k-state extension AGRONOMY e-Updates

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1. First hollow stem in wheat

Wheat is developing rapidly now and is earlier than normal in much of Kansas. Producers should start examining plants now to determine if the wheat has reached the "first hollow stem" (FHS) stage. This stage occurs as the wheat switches from the vegetative stage to the reproductive stage of growth.

When the leaf sheaths become strongly erect, the growing point, which is below the soil surface, will soon begin to develop a tiny head. Although the head is quite small at this point, it has already established some important yield components. At this stage, the maximum potential number of spikelets is determined. Sufficient nitrogen (N) should already be available in the root zone at growth stage in order to affect the potential number of seeds per head.

Once the embryo head has developed, the first internode will begin to elongate pushing the head up through the leaf sheaths. This first internode will be hollow. This will be visible before you can actually feel the first node (joint, located just above the first internode). Prior to this stage the nodes are all formed but tightly packed together and hard to see.

FHS is the point at which a half-inch or so of hollow stem can first be identified above the root system and below the developing head. FHS occurs when the developing head is still below the soil surface, which means that producers have to dig plants out of the ground to do the examination.

To look for FHS, start by digging up some plants from fields that have not been grazed. Select the largest tillers to examine. Cut off the top of the plant, about an inch above the soil surface. Then slice the stem open from the crown area up. Look for the developing head, which will be very small. Next, see if you can find any hollow stem between the developing head and the crown area. If there is any separation between the growing point and crown, the wheat plant is at FHS. FHS will occur between a few days and a week or more prior to jointing, depending on temperatures.

If the wheat has reached FHS, cattle should be removed to prevent grain yield loss. Yield losses from grazing after FHS may be up to 1.25 bushels per day according to OSU data, although losses may not be this great for the first few days of grazing after FHS. Still, it is easy for producers to be late by a few days in removing livestock as they wait for obvious nodes and hollow stems to appear, and even the first few days can be significant.

Two things are observed when wheat is grazed too long: 1) fewer heads per acre because the primary tiller has been removed and 2) smaller and lighter heads than expected because leaf area has been removed. As cattle continue grazing, the wheat plant is stressed and begins to lose some of the tillers that would produce grain. A little later, if there is not enough photosynthate, the plant begins aborting the lower spikelets (flowers where seed develops) or some of the florets on each head. Finally, if there is not enough photosynthate during grain filling, the seed size will be reduced and if the stress is severe enough, some seed will abort.

First hollow stem. (Photo courtesy of Gene Krenzer, former Oklahoma State University Extension wheat specialist.)

-- Jim Shroyer, Extension Agronomy State Leader
jshroyer@ksu.edu

2. Spring planting of alfalfa

Although most alfalfa is planted in the fall in Kansas, spring is also a good time for planting. Fall-seeded alfalfa will usually produce more first-year tonnage than spring-seeded alfalfa, but planting in April usually results in more reliable moisture conditions and less risk of poor stand establishment.

Before planting alfalfa, producers should be sure to have the soil tested for pH, phosphorus (P), and potassium (K). There is still time to get this done before a spring planting, and the results will pay off for the life of the stand – usually five to seven years.

Alfalfa does best when the soil pH ranges from 6.5 to 7.5. If the soil pH is less than 6.5, production will be reduced. At very low pH levels, the stand may be thin and weedy. Applying lime, if needed, before planting alfalfa, will pay big dividends.

Alfalfa is a big user of P. For every ton of alfalfa removed from a field, 10-12 pounds of P are removed. Past research in Kansas has shown that applying and incorporating P fertilizer, if recommended by a soil test analysis, results in large increases in productivity. In a no-till situation, P fertilizer can be surface-applied and still have a long-term beneficial effect on yields.

It's best to plant alfalfa no-till or reduced-till, if possible. Minimizing tillage can decrease planting costs and help maintain soil moisture levels. Alfalfa can be successfully no-tilled into wheat straw or row crop stubble. No-till will help create a firm, moist soil at planting time; save time; and cut costs.

Whether no-tilled or tilled, make sure there are no weeds growing when alfalfa is planted. Also, be sure there is not herbicide carryover from a previous crop that could injure the seedling alfalfa.

When seeding alfalfa, plant seed ¼ to ½ inch deep. Plant seed about ¾ inch deep in sandy soils, unless the field is irrigated. For dryland production, use a seeding rate of 8 to 12 pounds per acre in the west, and 12 to 16 pounds per acre in central and eastern Kansas. For irrigation production, use 15 to 20 pounds of seed per acre in all soils

When selecting seed, producers should be sure to use certified, treated seed. Varieties with a fall dormancy rating of 3 to 4 are best for the northern part of the state. For southern areas of the state, select a variety with a fall dormancy rating of 4 to 5. It is also important to select a variety with resistance to one or more of the following: phytophthora root rot, bacterial wilt, fusarium wilt, verticillium wilt, anthracnose, pea aphid, spotted alfalfa aphid, and other diseases and insects. This will help increase the longevity of the stand.

Producers should be sure the seed is inoculated to help ensure the nitrogen fixation necessary for optimum production.

-- Jim Shroyer, Extension Agronomy State Leader
jshroyer@ksu.edu

3. Foliar nitrogen fertilizer products for wheat

Various foliar nitrogen (N) fertilizer products are being promoted as an option for spring fertilization of wheat. These products range in analysis and can include straight nitrogen products or mixtures of N plus other macro and micro nutrients. The straight nitrogen products will typically have an analysis similar to traditional liquid N fertilizers, such as 25 to 30 percent N.

One of the main differences between traditional UAN and the foliar products is that a certain percentage of the N in the foliar fertilizers is commonly in some type of slow-release form. As a result, these specialty products are generally safer for application directly to the foliage in later stages of growth and result in less leaf burn than traditional UAN products.

K-State has tested many different types of foliar N fertilizer products over the years. Foliar N fertilizer products are just as effective as traditional N fertilizers on a pound-for-pound basis, but

they *are not more effective* than traditional N fertilizers. They can be applied in a broadcast spray application at later growth stages of wheat growth than traditional N fertilizer products without damaging the wheat.

