



Extension Agronomy

eUpdate

10/03/2014

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. Most likely causes of poor wheat emergence

Getting good stand establishment of wheat is the first hurdle for producers as they begin the new season. If the wheat doesn't emerge, or emerges in a spotty pattern, producers will have to diagnose the problem quickly and decide whether it would be best to wait a little longer or replant the field. Poor emergence can be caused by a number of problems, such as deep planting, a plugged drill, poor seed quality, seed dormancy, dry soil, soil crusting, and false wireworms. Take time to examine the evidence. Look for field patterns. Closer examination of the situation will help determine the causes of poor stands.

The ideal soil temperature for germination of wheat seed is between 54 and 77 degrees. This year, temperatures have been mild for the most part, conducive for good germination if there are no other problems. Topsoil moisture is adequate in most of Kansas, but is too dry for good germination and emergence in some areas.

Some fields have been crusted by heavy rains after planting, which can prevent the coleoptile from breaking through the soil surface. If the wheat hasn't emerged in a timely manner and you've had a heavy rain after the wheat was planted, dig up some seed and look for crinkled coleoptiles. If this is the case, you can try to break up the crust with a light tillage or hope for a gentle rain. But if the coleoptile stays underground for more than a week or so and hasn't been able to break through the soil surface, it will start losing viability. At that point, the producer will need to consider replanting.

If soil temperatures are ideal, the topsoil is not unusually dry, and there has been no crusting, the most likely causes of poor stands would be deep planting, a plugged drill, poor seed quality, unusually long seed dormancy, diseases, or insects.

Deep planting, deeper than the coleoptile's ability to elongate, can slow emergence or cause stand establishment problems. Varieties differ in their coleoptile lengths, but for the most part wheat should be planted about 1.5 inches deep. Most varieties can emerge at slightly deeper depths if the soil is not too restrictive and temperatures are in the ideal range. But if wheat is planted deeper than 2.5 inches, it is possible the wheat cannot emerge. Once the coleoptile grows as long as it can, which is determined by the variety and soil temperature conditions (coleoptile length is shorter at both lower and higher temperatures than the ideal range), the first true leaf will emerge below ground. Under normal conditions, this happens above ground. If the coleoptile is still under the soil surface when it stops growing and the first true leaf has to start growing in the soil, it is very unlikely to be able to force its way through the soil and emerge. What you'll see when digging up the seed is an intact coleoptile alongside a short first leaf that is scrunched up or crinkled. If this is the case, it's very unlikely the wheat will make a stand wherever the seed was planted too deeply and replanting will be necessary.

Another possibility is that the seed has poor quality. As long as the seed was tested for germination by a licensed laboratory and had an acceptable germination rate, seed quality should not be a problem. If germination testing on the seed lot was not done by a laboratory, poor seed quality could be a problem if other potential problems have been ruled out. At times, wheat doesn't germinate simply because the seed has an unusually long seed dormancy requirement. This is hard to identify in the field, and can cause producers to replant when it's not necessary. There are variety differences in seed dormancy, although this hasn't been tested recently. And even within the same variety, some

seed will have longer dormancy than others depending on the conditions in which it was produced. If a seed lot has unusually long seed dormancy, it should eventually germinate and emerge just fine.



Figure 1. There are two different varieties in this field. The variety on the right had poor seed quality, and this resulted in poor emergence. Photo by Jim Shroyer, K-State Research and Extension.

Finally, false wireworms can be the cause of poor emergence. False wireworms are soil-inhabiting, yellowish to orange-colored worms up to 11/2 inches long. A pair of short antennae is clearly visible on the front of the head and the head region does not appear flattened when viewed from the side. They commonly follow the drill row in dry soils, feeding on the seeds prior to germination.

Other insect and disease problems can attack seedlings after emergence.

For more information, see K-State's publication S-84, *Diagnosing Wheat Production Problems* at: <http://www.ksre.ksu.edu/bookstore/pubs/s84.pdf>

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2. Controlling annual weeds with fall-applied herbicides ahead of corn and sorghum

With row crop harvest underway, it's time to start planning your fall herbicide applications to control winter annual broadleaf weeds and grasses ahead of grain sorghum or corn. Fall applications during late October and through November can greatly assist control of difficult winter annuals and should be considered when performance of spring-applied preplant weed control has not been adequate. Henbit and marestail frequently are some of the most troublesome weeds that we try to manage with fall herbicide applications.

There are several herbicide options for fall application. If residual weed control is desired, atrazine is among the lowest-priced herbicides. However, if atrazine is used, that will lock the grower into planting corn or sorghum the following spring, or leave the land fallow during the summer and come back to winter wheat in the fall.

Atrazine is labeled in Kansas for fall application over wheat stubble or after fall row crop harvest anytime before December 31, as long as the ground isn't frozen. Consult the atrazine label to comply with maximum rate limits and precautionary statements when applying near wells or surface water. No more than 2.5 lbs of atrazine can be applied per acre in a calendar year on cropland.

One half to two pounds (maximum) per acre of atrazine in the fall, tankmixed with 1 to 2 pints/acre of 2,4-D LV4 or 0.67 to 1.33 pints LV6, can give good burndown of winter annual broadleaf weeds -- such as henbit, dandelion, prickly lettuce, Virginia pepperweed, field pansy, evening primrose, and marestail -- and small, non-tillered winter annual grasses. Atrazine's foliar activity is enhanced with crop oil concentrate, which should be included in the tankmix. Winter annual grass control with atrazine is discussed below.

Atrazine residual should control germinating winter annual broadleaves and grasses. When higher rates of atrazine are used, there should be enough residual effect from the fall application to control early spring-germinating summer annual broadleaf weeds such as kochia, common lambsquarters, wild buckwheat, and Pennsylvania smartweed -- unless the weed population is triazine-resistant. While it is always important to manage herbicide drift, herbicide applications made after fall frost have less potential for drift problems onto sensitive targets.

Marestail is an increasing problem in Kansas that merits special attention. Where corn or grain sorghum will be planted next spring, fall-applied atrazine plus 2,4-D or dicamba has been very effective on marestail rosettes, and should have enough residual activity to kill marestail as it germinates in the spring. Atrazine alone will not be nearly as effective postemergence on marestail as the combination of atrazine plus 2,4-D. Sharpen can be very good on marestail, but should be tankmixed with 2,4-D, dicamba, atrazine, or glyphosate to prevent regrowth.

If the spring crop will be corn, other residual herbicide options include ALS herbicides such as Autumn Super or Basis Blend. ALS-resistant marestail will survive an Autumn Super or Basis Blend treatment if applied alone. For burndown, producers should mix in 2,4-D, dicamba, and/or glyphosate. Aim + 2,4-D or Rage D-Tech are additional herbicide options for fall application with only the 2,4-D component providing a very short residual.

