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1. Options for distressed wheat

Many fields of wheat in western Kansas are not in very good condition at the moment, primarily due to ongoing drought conditions. Some of the wheat did not emerge last fall. Of the wheat that did emerge, some has had below-average growth and development. The extreme cold this week, combined with a lack of snow cover in most of western Kansas, will not help matters.

Some producers have ripped their wheat fields to prevent blowing, and many more may be wondering whether they should be planning to abandon the fields as failed wheat and move on to a spring-planted crop. Crop insurance considerations must be taken into account when planning any such actions, of course. But what about the purely agronomic considerations?

At this time, it is too early to give up on any field of wheat, even wheat that has not yet emerged, unless you know for sure that the wheat has died. To find out if emerged wheat is still alive, simply dig up a good representative sample of plants (including roots) and bring them indoors. Live plants will begin to green up after about a week, provided they have been given some water. To find out if unemerged wheat seed is still alive, dig up some seed and see if it is still firm. If the coleoptile has begun to grow but not yet emerged, the plant may or may not still be viable. If the seed has not germinated, or only slightly cracked the seed coat, it is probably still alive. As with the plants, the only way to know for sure is to bring some of the seeds inside and see if they will come up.

If the wheat is alive but poorly developed, or if stands are thin, the difficult decisions lie ahead. For the moment, the best advice is to not give up on the wheat. With favorable conditions in the

spring, even wheat with poor growth or thin stands at this point in the season can make a remarkable comeback and yield from 40 to 60 percent of normal.

It is important that producers who normally plan on topdressing their wheat with nitrogen (N) should still plan to do so, though the final rate may need to be adjusted to reflect conditions later this spring. If weather conditions become favorable this spring, the surviving plants will need N to tiller as much as possible and form as many spikelets per head as possible.

It is going to be especially important that fields planted last fall with little or no N applied preplant or at seeding have some additional N applied before green-up to stimulate potential tillering and spring growth. It may be prudent to consider a split topdress program in those fields. Apply some, 30 to 40 lbs of N, soon. Then if conditions do improve, a second application may be warranted to meet the demand from improved yield prospects. Where 20-30 pounds or more of N was applied last fall, producers can wait as long as possible (up to shortly before jointing) to evaluate stands and stand conditions before topdressing. If conditions do not improve with time and the wheat fails, most or all of the topdress N should still be available for a spring-planted crop.

Herbicide decisions on questionable wheat stands can be difficult. Thin, late wheat is not competitive with weeds, so weed control is important to minimize yield loss and harvest problems. On the other hand, using a long-residual herbicide might interfere with alternative crops planted on failed wheat acres. Use of residual herbicides should give the best weed control in thin wheat and might be the best choice where you are committed to harvesting the crop. If unsure about the crop, herbicide applications can be delayed until the status of the wheat crop is determined, or short-residual herbicides can be used. The use of MCPA (between 2-leaf and boot stage), dicamba (prior to jointing), the Affinity products, Express, or Harmony Extra (between 2-leaf and flag leaf emergence) will allow more recropping options. Also, 2,4-D can be applied between full-tiller and boot stage. But be especially careful not to apply 2,4-D too early on thin stands because it will stop tillering, and you want as much tillering as possible in this situation.

Additional information on herbicide options, crop rotation restrictions, and application guidelines can be found in K-State Report of Progress 994 “2011 Chemical Weed Control for Field Crops, Pastures, Rangeland, and Noncropland”: http://www.ksre.ksu.edu/library/crpsl2/srp1045.pdf

Be sure to read all product labels for growth stage application timing and rotational crop restrictions.

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2. Kansas Flint Hills Smoke Management Plan: How weather patterns affect smoke

The following is a slightly edited transcript of the second in a series of K-State's Agriculture Today radio broadcasts on the Kansas Flint Hills Smoke Management Plan. This is an interview with Kris Craven, meteorologist and fire/weather program leader with the National Weather Service in Topeka, conducted by Eric Atkinson of the K-State Radio Network. Podcasts of all Agriculture Today interviews can be found at: http://www.ksre.ksu.edu/news/DesktopDefault.aspx?tabid=66

Q: Grassland managers have to pay attention to the weather when they conduct their spring burning, correct?