One of the reasons the foliar products have not been found to be more effective than traditional soil application is that only a small portion of the N applied as a foliar application to wheat actually moves into the plant through the leaf tissue. An excellent study done in Canada a few years ago found that when care was taken to prevent foliar applied N from reaching the soil, only 8-12% of the applied N was recovered by the plant, compared to 35 to 70% of soil applied N being taken up by the plant. Thus it is very likely that many foliar applied fertilizers are actually taken up through the roots once they wash off the plant.

At the normal topdress time (prior to jointing), producers should simply compare a foliar product to a traditional N fertilizer product based on the cost of a pound of N per acre to determine which product gives the best value. Invariably, the foliar products will be higher in terms of cost-per-pound-of-N than the traditional N fertilizers. In unusual situations (well after jointing or when trying to increase protein levels), the foliar N products would have some premium value since traditional N products could not safely be used in a broadcast spray application.

To reduce the potential for leaf burn, there are alternative ways to apply traditional liquid N sources other than the standard spray nozzle. Streamer bars, a 10- to 15-inch long plastic bar which can be used with traditional spray booms in place of the nozzle, provide a solid stream of liquid fertilizer spaced every 5-6 inches. These streams of liquid greatly reduce foliar burn as compared to complete foliage coverage with standard flat fan spray nozzle. Broadcast granular urea also produces limited leaf burn as compared to sprayed UAN.

The bottom line is, foliar N products can be used for later applications, but the limited amounts of N which can be applied based on the labels of many of these foliar products limits their use in situations where large amounts of N are needed.

-- Dave Mengel, Soil Fertility Specialist
dmengel@ksu.edu

4. Kansas Flint Hills Smoke Management Plan: The impact of weather conditions on smoke movement

The Kansas Flint Hills Smoke Management Plan is entering its second year in 2012. This comprehensive plan is designed to minimize the movement of concentrated smoke plumes into large metropolitan areas through voluntary participation. All Flint Hills landowners and managers who conduct prescribed burns should know what is in this plan.

To help educate all those affected, a series of radio interviews is being broadcast weekly each Monday on K-State's *Agriculture Today* talk show. These programs will explain the many aspects of the new plan. *Agriculture Today* is part of the K-State Radio Network. The broadcast interviews are podcast online at www.ksre.ksu.edu/news/DesktopDefault.aspx?tabid=66.

The following is a slightly edited transcript of the first in the 2012 series of *Agriculture Today* radio broadcasts on the Kansas Flint Hills Smoke Management Plan. This is an interview with Kris

Craven, meteorologist with the National Weather Service office in Topeka, conducted by Eric Atkinson of the K-State Radio Network.

Q: Weather is a keystone to the whole thing, isn't it?

A: Absolutely. In terms of where the smoke goes and how it behaves, weather is integral to the process.

Q: What do we know in a general sense about how weather impacts smoke?

A: There are a lot of variables that go into how smoke moves through the environment. Obviously wind plays a role. And not just wind at ground level, but wind 2000 or 3000 feet up into the atmosphere. You need to think about where the smoke will go once it reaches those levels. Relative humidity has an effect. The lower the relative humidity, the more effective the burn will be as the grasses will be dried. The speed of the wind in the mixing layer will help determine how far the smoke will travel. Temperature will affect how deeply the atmosphere mixes. There are a lot of things that affect smoke movement.

Q: How does cloud ceiling affect smoke movement?

A: The general recommendation is that you burn when there is no more than 30 to 50 percent cloud cover. That should give you enough sunshine to allow the surface of the earth to heat up and to allow the atmosphere to get to a good mixing depth. We actually put out forecasts on that – the depth to which we think the atmosphere will mix on a given day. For relative humidity, the recommendation is in the 30 to 50 percent range. If it's higher than that, the fuel won't burn. If it's lower than that, conditions get dangerous.

Q: If you have high humidity, this will also affect the density of the smoke, correct?

A: Certainly. The greener the material you are burning, the more smoke it will produce. We're trying to spread out the period of time in which burning is conducted so that it's not all done on the same day or two in any one location.

Q: What can people expect to find of the ksfire.org web site in terms of weather information?

A: Since 2008 we have had been doing fire weather forecasts on the National Weather Service web site, listing parameters such as wind transport speed and mixing height wind speed. That information is on the weather.gov/topeka web site, or you can go to ksfire.org and click on the "Weather" link. The National Weather Service site has a "fire weather" page. There is information on that page in both Word form and tabular form. The tabular form is quite popular because it lists the weather by the hour. It is also in graph form. There is also an "activity planner" so that you can put in the weather conditions you want for a specific activity and it will let you know when those conditions are predicted to occur. Let's say you want north winds and you want it to be 30 to 50 percent relative humidity and less than 50 percent cloud cover, it will spit out a bar graph and show you when all those criteria are likely to occur.

Q: So you don't have to sort through a lot of information to find the guidance you're looking for?

A: True, especially with the tabular data and the activity planner. You can just pick what you want to plot. If you don't care about certain elements of the forecast, you can just choose not to plot those.