Winter annual grasses can also be difficult to control with atrazine alone. Success depends on the

stage of brome growth. For downy brome control, 2 lbs/acre of atrazine plus crop oil concentrate (COC) has given excellent control, whereas 1 lb/acre has given only fair control. Volunteer wheat and brome species that have tillered and have a secondary root system developing will likely not be controlled even with a 2-lb rate. Adding glyphosate to atrazine will ensure control of volunteer wheat, annual brome grasses, and other winter annual grassy weeds. Atrazine antagonizes glyphosate, so if the two are used together, a full rate of glyphosate (0.75 lb ae) is recommended for good control. The tankmix should include AMS as an adjuvant.

If fall treatments control volunteer wheat, winter annuals, and early-emerging summer annuals right up to planting of corn or sorghum, then at planting time a preemergence grass-and-broadleaf herbicide application with glyphosate or paraquat will be needed to control newly emerged weeds. Soils will be warmer and easier to plant where winter weeds were controlled in fall.

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3. Austrian winter peas as a cover crop in a wheat-sorghum rotation

Austrian winter peas have a growth pattern very similar to that of winter wheat. It is established in the fall, overwinters, and makes some additional spring growth. As a cover crop, it is then terminated sometime in the spring prior to planting of a summer row crop.

There are several potential benefits of planting Austrian winter peas as a cover crop:

- As a legume, it provides supplemental nitrogen to the soil
- Reduced erosion potential
- Captures left-over nitrogen from the previous crop
- Provides habitat for soil-improving microorganisms

However, cover crops can also use up soil moisture that would otherwise be available to the cash crop, potentially reducing yields. It also adds an extra expense to the cropping operation.

A no-till research project was conducted from 1996 to 2008 by Bill Heer, former agronomist-in-charge at the South Central Kansas Experiment Field near Hutchinson, to evaluate the effects of winter peas and their ability to supply nitrogen to the succeeding grain sorghum crop.

Methods

Within a no-till wheat-grain sorghum rotation, winter peas were planted in the fall after wheat harvest. Half the plots were not planted to the cover crop. Where winter peas were planted, they were chemically terminated at two different times – April and May. The plots, both where the cover crop had been grown and without a cover crop, were then fertilized with nitrogen broadcast at the rates of 0, 30, 60, and 90 pounds per acre. The plots were then planted to grain sorghum. Phosphate was applied at the rate of 40 lbs/acre in the row when planting grain sorghum and wheat.

Winter peas were planted at the rate of 40 lbs/acre in 10-inch rows with a double-disc drill.

Results

Each component in the rotation was present every third year. Grain sorghum was harvested in 1996, 1999, 2002, 2005, and 2008. Yields are summarized in the chart below, averaged over all five years.

Grain sorghum yield as affected by N rate, winter pea cover crop, and termination date:			
South Central Kansas Experiment Field 1996-2008			
Cover crop treatment	Cover crop termination date	N rate (lbs/acre)	Yield, 5-year average (bu/acre)
None	N/A	0	62.0
		30	79.1

		60	84.2
		90	98.2
		Average:	80.9
Winter peas	April	0	84.9
		30	90.8
		60	92.5
		90	85.2
		Average:	88.4
	May	0	84.3
		30	89.7
		60	92.2
		90	95.0
		Average:	90.3

Conclusions

- Averaged over 5 years and all N rates, Austrian winter peas as a cover crop increased grain sorghum yields by about 7-9 bu/acre.
- Termination date of the winter peas made no significant difference in sorghum yield.
- Where nitrogen was applied at the highest rate, 90 lbs/acre, the beneficial effect of winter peas on sorghum yield disappeared. In fact, sorghum yields were highest where N rates were 90 lbs/acre and no cover crops were grown. At all other N rates, winter peas improved sorghum yields.

For more details, see *Austrian Winter Pea: Effects on N Rates and Grain Sorghum Yield in a Cover Crop, Grain Sorghum, Winter Wheat Rotation*, Keeping Up With Research SRL 142:

<http://www.ksre.ksu.edu/bookstore/pubs/SRL142.pdf>

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4. Using 2,4-D and glyphosate as burndown prior to planting wheat

Sometimes a single early preplant burndown treatment prior to planting wheat does not hold down grass and broadleaf weed pressure all the way until the time wheat is planted. In some areas of Kansas this year, higher-than-normal rainfall in August and September has led to a flush of grasses, volunteer wheat, and broadleaf weeds on some fields that had received an earlier burndown treatment.

When this occurs, producers may want to add another herbicide to glyphosate for additional broadleaf weed control in the second burndown treatment closer to the time of wheat planting. Is 2,4-D a good option for tankmixing with glyphosate in this situation?

The label for 2,4-D LV, which is the best form of 2,4-D to use in this case, is a little vague about the required waiting time between application on fallow or stubble ground and the planting of wheat. When used on fallow ground or crop stubble, the label states you can plant only those crops listed on the label within 29 days after application of 2,4-D LV4. Wheat is one of the crops listed on the label, so that's fine. Corn and soybeans have specific guidelines for preplant application on the label, but small grains and sorghum do not.

The label also states that wheat and other crops listed on the label may be at risk of crop injury or loss if planted soon after application, especially during the first 14 days. The risk of injury to wheat following a 2,4-D application to fallow or crop stubble increases: (1) at higher use rates, (2) if soil temperatures have been cold, or (3) if soils have been excessively wet or dry in the days following application. All of these factors affect the degradation of 2,4-D LV4 after application. In practice, the risk of injury is probably minimal if you allow a 7-day waiting interval between application of up to 1 pt/acre of 2,4-D LV4 and planting wheat.

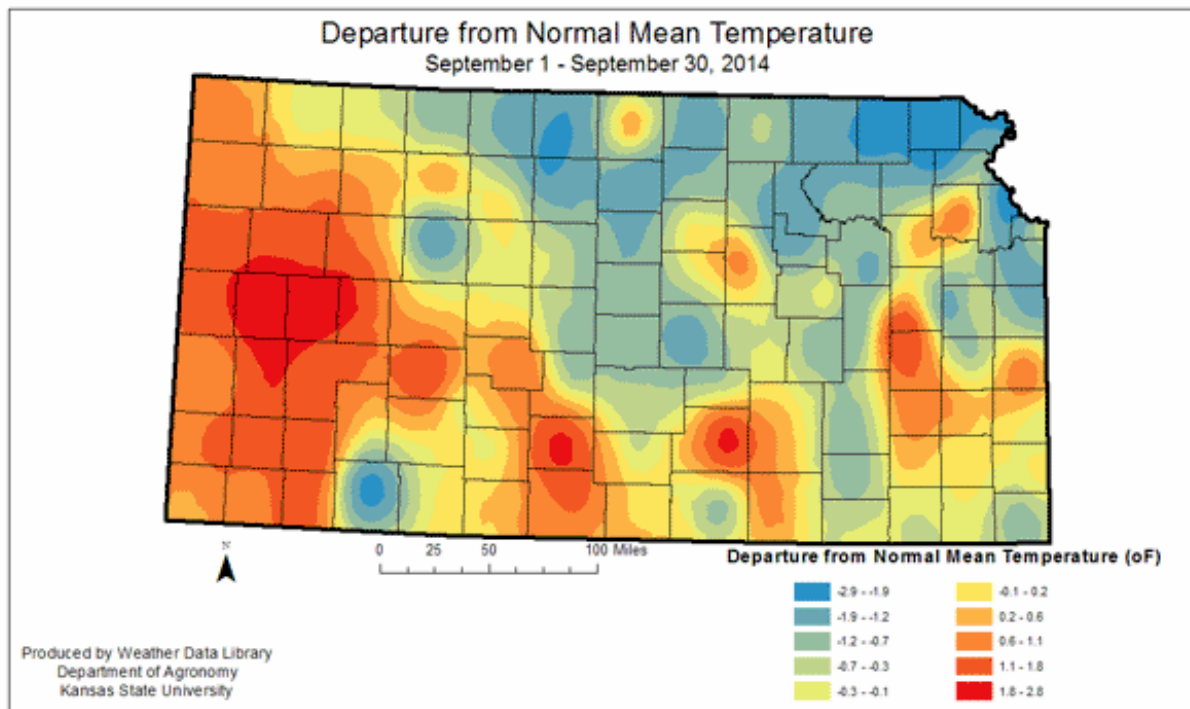
The greatest risk of crop injury to wheat would occur with 2,4-D application close to planting and a good rainfall shortly after planting.

