



## Extension Agronomy

# eUpdate

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*07/11/2014*

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](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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## 1. Control weeds in wheat stubble before they set seed

Due to rainfall across the entire state, many fields of wheat stubble in Kansas have rather large broadleaf and grassy weeds actively growing at this time. These weeds are utilizing moisture and nutrients that would be available for a subsequent crop. It is a good idea to control these weeds before they set seed.

Kochia and Russian thistle are daylength sensitive and will begin to flower toward the end of July and into August, thus will need to be controlled very shortly. Controlling kochia and Russian thistle now is very important to prevent seed production.

Weeds growing now in wheat stubble fields, without crop competition, set ample seed -- which will be likely to cause a problem in following crops. It is especially important to prevent seed production from happening on fields that will be planted to crops with limited options for weed control, such as grain sorghum, sunflower, or annual forages. It is especially difficult to control broadleaf weeds in sunflower and grassy weeds in sorghum that emerge after crop emergence. Preventing weed seed production ahead of these crops is essential. Seed of some weed species can remain viable for several years, so allowing weeds to produce seed can create weed problems for multiple years.

If the field will be planted to Roundup Ready corn or soybeans, producers may decide they can just wait and control any weed and grass seed that form now and emerge next season with a postemergence application of glyphosate in the corn or soybeans. However, with the concerns over the development of glyphosate-resistant weeds, kochia, Palmer amaranth, and waterhemp, it would be far better to control these weeds now in wheat stubble. That way, other herbicides with a different mode of action can be tank-mixed with glyphosate to ensure adequate control.

Producers should control weeds in wheat stubble fields by applying the full labeled rate of glyphosate with the proper rate of ammonium sulfate additive. As mentioned, it is also a good idea to add 2,4-D or dicamba (unless there is cotton or other susceptible crops in the area) to the glyphosate. Do not apply the growth regulator herbicides around cotton. Tank mixes of glyphosate and either 2,4-D or dicamba will help control weeds that are difficult to control with glyphosate alone, and will help reduce the chances of developing glyphosate-tolerant weed populations.

Often dicamba or 2,4-D tankmixes with glyphosate may not perform well under the drier conditions of western Kansas, especially on kochia and Russian thistle; however this year with the improved moisture conditions, we may find glyphosate tank mixes will work well. If drought and heat stress set in, however, utilizing Gramoxone with atrazine (atrazine is synergistic with Gramoxone) has been a more effective treatment than glyphosate/dicamba or glyphosate/2,4-D.

Several have asked about the addition of atrazine for residual weed control in fallow. Although atrazine provides residual control of weeds, it is best applied later in the fall. At this time of year, atrazine residual is quite short and will not provide adequate control of fall emerged weeds/winter annuals. An application of atrazine needs to be made in the fall (mid October through November), depending on the weeds being targeted. Also, keep in mind that atrazine antagonizes glyphosate -- just the opposite of the synergistic effect of atrazine and Gramoxone. Do not apply atrazine with reduced rates of glyphosate.

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## 2. Now is the time to make decisions for fungicide management of gray leaf spot

Most corn fields in Kansas are now, or soon will be at the critical juncture for making fungicide application decisions for gray leaf spot management. Years of fungicide application research clearly demonstrates that the single best time to apply a fungicide to corn for gray leaf spot control is from VT to R1.

University fungicide trials also reveal that final disease severity plays a critical role in the magnitude and consistency of yield response to a foliar fungicide application. The tricky part is being able to predict before the VT to R1 stages what the disease pressure will be several weeks later. To make such a prediction, one needs to consider “disease risk factors” and to scout for disease.

Disease risk factors include these:

*Susceptibility level of corn hybrid.* Seed companies typically provide information on the susceptibility of their hybrids to gray leaf spot in their catalogs. In general, hybrids that are more susceptible to fungal foliar diseases will have a greater response to a foliar fungicide (if disease pressure is high enough).

*Previous crop.* Because gray leaf spot survives in corn residue, the risk of disease increases when corn is planted back into a field that was in corn the previous year.