-- Steve Watson, Agronomy e-Update Editor
swatson@ksu.edu

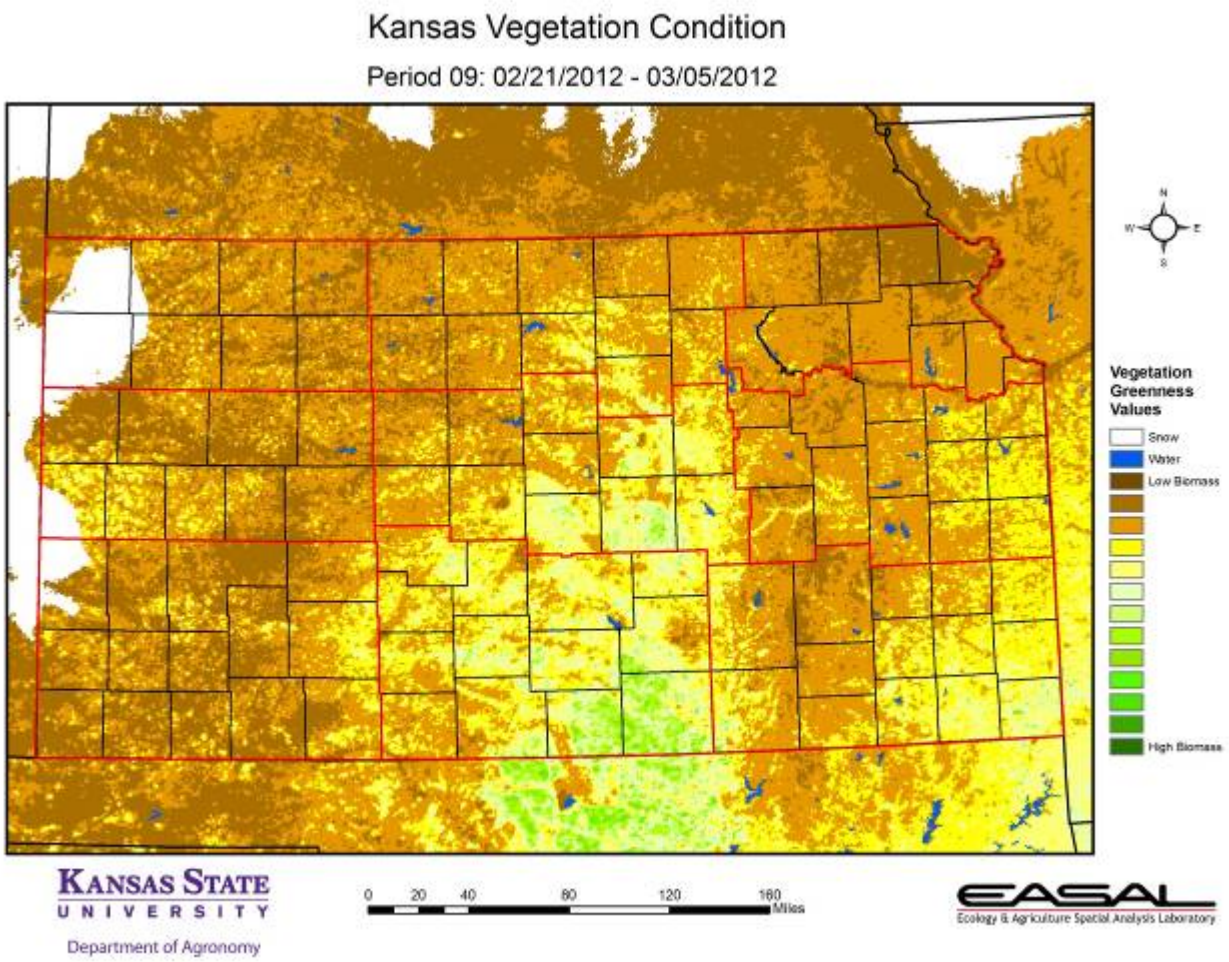
5. Comparative Vegetation Condition Report: February 21 – March 5

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.

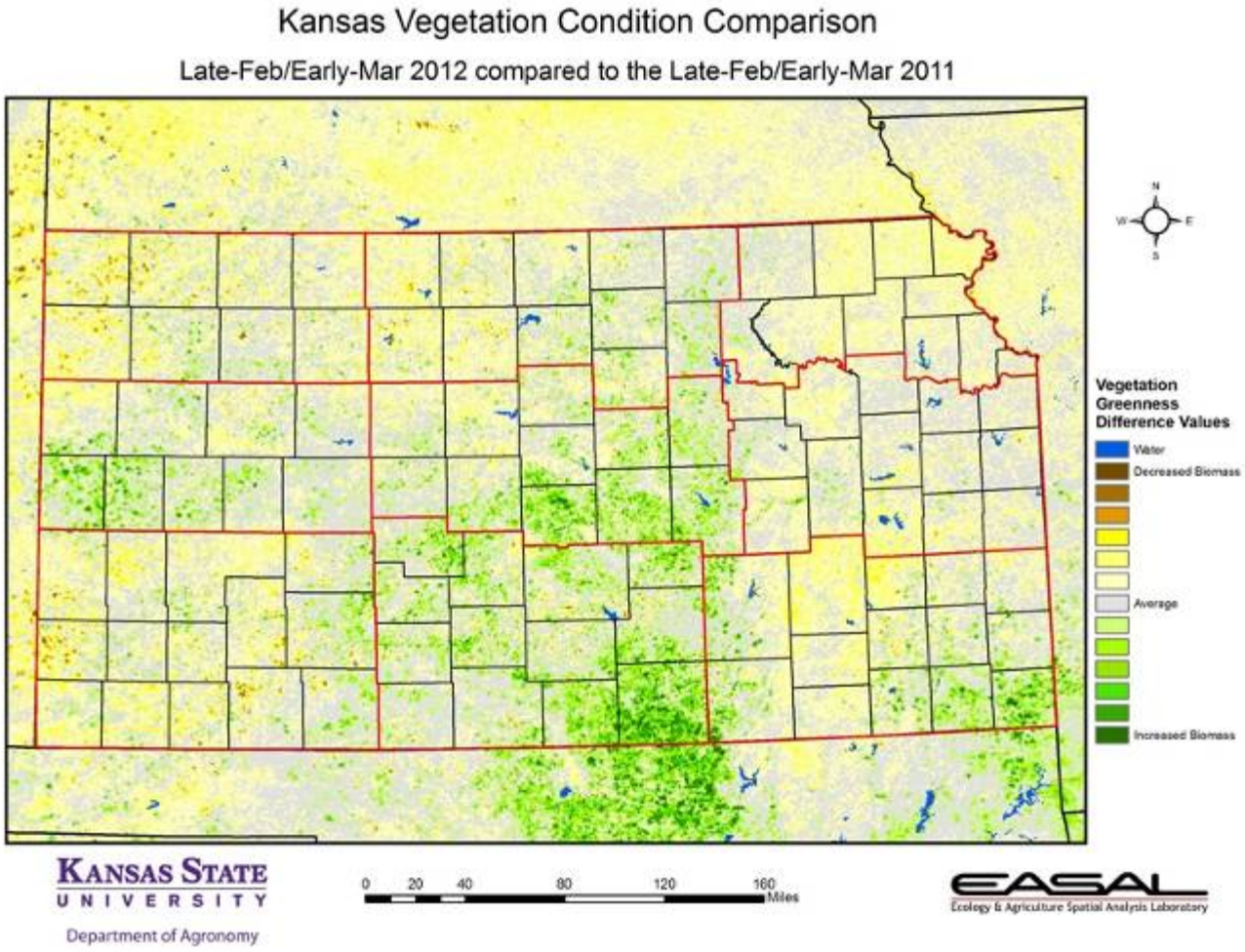
Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5NIggw
http://www.youtube.com/watch?v=tUdOK94efxc