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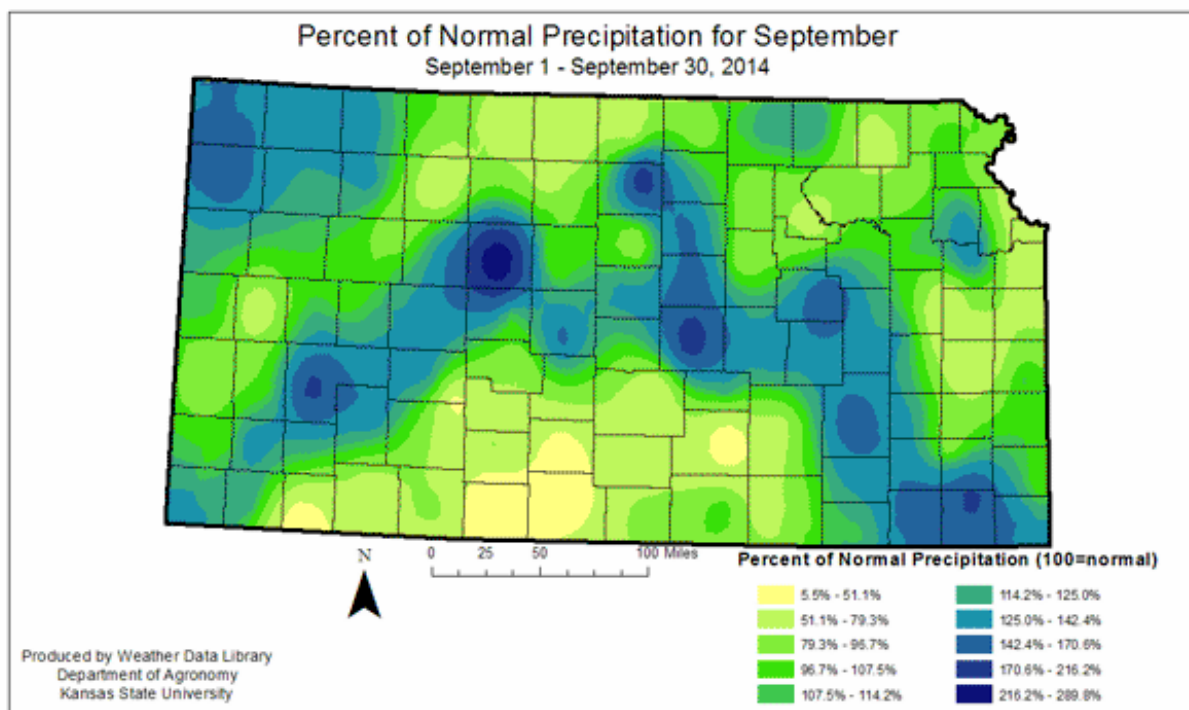
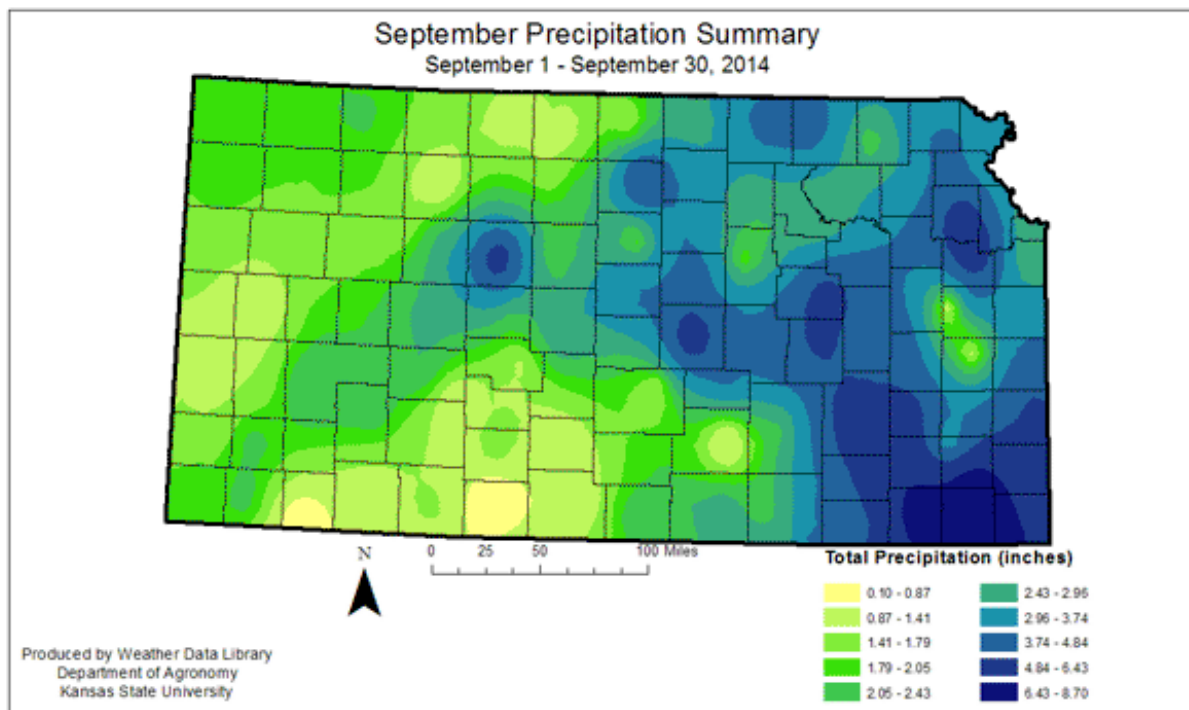
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5. September weather summary for Kansas: Early autumn

On average, temperatures in September for Kansas were very close to normal. The Southwestern Division had the greatest departure with an average of 69.7 degrees F, or 1.0 degree warmer than normal. The North Central and Northeastern divisions vied for coolest. All divisions had temperatures above 90 degrees during the month. The warmest reading was 104 degrees, reported at multiple locations. On the cool side of the scale, there were 93 new daily record low maximum temperatures and 99 new daily record low minimum temperatures for the month.



