



K-STATE
Research and Extension

Extension Agronomy

eUpdate

10/31/2014

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. Factors involved in fall growth of canola

Establishing a canola stand at the optimum planting date is the most critical step to achieving uniform stand and consequently, high yield. Winter canola that is planted on time, at even planting depth, and in good soil moisture has the greatest potential for rapid establishment and the greatest ability to achieve the desired amount of above- and below-ground biomass for overwintering.

Effect of canola size on winter survival

Canola overwinters and is the most tolerant to cold temperatures in the rosette growth stage. At this stage, the crown develops at the soil surface with larger, older leaves at the base and smaller, newer leaves at the center. The stem thickens but its length remains unchanged. For optimum winter survival, a winter canola plant needs 5 to 8 true leaves, 6 to 12 inches of fall growth, and an extensive root system. Hardened winter canola can withstand temperatures below 0 degrees Fahrenheit.



Figure 1. Winter canola at the appropriate size for overwintering. Photo by Scott Dooley, K-State Research and Extension.

On the other hand, canola that has too much top growth (typically 20 inches or more) can succumb to winterkill for a number of reasons, including overuse of available soil water and nutrients and stem elongation above the soil surface.

Causes of excessive fall stem elongation

Stem elongation in the fall -- not to be confused with bolting, i.e. stem elongation with visible flowering structures -- may occur because: (1) the crop was planted too early or seeded at higher-than-optimal plant populations, (2) excessive soil fertility is present, (3) an unusually warm fall persists, or (4) a combination of any of these factors.

For instance, closely-spaced and crowded canola plants increase early plant-to-plant competition for light. This “reaching” for light may lead to an extension of the growing point above the soil surface. Any time the growing point is elevated above the soil surface, the chances for winterkill are increased.



Figure 2. Winter canola plot in mid-October, 2014. Early planting and warm temperatures have resulted in more than 20 inches of fall growth. Photo by Mike Stamm, K-State Research and Extension.



Figure 3. High plant populations in a winter canola plot in mid-October, 2014. Competition for light places the growing point well above the soil surface. Photo by Ignacio A. Ciampitti, K-State Research and Extension.

Another factor in stem elongation and winter survival is the amount of surface residue present in the seed row. Residue removal from the seed row is important for keeping the rosette, or crown, close to the soil surface, especially in no-till cropping systems. This residue management (related to quantity and even or uneven distribution) greatly benefits winter survival.

Planting dates in 2014

Many canola producers seeded winter canola earlier than normal this year because soil moisture was ideal for planting. Early seeding made sense because some canola did not achieve adequate growth

to survive a colder-than-normal winter in 2013-2014. Warm October temperatures have led to significant growth -- and in some cases what we would consider too much fall growth. The figure below portrays strikingly different high and low temperatures for mid-October comparing 2013 vs. 2014 (Figure 4). Up until this weekend (10/25/2014), there have been no hard freeze events. Temperatures at or below 28 degrees F will cause the plant to wilt and slow growth.

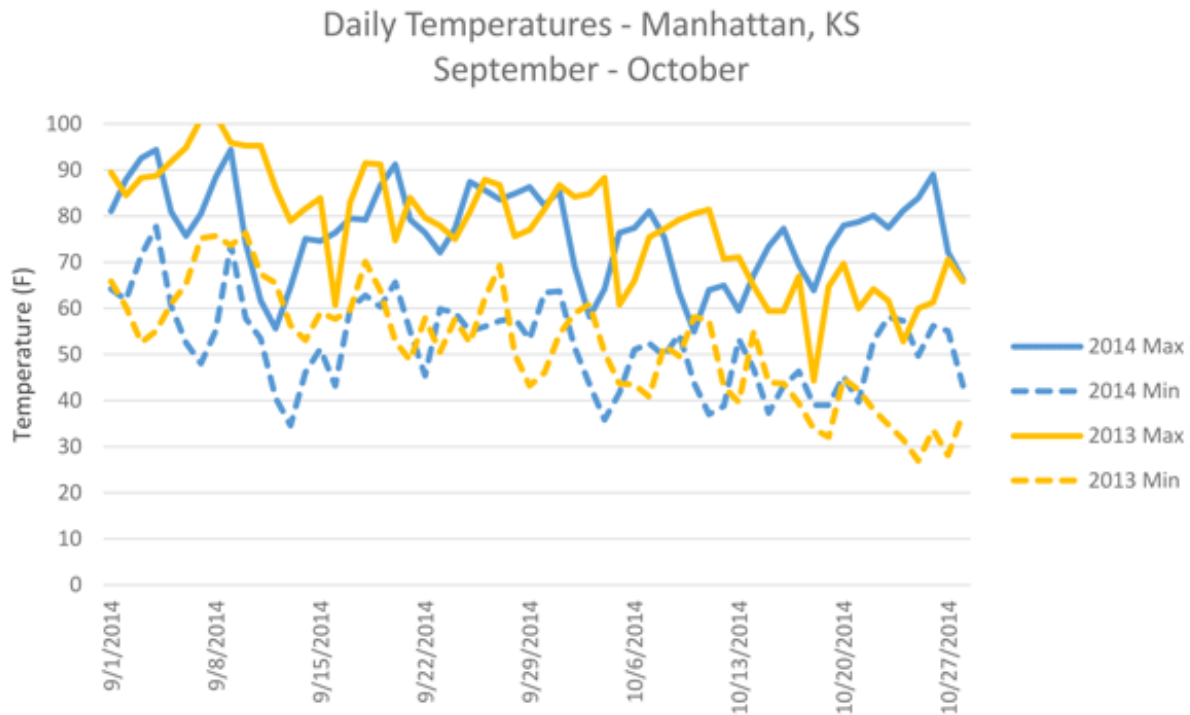


Figure 4. High and low temperatures from 2013 and 2014 at Manhattan. Mid-October temperatures were significantly warmer in 2014. Source: Kansas Mesonet, K-State Weather Data Library.

