

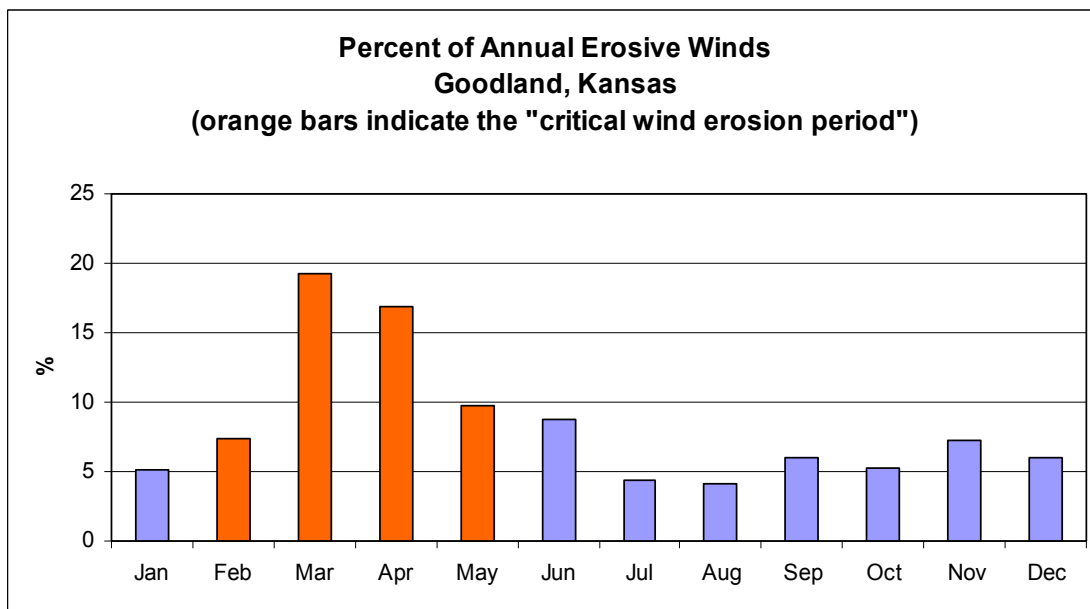


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1. Measures to reduce wind erosion when wheat stands are thin

Some wheat stands, especially in parts of western Kansas, are thin or poorly developed this year due to dry conditions. This increases the potential for wind erosion during the winter and early spring months, when wind erosion rates are often at their highest.



Source: John Tatarko, USDA-ARS Wind Erosion Research Unit, Manhattan, Kansas

When vegetation is insufficient, ridges and large soil clods (or aggregates) are frequently the only means of controlling erosion on large areas. Roughening the land surface with ridges and clods reduces the wind velocity and traps drifting soils. A cloddy soil surface will absorb more wind energy than a flat, smooth surface. Better yet, a soil surface that is both ridged and cloddy

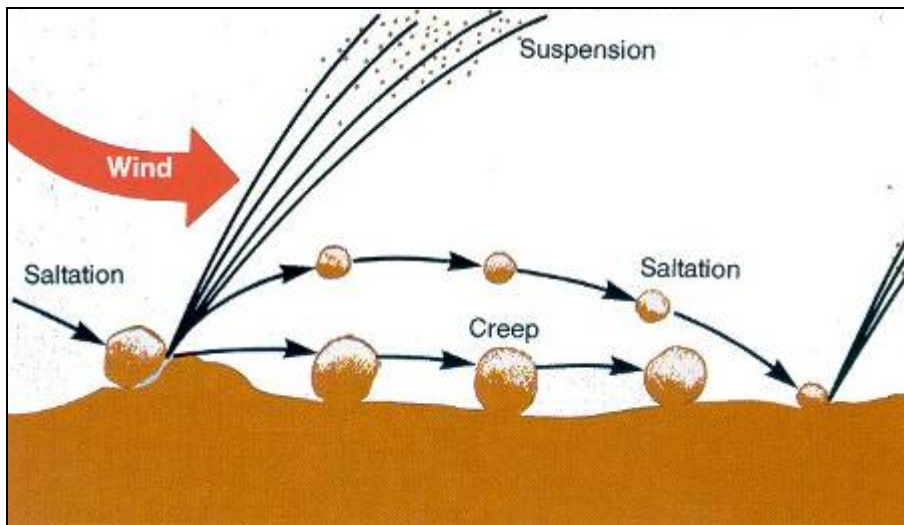
will absorb even more wind energy and be even more effective in reducing the potential for wind erosion.