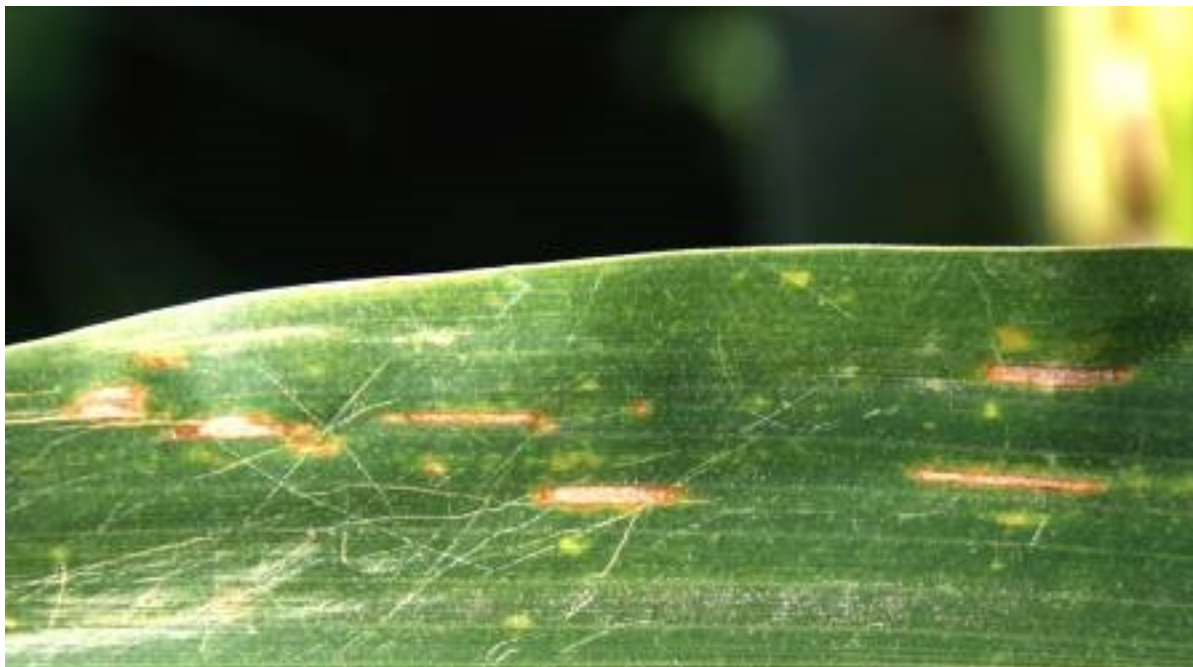
*Weather.* Rainy and/or humid weather generally is most favorable to gray leaf spot. In growing seasons when these conditions prevail, the risk for disease development increases.

*Field history.* Some field locations may have a history of high foliar disease severity. Fields in river bottoms or low areas or surrounded by trees may be more prone to having gray leaf spot.

Scout for gray leaf spot in corn just before tassel emergence. Gray leaf spot is characterized by rectangular lesions that are 1-2” in length and cover the entire area between the leaf veins. Early lesions are small, necrotic spots with yellow halos that gradually expand to full-sized lesions. Lesions are usually tan in color but may turn gray during foggy or rainy conditions. The key diagnostic feature is that the lesions are usually very rectangular in shape.



**Figure 1. Early development of gray leaf spot lesions showing a distinct yellow halo. Photos courtesy of Doug Jardine, K-State Research and Extension.**



**Figure 2. Mature gray leaf spot lesions showing the distinctive rectangular shape.**

Current disease management guidelines suggest the following criteria for considering an application of foliar fungicide:

For susceptible hybrids (those with the lowest rating within a company's line-up): If disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined.

For intermediate hybrids (those with an average rating within a company's line-up): If disease symptoms are present on the third leaf below the ear or higher on 50 percent of the plants examined, if the field is in an area with a history of foliar disease problems, if the previous crop was corn, if there is 35 percent or more surface residue, and if the weather is warm and humid.

For resistant hybrids (those with the best rating within a company's line-up): Fungicide applications generally are not recommended.

According to the data from Illinois corn fungicide trials, if at least 15 percent of the ear leaf area is affected by disease at the end of the season, a foliar fungicide applied between VT and R1 would likely have been beneficial. Using the disease risk factors and scouting observations collected just before tassel emergence will help you predict how severe disease may be several weeks before the VT to R1 stages, and help you decide whether to apply a foliar fungicide.

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### 3. Drought stress in corn

In many areas of the state, dryland corn has received plenty of rain and the crop is in good condition. But parts of Kansas are still short on topsoil and subsoil moisture. Since the growing season is progressing at high-speed, it is best to be prepared to take a close look for symptoms of potential drought stress.

One of the first visible corn responses to insufficient water availability is leaf rolling. If the stress is severe, the leaf rolling process can be detected even very early in the morning. Leaf rolling is just a plant defense mechanism to reduce transpiration and plant canopy temperature, and with an overall improvement in water use efficiency. Under continuous drought for several days, reductions in leaf elongation and in plant height should be expected.



**Figure 1. Leaf rolling in corn under drought stress. Photos by Ignacio Ciampitti, K-State**



## Research and Extension.

Shorter, less leafy plants are also among the most visible symptoms of drought stress conditions. Plants may not be as green as usual if chlorophyll production is affected. In addition, root systems will be smaller under drought conditions since all below and above-ground plant growth will be affected. Those symptoms are the outcome of plants that are less efficient in growing as photosynthesis is slowing.



**Figure 2. Effect of drought stress on root systems. On the left is a plant with a smaller root system and stalk diameter caused by drought stress. On the right is an unstressed corn plant, with greater root system, more nodal roots, and greater stalk diameter.**

Overall reductions in potential yield can be expected even if the stress is occurring early (10-leaf to 15-leaf stages) or late (dough and dent stages) in the crop growing season.

### Critical period bracketing silking

At what stage of growth is corn most sensitive to drought stress? To answer the question, we need to know the most important growth stages for grain determination. The final number of kernels for corn is determined around the pollination period (2 weeks before and 2 weeks after flowering). Thus, corn is extremely sensitive to drought stress during that period. Drought stress directly affects the final number of kernels through different processes, such as:



1. Potential delays in silking (asynchrony between the development of male and female reproductive parts). This happens when the tassel is shedding pollen but the ear is not yet receptive (silks are not yet out of the husk).
2. Potential reductions in ear size (smaller ears with less physical space for bearing grains).
3. Shorter time for pollen receptivity. This occurs when the silks dry out very fast under warm temperatures, impeding a successful pollination.
4. Pollination is concentrated in just a few days. In general, pollination takes place earlier and with a short duration under drought stress. High temperatures can also potentially impact pollen viability.
5. Even when pollination is effective, kernel abortion or cessation can occur right after flowering, in the blister and milk stages, if drought stress continues.