Varietal differences

Varietal differences exist for traits such as fall vigor, the ability to avoid fall stem elongation, and winter survival. More hybrids are being grown each year and the industry will one day switch from being dominated by open-pollinated (OP) varieties to hybrids. Hybrids tend to have greater fall vigor because of larger seed size. Fall vigor is important because it results in rapid establishment and root growth. However, with hybrids and certain OP varieties, there can be a tradeoff between fall vigor and too much fall growth, and this usually has to be managed by agronomic practices such as planting date and seeding rate. Planting hybrids later to take advantage of improved fall vigor may present some challenges in terms of winter survival if weather conditions are not favorable.

The K-State canola breeding program has been selecting for lines that avoid fall stem elongation regardless of the planting date or seeding rate. These lines have prostrate fall growth and this often translates into greater winter survival. This trait could be especially useful in a year like 2014 when

soil moisture conditions are favorable but the calendar indicates it is too early to plant canola. In addition, we hope to broaden the optimum planting window by planting these lines earlier while avoiding the risk of too much fall growth.

Another tool under development by private industry and being evaluated by the K-State canola breeding program is the semi-dwarfing trait, or low-biomass-producing trait. The semi-dwarfing trait also helps to keep the crown closer to the soil surface regardless of planting date or seeding rate. We have seen enhanced winter survival in hybrids that possess this trait.

Figure 5 shows three entries from the National Winter Canola Variety Trial. The stake represents the soil surface while the red arrows point to the canola plant's growing point. The hybrid on the left was developed in the European Union (EU) and is exhibiting about 2 to 3 inches of fall stem elongation. The variety in the center is an experimental line from the K-State canola breeding program, showing no stem elongation. The hybrid on the right was developed in the EU and it possesses the semi-dwarfing trait. Depending upon the weather this fall and winter, we would expect the hybrid on the left to be more susceptible to winterkill because of the elevated crown.



Figure 5. Varieties exhibiting differences in fall stem elongation in the National Winter Canola Variety Trial at the North Central Experiment Field, Belleville. Photo by Mike Stamm, K-State Research and Extension.

Current research

K-State agronomists are undertaking several research studies investigating production practices to help manage fall vigor and growth. We have studies evaluating seeding rate by variety (OP vs. hybrid) in narrow and wide row spacing (9-in, 20-in, and 30-in). In collaboration with private industry, we are evaluating plant growth regulators and their ability to help manage fall growth. Using plant growth regulators in winter canola is a common practice in the EU. Other questions we want to address through these studies include: How far can we reduce seeding rates and remain profitable? How do varieties respond to different seeding rates? What is the optimum seeding rate for a given row spacing?

Predicting the weather is challenging enough and having too much or too little fall growth in winter canola greatly depends upon the weather conditions in the fall. This can be stressful on canola producers. Through breeding and production research at K-State, we hope to find improved ways to manage this risk.

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2. Purple seed stain on soybeans

Purple seed stain, also known as *Cercospora* leaf blight, has been positively identified on soybeans in several Kansas fields this year. This disease is most common when moisture is abundant during the reproductive stages of growth and where soybeans have followed soybeans in the rotation. While it occurs at low levels almost every year, in some years, such as 2014, it is much more abundant.

Producers may wonder what effect it has on yields and seed quality.

The first signs of a problem occur about the time of seed set. Upper leaves exposed to the sun develop a distinct purplish color (Figure 1). The discoloration can deepen and extend over the entire upper surface of affected leaves, giving them a leathery, dark, reddish purple appearance. Later, reddish purple, angular- to irregular-shaped lesions may appear on both the upper and lower leaf surfaces.



Figure 1. Purplish discoloration of the upper foliage caused by *Cercospora* leaf blight. Photos courtesy of Doug Jardine, K-State Research and Extension.

When pods are infected, the disease causes a noticeable purple discoloration of the seed, as if the seed were stained with grape juice (Figure 2). Most often, only part of the seed is discolored.



Figure 2. Seed stained purple by *Cercospora*.

A fungicide seed treatment may reduce early seed-borne infection. Planting untreated, purple-stained seed can serve as a source of inoculum to the developing crop. Plants developing from infected seed can be killed or stunted. Planting untreated, infected seed is not recommended.

The severity of purple seed stain at harvest time however, is usually not related to its presence on the planted seed. Environmental conditions at the time of flowering have the most influence on the incidence and severity of the discoloration. Conditions that favor infection at this time include high temperatures (greater than 80 degrees), rainfall, and high humidity. The fungus survives on crop residue so the disease is most likely to be a problem in continuously planted, no-till fields.

If the disease infects leaves early, there may be some yield loss -- usually less than 10 percent. Purple seed stain does not usually affect seed quality for processing, but the seed discoloration may result in a reduction in price at the point of sale.

The most effective control measures include using disease-free or treated seed and crop rotation. Using treated seed will help reduce seedling loss, but will have little or no effect on later-season infections of foliage or seed. Fungicides applied at the R3 to R5 growth stages can be used to

improve seed quality and occasionally limit yield losses, but this is rarely needed in Kansas. There are no thresholds for treatment and by the time a grower realizes that treatment is needed, it is usually too late.

Varieties show differences in susceptibility to purple seed stain, but recent data on which varieties are more resistant than others is not available.

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3. Leaf rust and wheat streak mosaic found on wheat this fall

Leaf Rust

Leaf rust has been reported at multiple areas of the state, suggesting that fall infection is widespread this year. Leaf rust infection is common in Kansas but the disease rarely reaches damaging levels.

There is no need for fungicide applications this fall, because the disease only survives the winter in 30 to 40% of the years in Kansas. Winter survival of leaf rust is favored by above-normal temperatures and snow cover. Snow cover is important because it insulates the wheat from cold temperatures and drying winds that cause tip dieback and desiccation of wheat leaves.

This loss of leaf area is not critical to the plant because it will produce a lot of new growth in the spring. However, the loss of leaf area is important for the survival of the leaf rust, because the rust fungus needs a living host to survive. The loss of leaf area during the winter months often results in mortality of the leaf rust fungus.

It is helpful to know that leaf rust is present in the fall because this information can help us establish scouting priorities next spring. The risk of severe disease increases significantly when leaf rust survives the winter locally and becomes established on the new growth next March.



Figure 1. Leaf rust on wheat this fall. Photo by Erick DeWolf, K-State Research and Extension.

