



Natural Resources Conservation Service
P.O. Box 2890
Washington, D.C. 20013

Weekly Report - Snowpack / Drought Monitor Update **Date: 9 October 2009**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: SNOTEL and ACIS-day station average weekly temperature anomalies were quite cool across the West this week (Fig.1). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over the southwestern New Mexico ($>+3F$) and the greatest negative departures occurred over central Wyoming ($<-15F$) (Fig. 1a).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 8 October shows a mostly dry West with the exception of some scattered rain and snow over the higher elevation from central Oregon to the Northern High Plains (Fig 2 and 2a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows rather exaggerated values since the Water Year is only 9 days old (Fig. 2b).

WESTERN DROUGHT STATUS

The West: The first major winter storm of the season brought up to an inch of precipitation (liquid equivalent) in western Montana and most of Idaho, with southwestern portions of these states receiving 2 inches or more. This equates to a foot or more of snow across some of the higher elevations. Accordingly, the area of D0 in southwestern Montana was trimmed back. In Arizona, rainfall has been on the light side during the past 4 months (JJAS), and temperatures were above normal. As this was the tenth driest monsoon on record (since the late 1800's), drought conditions worsened and became more widespread. Arizona now heads into the winter wet season with substantial deficits accumulated during the summer months. Author: Anthony Artusa, Climate Prediction Center, NOAA

A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.

DROUGHT IMPACTS DEFINITIONS (<http://drought.unl.edu/dm/classify.htm>)

The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 3, 3a, and 3b).

SOIL MOISTURE

Soil moisture (Figs. 4a and 4b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting

Weekly Snowpack and Drought Monitor Update Report

reliably in real-time and for having records of longer than 45 years (and various other criteria). Another good resource can be found at:

<http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>.

OBSERVED FIRE DANGER CLASS

The [adjective class rating](#) is a method of normalizing rating classes across different fuel models, indexes, and station locations. It is based on the primary fuel model cataloged for the station, the fire danger index selected to reflect staffing levels, and climatological class breakpoints. This information is provided by local station managers. About 90% use the Burning Index (BI); others use Energy Release Component (ERC). Staffing class breakpoints are set by local managers from historical fire weather climatology (Figs. 5).

Only reporting station locations are indicated with a marker on the maps. Values between stations are estimated with an inverse distance-squared technique on a 10-km grid. This works pretty well in areas of relatively high station density, but has obvious shortcomings in other areas.

VEGETATION STRESS (Figure 6)

http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php

Image Interpretation

The images are color-coded maps of vegetation condition (health) estimated by the Vegetation and Temperature Condition Index (VT). The VT is a numerical index, which changes from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100). Fair conditions are coded by green color (50), which changes to brown and red when conditions deteriorate and to blue when they improve. The VT reflects indirectly a combination of chlorophyll and moisture content in the vegetation and also changes in thermal conditions at the surface. This new approach combines the visible, near infrared and thermal radiances in a numerical index characterizing vegetation health. This approach is extremely useful in detecting and monitoring such complex and difficult-to-identify phenomenon as drought. The VT values below 35 are used for identifying vegetation stress which is an indirect drought indicator. The VT is very useful for early drought detection, assessing drought area coverage, duration, and intensity, and for monitoring drought impacts on vegetation and agricultural crops.

U.S. HISTORICAL STREAMFLOW

This map, (Fig. 7) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.

http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map.

PASTURE AND RANGELAND CONDITIONS (Figure 8)

This product is produced and compiled by the NOAA's Climate Prediction Center:

<http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/pasture-range-statewide-conditions.pdf>.

Weekly Snowpack and Drought Monitor Update Report

STATE ACTIVITIES

State government drought activities can be tracked at the following URL: <http://drought.unl.edu/mitigate/mitigate.htm>. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information - <http://www.wcc.nrcs.usda.gov/cgibin/bor.pl>. Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/> and <http://drought.gov>.