Under extreme drought and heat stress, plants may be barren, with no ears being formed at all.



**Figure 3. Leaf rolling in corn under drought stress during early reproductive stages.**

### **Management practices and other factors**

From a management practice perspective, situations that tend to make corn more susceptible to drought stress include high plant densities, narrow row spacing, and excessive applications of

fertilizer or manure. Also, sandy soils are more prone to the drought stress since they have a low capacity to hold water.

## **Summary**

Scout your acres for drought symptoms. The impacts of the drought stress on grain yield can be known with more precision right after flowering. If the stress is impacting the potential kernel number, and if the projected conditions for the rest of the growing season are not likely to change, yield reductions can be expected due to low kernel number and weight.

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#### 4. Comparative Vegetation Condition Report: June 24 - July 7

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.

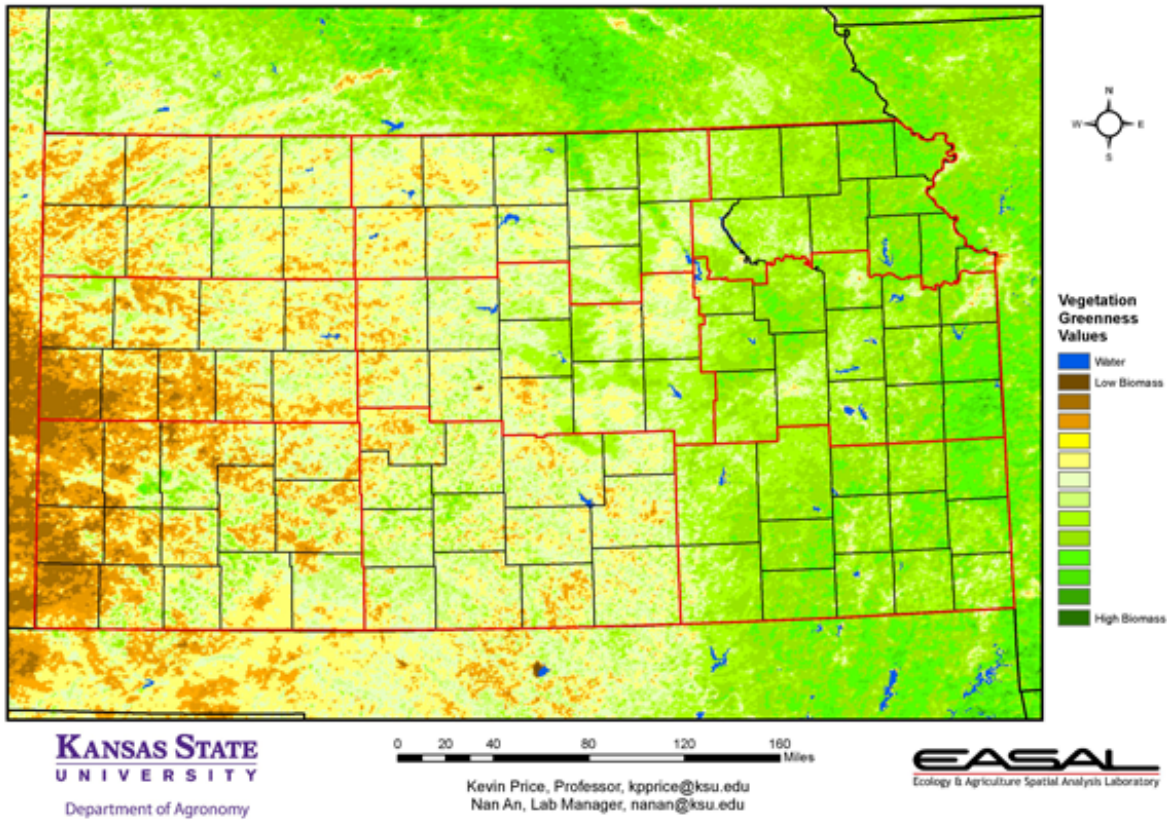
NOTE TO READERS: The maps below represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact NanAn at [nanan@ksu.edu](mailto:nanan@ksu.edu) and we can place you on our email list to receive the entire dataset each week as they are produced. The maps are normally first available on Wednesday of each week, unless there is a delay in the posting of the data by EROSDataCenter 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 27: 06/24/2014 - 07/07/2014



**Figure 1. The Vegetation Condition Report for Kansas for June 24 – July 7 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the area of highest productivity is in the eastern third of the state. Increased photosynthetic activity can also be seen in parts of southwest Kansas where high rainfalls have been reported.**