The statewide average precipitation for September was 3.04 inches. The total is 116 percent of the normal precipitation for the month. Only the South Central Division averaged below normal, with 1.82 inches, or 70 percent of normal. It should be noted that this does not include the rain that fell during the afternoon and evening of September 30. September saw heavy rains both to start and end the month, with more isolated events during the middle of the month.



Drought conditions persist, but there was continued improvement over much of the state. Conditions deteriorated in the south central part of the state. At the start of September only two percent of the state was considered drought-free. At the end of September, the portion of the state that was drought-free increased to almost 19 percent. The El Niño/Southern Oscillation (ENSO) is still expected to switch to an El Niño event before winter, but it still remains to be seen what impact will be felt. Other global circulation patterns, including the North Atlantic Oscillation (NAO), can have

significant impacts on the winter season. The October temperature outlook is neutral for the entire state, with equal chances of above normal, normal or below normal temperatures across most of Kansas. The precipitation outlook is also neutral for all except extreme eastern Kansas. In those areas, there is a slight chance for above normal precipitation. This does not indicate how that moisture might be distributed, and means heavy rains or extended dry periods are both possible.

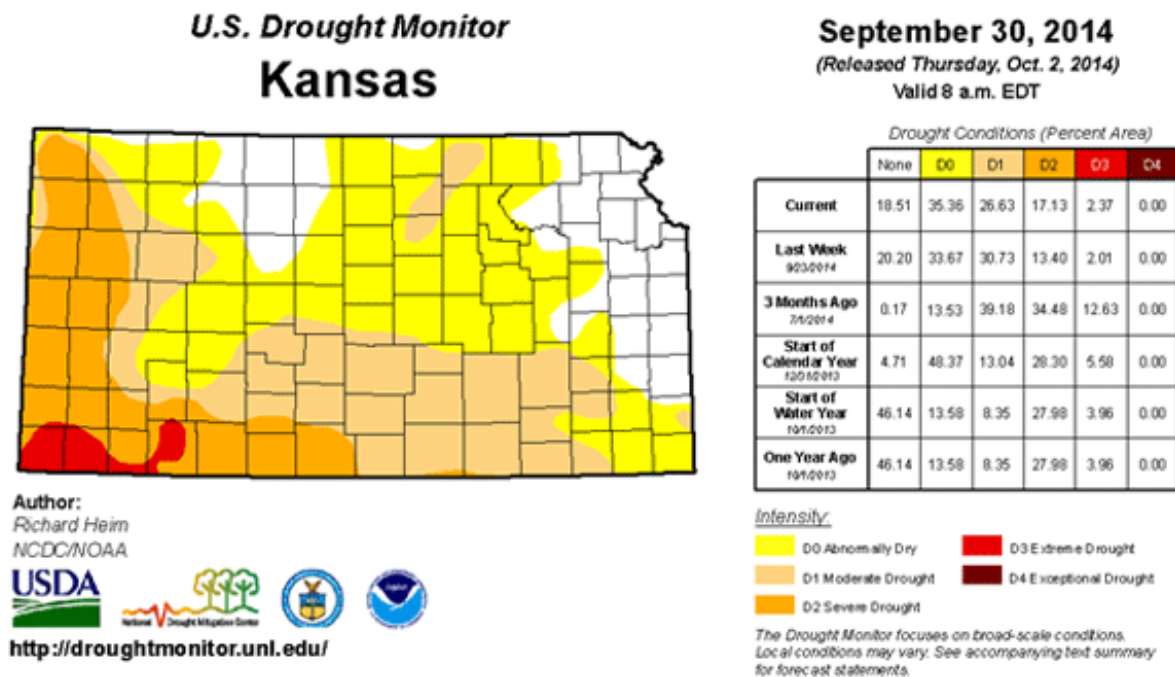


Table 1

September 2014

Kansas Climate Division Summary

	Precipitation (inches)						Temperature (°F)			
	Sept. 2014			Jan. - Sept. 2014					Monthly Extremes	
Division Total	Dep. ¹	% Normal	Total	Dep. ¹	% Normal	Ave	Dep. ¹	Max	Min	
Northw est	1.57	0.05	109	15.56	-2.85	84	65.5	0.3	101	30
West	1.84	0.24	111	17.76	-0.13	97	67.2	0.8	102	30
Central										
Southw	1.83	0.21	115	15.28	-1.78	88	69.6	1.0	104	35

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North Central Central	3.17	0.54	115	20.64	-3.28	85	66.7	-1.2	101	32
South Central	4.67	2.16	187	22.73	-2.26	91	68.4	-0.7	102	31
South Central	1.82	-0.78	70	21.51	-4.56	82	70.6	0.4	99	35
Northeast	3.98	0.37	110	23.88	-5.39	81	66.0	-1.4	97	34
East Central	4.23	0.57	114	22.08	-9.18	70	67.5	-0.8	99	34
Southeast	4.94	0.93	122	23.63	-9.79	70	69.6	0.0	97	33
STATE	3.07	0.45	116	20.23	-4.39	82	67.9	-0.2	104	30

1. Departure from 1981-2010 normal value

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6. Comparative Vegetation Condition Report: September 16 - 29

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 39: 09/16/2014 - 09/29/2014