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 21-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.

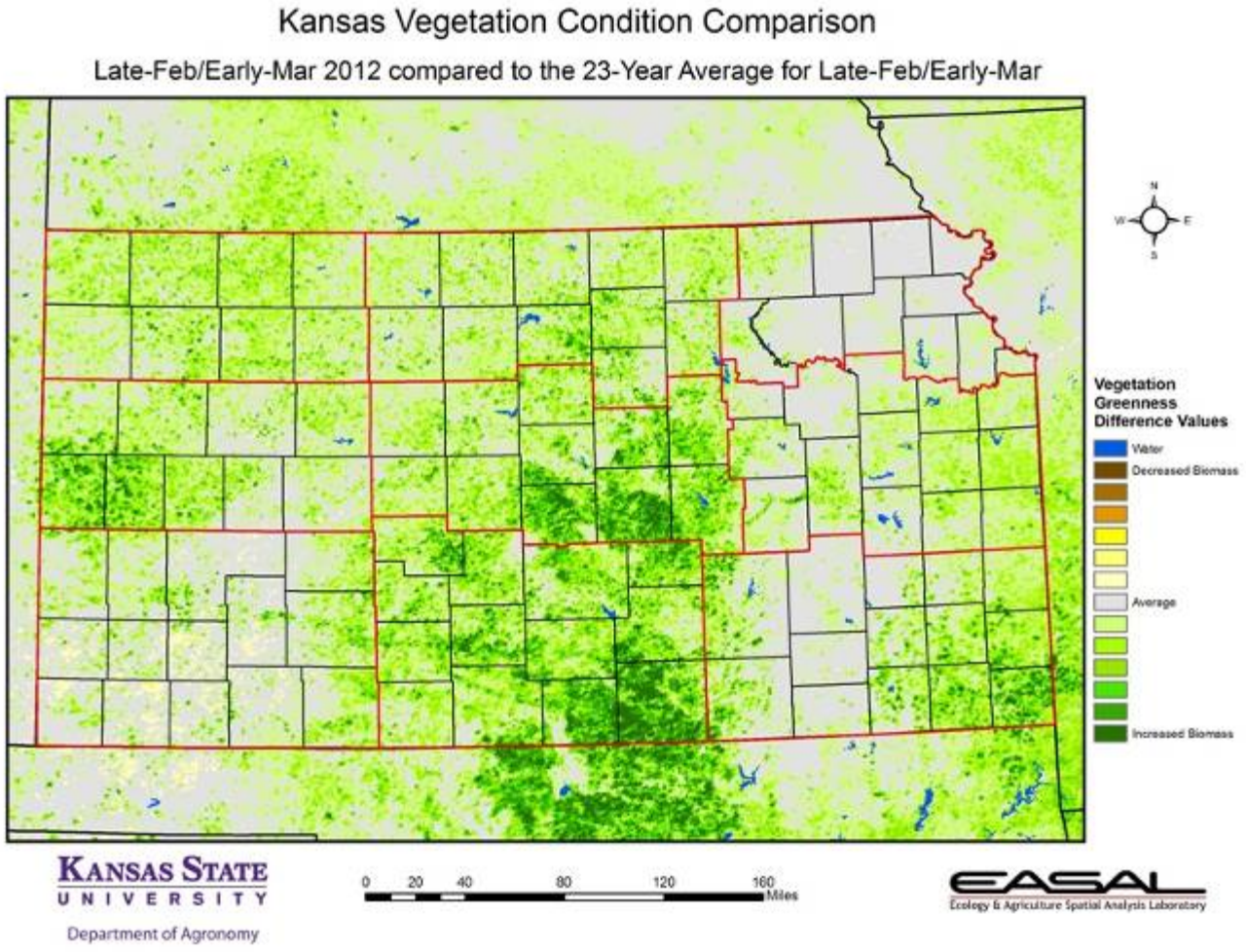
The maps below show the current vegetation conditions in Kansas, the Corn Belt, and the continental U.S, with comments from Mary Knapp, state climatologist:



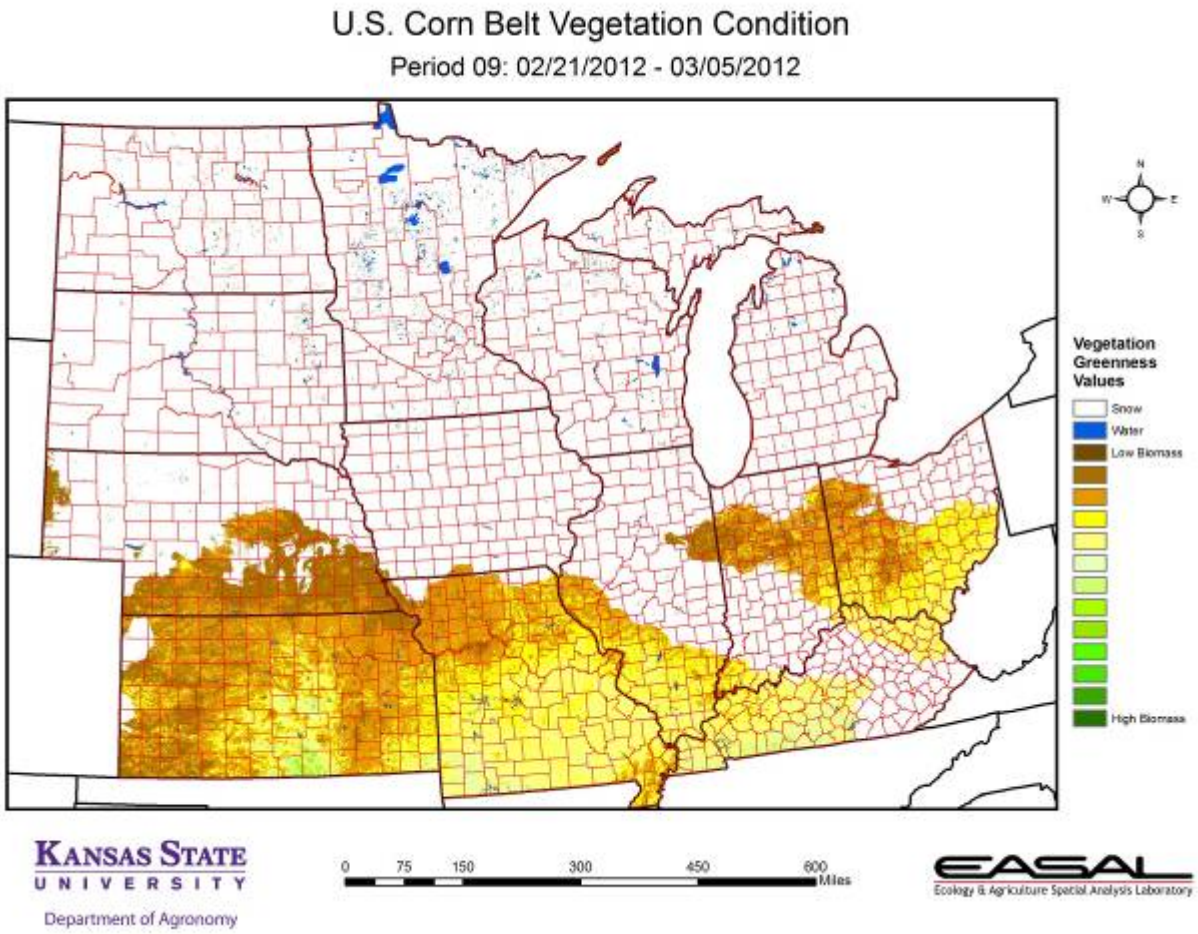
Map 1. The Vegetation Condition Report for Kansas for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the vegetation has begun to break dormancy, particularly in south central and central Kansas. Snow impact during this period was limited to the western portions of the state. Where there are lower NDVI values, that is mostly the result of vegetation that is still dormant.



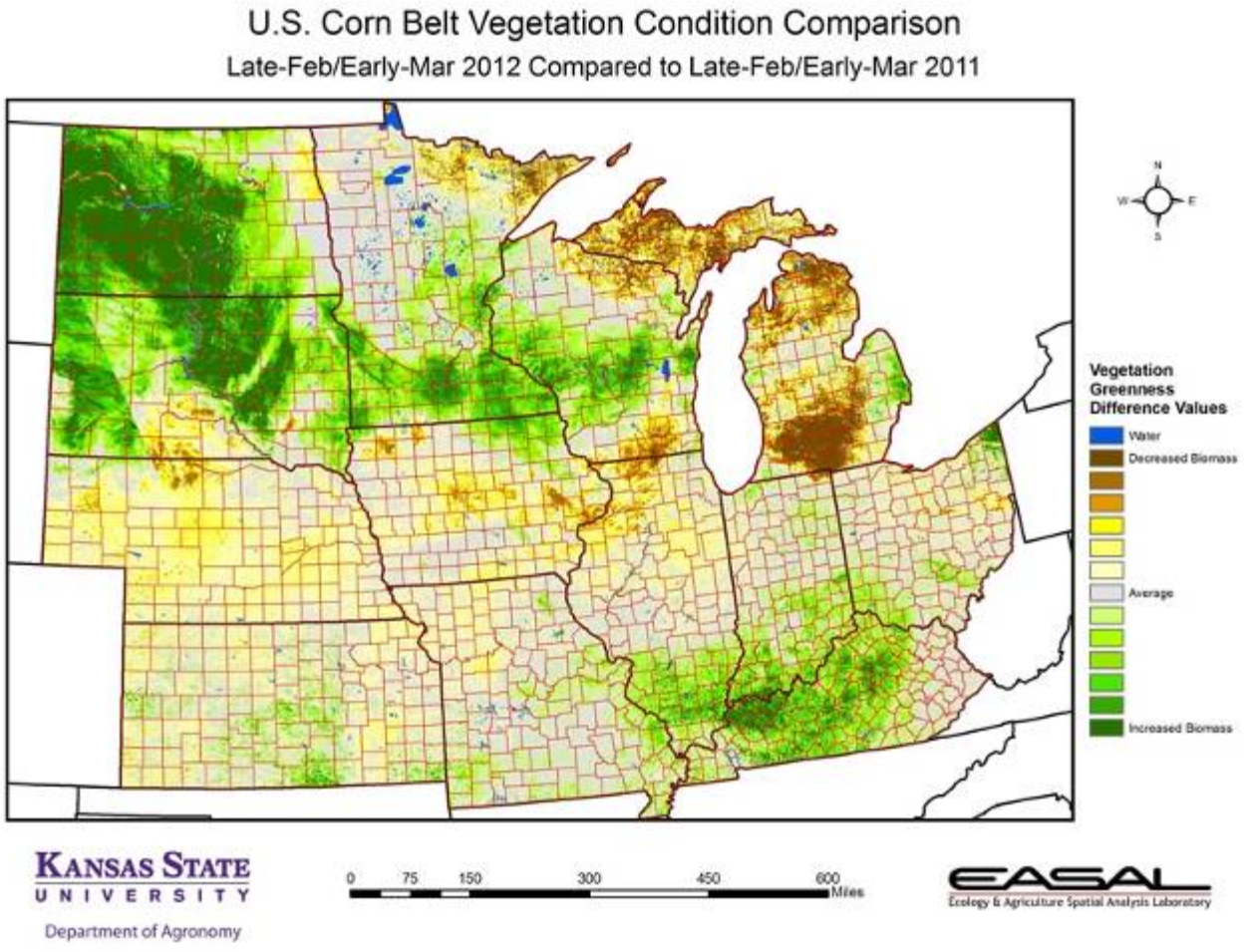
Map 2. Compared to the previous year at this time for Kansas, the current Vegetation Condition Report for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows a few areas that are ahead of last year in terms of NDVI values. In south central Kansas, this is due to the more favorable moisture situation. In Southeastern Kansas, this year has seen milder temperature and less snow cover. This has resulted in increased photosynthetic activity in the region.