Kansas State University Department of Agronomy

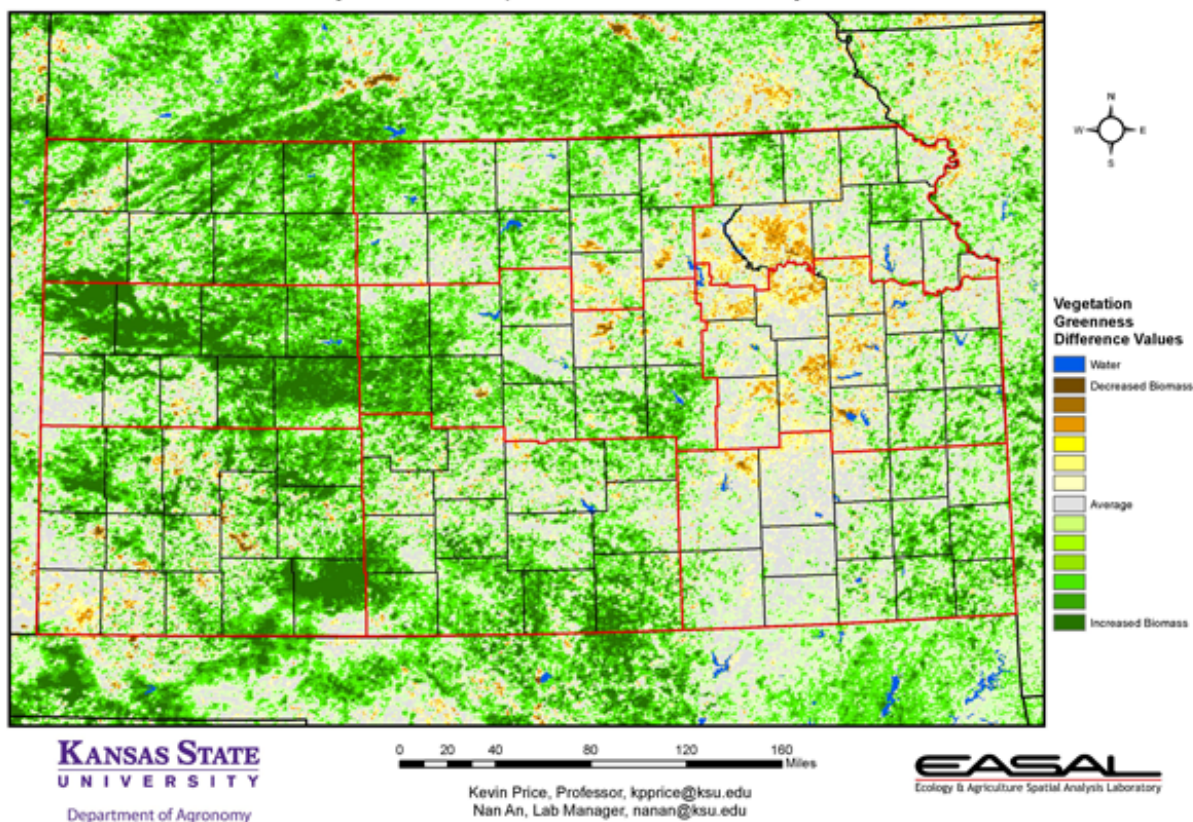
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## Kansas Vegetation Condition Comparison

Late-Jun/Early-Jul 2014 compared to the Late-Jun/Early-Jul 2013



**Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for June 24 – July 7 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that statewide biomass production is higher. This is particularly notable in the Smoky River Valley.**

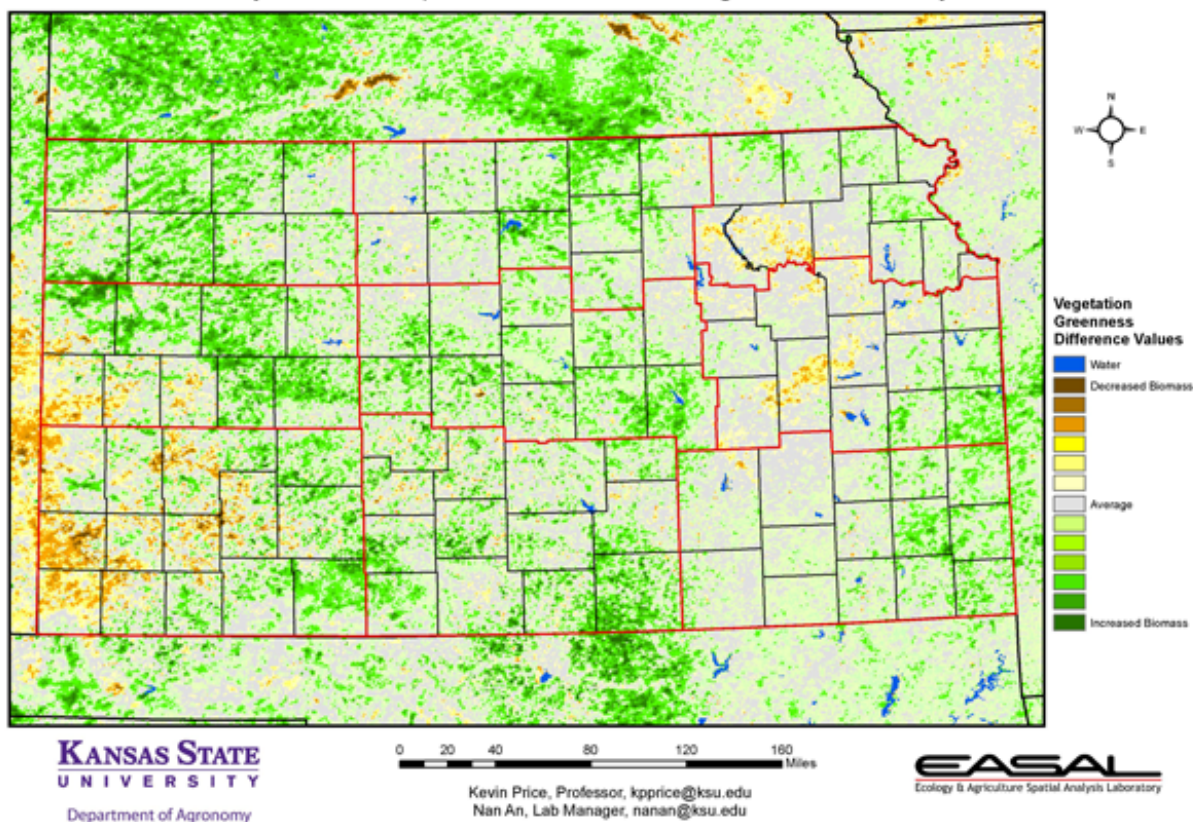
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## Kansas Vegetation Condition Comparison