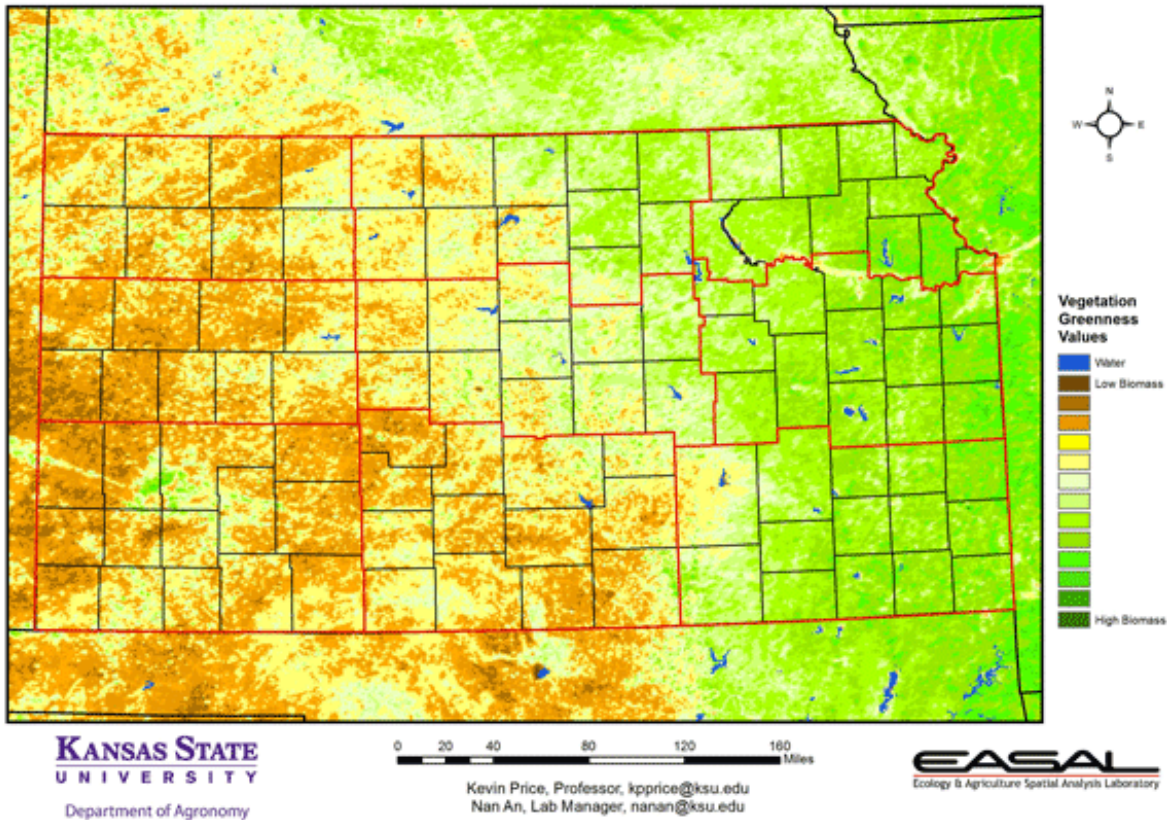


Figure 1. The Vegetation Condition Report for Kansas for September 16 – 29 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that shows higher NDVI values across the eastern part of the state, while lower biomass activity is dominant in the west and south central portions of the state.

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

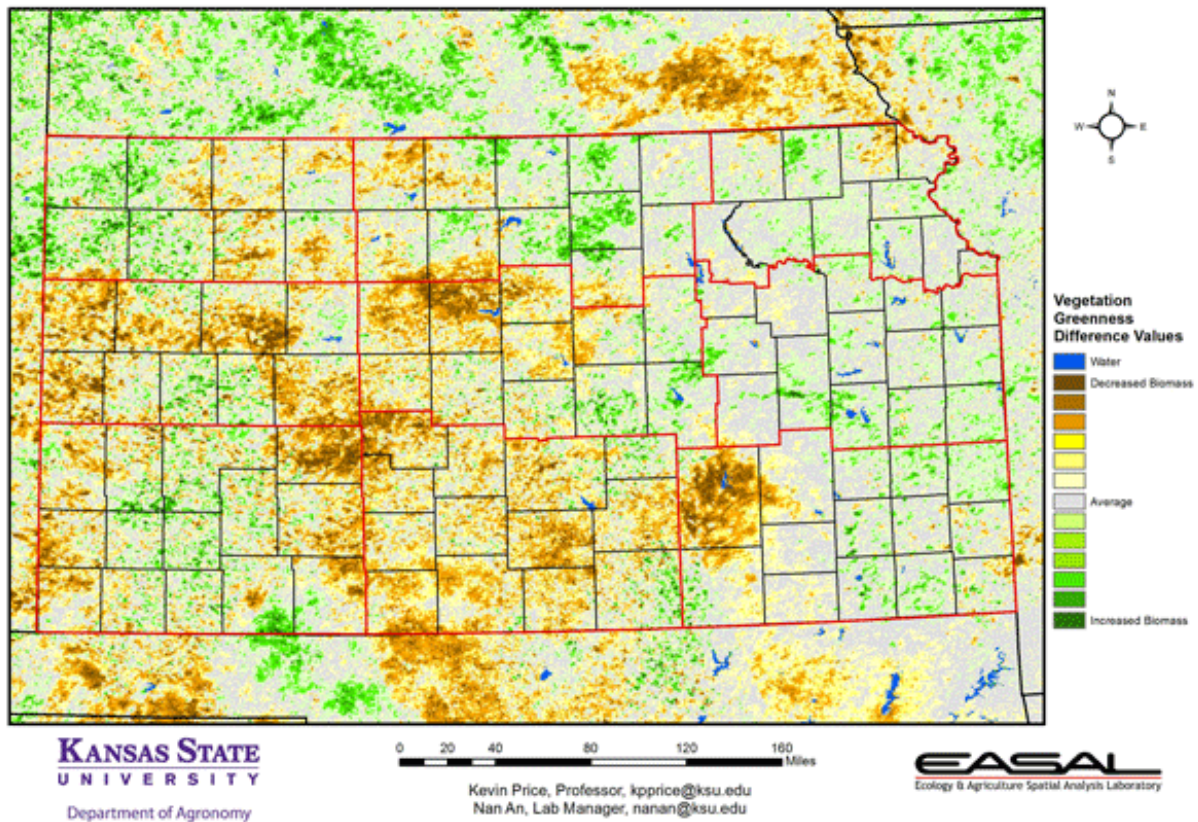


Figure 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for September 16 – 29 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that there is a noticeable drop in biomass production in parts of central Kansas. The most visible decrease is Butler County. On the other hand, northwest Kansas generally has higher photosynthetic activity, particularly in Sherman County.