Wheat Streak Mosaic

I have also received multiple reports of wheat streak mosaic this past week. The images submitted by

area Extension specialists, county agents, and consultants are consistent with this viral disease, but I am waiting for laboratory confirmation of the virus. In nearly all the reports, the infection of wheat streak mosaic can be traced back to volunteer wheat and/or early planting dates. The volunteer wheat serves as a reservoir or "green bridge" for the virus and wheat curl mites that spread the disease.

Unfortunately, there is nothing that can stop the development of the disease or activity of the curl mites once the problem has begun. Some producers have asked about the possibility of destroying a wheat stand and replanting this fall. The replant option seems risky. We need time for the current wheat stand and the mite population to die before we could replant. This delay could result in late-planted wheat with a poor yield potential. It is hard to do, but it is probably best to wait and evaluate the yield potential next spring. If yield potential is poor because of disease, it might be possible to use the wheat as a forage crop or consider switching to another crop in the spring.



Figure 2. Wheat streak mosaic this fall. Photo by Jeanne Falk Jones, K-State Research and Extension.

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4. Greenbugs, armyworms, and fall armyworms infesting seedling wheat

During the week of Oct. 27-31 we received a report from Phillips County of greenbug infestation on seedling wheat (Figure 1). The unusually warm weather over the past few weeks, combined with prompt germination of this year's wheat plantings, have likely contributed to this occurrence.

Winged aphids originating in subtropical latitudes are carried by air currents over Kansas virtually all year long, but fall infestations of seedling wheat by greenbugs are relatively rare this far north.

Given the recent favorable weather conditions for greenbug establishment, wheat farmers would be wise to check their fields for signs of greenbug damage. A single hard freeze should be enough to kill them off, but a few hours of subfreezing temperatures, such as those forecast for central Kansas Saturday night, might not be enough. Note that the threshold for greenbugs in seedling wheat is 50 aphids per row foot, or even fewer if the stand is sparse. If infestation is found, be sure to carefully determine the area affected and restrict treatment to this part of the field.



Figure 1. Greenbug infestation of seedling wheat. Photo by JP Michaud, K-State Research and Extension.

In addition, armyworms and fall armyworms have been very active in central Kansas over the past couple of weeks. Both worms will feed on leaf tissue above ground and consume more and more as the worms get larger.



Figure 2. Armyworms in seedling wheat. Photo by Jeff Whitworth, K-State Research and Extension.

The armyworm larvae in the photo below have been feeding on wheat, but started in forage sorghum. As the wheat germinated, these worms moved from the sorghum to the wheat. This was regrowth forage sorghum and thus was still very green and succulent. However, for some reason, after feeding a little in the sorghum, all the armyworms and fall armyworms then moved to wheat (see Figure 3).

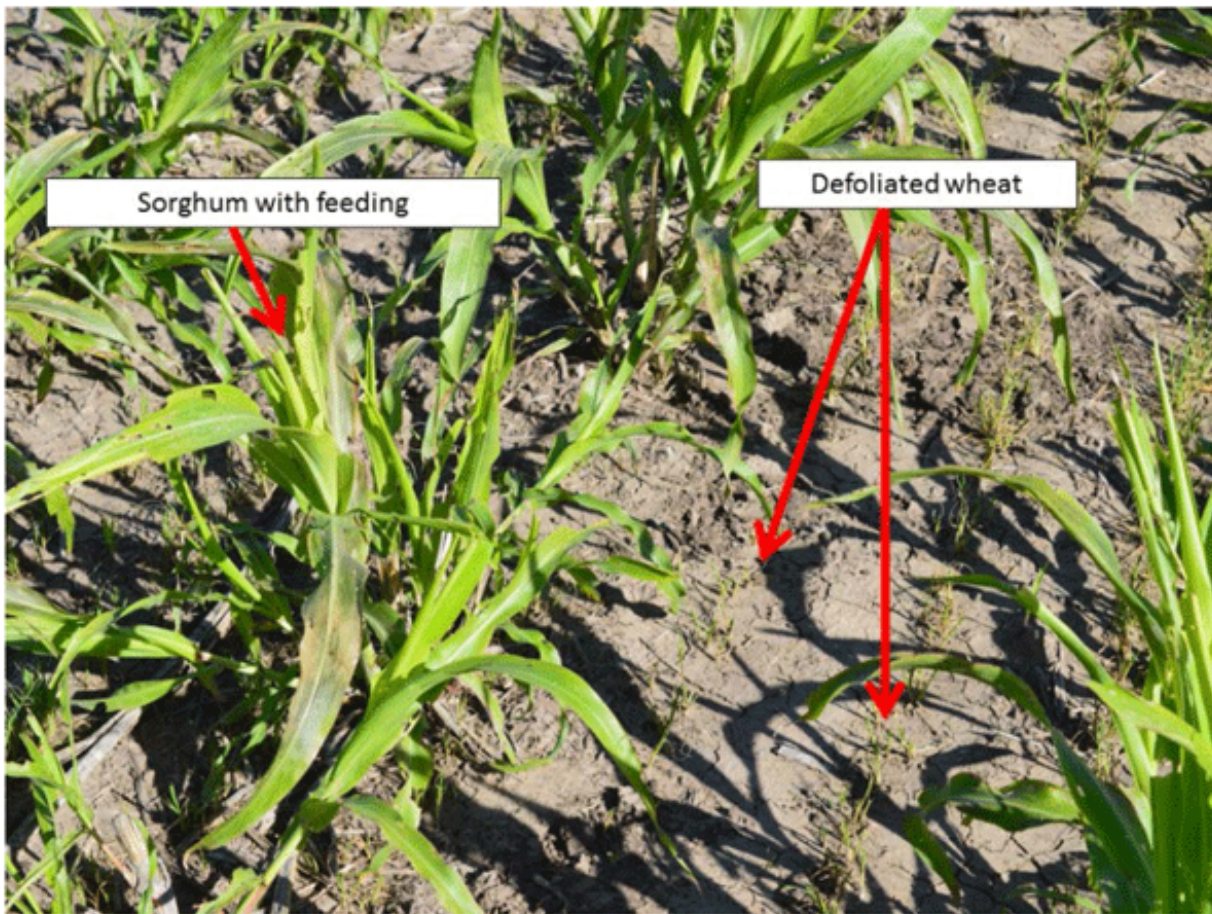


Figure 3.