A: As rangeland owners prepare to burn off their land, they look for fairly specific parameters to get the best burn conditions. Two big factors that are good to look at are wind and relative humidity. You don't want it to be too windy so that the fire gets away from you. And you don't want it to be not windy enough so that you don't have enough wind to push the fire. So a lot of times landowners are looking for a range of wind speeds between 5 and 15 miles per hour. Sometimes individual counties will set a maximum limit on wind speed for burning. A lot of counties won't let people burn when the wind speed gets over 20 miles per hour.

Wind speed works in combination with relative humidity. Grasses are very thin, and respond rapidly to changes in relative humidity, especially when conditions dry out in the afternoon during the spring and summer. Most people recommend that landowners burn in the range of 40 to 70 percent relative humidity. Anything below 30 percent and it gets a little dangerous because those fields start to get dry and they will burn fairly quickly. It gets a little difficult to burn at the higher range of relative humidities – 60 to 70 percent. It will take longer to burn under those conditions.

You want to look not only at conditions for the day you burn, but at conditions for the overnight hours and for the next day. Let's say you go out in the morning and you have the right conditions to burn. You get it burned off and you think you're done. But maybe you've left some stumps or paddies smoldering and the next day you get 40 mile-per-hour winds. Then you run the risk of reigniting that fire and having it move onto someone else's property.

Q: There are often limited opportunities to meet all of the ideal conditions for conducting a prescribed burn. That's why in many cases you'll see prescribed burning concentrated in a short time span.

A: Absolutely. It difficult in some instances to get those ideal conditions where it is both a little breezy and dry. But also, you want to burn at different times of the year for different purposes. For example, you might burn in February if you're trying to kill cedar trees. But the prime time of the year for pastureland burning to increase forage production for cattle or to decrease weed and invasive species populations, is in April. So there's a rush to get Flint Hills grasslands burned in the April timeframe.

Q: When it comes to how the smoke from pasture burning behaves, the weather and wind clearly have an effect. Are there other factors, too?

A: Surface winds are what we normally encounter since that's where we live. But as the smoke rises into the atmosphere, we calculate a parameter called mixing time. This is a fancy word for stating how high the atmosphere mixes in the middle of an afternoon. Let's say you mix to 3,000 feet. So you light your fire and get the burn going, and the smoke wafts up into the atmosphere and gets to 3,000 feet. Maybe there's a 15 mph wind to carry that smoke downstream. That's just what's happening today. That's a snapshot in time. The next day, let's say a front comes through and the wind direction changes. So now that smoke concentration which was moving toward Kansas City may now get shoved back toward Wichita. The problem is that the atmosphere is not a static condition; it is very dynamic. It is always changing, and predicting exactly how those smoke plumes will move is one of the challenges of smoke management.

Q: When there is a cloud ceiling overhead, that can clearly make a difference in how the smoke behaves, correct?

A: Absolutely. A lot of people recommend a minimum cloud ceiling of about 2,000 feet for pasture burning. And most will recommend you don't burn when there is complete cloud cover. About 70 percent or less cloud cover is what you're looking for. Clouds will act like a lid and keep the smoke down low. That may impact not only places that seem far away like Kansas City and Wichita, but that can also impact your local area as well.

Q: When you look at the smoke management plan from a meteorological standpoint, how do you view it in dealing with these smoke issues?

A: Everybody wants the plan to work. Burning is so beneficial in so many ways, there needs to be a burning plan in place so that we can get the burning done. At the same time, burning can have a pretty tremendous impact on human populations. So finding that balance without changing things too dramatically is really important.

Q: For those who conduct prescribed pasture burning, it is worth bringing up that the National Weather Service offers myriad information sources on its web site that can help in making these decisions on wind speed, direction, humidity, and so forth.