FOR MORE INFORMATION

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage - <http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ NOLLER HERBERT
Director, Conservation Engineering Division

Weekly Snowpack and Drought Monitor Update Report

SNOTEL (solid) and ACIS (dot-filled) Networks 7-Day Average Temperature Anomaly (Degrees F)

Oct 09, 2009

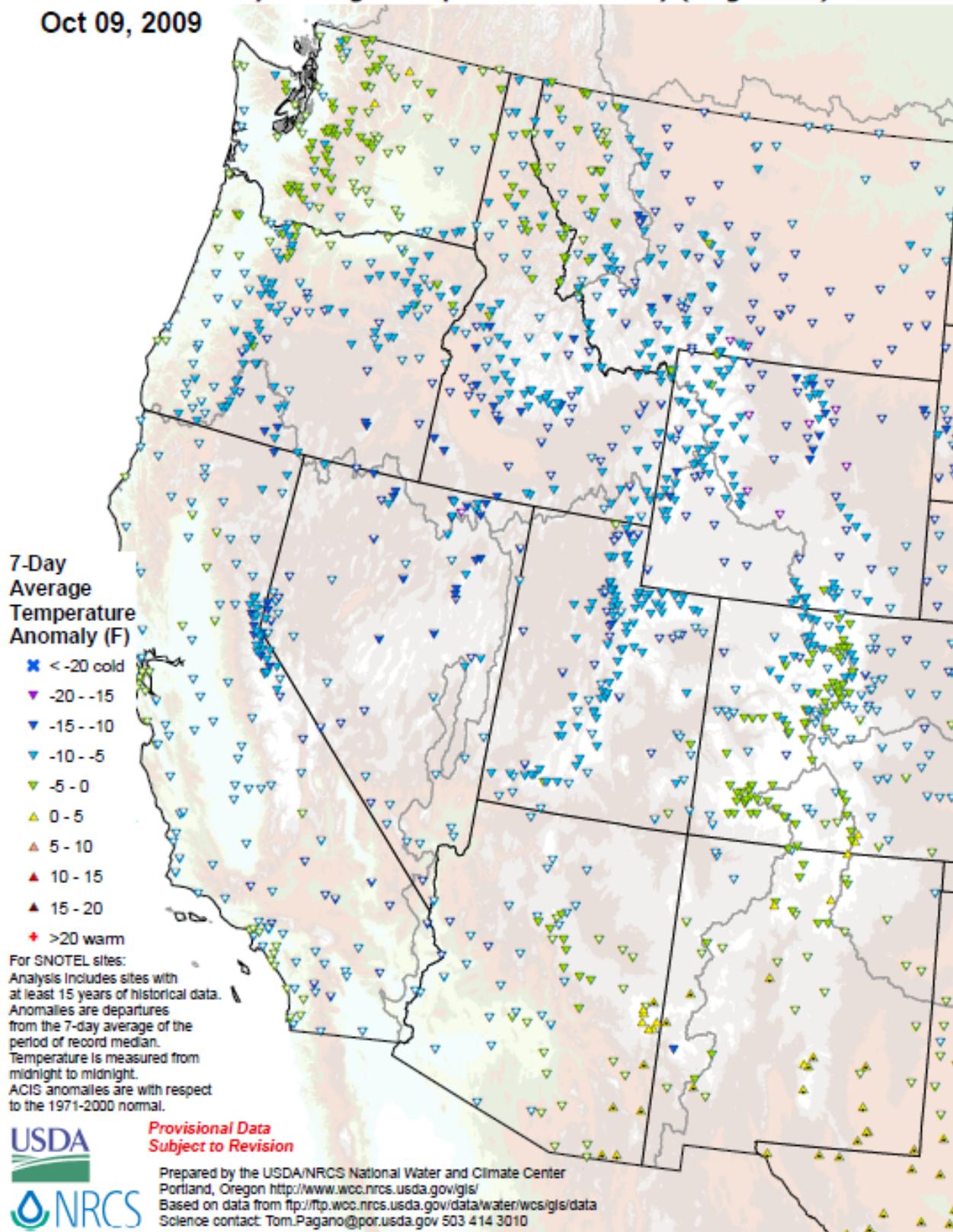
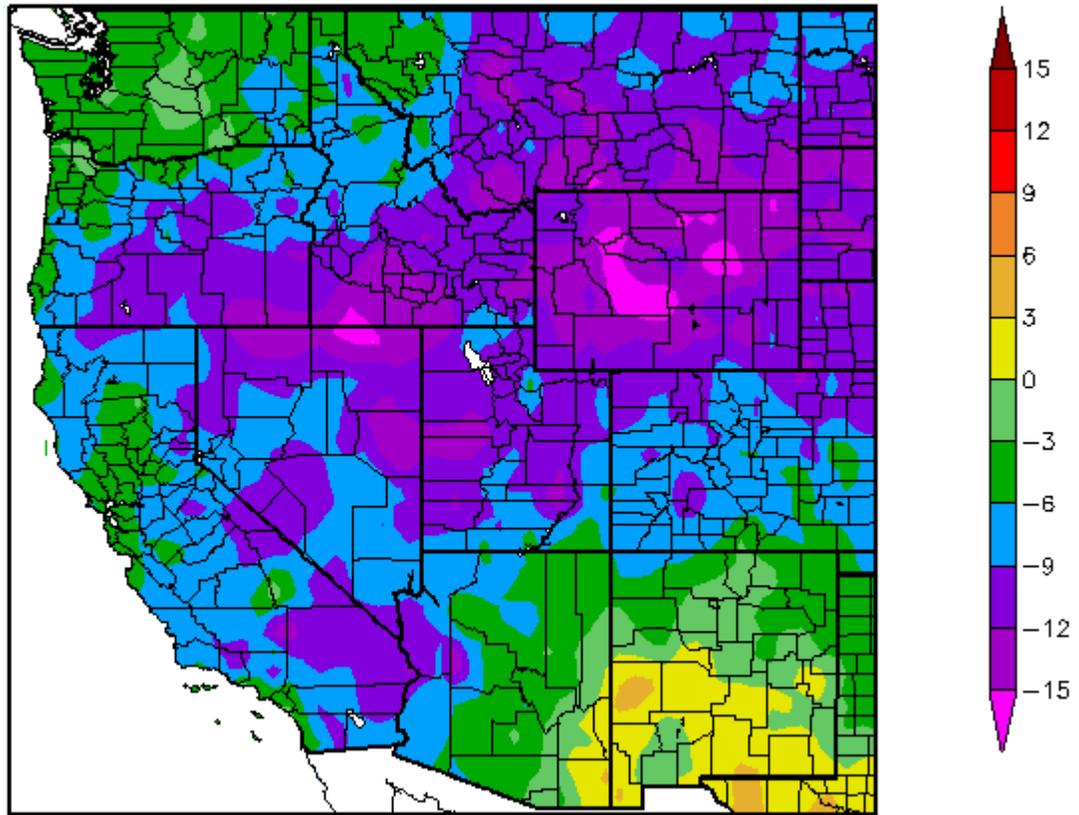