Larval feeding has defoliated much wheat in patches in these fields. However, the wheat seems to have already established a root system. This armyworm feeding will reduce the capacity to utilize these fields for fall pasture but probably will not impact the stand too much. These larvae are mostly finished feeding and many are already pupating (see Figure 4).



Figure 4. Pupating armyworm. Photo by Jeff Whitworth, K-State Research and Extension.

This late in the fall there should not be another generation of larvae this year. Armyworms may overwinter as larvae or pupae, thus may survive the winter and emerge as adults in this field next spring. However, the wheat should be tall enough by the time this generation starts feeding in the spring that leaf defoliation will be negligible.

For more information and the most current Wheat Insect Management Guide for treatment options:
<http://www.ksre.ksu.edu/bookstore/pubs/MF745.pdf>

(Note: This article comes from Kansas Insect Newsletter, October 31, 2014:
<http://entomology.k-state.edu/doc/Newsletters/2014/KSInsectNewsletter26.pdf>)

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5. Comparative Vegetation Condition Report: October 14 - 27

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 43: 10/14/2014 - 10/27/2014

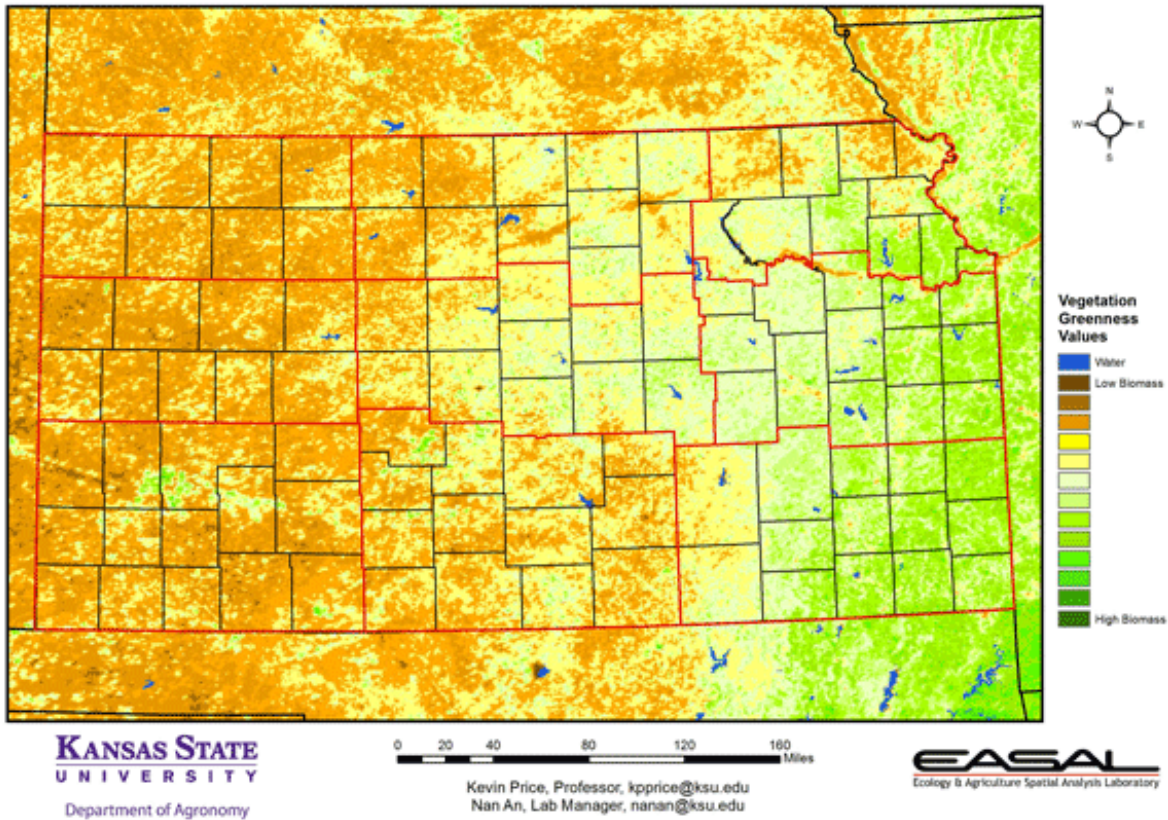


Figure 1. The Vegetation Condition Report for Kansas for October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that areas of low photosynthetic activity continues to progress eastward as we move into winter. Areas of higher biomass production are visible in Finney, Kearney, and Pawnee counties.

Kansas Vegetation Condition Comparison
Late-October 2014 compared to the Late-October 2013