Soil crusts and frozen ground also can increase resistance of the surface soil to wind forces, but this effect is only temporary and should not be relied on for erosion control.

**Crosswind ridges** are formed by tilling or planting across the prevailing wind erosion direction. If erosive winds show no seasonal or annual prevailing direction, this practice has limited protective value. In Kansas, the prevailing winds in the winter are from the north, and in early spring the prevailing winds are from the south. Crosswind ridges at this time of year, therefore, should be in an east-west direction to protect from both northerly and southerly winds.

Month	Prevailing Wind Erosion Direction, Goodland
January	NNW
February	NNW
March	NNW
April	NNW
May	SSE
June	S
July	SSE
August	SSE
September	S
October	NNW
November	NNW

Tillage implements can form ridges and depressions that alter wind velocity. The depressions also trap saltating soil particles and stop avalanching of eroding material downwind.



However, soil ridges protrude higher into the turbulent wind layer and are subject to greater wind forces. Therefore, it is important that cloddiness on top on the ridge is sufficient to withstand the

added wind force, otherwise they will quickly erode, and the beneficial effects will be lost. Ridging sandy soils, for example, is of little value because the ridges of sand are erodible and soon leveled by the wind.



**Emergency tillage was used to help prevent wind erosion on this field of thin wheat in Hamilton Co. in 2008. Photo by Jim Shroyer, K-State Research and Extension.**

**Clod-forming tillage** produces aggregates or clods that are large enough to resist the wind force and trap smaller moving particles. They are also stable enough to resist breakdown by abrasion throughout the wind erosion season.

If clods are large and stable enough, as smaller particles are removed or trapped, the surface becomes stable or “armored” against erosive action. The duration of protection depends on the resistance of the clods to abrasion or changes in the wind direction.

Of the factors that affect the size and stability of soil aggregates, most notable is soil texture. Sandy or coarse-textured soils lack sufficient amounts of silt and clay to bind particles together to form aggregates. Such soils form a single-grain structure or weakly cemented clods, a condition that is quite susceptible to erosion by wind. Loams, silt loams, and clay loams tend to consolidate and form stable aggregates that are more resistant to erosive winds. Clays and silty clays are subject to fine granulation and more subject to erosion.

Many other factors also affect aggregate consolidation and stability — climate, including moisture; compaction; organic matter; lime; microorganism activity; and other cementing materials.

Any process that reduces soil consolidation also increases erodibility. The persistence of aggregates is greatly affected by the climatic process of wetting and drying, freezing and thawing, or freeze-drying, which generally disintegrates clods and increases erodibility.

Mechanical action, such as tillage, animal or machine traffic, and abrasion by saltating soil particles also can affect cloddiness. Tillage may either increase or decrease clods at the surface, depending on the soil condition in the tilled layer and the type and speed of the implement. Repeated tillage usually pulverizes and smooths dry soils and increases their erodibility,

especially if done with implements that have an intensive mechanical action, such as tandem disks, offset disks, or harrows.

Soil water at the time of tillage also has a decided effect on cloddiness. Research has found that different soils have differing water contents at which soil pulverization is most severe. If the soil is extremely dry or extremely moist, smaller clods are produced than at intermediate water contents.

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## 2. Estimating crop residue cover

Where wheat has been planted no-till into fields with sufficient levels of crop residue, this residue will reduce wind erosion during the winter and early spring.

How much residue is enough? Do you know how to estimate it? For producers, it is very important to know how to measure crop residues, as this provides an estimate of how well soil is protected from wind and water erosion. To meet the definition of conservation tillage (including no-till, strip-till, ridge-till and mulch-till), at least 30% of the soil surface must be covered with residue after planting.