Kansas Vegetation Condition Comparison

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

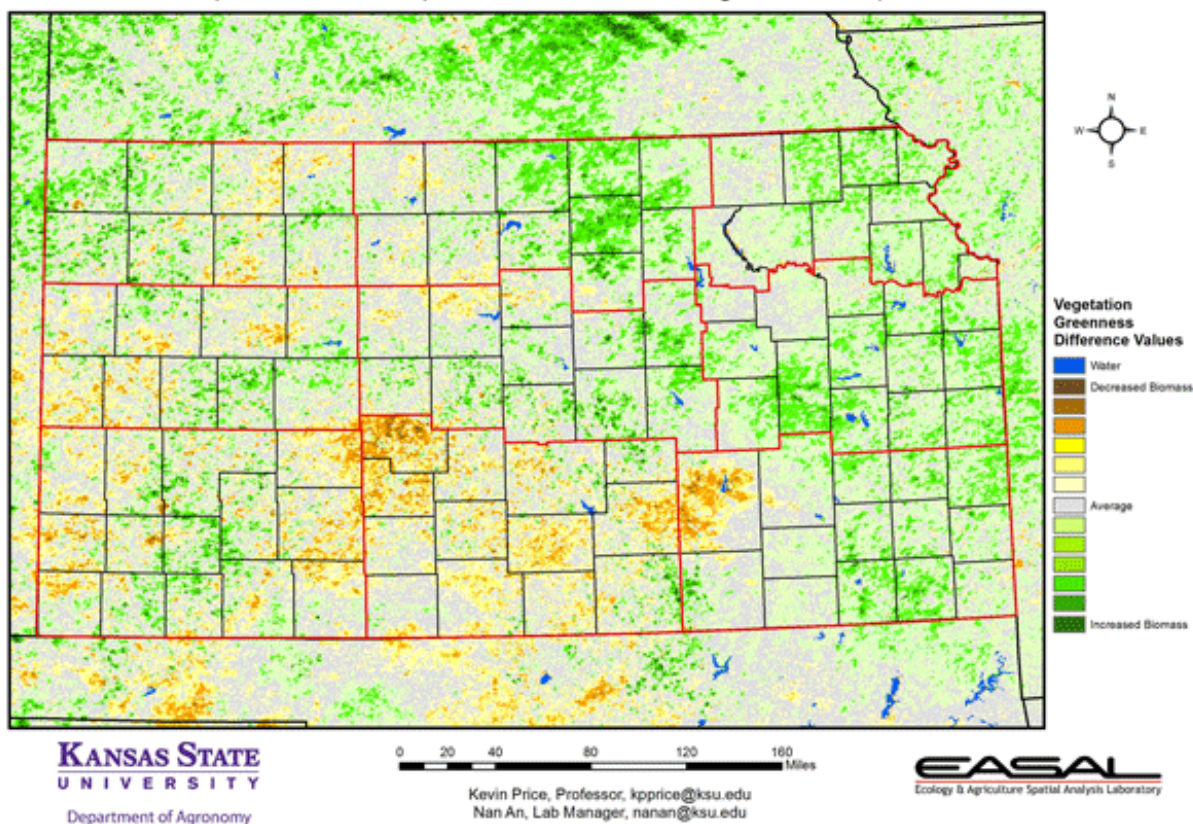


Figure 3. Compared to the 25-year average at this time for Kansas, this year's Vegetation Condition Report for September 16 – 29 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the greatest decrease in parts of south central and southeast Kansas. These areas of below-average readings are particularly visible in Pawnee and Edwards counties, and in Harvey and Butler counties. The greatest increase in photosynthetic activity is in the north central region, particularly in Cloud County.

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U.S. Corn Belt Vegetation Condition

Period 39: 09/16/2014 - 09/29/2014

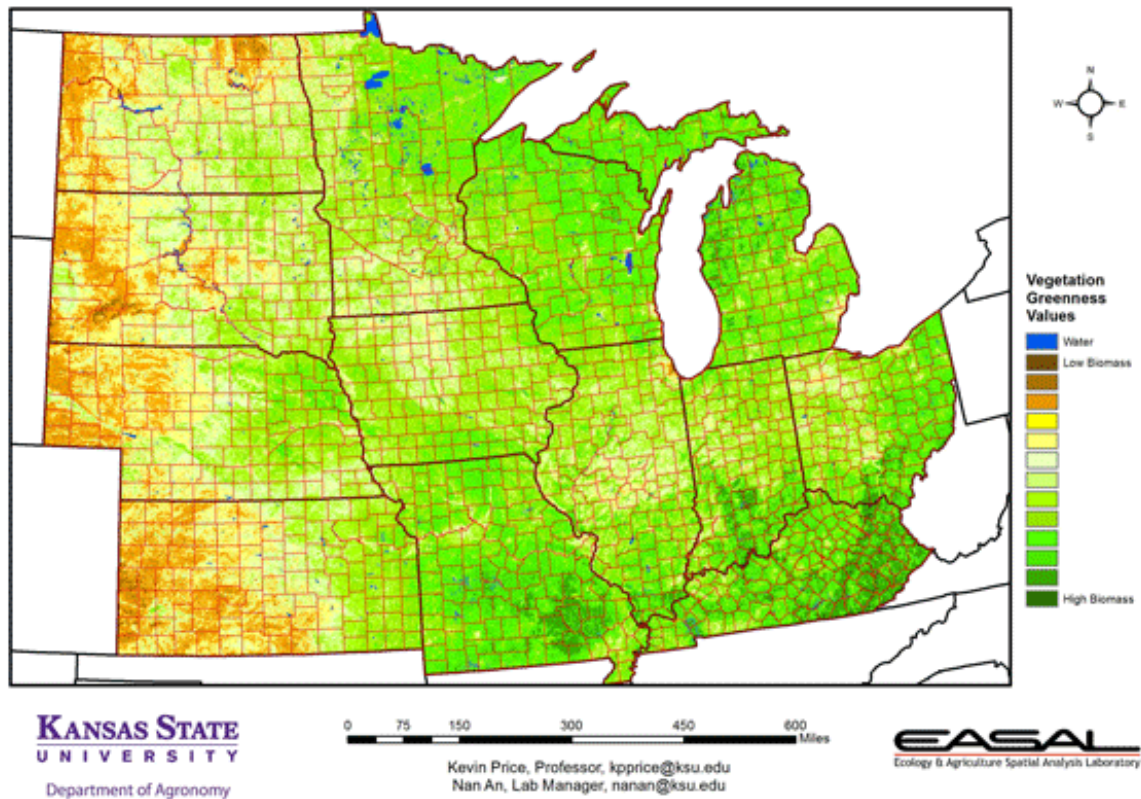


Figure 4. The Vegetation Condition Report for the Corn Belt for September 16 – 29 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that photosynthetic activity continues to decline, with the highest NDVI readings in the southern and eastern portions of the region. This is particularly evident in southeastern Missouri and southeastern Kentucky. In southeastern Missouri, the corn condition at the end of September was reported at 90 percent good to excellent.