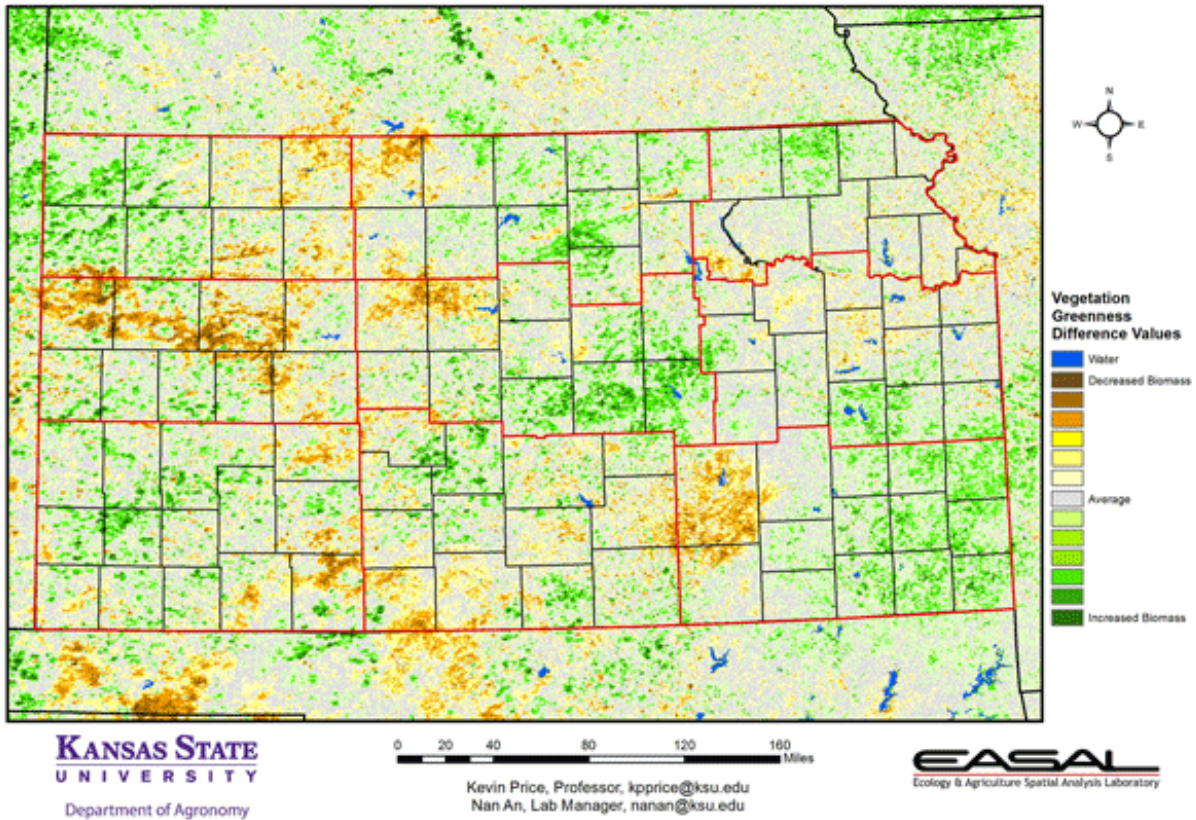


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that much of the state has higher NDVI values. The area with the greatest decrease is in west central Kansas, from Wallace to Gove counties.

Kansas Vegetation Condition Comparison

Late-October 2014 compared to the 25-Year Average for Late-October

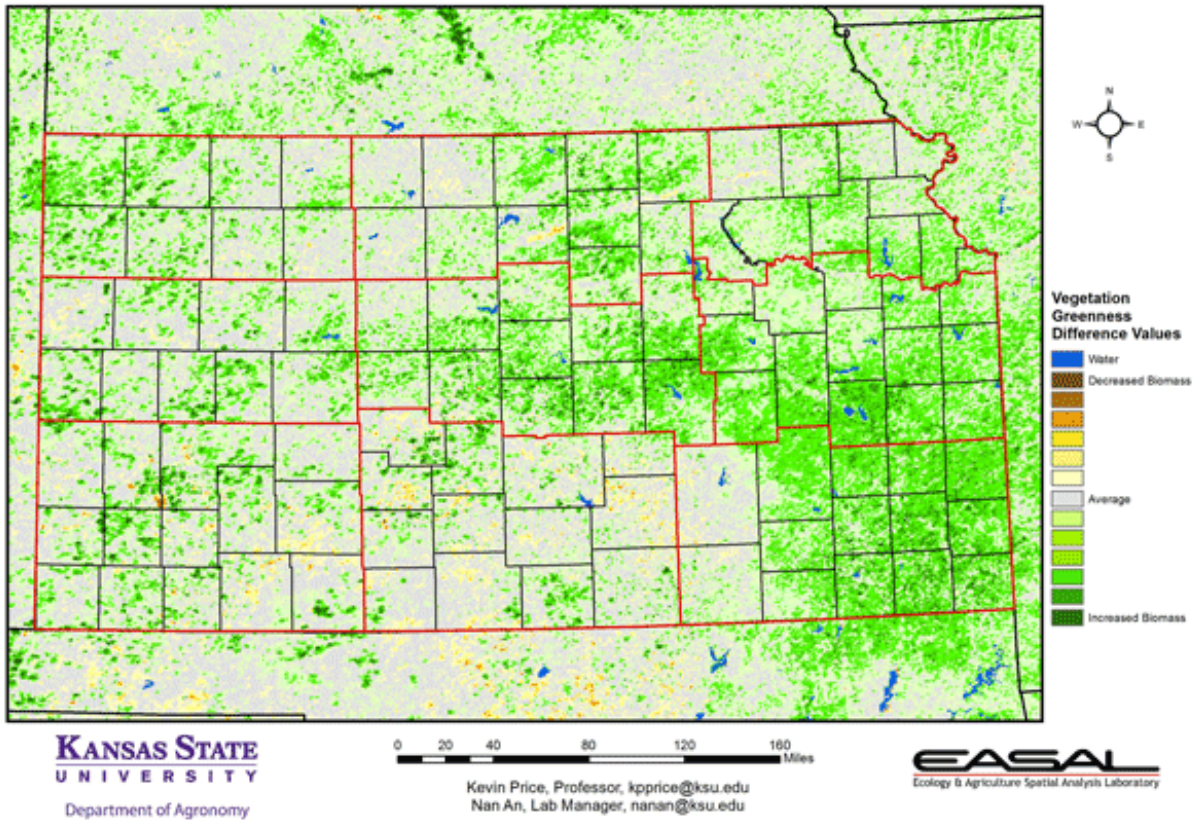


Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for October 14 – 27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows conditions are normal or above-normal statewide. The East Central and Southeastern Divisions show the highest photosynthetic activity compared to the long-term average. These parts of the state have had favorable temperatures and moisture for plant growth.

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U.S. Corn Belt Vegetation Condition