A: Yes. On our web site, which is www.weather.gov/topeka, we have a fire/weather tab. On that tab is a map you can click on and get a fire/weather forecast. We've trained our group to write a forecast specifically aimed at people who are burning. And we have our forecasters write a short discussion about how weather patterns will impact burning and fire behavior over the next couple of days. We've got tools that allow you to see hourly graphs on how the temperatures and winds will behave, and how the mixing zone will change throughout the day and the night. In terms of the smoke management plan, the main idea is that if we can just get people to spread out their burning a little more and get the concentrations down, then if our weather patterns in April aren't quite so great for burning, we won't find ourselves in a situation where everyone is trying to burn all at the same time.

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3. No-till and crop rotation research at Tribune

Determining the full effect of different tillage systems and crop rotations on yields is a long-term process. It can take many years for soils to adjust to new tillage systems. And the response of crops under different tillage systems to varying environments can only be determined by testing the systems year after year in the same location.

At the Southwest Research-Extension Center at Tribune station, we have been conducting research on tillage intensity in a wheat/sorghum/fallow system since 1991. The three tillage intensities in this study are:

* Conventional tillage. Tillage is performed as needed to control weeds during the fallow period. On average, this resulted in four to five tillage operations per year, usually with a blade plow or field cultivator.
* Reduced tillage. Beginning in 2001, this system uses no-till from wheat harvest through sorghum planting (short-term no-till) and conventional tillage from sorghum harvest through wheat planting.
* No-till. This system uses herbicides exclusively to control weeds during the fallow period.

All tillage systems used herbicides to control weeds in-crop.

In addition to examining this single three-year rotation under three tillage intensities, three four-year rotations were examined under a single tillage system – no-till. Those rotations were:
* Wheat/wheat/sorghum/fallow
*Wheat/sorghum/sorghum/fallow
* Continuous wheat

Wheat/Sorghum/Fallow: Different Tillage Intensities

Grain yields of both wheat and grain sorghum increased with decreased tillage intensity in this rotation.

Wheat. Wheat yields were very low during 5 of these 10 years due to drought conditions. Averaged over the past 10 years, no-till wheat yields were 6 bu/acre higher than under reduced-tillage, and 9 bu/acre higher than under conventional tillage. Wheat yields in the reduced tillage system were 3 bu/acre higher than in conventional tillage, even though both systems had tillage prior to wheat.

One of the issues with no-till wheat is getting a good stand when conditions are dry. I wish I had some good tips on how to always get good wheat stands with no-till. That is a big problem with the system some years. If rain does not come in late August or September, then no-till wheat stands can be poor. This does not always occur, but it did happen a couple of years ago and again this year. I believe this has caused producers in western Kansas to quit no-till wheat. But I don't have an answer.

Wheat Response to Tillage in a Wheat/Sorghum/Fallow Rotation: Tribune, 2001-2010			
	Conventional-till	Reduced-till	No-till
Year	Yield (bu/acre)		
2001	17	40	31
2001	0	0	0
2003	22	15	30
2004	1	2	4
2005	32	32	39
2006	0	2	16
2007	26	36	51
2008	21	19	9
2009	8	10	22
2010	29	35	50
Average	**16**	**19**	**25**

Grain sorghum. During that same period of time, grain sorghum yields under long-term no-till have been twice as high as under reduced tillage (short-term no-till). The yield benefit from reduced tillage was greater for grain sorghum than wheat. Grain sorghum yields under reduced tillage were 10 bu/acre more than conventional tillage. For sorghum, both the reduced-till and no-till systems used herbicides exclusively for weed control during the period between wheat harvest and sorghum planting, so the difference in yield can be contributed to short-term compared with long-term no-till. This consistent yield benefit with the long-term vs. short-term no-till has been observed since the reduced-till system was changed in 2001.