There are three main methods used to estimate residue, but the most reliable is the line-transect approach. For this method, use either a 100' tape measure or a rope with 100 knots tied at 1' intervals. Stretch the tape or rope at a 45-degree angle to the row direction, walk along the tape, and count the number of times a piece of residue at least 1/8" in diameter occurs under each foot mark or knot.



**Tape measure used for the line-transect method. Place tape measure at a 45-degree angle to the rows. Photo by DeAnn Presley, K-State Research and Extension.**

Calculate the percent coverage by dividing the number of times that residue occurred by the total number of observations (knots or feet). Note that you could also use a 50' rope with knots at 6" intervals, or a 50' tape and measure every 6". The important thing is to make 100 observations at each site, and repeat this process at five sites per field in order to determine the field average.

The yardstick method is another approach for measuring residue levels in the field. Throw a yardstick, and measure the amount of residue under one side of the yardstick. If 18 inches of the yardstick has residue beneath it, the residue level is 50 percent for that observation method. Just make sure you are randomly sampling! It is best to avoid end-rows in any of the methods for residue estimation.

You can also compare your fields to photos that contain a known percentage of crop residue. The following K-State Research and Extension publications are available with photos:

Soybean and sunflower residue: <http://www.ksre.ksu.edu/library/crps12/L783.pdf>

Grain sorghum residue: <http://www.ksre.ksu.edu/library/crps12/L782.pdf>

Corn residue: <http://www.ksre.ksu.edu/library/crps12/L784.pdf>

Wheat residue: <http://www.ksre.ksu.edu/library/crps12/L781.pdf>

If you estimate residue in the winter, how much will be left in the spring? One estimate is that approximately 10 percent of the residue will blow away or decompose over winter, but residue decomposition varies depending on temperature and moisture (i.e., residue decomposes more

quickly in warm, moist climates). If you graze crop residues, some studies suggest that cattle will remove approximately 25% of the material, but that also depends on the location of waterers, mineral tubs, etc., and how long the cattle remain on a particular field.

The critical period for wind erosion in Kansas is November through spring until new vegetation is established.



**A newly-planted, very low-residue wheat field in central Kansas. Photo by Kraig Roozeboom, K-State Research and Extension.**



**A no-till wheat field with excellent residue cover in central Kansas, taken at the same time as the other images. This field was not generating dust. Photo by Kraig Roozeboom, K-State Research and Extension.**

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### 3. Topdressing wheat decisions for winter and early spring

Producers in most areas of Kansas topdress their wheat with nitrogen (N), and possibly a broadleaf residual herbicide, during the winter or early spring. As always, it is important for producers to properly plan their N fertilization programs in order to make sure they get the highest possible net return. The four main factors involved in this are timing, source, application method, and rate.

\* Timing. The most important factor in getting a good return on topdress N is usually timing. It is critical to get the N on early enough to have the maximum potential impact on yield. While some producers often wait until spring just prior to jointing, this can be too late in some years. For well-drained medium-fine textured soils that dominate our wheat acres, the odds of losing

much of the N that is topdress applied in the fall or winter is low since we typically don't get enough precipitation over the winter to cause significant denitrification or leaching. For these soils, topdressing can begin anytime now, and usually the earlier the better.

For wheat grown on sandier soils, earlier is not necessarily better for N applications. On these soils, there is a greater chance that N applied in the fall or early winter could leach completely out of the root zone if precipitation is unusually heavy during the winter. Waiting until closer to spring green-up to make topdress N applications on sandier soils will help manage this risk.

On poorly drained and/or shallow clay pan soils, N applied in the fall or early winter would have a significant risk of denitrification N loss. Waiting until closer to spring green-up to make topdress N applications on these soils will help minimize the potential for this N loss.