Period 43: 10/14/2014 - 10/27/2014

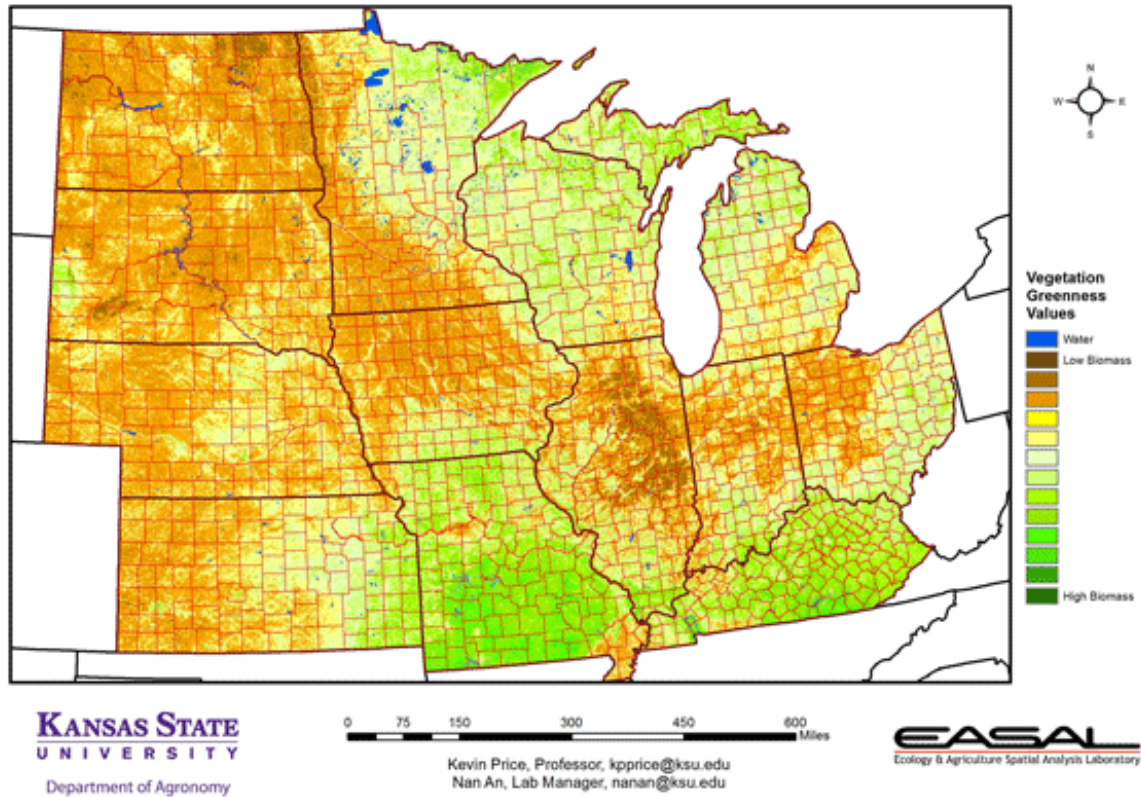


Figure 4. The Vegetation Condition Report for the Corn Belt for October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that biomass production continues to decrease in the upper Great Lakes region, while photosynthetic activity continues at higher levels along the southern portions of the region. It is particularly high in southern Missouri and Kentucky, where mild temperatures have prevailed.

U.S. Corn Belt Vegetation Condition Comparison
Late-October 2014 Compared to Late-October 2013

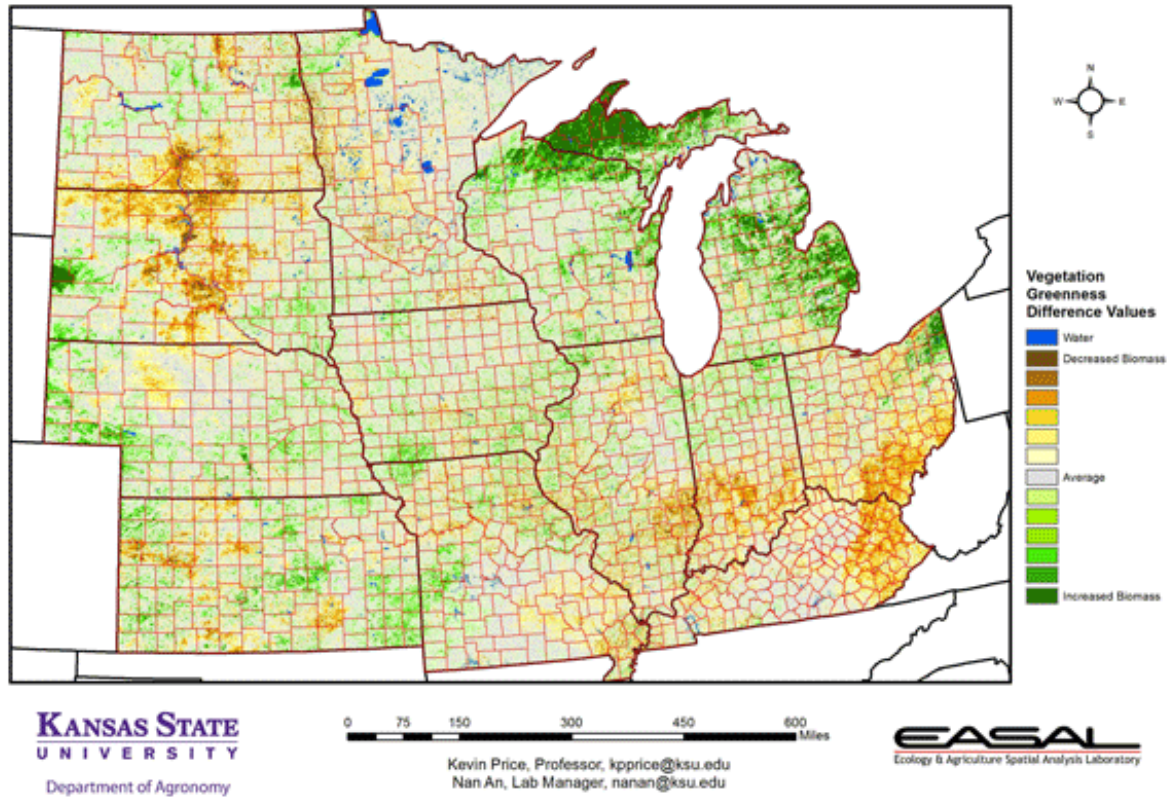


Figure 5. The comparison to last year in the Corn Belt for the period October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that most of the region is similar. The Upper Peninsula of Michigan has particularly high values compared to last year. Crops continue to be behind last year’s development.