Sorghum Response to Tillage in a Wheat/Sorghum/Fallow Rotation: Tribune, 2001-2010			
	Conventional-till	Reduced-till	No-till
Year	Yield (bu/acre)		
2001	6	43	64
2001	0	0	0
2003	7	7	37
2004	44	67	118
2005	28	38	61
2006	4	3	29
2007	26	43	62
2008	16	25	40
2009	19	5	72
2010	10	26	84
Average	**16**	**26**	**57**

No-till: Different Four-Year Crop Rotations

In the test of different four-year crop rotations under no-till, there are now 14 years of results.

Wheat. In the wheat/wheat/sorghum/fallow rotation, the recrop wheat (the second wheat crop) yielded about 83 percent of the first-year wheat. In most years, continuous wheat yields have been similar to recrop wheat yields. However, in several years (2003, 2007, and 2009), recrop wheat yields were considerably higher than continuous wheat yields. Generally, there has been little difference in wheat yields following either one or two sorghum crops.

Wheat Response to Different No-till Rotations: Tribune, 1997-2010				
	Crop and Rotation			
	Yield (bu/acre)			
Year	Wheat after sorghum (w/s/s/f)	First-year wheat (w/w/s/f)	Recrop wheat (w/w/s/f)	Continuous wheat
1997	57	55	48	43
1998	70	64	63	60
1999	74	80	41	43
2000	46	35	18	18
2001	22	29	27	34
2002	0	0	0	0
2003	29	27	66	30
2004	6	6	1	1
2005	45	40	41	44
2006	28	26	7	2
2007	75	61	63	41
2008	40	40	5	6
2009	37	39	50	24
2010	63	60	29	23
Average	**42**	**40**	**33**	**26**

Grain sorghum. Sorghum yields were similar whether following one or two wheat crops, which is consistent with the long-term average. The second sorghum crop in the wheat/sorghum/sorghum/fallow rotation typically average about 70 percent of the yield of the first sorghum crop.

Sorghum Response to Different No-till Rotations: Tribune, 1996-2010			
	Crop and Rotation		
	Yield (bu/acre)		
Year	First –year sorghum (w/s/s/f)	Recrop sorghum (w/s/s/f)	Sorghum after wheat (w/w/s/f)
1996	58	35	54
1997	88	45	80
1998	117	100	109
1999	99	74	90
2000	63	23	67
2001	68	66	73
2002	0	0	0
2003	60	41	76
2004	91	79	82
2005	81	69	85
2006	55	13	71
2007	101	86	101
2008	50	30	57
2009	89	44	103
2010	98	52	105
Average	**75**	**51**	**77**

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4. Three new webcasts for sorghum producers

The Plant Management Network has announced three new and fully open-access webcasts on sorghum crop management, made possible through the United Sorghum Checkoff Program. The

Plant Management Network is jointly managed by the American Society of Agronomy, American Phytopathological Society, and Crop Science Society of America.

These webcasts cover weed management practices, no-till grain sorghum production, and a comparison of corn and sorghum's profitability, particularly in stress-prone environments. A short description of each webcast is below.

"Herbicide Tolerant Sorghum, Development and Management Considerations" by Curtis Thompson, Professor of Agronomy at Kansas State University, introduces growers, consultants, and others involved in sorghum production to the new herbicide-resistant technologies for control of grass weeds post-emergence. The presentation also covers stewardship principles to preserve the technology and suggestions to optimize weed control.
www.plantmanagementnetwork.org/edcenter/seminars/sorghum/WeedControlBMPS/

"Sorghum and Corn: Crop Management in Stress-prone Environments" by Scott Staggenborg, Professor of Cropping Systems at Kansas State University, compares the profitability of corn versus sorghum production, particularly in drought-prone environments. Staggenborg used crop performance test data from Kansas and Nebraska over the course of 13 years to evaluate corn and sorghum yields in over 200 environments. Production budgets and sorghum:corn price ratios are used to determine scenarios where grain sorghum is more profitable to grow than corn.
www.plantmanagementnetwork.org/edcenter/seminars/sorghum/CornVSorghum/

