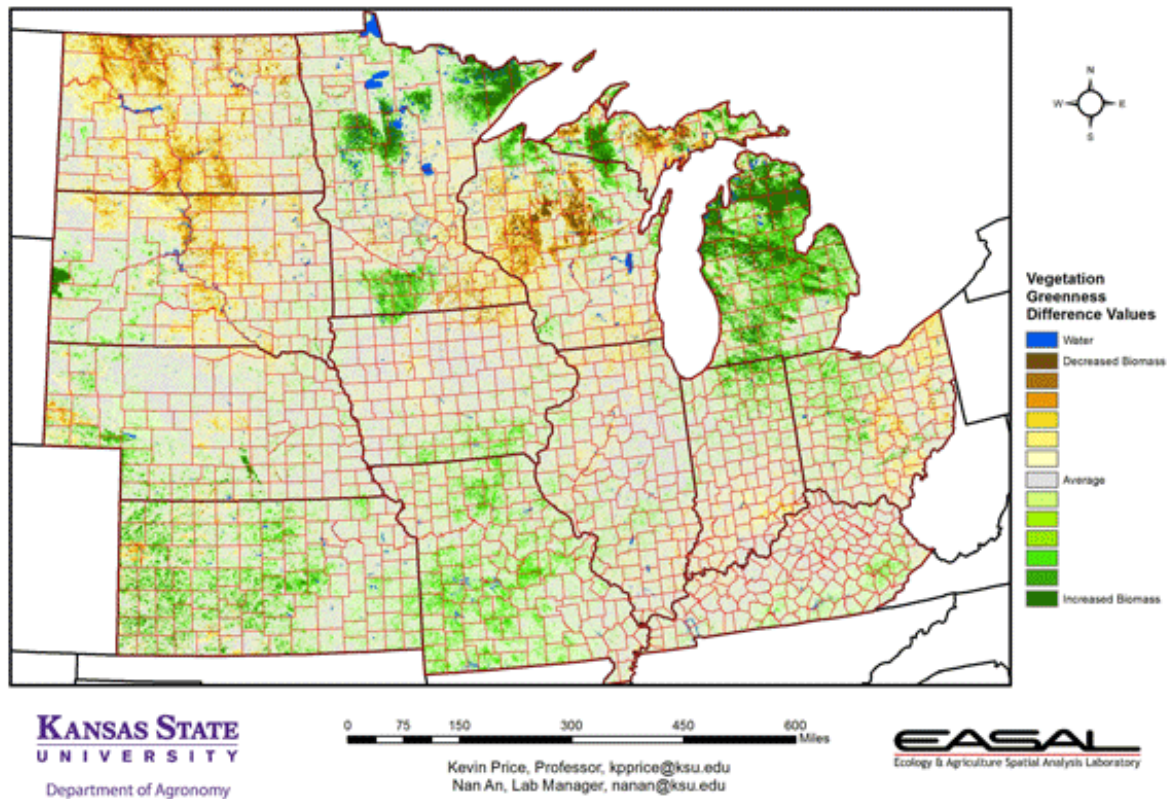


Figure 5. The comparison to last year in the Corn Belt for the period October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest departures are in Michigan. More favorable growing conditions have resulted in more persistent biomass production into the fall in this area.