On all soils, nitrogen should be applied early enough that it has time to move down into the root zone of the wheat before jointing begins. Surface-applied nitrogen moves into the soil with rain and/or snow, and that can be unpredictable in many regions of Kansas. Therefore, particularly in drier regions the best strategy on most soils is to apply the N as early as possible to have the best chance of getting a rain that will move the N into the root zone. Another reason to apply N as early as possible on most soils is that wet and muddy fields may make timely topdress applications impossible if the applications are delayed too late in the growing season.

As temperatures warm in the early spring, there is a greater likelihood of getting significant leaf burn from topdress N applications. This leaf burn generally does not reduce yield prospects if applications are made before the last, uppermost leaves are developed. If the leaf burn occurs at a very late stage of growth – such as flag leaf emergence or boot stage – significant yield reductions are possible. Volatilization N loss is not an issue for topdress N applications made during cool weather in Kansas.

A final reminder about the timing of topdress applications: Nitrogen should not be applied to the soil surface when the ground is deeply frozen. This will help prevent runoff losses.

\* Application method. Most topdressing is broadcast applied. In high-residue situations, this can result in some immobilization of N, especially where liquid UAN is used. If no herbicides are applied with the N, producers can get some benefit from applying the N in a dribble band on 15-18-inch centers. This can help avoid immobilization and maybe provide for a little more consistent crop response.

\* Source. The typical sources of N used for topdressing wheat are UAN solution and dry urea. Numerous trials by K-State over the years have shown that both are equally effective. In no-till situations, there may be some slight advantage to applying dry urea since it falls to the soil surface and may be less affected by immobilization than broadcast liquid UAN, which tends to get hung up on surface residues. Dribble (surface band) UAN applications would avoid much of this tie-up on surface crop residues as well. But if producers plan to tank-mix with a herbicide, they'll have to use liquid UAN and broadcast it.

\* Rate. Producers should start the season with a certain N recommendation in hand, ideally based on a profile N soil test done before the crop is planted and before any N has been applied. It is not uncommon for many producers to just use the same N rate year after year. This may result in too much N being applied some years, and too little in others. Where conditions have been dry



and recent crop yields have been low, there could well be some very high levels of residual N remaining in the soil, and easily within the root zone of wheat. In those cases, a topdress N application may not increase yields at all. The only way to know for sure is to have a profile N test done. However, if some N has already been applied to the wheat crop, it is too late to use the profile N soil test since it is not reliable in measuring recently applied N.

The K-State wheat N guidelines suggest that all potential soil N contributions (soil organic matter (SOM), residual soil profile N (ProfN), manure-N (ManN), etc.) be subtracted from the total N requirement. For no-till systems, 20 lbs N per acre is added to the recommendation. And another 30 lbs N per acre is added if sunflowers or grain sorghum immediately preceded the wheat crop. Below is the suggested N guideline equation:

$$\text{N Rec} = (2.4 \times \text{Expected Yield}) - (10 \times \% \text{SOM}) - (\text{ProfN}) - (\text{Man-N}) + \text{Adjustments}$$

Additionally, if the wheat will be grazed this fall and winter, producers should add an additional 30-40 lbs N/acre for every 100 lbs of beef weight gain removed from the field. For heavy grazing, it may be necessary to apply some N preplant or as an early topdress, then make an additional N application to compensate for N removed by grazing.

One common question is whether topdress N rates should be cut back, or eliminated entirely, if the wheat looks like it will have below-average yield potential. In general, the answer is to not be too pessimistic at this point and cut N applications too much. If environmental conditions are more favorable in winter and spring, the N that is topdressed will be needed for this wheat to reach its yield potential.