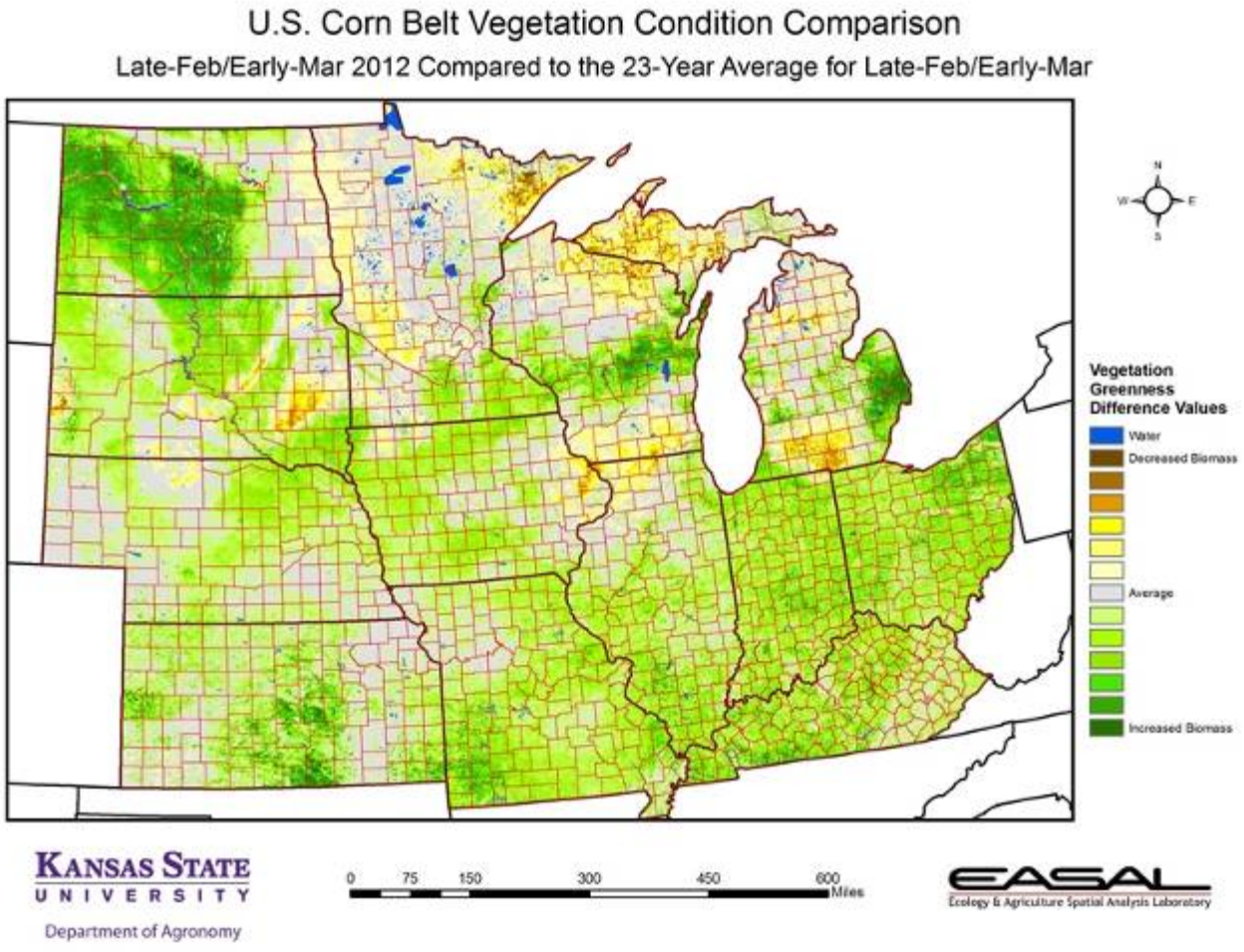
Map 3. Compared to the 23-year average at this time for Kansas, this year's Vegetation Condition Report for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that most of the state is above average in biomass production. In southwest Kansas, the low moisture is delaying progress. The greatest increase in biomass production is visible in the Central and South Central Divisions. Milder temperatures have prevailed, and resulted in greater biomass productivity.