"No-Till Grain Sorghum Production" by Rick Kochenower, Extension Agronomist at Oklahoma State University, helps viewers in the Southern Great Plains understand how to grow grain sorghum in a no-till system. The basics of no-till planting and fertility recommendations are discussed. Kochenower presents research that shows increased yields and test weights due to no-till. Other research presented suggests that increasing cropping intensity reduces evaporative water loss when compared to the traditional continuous wheat.
www.plantmanagementnetwork.org/edcenter/seminars/sorghum/Notill/

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5. Status of Roundup Ready alfalfa/Fall dormancy and winterhardiness ratings of alfalfa varieties

The ban on planting Roundup Ready (RR) alfalfa that was implemented in 2007 as a result of a court ruling has been lifted following publication of an Environmental Impact Assessment by USDA that authorizes the resumption of sales and planting RR alfalfa seed. Several seed companies will have Genuity Roundup Ready alfalfa seed in stock and ready for sale this spring. However, the same factors important to selecting conventional alfalfa varieties as described in last week's (No. 280) article, such as disease resistance and fall dormancy ratings, would also apply to selecting RR alfalfa varieties. Also, keep in mind that glyphosate-resistant weeds are starting to show up in some areas and exclusive reliance on glyphosate for weed control over time will favor the develop of resistant weed populations.

The article in last week's e-Update on spring planting of alfalfa mentioned that one of the factors to consider when choosing an alfalfa variety is its fall dormancy rating. It should have also mentioned that fall dormancy ratings have now been separated from winter survival/hardiness

ratings. The reason for this change is that fall dormancy and winter survival are not necessarily genetically linked. We used to think that for varieties to survive winters they had to go dormant early -- in late summer/early fall. That's not the case. So, now we see some varieties that are productive well into the fall and still able to survive the winters. These varieties just need enough time to harden, and they can survive the winters.

The Fall Dormancy (FD) scale is 1-11, with 1 being the most fall dormant and 11 the least dormant. These numbers are determined by comparing new varieties to older, standard varieties in research trials. We want to select alfalfa varieties that grow well into the fall, yet have time to harden before they go dormant. This will allow more production later in the season. We like to have varieties with FD ratings of 4-5 for Kansas, but we can stretch that a bit if the variety has good winter survival.

The next item we must consider is Winter Survival/hardiness. Winter Survival (WS) rating is on a 1-6 scale, with 1 having the best WS and 6 has the least WS. In Kansas, we generally should be looking at WS ratings of 2-3, although we might see some 4's being grown in southern areas of the state. A variety with a FD score of 5 and a WS rating of 3 would be good for much of Kansas. Also, a variety with a FD of 6 or 7 and a WS of 2 would also be good for most of the state.