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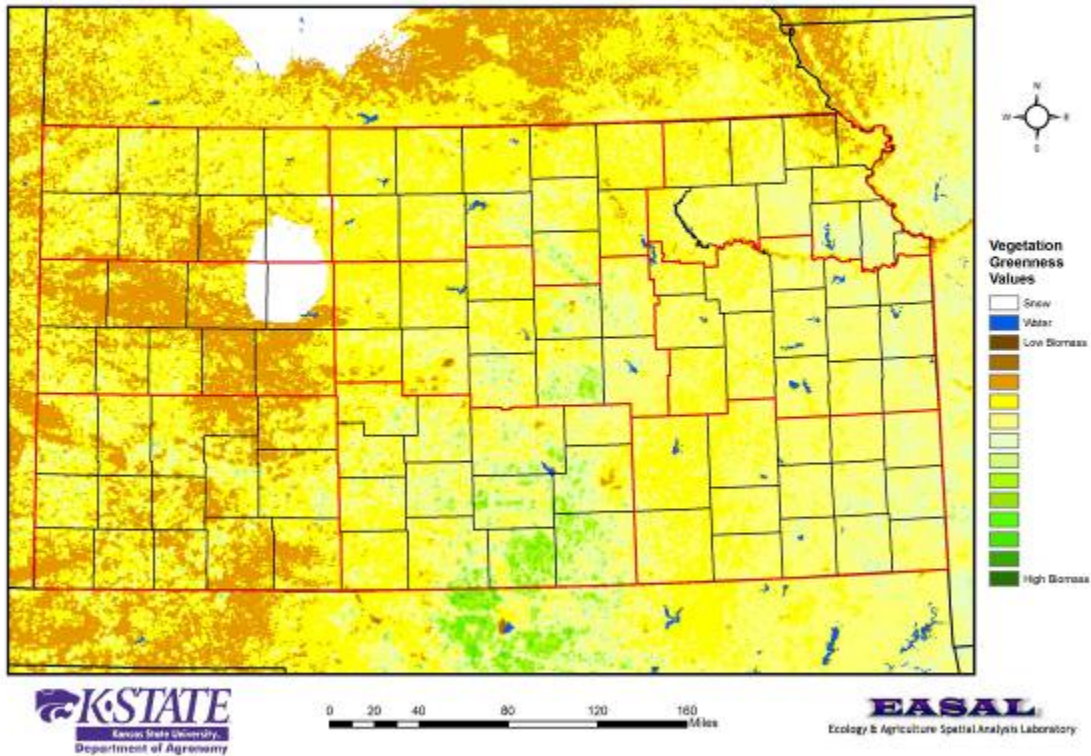
#### 4. Comparative Vegetation Condition Report: November 23 – December 6

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.

The maps below show the current vegetation conditions in Kansas, the Corn Belt, and the continental U.S:

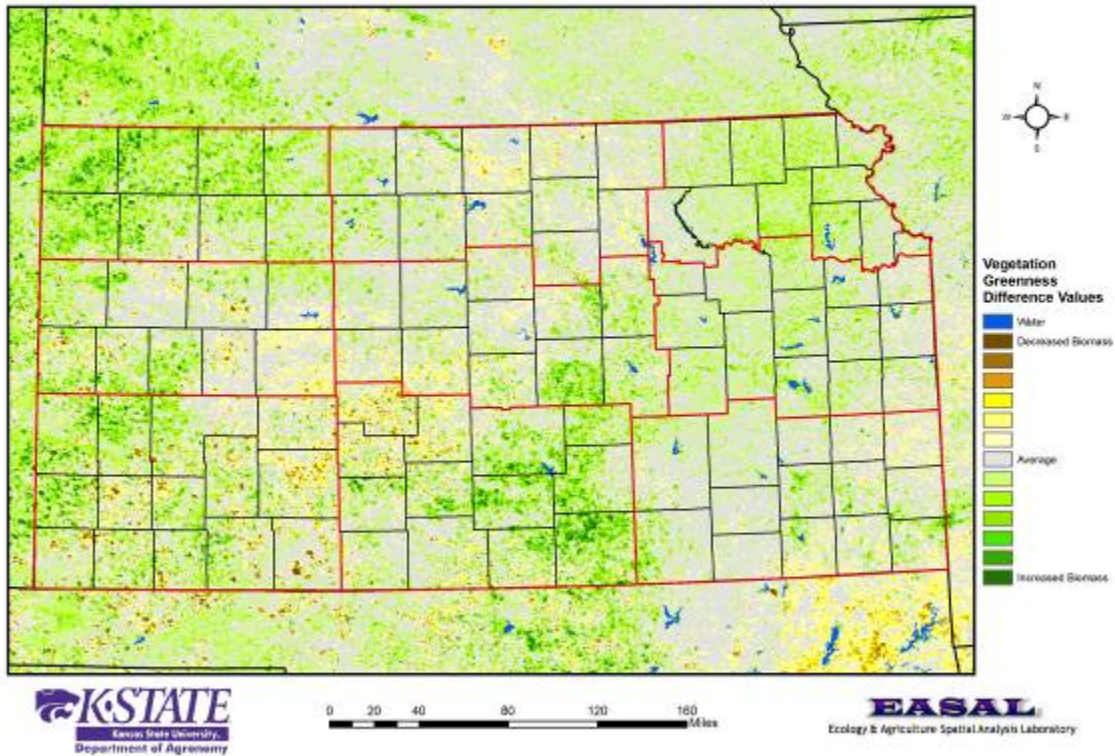
## Kansas Vegetation Condition

Period 49: 11/23/2010 - 12/06/2010



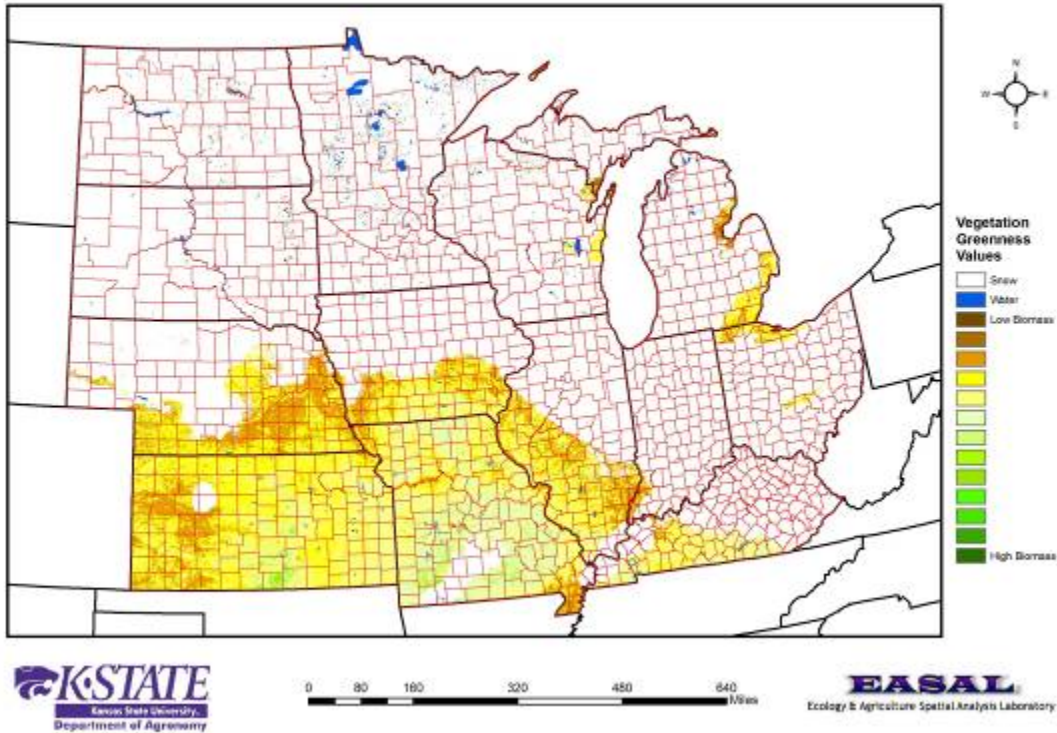
**Map 1. The Vegetation Condition Report for Kansas for November 23 – December 6, from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that conditions haven’t changed much from the last report. The area of white in the eastern areas of northwest Kansas is due to cloud cover rather than snow.**

Kansas Vegetation Condition Comparison  
Early-December 2010 compared to the Early-December 2009