Late-Jun/Early-Jul 2014 compared to the 25-Year Average for Late-Jun/Early-Jul



**Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for June 24 – July 7 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state is close to average. Areas of extreme southwest Kansas, which have continued to miss out on the rain, continue to lag in biomass production.**

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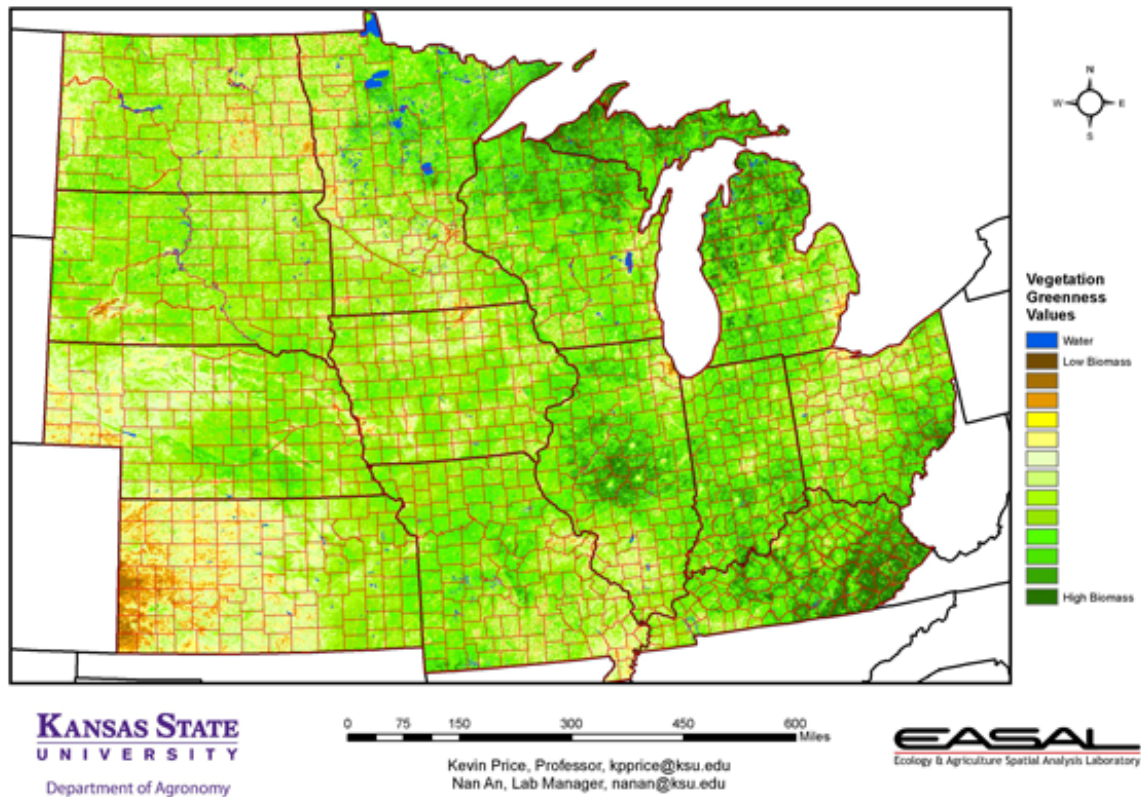
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## U.S. Corn Belt Vegetation Condition