Fig. 1. SNOTEL and ACIS-day station average weekly temperature anomalies were quite cool across the West this week. Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)
10/2/2009 – 10/8/2009



Generated 10/9/2009 at HPRCC using provisional data.

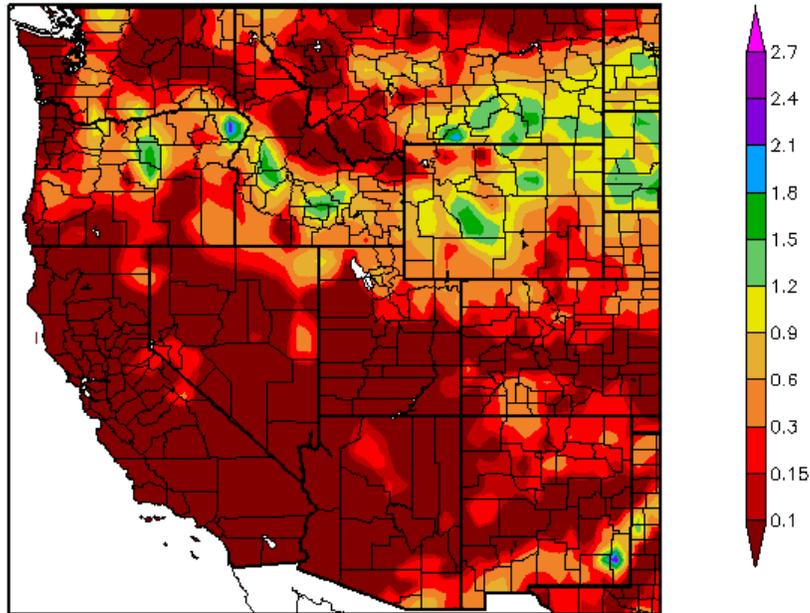
NOAA Regional Climate Centers

Fig. 1a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over the southwestern New Mexico (>+3F) and the greatest negative departures occurred over central Wyoming (<-15F).

Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDept

Weekly Snowpack and Drought Monitor Update Report

Precipitation (in)
10/2/2009 - 10/8/2009

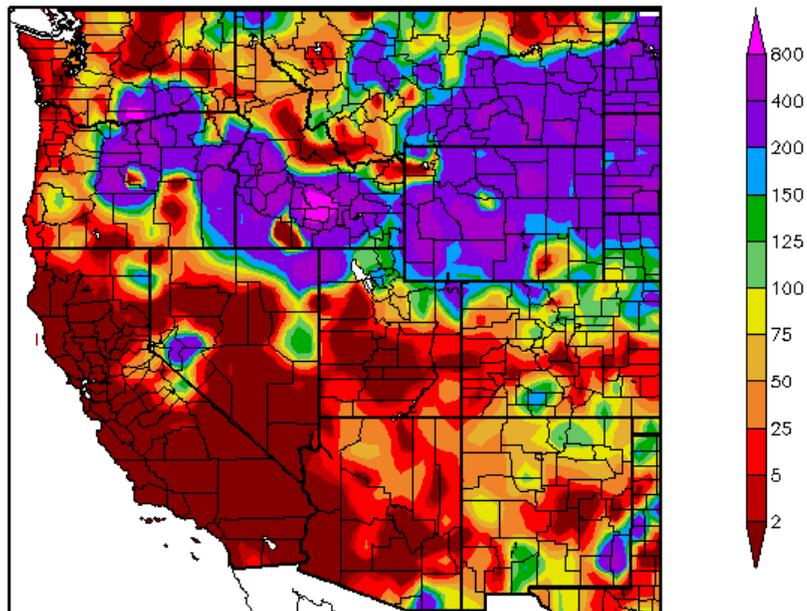


Generated 10/9/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2. and 2a. ACIS 7-day average precipitation amounts for the period ending 8 October shows a mostly dry West with the exception of some scattered rain and snow over the higher elevation from central Oregon to the Northern High Plains. Ref: <http://www.hprcc.unl.edu/maps/current/>.

Percent of Normal Precipitation (%)
10/2/2009 - 10/8/2009



Generated 10/9/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Weekly Snowpack and Drought Monitor Update Report