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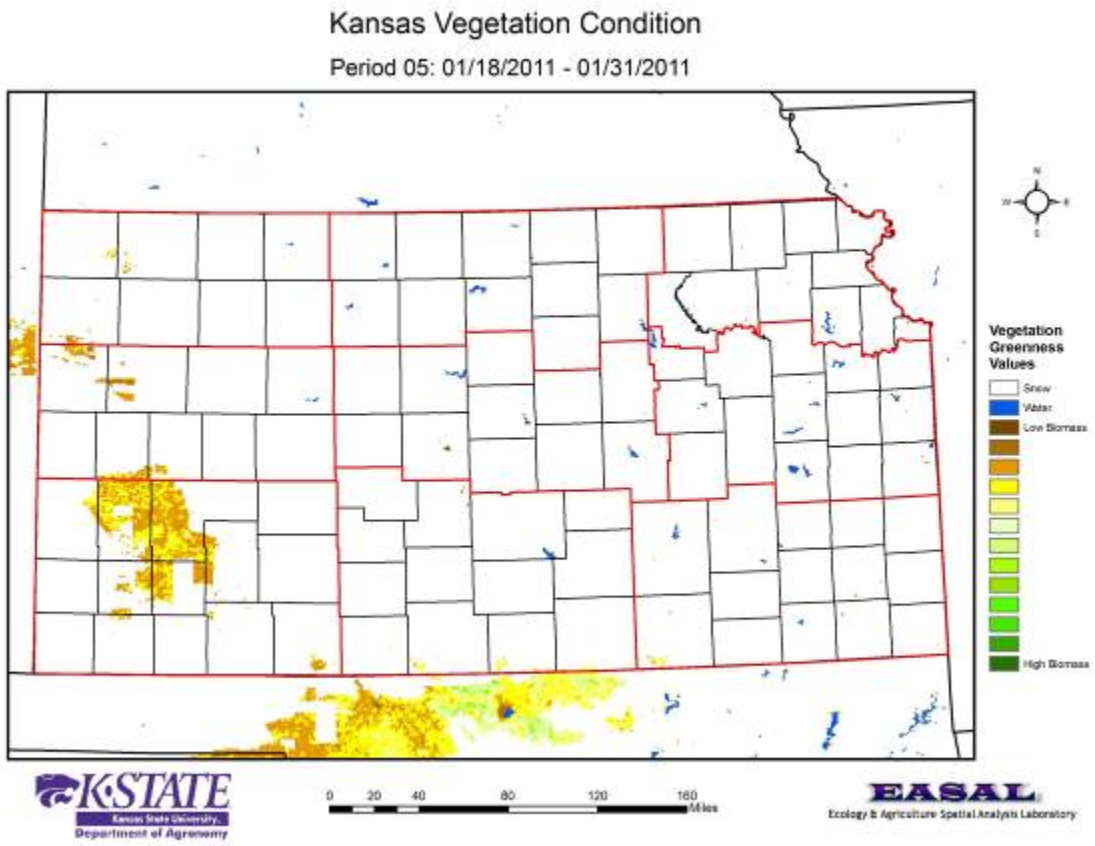
6. Comparative Vegetation Condition Report: January 18 – 31

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.

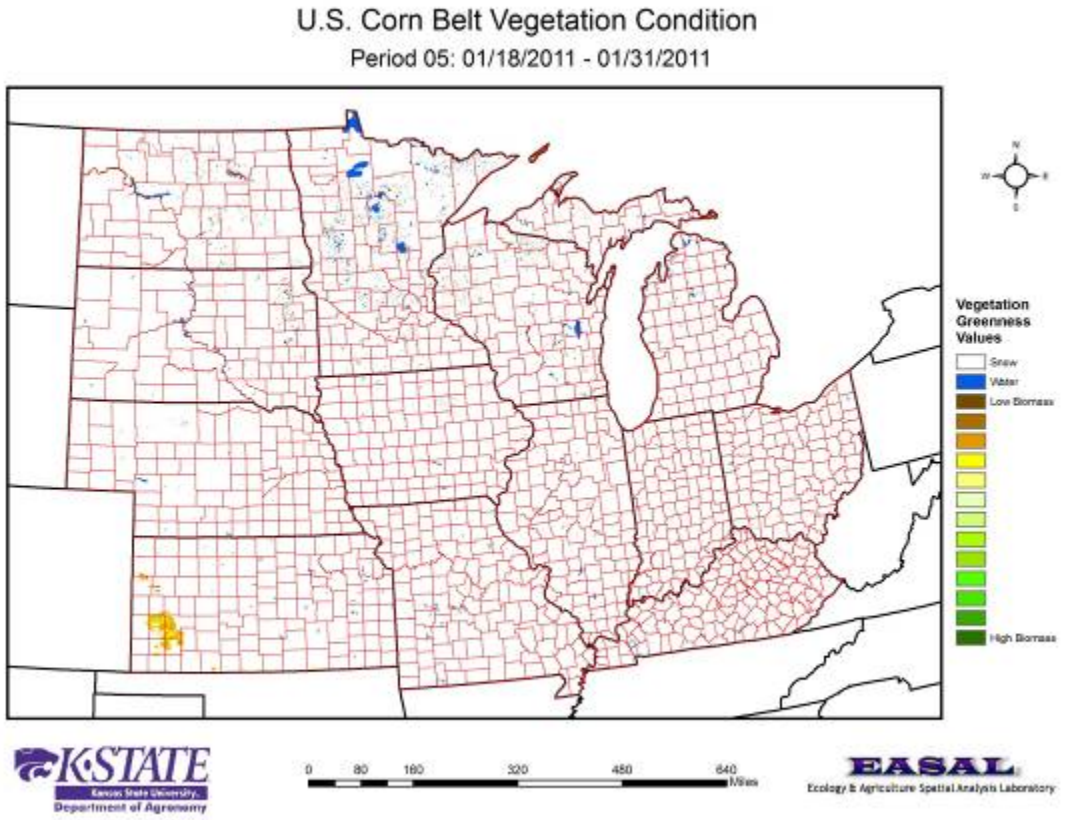
Two short videos of Dr. Kevin Price explaining the development of these maps can be viewed on YouTube at:
http://www.youtube.com/watch?v=CRP3Y5NIggw
http://www.youtube.com/watch?v=tUdOK94efxc