**Map 2. Compared to last year at this time, this year's Vegetation Condition Report for November 23 – December 6, from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows much of the state as greener than last year. This is a result of the slower onset of dormancy this year. This time last year, there was snow cover along the northern areas of the state, and much of the winter wheat in south central Kansas had not been planted due to excessive moisture.**

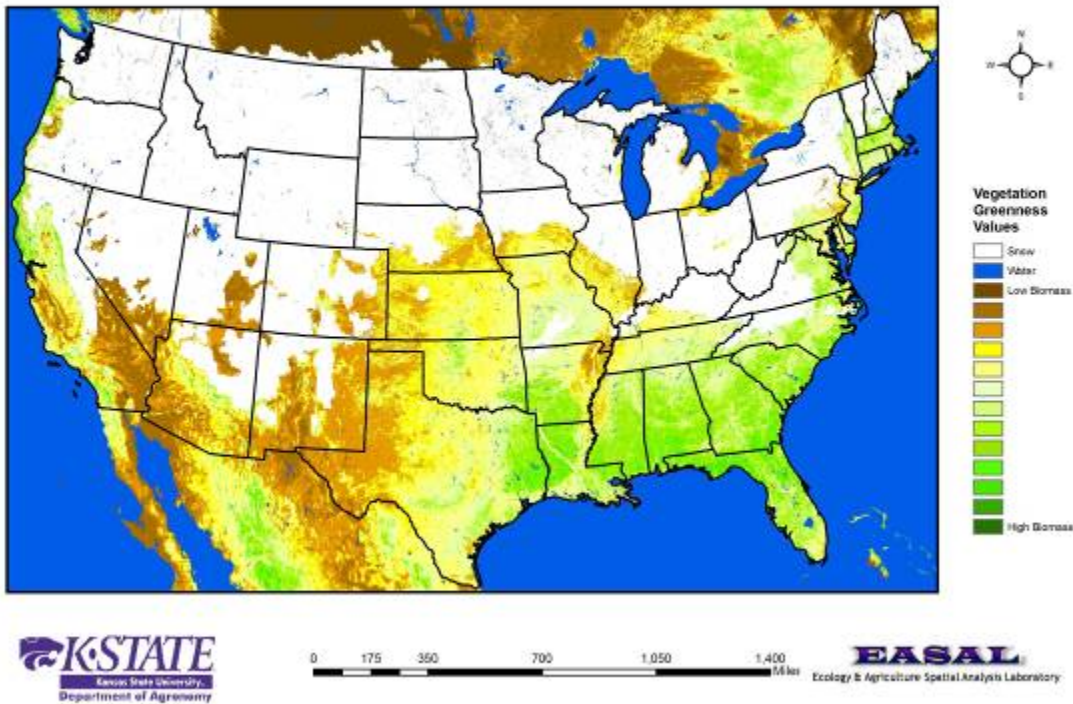
U.S. Corn Belt Vegetation Condition  
Period 49: 11/23/2010 - 12/06/2010



**Map 3. The Vegetation Condition Report for the Corn Belt for November 23 – December 6, from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows that vegetation in areas of the Corn Belt that are not snow-covered is largely dormant. The exceptions are in parts of south central Kansas and southern Missouri. Cold weather over the next week will reduce the photosynthetically active biomass in these regions as well.**

## Conterminous U.S. Vegetation Condition

Period 49: 11/23/2010 - 12/06/2010



**Map 4. The Vegetation Condition Report for the U.S. for November 23 – December 6, from K-State’s Ecology and Agriculture Spatial Analysis Laboratory shows the extent of snow from the Thanksgiving weekend storms. Photosynthetically active biomass production is confined for the most part to the southeastern, and coastal areas of the U.S. Drought areas along the middle Mississippi River basin continue to be visible, particularly in areas of northeastern Arkansas.**

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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), or Jim Shroyer, Research and Extension Crop Production Specialist and State Extension Agronomy Leader 785-532-0397 [jshroyer@ksu.edu](mailto:jshroyer@ksu.edu)