Period 27: 06/24/2014 - 07/07/2014



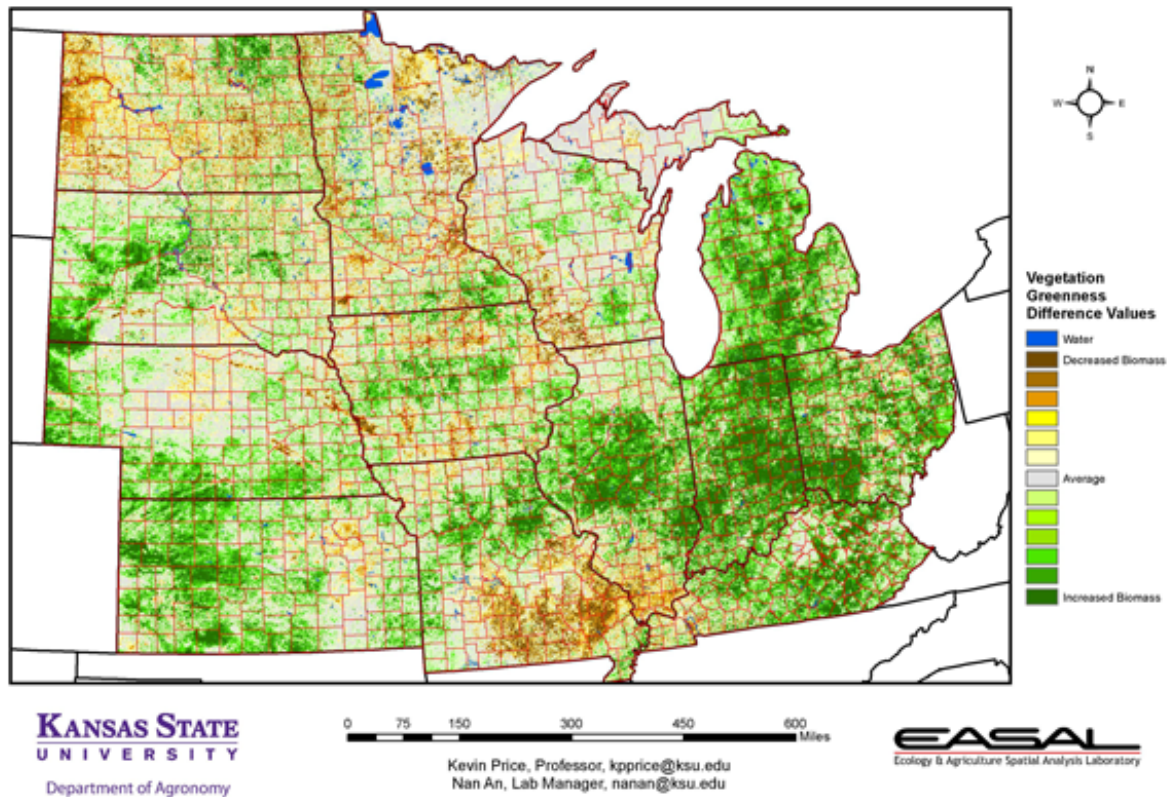
**Figure 4. The Vegetation Condition Report for the Corn Belt for June 24 – July 7 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that high biomass production dominates the Corn Belt. Most of western Kansas continues to stand out with lower NDVI values. This reflects the continued extreme drought in that area.**

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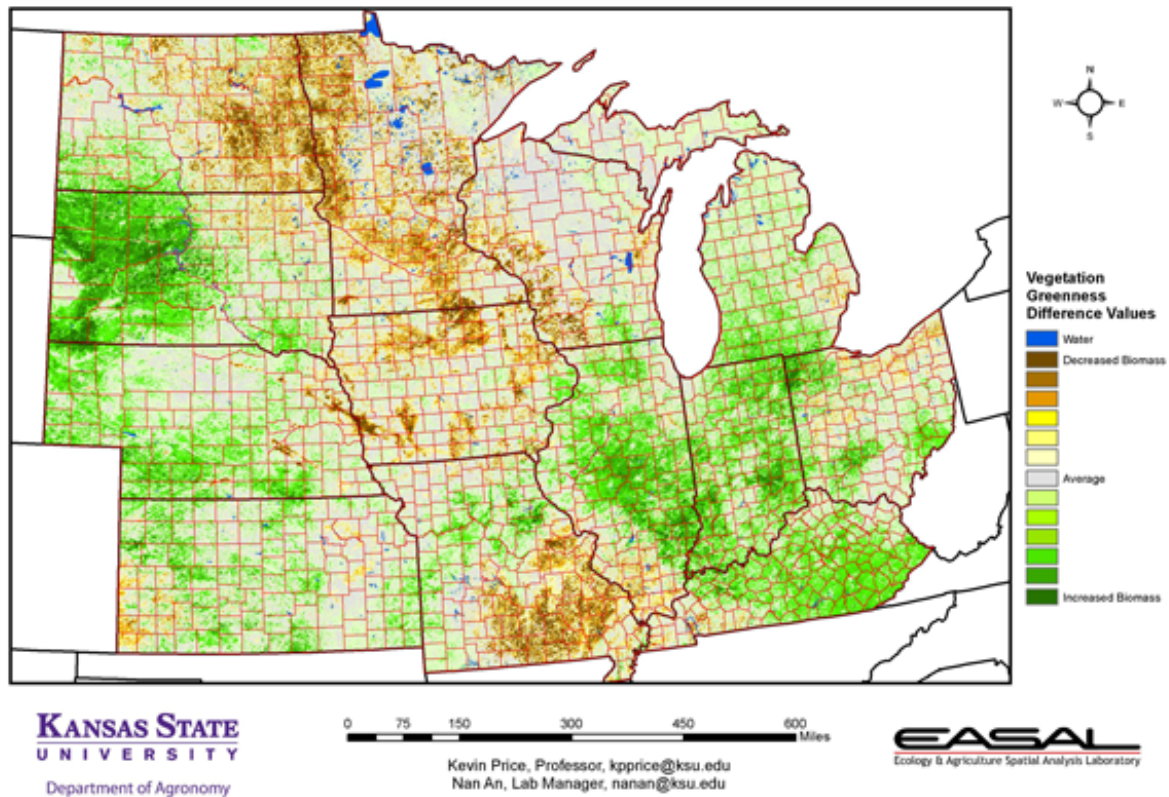
U.S. Corn Belt Vegetation Condition Comparison  
Late-Jun/Early-Jul 2014 Compared to Late-Jun/Early-Jul 2013