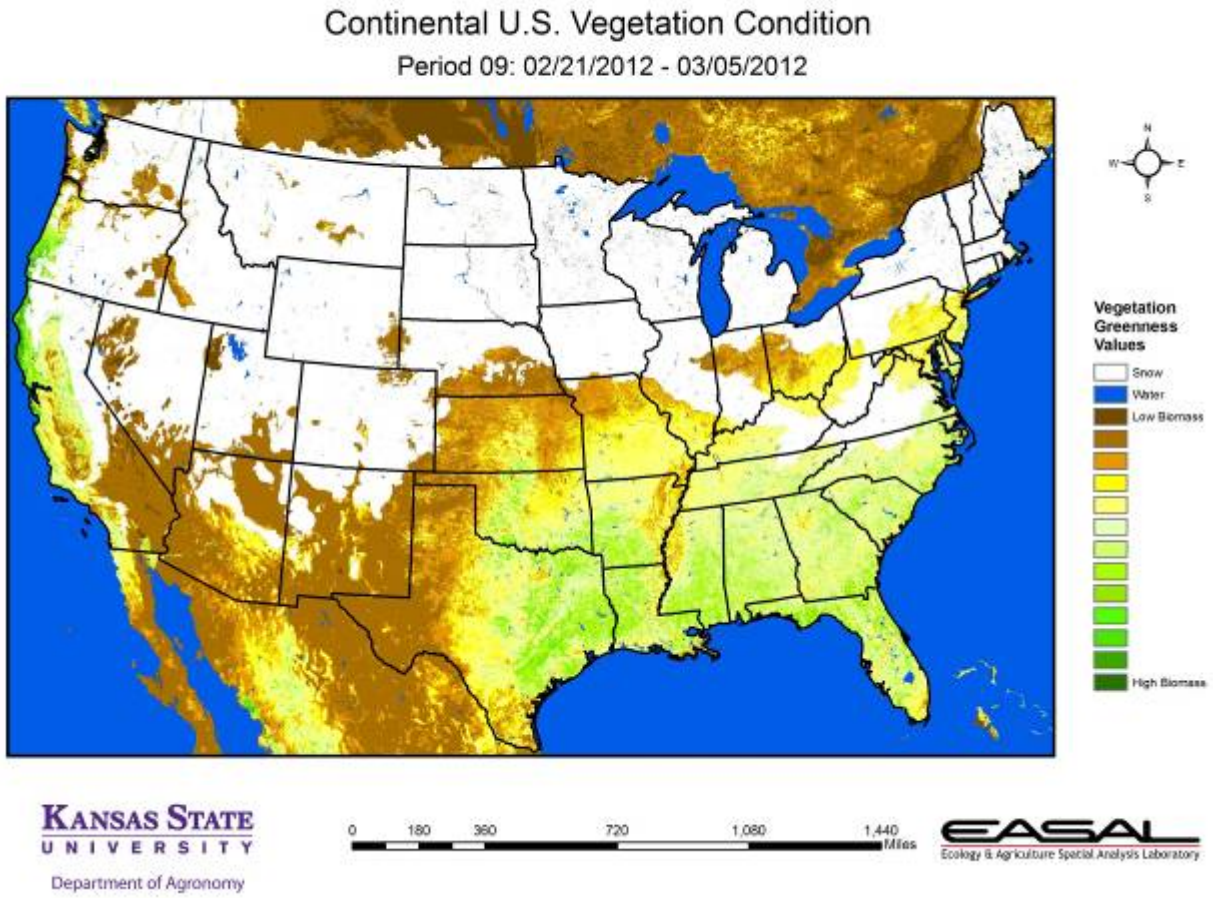
Map 4. The Vegetation Condition Report for the Corn Belt for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snows dominated the northern reaches of the Corn Belt during this period. Most of the remainder of the region continues to show low NDVI values.



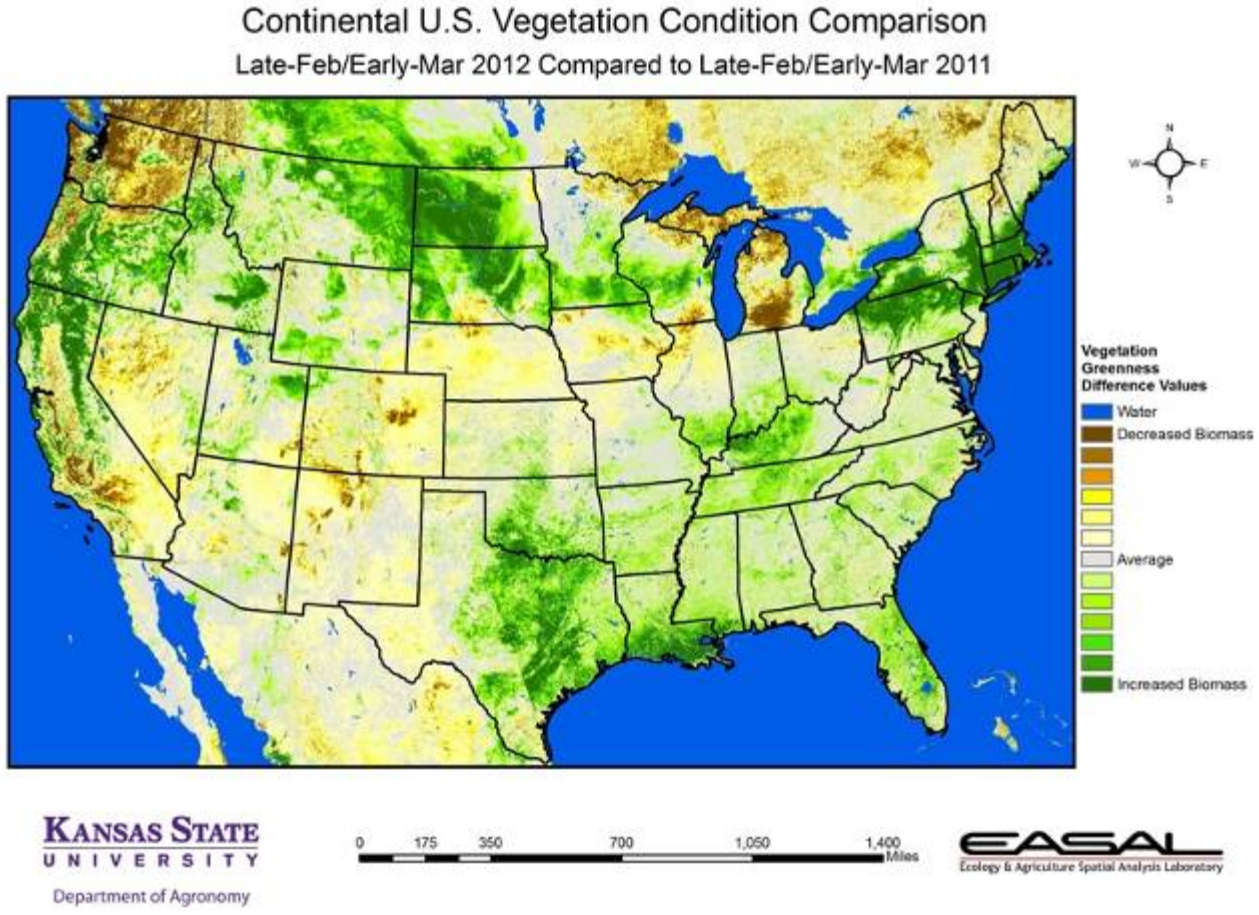
Map 5. The comparison to last year in the Corn Belt for the period February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the difference in the snow effects. The Dakotas and Southern Indiana and Illinois had high snow levels last year, resulting in comparatively greater NDVI values this year. Much of Michigan has seen more snow this season, suppressing photosynthetic activity.