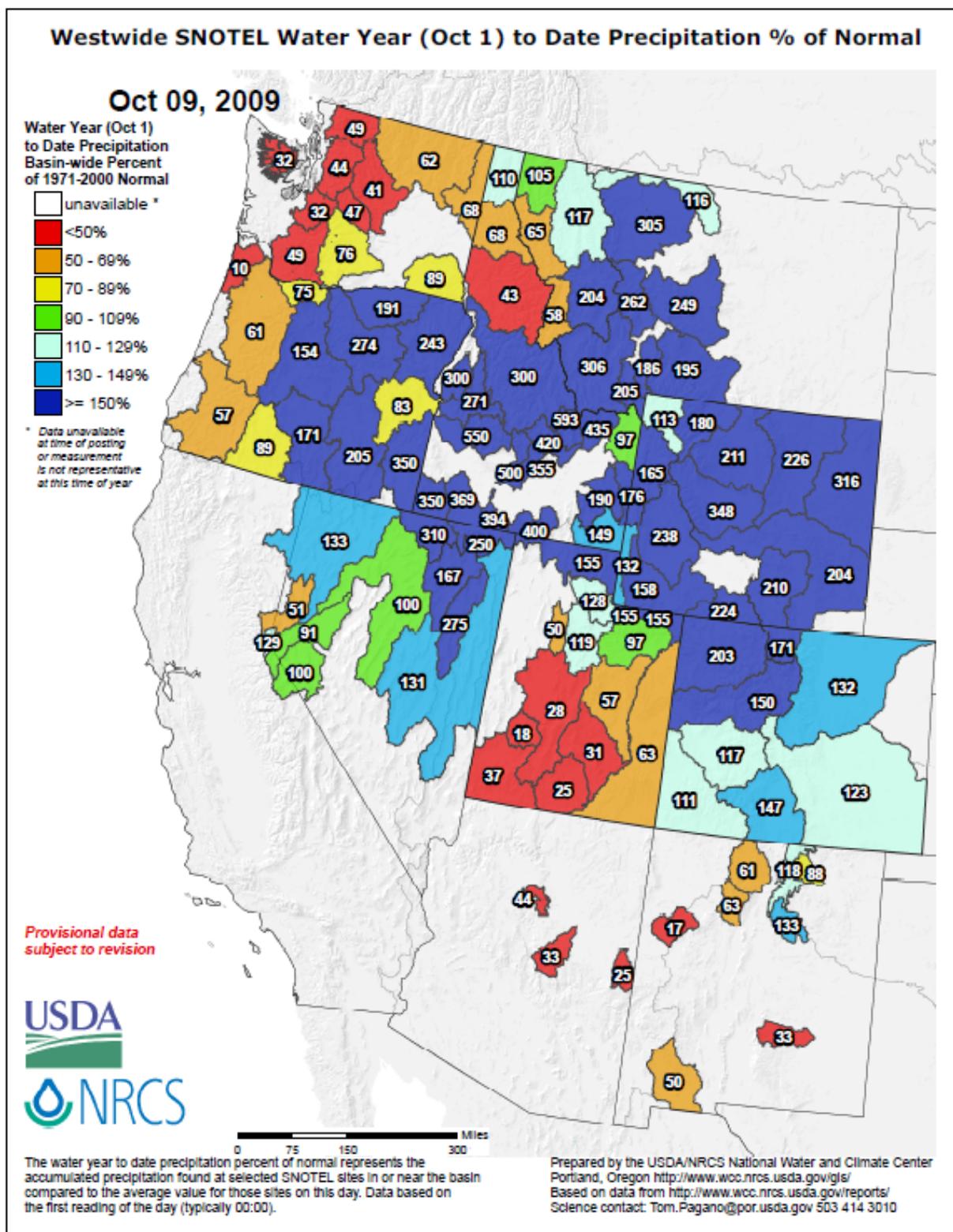


Fig 2b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows rather exaggerated values since the Water Year is only 9 days old.

Ref: http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecptnormal_update.pdf.