**Figure 5. The comparison to last year in the Corn Belt for the period June 24 – July 7 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest departures can be seen in southeastern Missouri.**

## U.S. Corn Belt Vegetation Condition Comparison

Late-Jun/Early-Jul 2014 Compared to the 25-Year Average for Late-Jun/Early-Jul

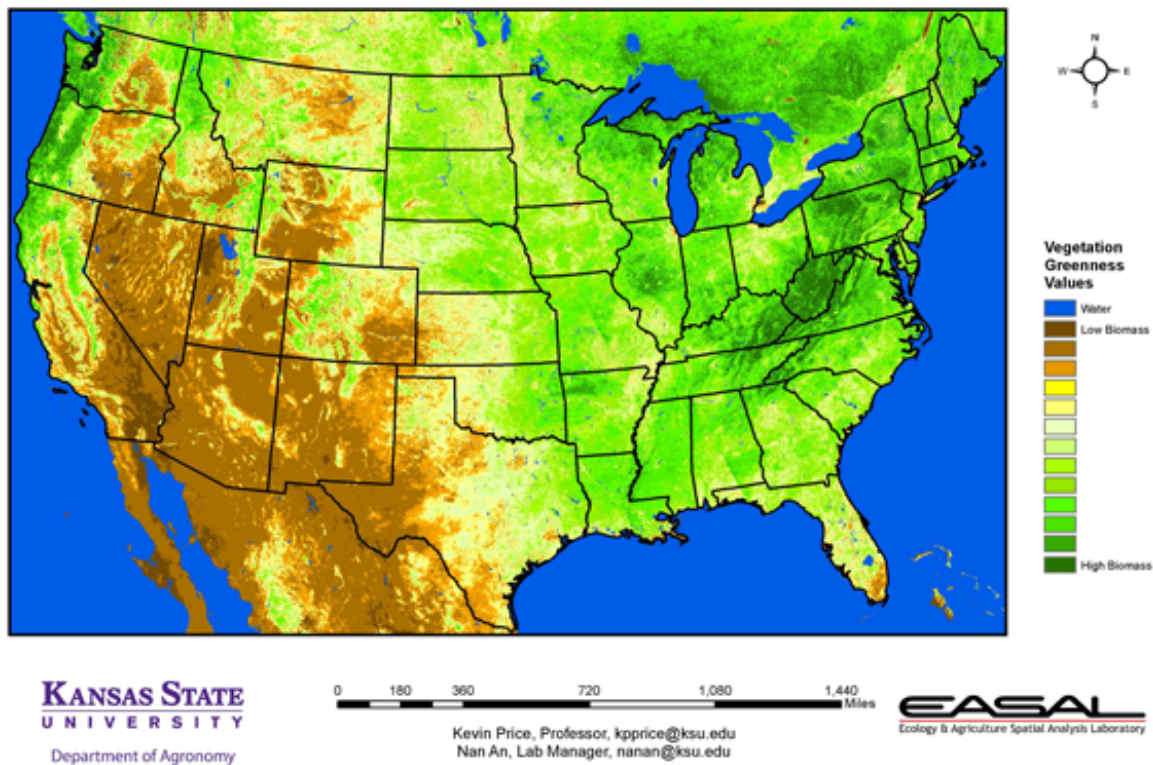


**Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for June 24 – July 7 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the central portion of the region has the biggest decrease in productivity. Excessive moisture has been an issue in this region.**



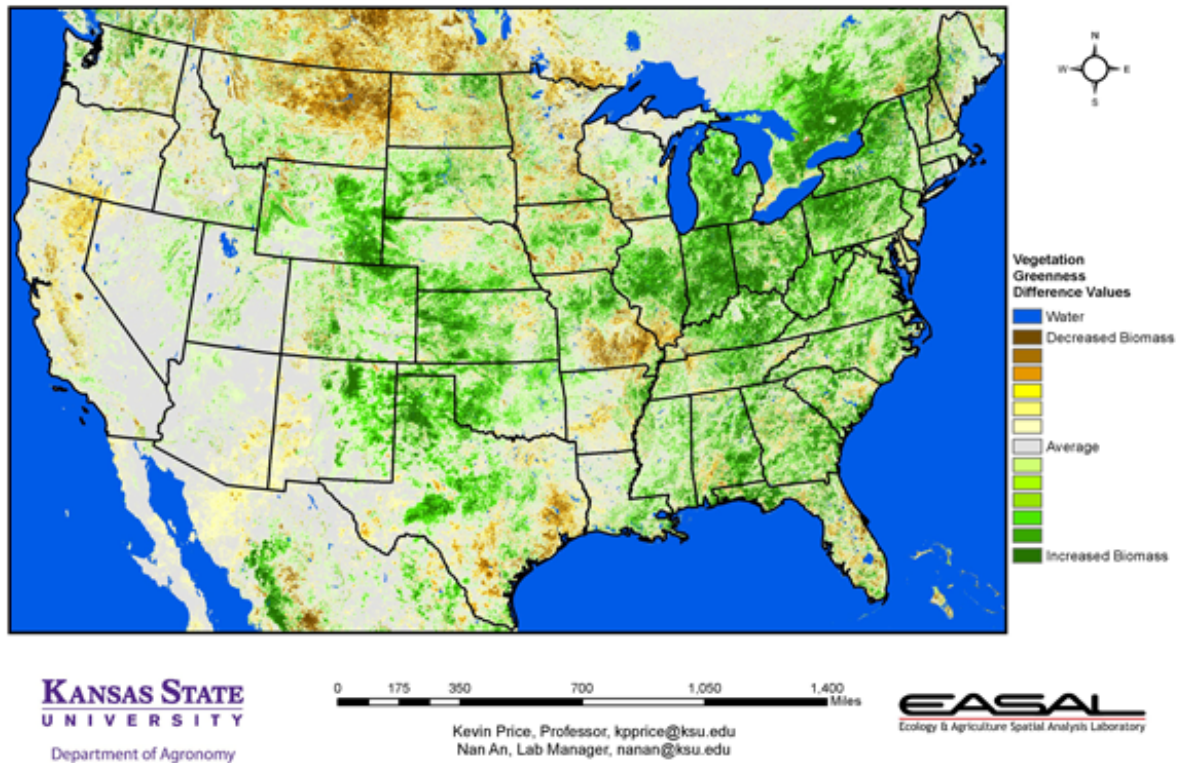
## Continental U.S. Vegetation Condition