U.S. Corn Belt Vegetation Condition Comparison
Late-October 2014 Compared to the 25-Year Average for Late-October

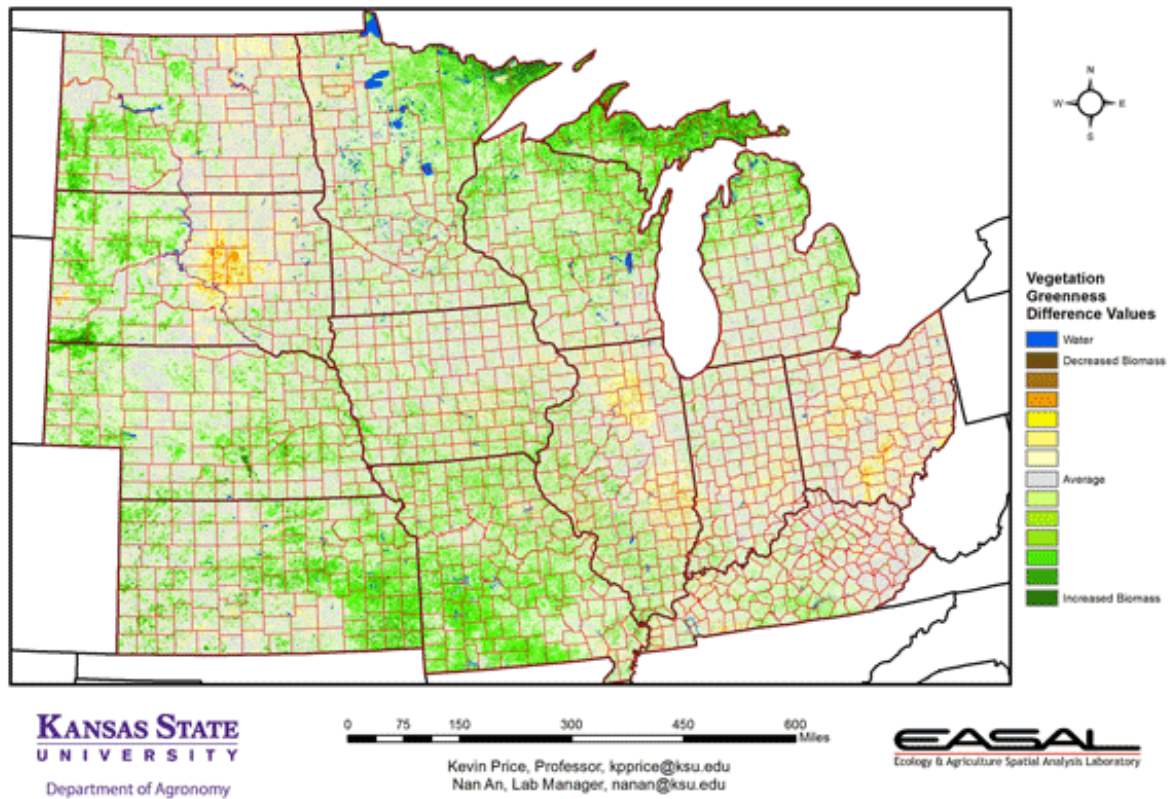


Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for October 14 – 27 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest area of above-average photosynthetic activity continues to be in northeastern Minnesota and the Upper Peninsula of Michigan. Crops continue to be behind average in development.

Continental U.S. Vegetation Condition

Period 43: 10/14/2014 - 10/27/2014

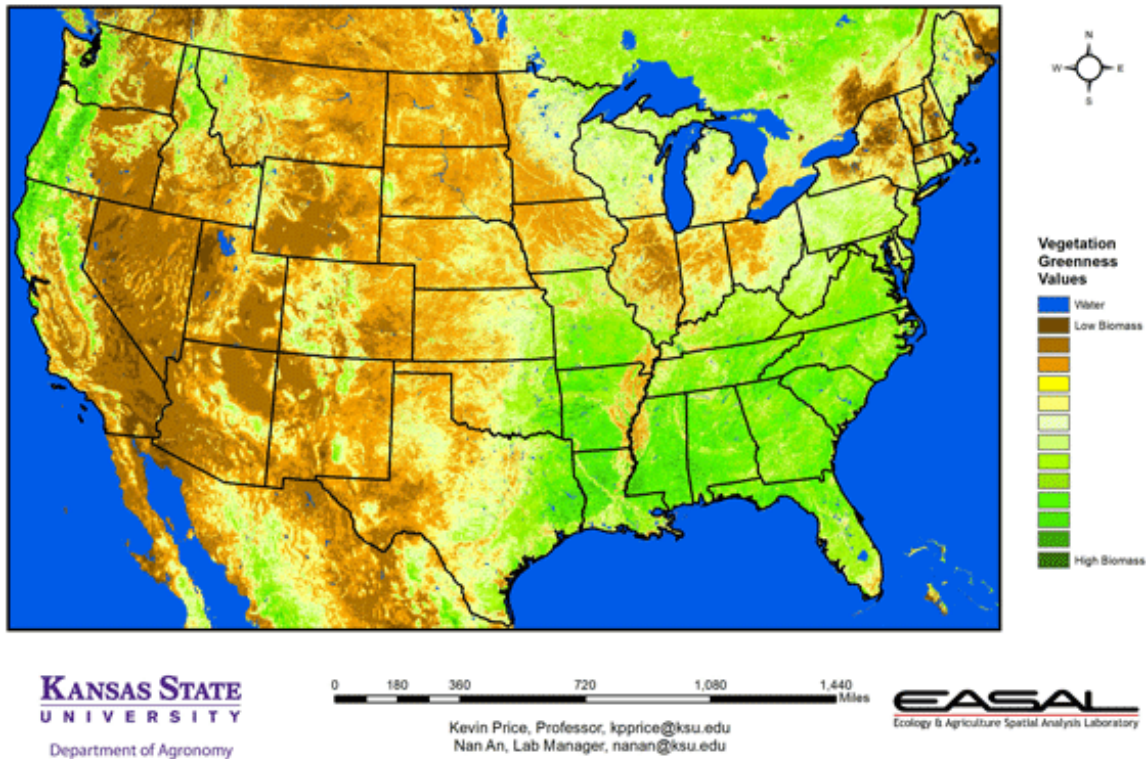


Figure 7. The Vegetation Condition Report for the U.S. for October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that high NDVI values are prominent along the Pacific Northwest and the Southeastern U.S. Parts of New England have low NDVI values, particularly in New York, New Hampshire, and Vermont.