U.S. Drought Monitor

October 6, 2009
Valid 8 a.m. EDT

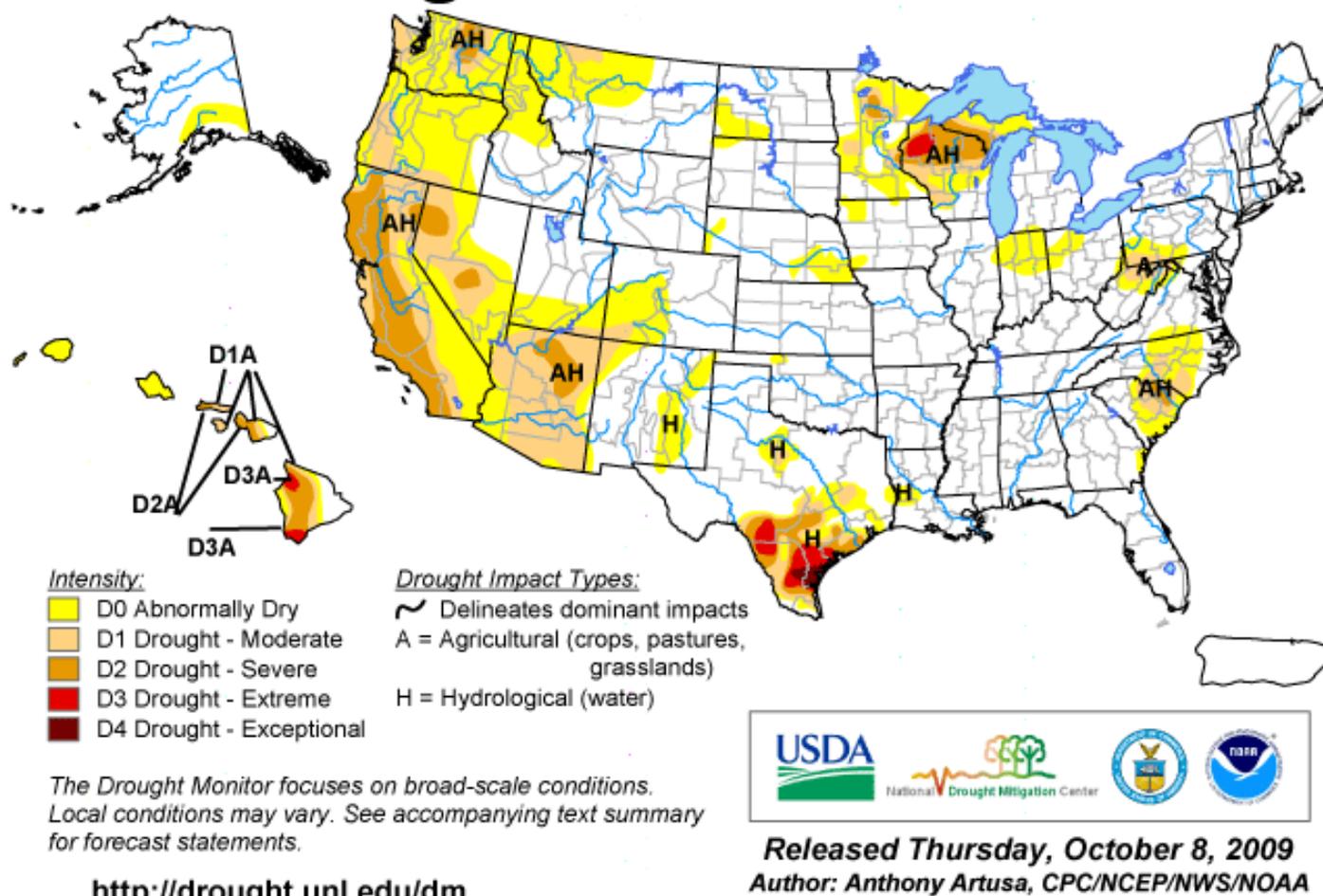


Fig. 3. Current Drought Monitor weekly summary.

Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

U.S. Drought Monitor

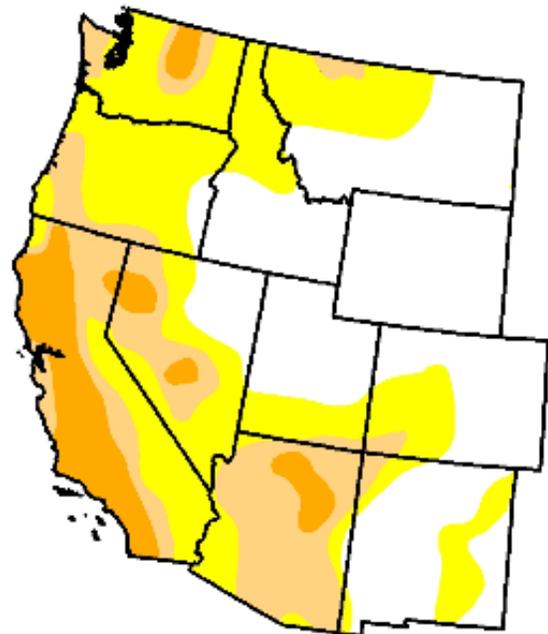
West

October 6, 2009

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	42.1	57.9	25.4	8.5	0.0	0.0
Last Week (09/29/2009 map)	40.7	59.3	22.8	7.5	0.0	0.0
3 Months Ago (07/14/2009 map)	55.1	44.9	19.0	7.7	0.0	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	0.0
Start of Water Year (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

<http://drought.unl.edu/dm>



Released Thursday, October 8, 2009

Author: A. Artusa, CPC/NOAA

Fig. 3a. Drought Monitor for the Western States with statistics over various time periods. Regionally, there was little change during the past week.

Ref: http://www.drought.unl.edu/dm/DM_west.htm.

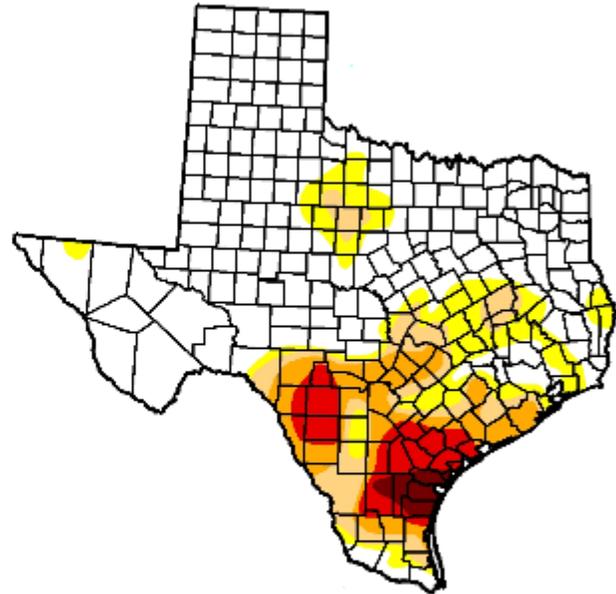
U.S. Drought Monitor

Texas

October 6, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	66.1	33.9	22.4	14.5	6.8	1.5
Last Week (09/29/2009 map)	63.8	36.2	27.8	21.9	12.3	3.1
3 Months Ago (07/14/2009 map)	31.8	68.2	40.4	30.0	24.7	17.9
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/06/2009 map)	66.1	33.9	22.4	14.5	6.8	1.5
One Year Ago (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