U.S. Corn Belt Vegetation Condition Comparison

Early-November 2014 Compared to the 25-Year Average for Early-November

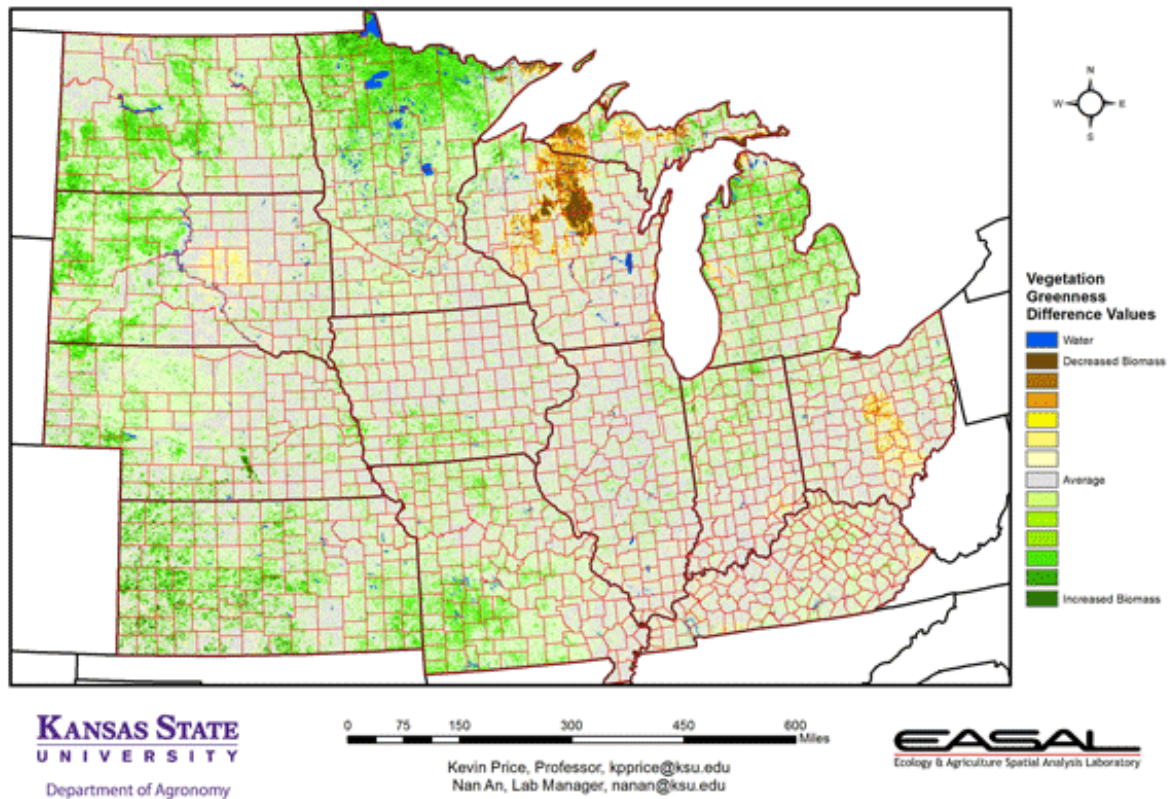


Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for October 28 – November 10 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that biomass production is generally at or above the long-term average. Parts of central Wisconsin and the Upper Peninsula of Michigan are the major exceptions. These areas correspond to the heaviest snowfalls with the most recent system.