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

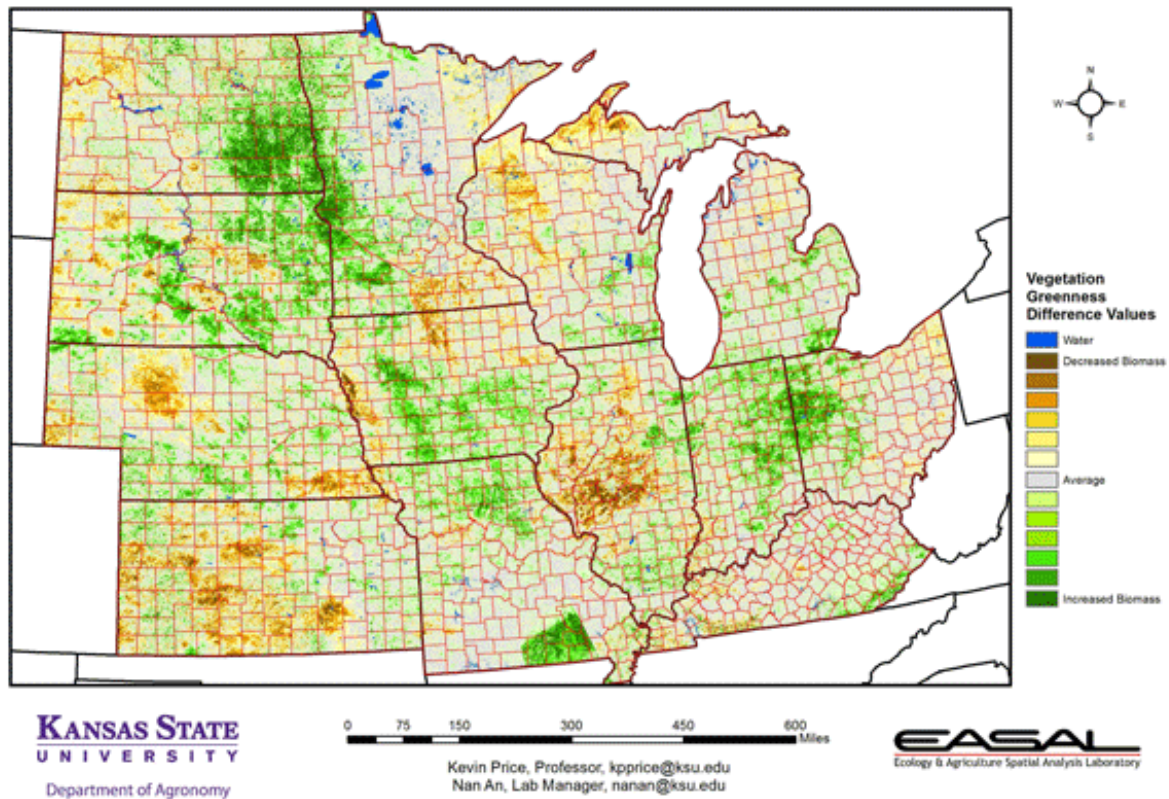


Figure 5. The comparison to last year in the Corn Belt for the period September 16 – 29 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows, despite the splice line, that the eastern portions of the Dakotas have much higher photosynthetic activity than last year. Much of this is due to delayed development of the crops. In North Dakota, 30 percent of the corn is rated mature, while last year at this time the maturity rate was 47 percent.

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

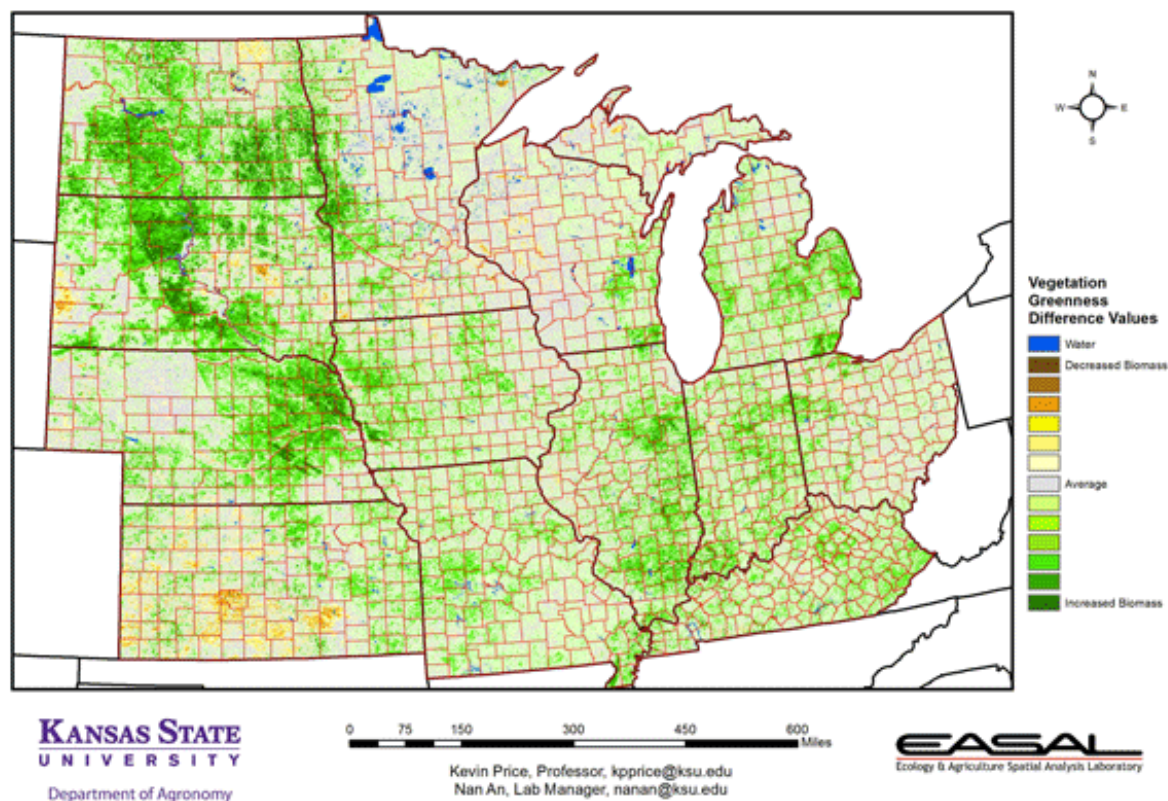


Figure 6. Compared to the 25-year average at this time for the Corn Belt, this year's Vegetation Condition Report for September 16 – 29 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the greatest departure is in the Northern Plains. Crop maturity lags behind average, although it made some progress in the last week.

Continental U.S. Vegetation Condition

Period 39: 09/16/2014 - 09/29/2014

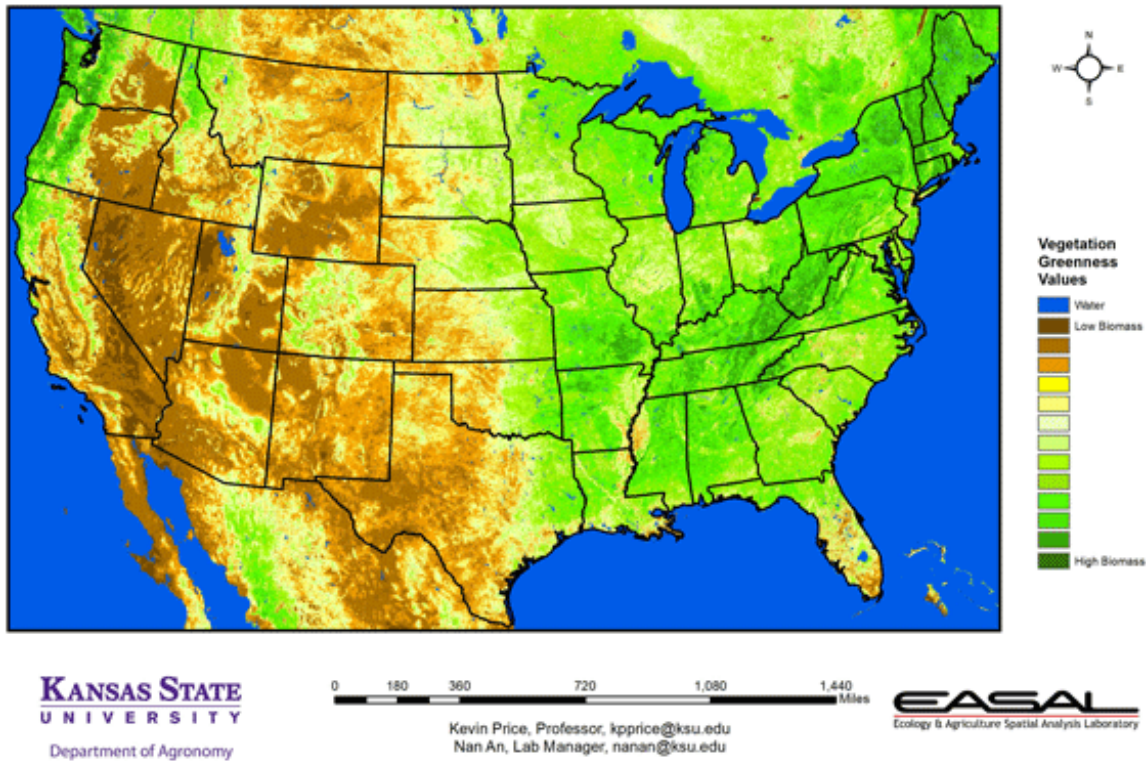


Figure 7. The Vegetation Condition Report for the U.S. for September 16 – 29 from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that highest NDVI values are in the east central U.S., from eastern Missouri through West Virginia. A second area of high photosynthetic activity is visible in upper New England.