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.

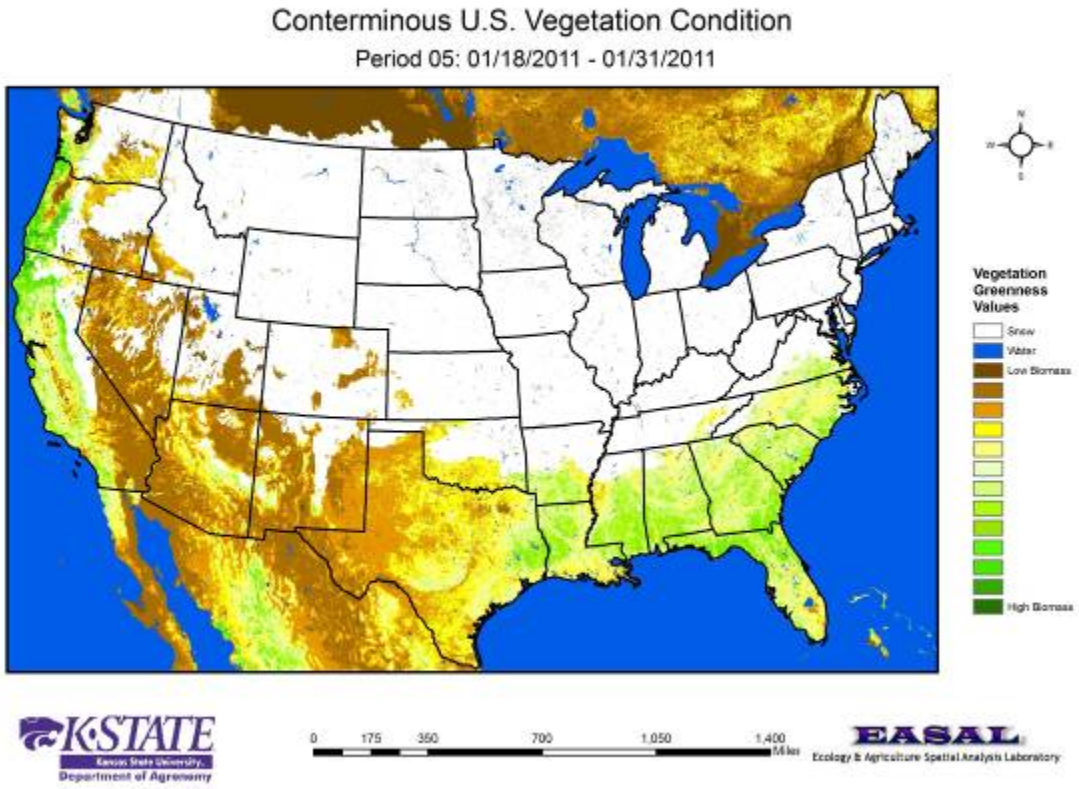
The maps below show the current vegetation conditions in Kansas, the Corn Belt, and the continental U.S, with comments from Mary Knapp, state climatologist:



Map 1. The Vegetation Condition Report for Kansas for January 18 – 31 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that again, parts of western Kansas missed on the snow cover. This is particularly a problem due to the extremely cold temperatures that followed this period. Only the north central and northeast divisions saw significant moisture from the event. Statewide average precipitation for the period was 0.19 inches, or 62 percent of normal. The southwest division averaged only 0.04 inches, or just 19 percent of normal.



Map 2. The Vegetation Condition Report for the Corn Belt for January 18 – 31 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows much of the Corn Belt continues to be covered in snow. Snow water equivalents were higher in the eastern areas, where 4 inches of snow equated to between four tenths and half an inch of moisture. In Kansas, some reports of 4 inches of snow produced as little as a quarter of an inch of liquid.



Map 3. The Vegetation Condition Report for the U.S. for January 18 – 31 from K-State's Ecology and Agriculture Spatial Analysis Laboratory shows that the storms at the end of January didn't penetrate as far south as those during the first half of the month. Note that parts of eastern Colorado missed out on the snows, just as did parts of western Kansas.

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7. Soil temperature readings on Feb. 2-3 in western Kansas

Given the lack of snow cover to start February in Western Kansas, there is a great deal of interest in potential impact of the sub-zero temperatures on the winter wheat. Below are the soil temperature readings at the 2-inch depth for three locations in western Kansas. Note that the Colby readings are under bare ground (similar to a poor wheat stand). Tribune and Garden City are under buffalograss sod.

2" soil temperatures (degrees Fahrenheit) in Western Kansas

Date	Hour	Colby (bare soil)	Garden City (sod)	Tribune (sod)	Date	Hour	Colby (bare soil)	Garden City (sod)	Tribune (sod)
2-Feb	100	19.9	26.1	27.8	3-Feb	100	18.8	22.5	25.2
	200	19.5	25.7	27.5		200	18.4	22.2	25.0
	300	19.0	25.3	27.3		300	18.1	21.9	24.8
	400	18.6	24.9	27.0		400	17.8	21.6	24.5
	500	18.3	24.6	26.8		500	17.5	21.4	24.4
	600	18.0	24.2	26.5		600	17.3	21.1	24.2
	700	17.8	23.9	26.3		700	17.1	20.9	24.0
	800	17.4	23.5	26.1		800	16.8	20.7	23.9
	900	17.3	23.2	26.0		900	16.6	20.6	23.7
	1000	17.8	23.1	25.9		1000	17.6	20.7	23.7
	1100	19.0	23.3	26.0		1100	19.5	21.1	24.0
	1200	20.7	23.8	26.1		1200	22.4	22.0	24.3
	1300	22.6	24.4	26.4		1300	25.3	23.1	24.8
	1400	24.3	25.1	26.6		1400	28.0	24.2	25.1
	1500	25.6	25.7	26.8		1500	30.0	25.2	25.5
	1600	26.0	26.0	27.0		1600	30.8	25.9	25.9
	1700	25.6	26.2	27.0		1700	31.1	26.2	26.2
	1800	24.9	26.0	27.0		1800	30.2	26.2	26.3
	1900	23.7	25.6	26.8		1900	28.4	25.8	26.2
	2000	22.5	25.0	26.5		2000	26.6	25.1	26.0
	2100	21.4	24.4	26.3		2100	25.3	24.5	25.8
	2200	20.6	23.8	26.0		2200	24.6	24.0	25.6
	2300	19.9	23.3	25.7		2300	23.8	23.5	25.4
	2400	19.3	22.9	25.5		2400	23.1	23.1	25.3
Coldest:		17.3	22.9	25.5	Coldest:		16.6	20.6	23.7
Average:		20.8	24.6	26.5	Average:		22.7	23.1	25.0

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