Continental U.S. Vegetation Condition Comparison
Late-October 2014 Compared to Late-October 2013

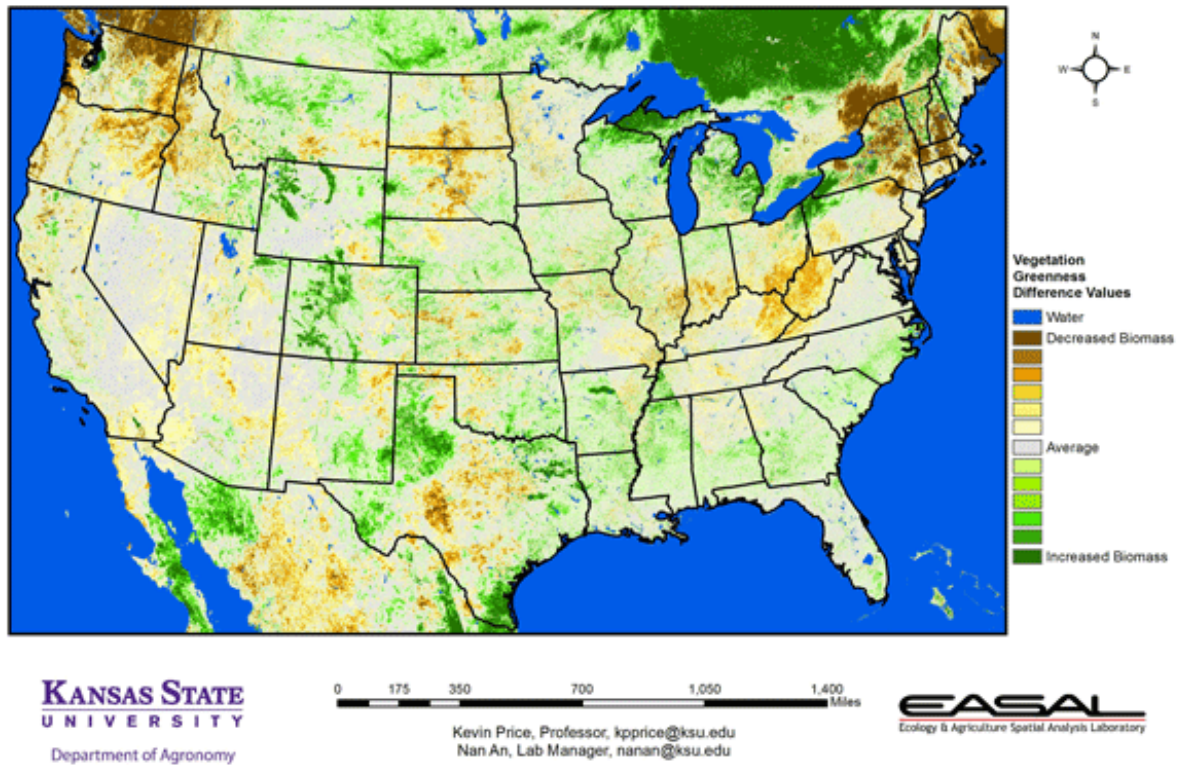


Figure 8. The U.S. comparison to last year at this time for the period October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that New England has the greatest area of lower photosynthetic activity. Rains in the region delayed field work, but helped recharge water supplies.

Continental U.S. Vegetation Condition Comparison
Late-October 2014 Compared to 25-year Average for Late-October

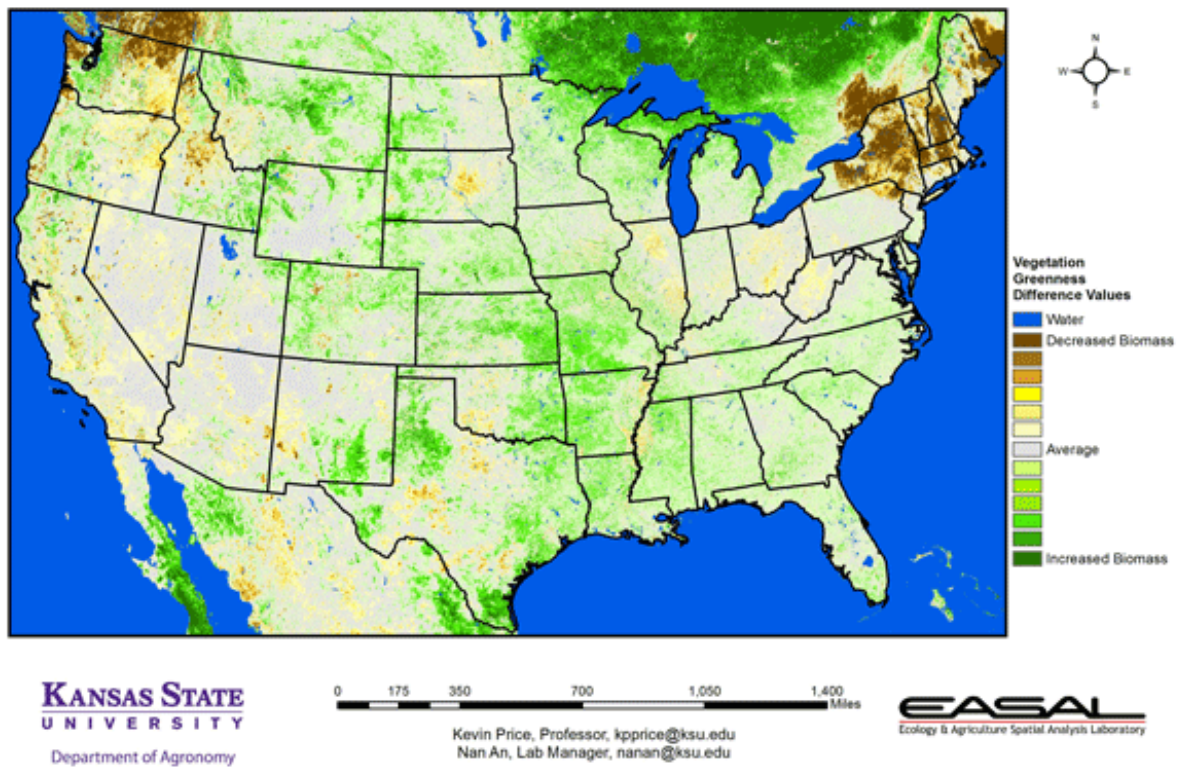


Figure 9. The U.S. comparison to the 25-year average for the period October 14 – 27 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest departures are areas of below-average photosynthetic activity in New England. In New York, winter wheat is ahead of average, with most of the crop in good to excellent condition.

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