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

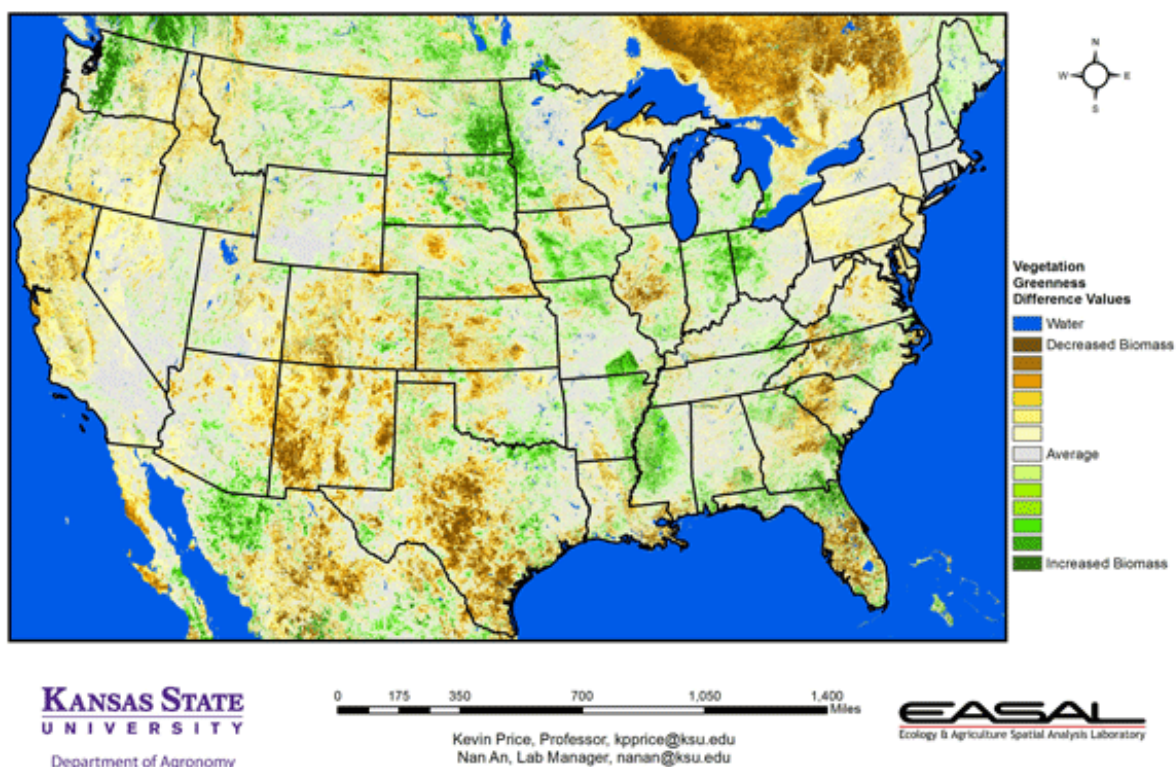


Figure 8. The U.S. comparison to last year at this time for the period September 16 – 29 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that much of the country has very similar photosynthetic activity. Lower NDVI values are visible in Arizona and Texas, while higher NDVI values are most noticeable in the eastern Cascades of Washington State.

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

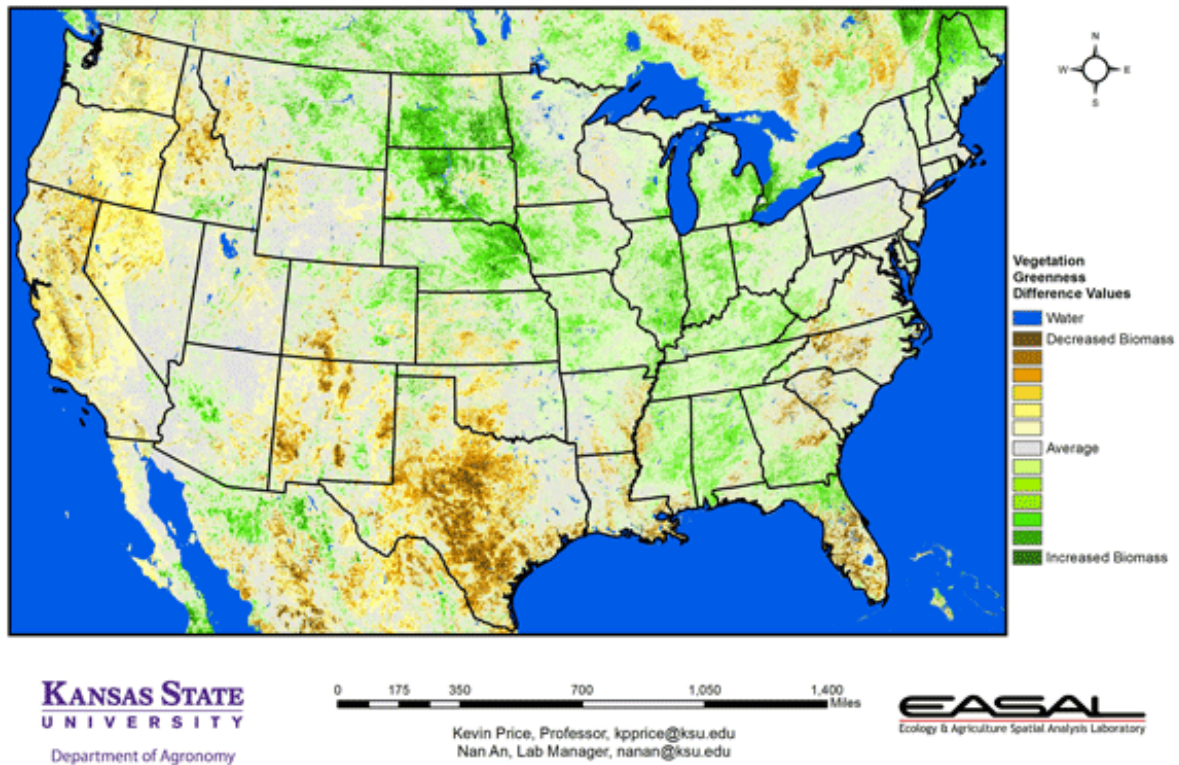


Figure 9. The U.S. comparison to the 25-year average for the period September 16 – 29 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that biggest departures are in the center of the U.S. Higher-than-average photosynthetic activity dominates the Northern Plains, while much lower-than-normal activity is predominant in Texas.

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