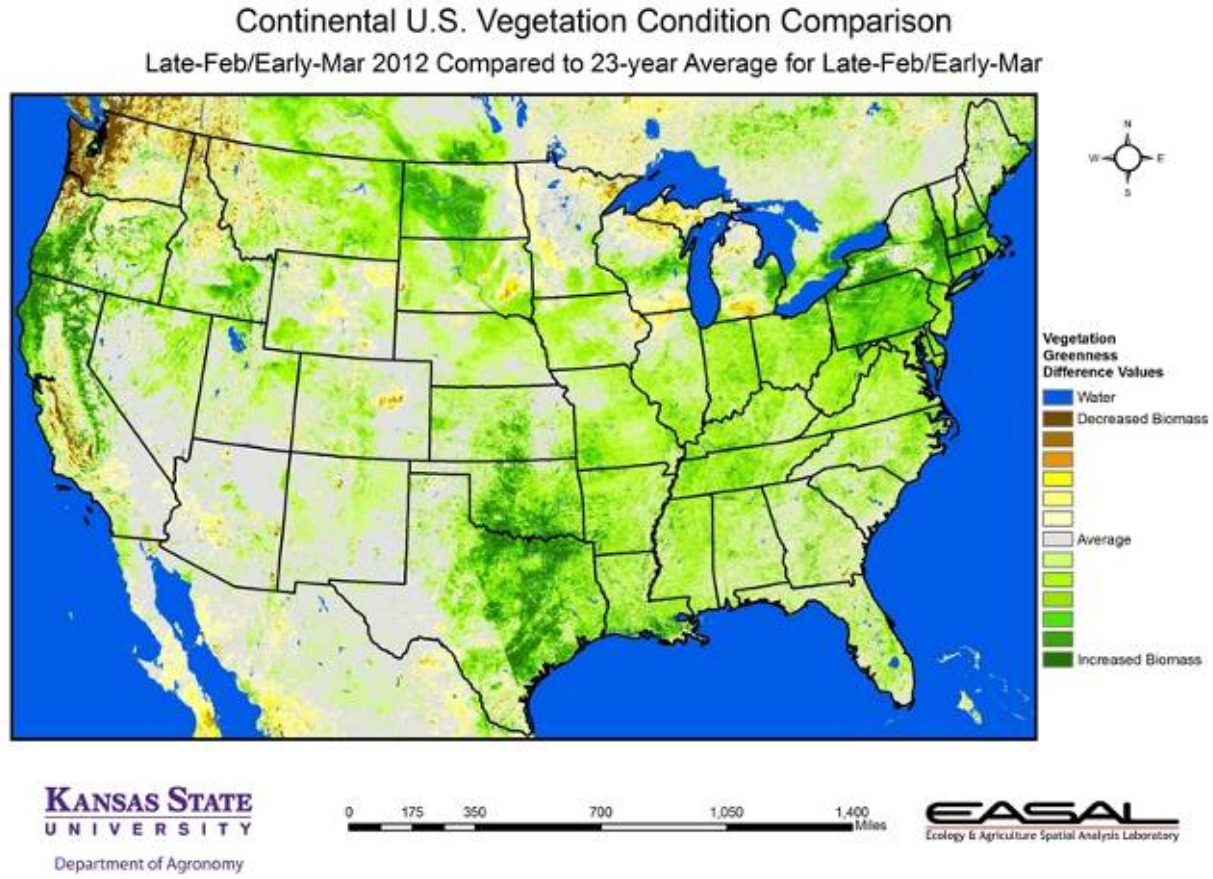
Map 6. Compared to the 23-year average at this time for the Corn Belt, this year's Vegetation Condition Report for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows the generally mild winter has favored higher NDVI values across much of the region. Across the southern portions of the region, vegetation has begun to break dormancy. In North Dakota, the higher NDVI values are due mainly to less snow cover than average.



Map 7. The Vegetation Condition Report for the U.S. for February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that snow continued to make its presence known. On March 5th, 30 percent of the nation had snow on the ground. Last month the snow cover extent was only 27 percent.



Map 8. The U.S. comparison to last year at this time for the period February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that Oklahoma and east Texas are benefiting from the winter moisture with high biomass productivity. Across the northern areas of the country the greater NDVI values continue to be due to lack of snow cover. As noted in the previous map, 30 percent of the nation had snow on the ground. Last year during this period, snow cover was at 50 percent.



Map 9. The U.S. comparison to the 23-year average for the period February 21 – March 5 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that increased photosynthetic activity has begun in Oklahoma and Texas. In the South, from Mississippi to South Carolina, this activity is suppressed somewhat by drought. Lowest NDVI values in the region are centered around Georgia, where the latest Drought Monitor has conditions in extreme to exceptional drought.

Note to readers: The maps above represent a subset of the maps available from the EASAL group. If you'd like digital copies of the entire map series please contact us at kpprice@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.

-- Mary Knapp, State Climatologist
mknapp@ksu.edu

-- Kevin Price, Agronomy and Geography,
Remote Sensing, Natural Resources, GIS
kpprice@ksu.edu

-- Nan An, Graduate Research Assistant,
Ecology & Agriculture Spatial Analysis Laboratory (EASAL)
nanan@ksu.edu

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, or
Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader
785-532-0397 jshroyer@ksu.edu