Period 27: 06/24/2014 - 07/07/2014



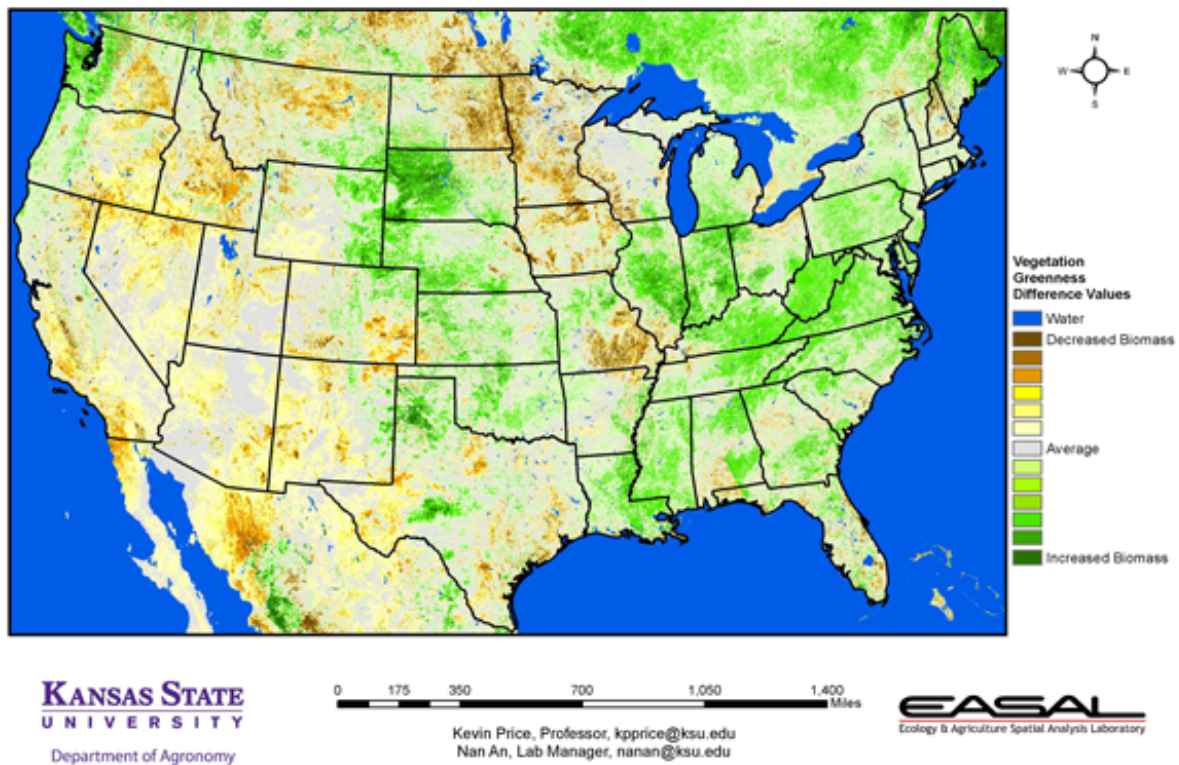
**Figure 7. The Vegetation Condition Report for the U.S. for June 24 – July 7 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the highest NDVI values are centered on West Virginia. Southeastern Colorado and southwest Kansas, where drought continues, have lower values.**

Continental U.S. Vegetation Condition Comparison  
Late-Jun/Early-Jul 2014 Compared to Late-Jun/Early-Jul 2013



**Figure 8. The U.S. comparison to last year at this time for the period June 24 – July 7 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that much of the country has an increased level of biomass production. Notable are the areas of decreased production in southeastern Missouri and in northern California.**

Continental U.S. Vegetation Condition Comparison  
Late-Jun/Early-Jul 2014 Compared to 25-year Average for Late-Jun/Early-Jul



**Figure 9. The U.S. comparison to the 25-year average for the period June 24 – July 7 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that the Central Plains has above-average biomass production. There are noticeable areas of below-normal productivity to the east and west. To the east excessive moisture has created problems, while extended drought continues to depress production in southeastern Colorado into New Mexico and Arizona.**

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