Continental U.S. Vegetation Condition

Period 45: 10/28/2014 - 11/10/2014

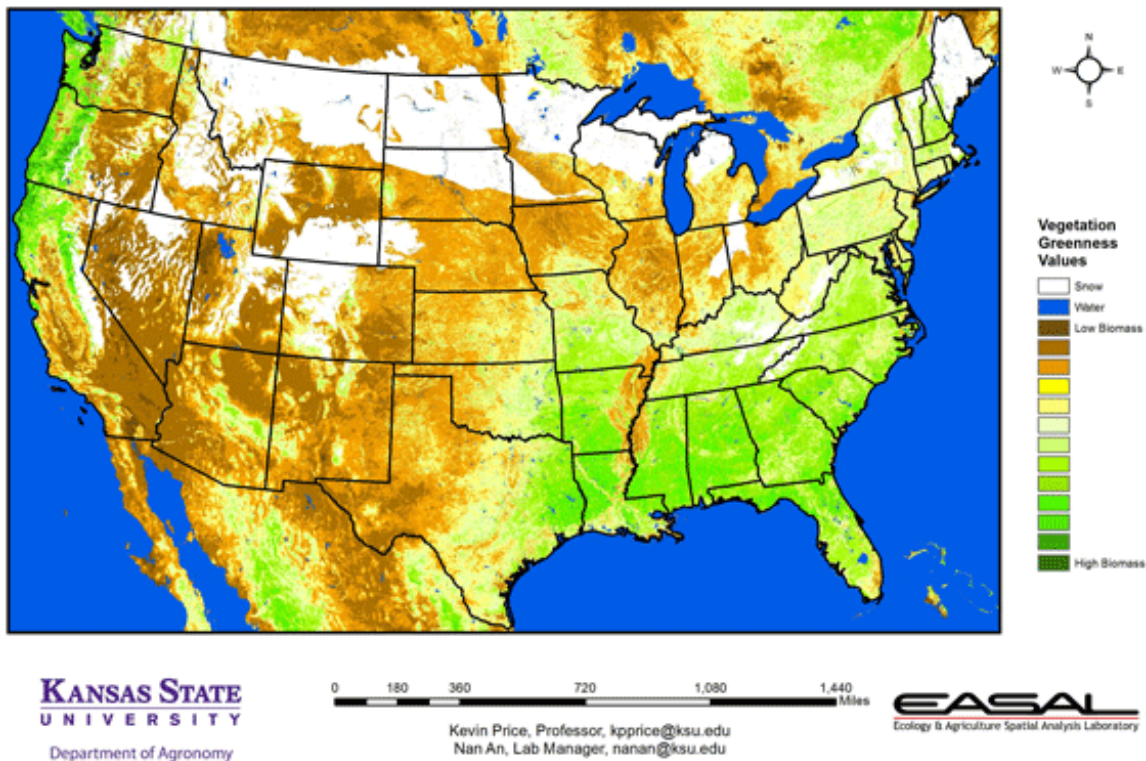


Figure 7. The Vegetation Condition Report for the U.S. for October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that snow has become a factor in some areas. Greatest snow depths were reported in northern Wisconsin and the Upper Peninsula of Michigan. It is noteworthy that snowfall has been limited in the mountains of California, where winter precipitation is a critical factor in water supplies.

Continental U.S. Vegetation Condition Comparison
Early-November 2014 Compared to Early-November 2013

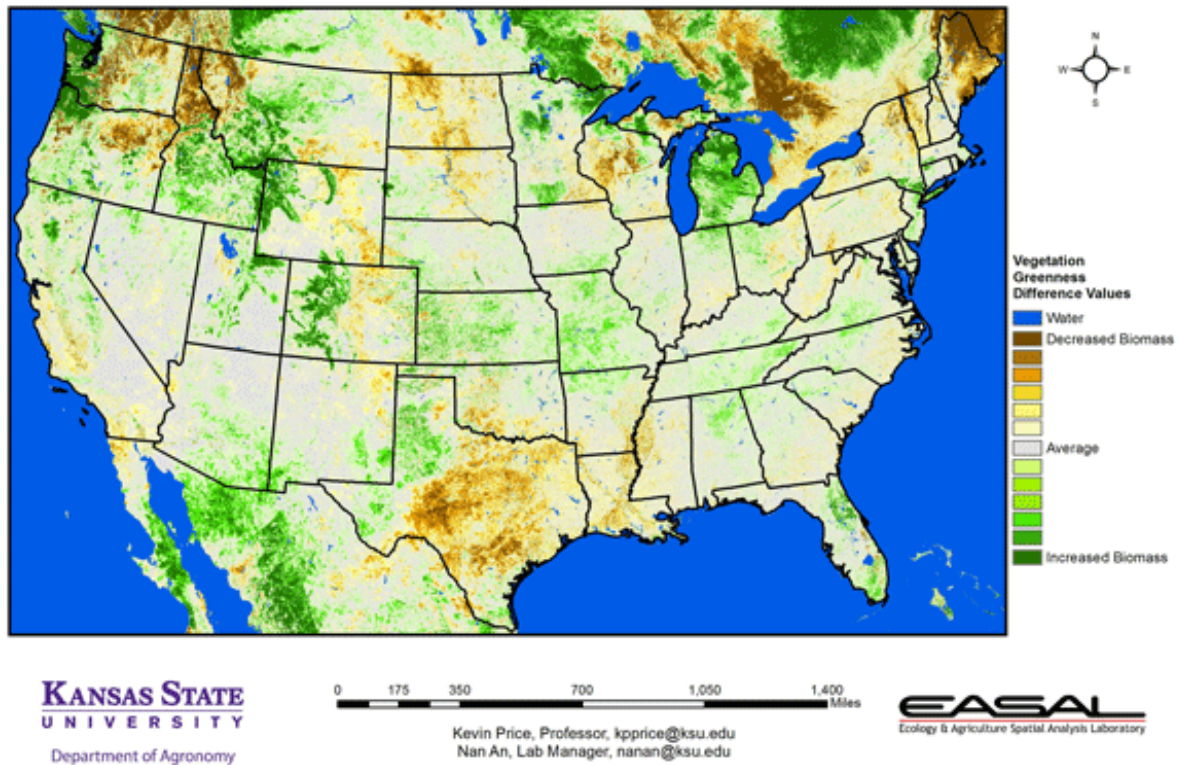


Figure 8. The U.S. comparison to last year at this time for the period October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that there is generally comparable photosynthetic activity. There is much lower NDVI values in northern Idaho and western Montana, where early snow totals have limited vegetative activity.

Continental U.S. Vegetation Condition Comparison
Early-November 2014 Compared to 25-year Average for Early-November

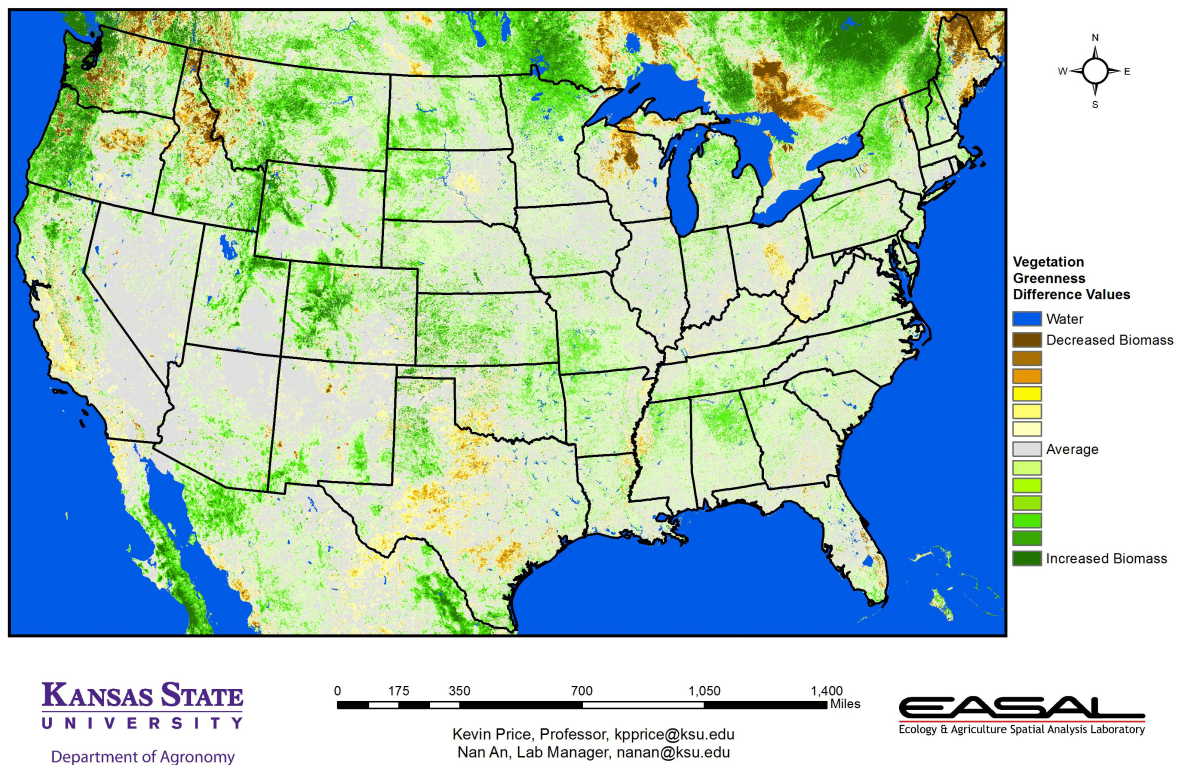


Figure 9. The U.S. comparison to the 25-year average for the period October 28 – November 10 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that vegetative activity is generally above average. The greatest departure can be seen along the Pacific Northwest, where warm temperatures and rain have fueled plant growth.

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