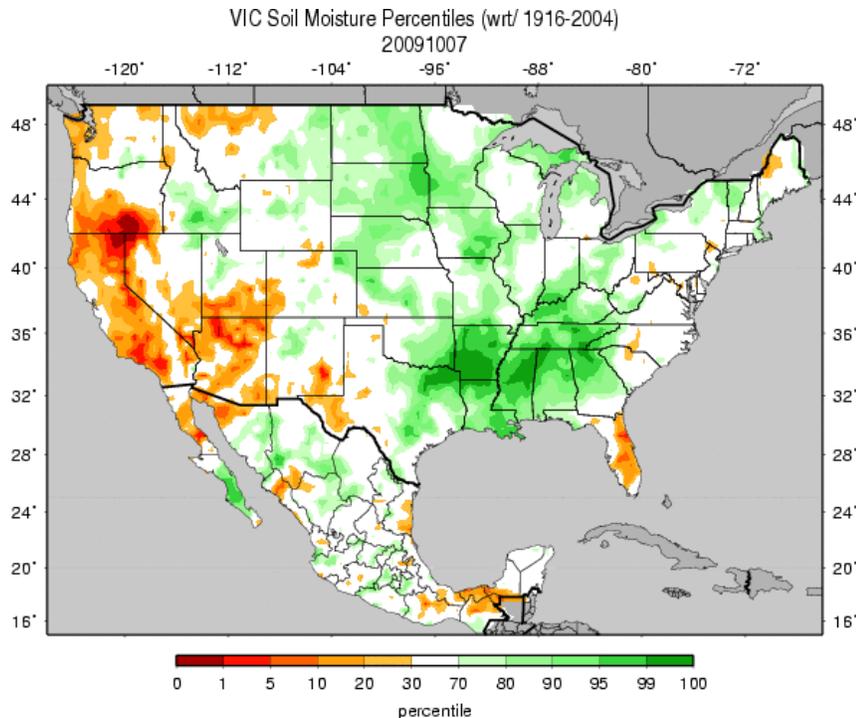
<http://drought.unl.edu/dm>



Released Thursday, October 8, 2009
Author: A. Artusa, CPC/NOAA

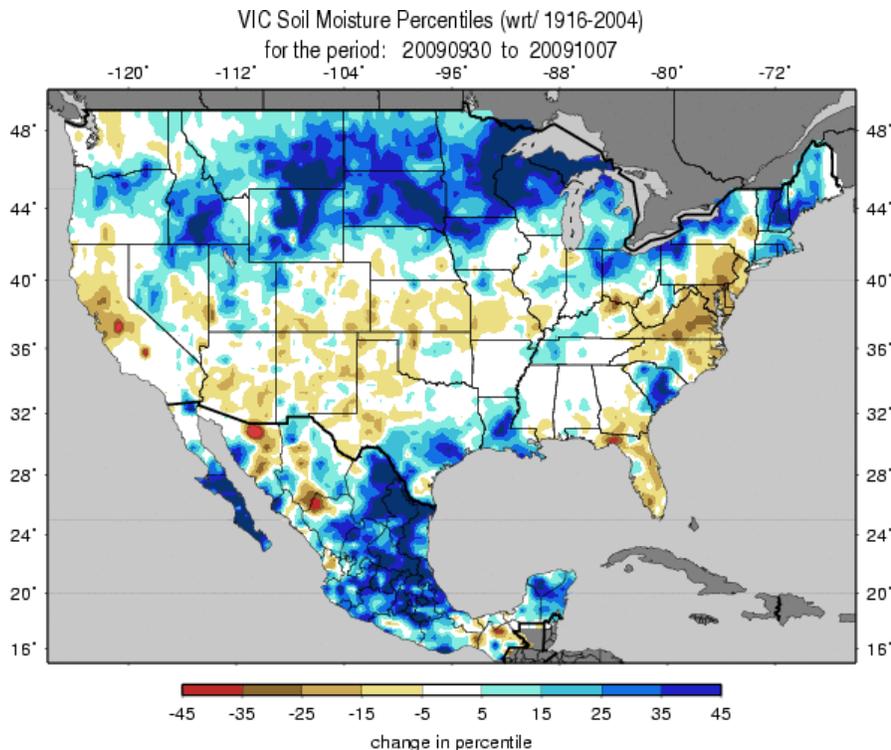
Fig. 3b: Texas is the only state with D4 drought condition in the US. Note that there was continued significant improvement in D2-D4 categories this week.
Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S

Weekly Snowpack and Drought Monitor Update Report



Figs. 4a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 07 October. Note that the Southern States are the wettest areas while the driest areas dominate over the Oregon, California and Arizona.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif



Figs. 4b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. Excessive drying is found over much of the country. Excessive moistening is found over much of Northern Plains, the Northwest Gulf Coast, and New England.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif

Weekly Snowpack and Drought Monitor Update Report

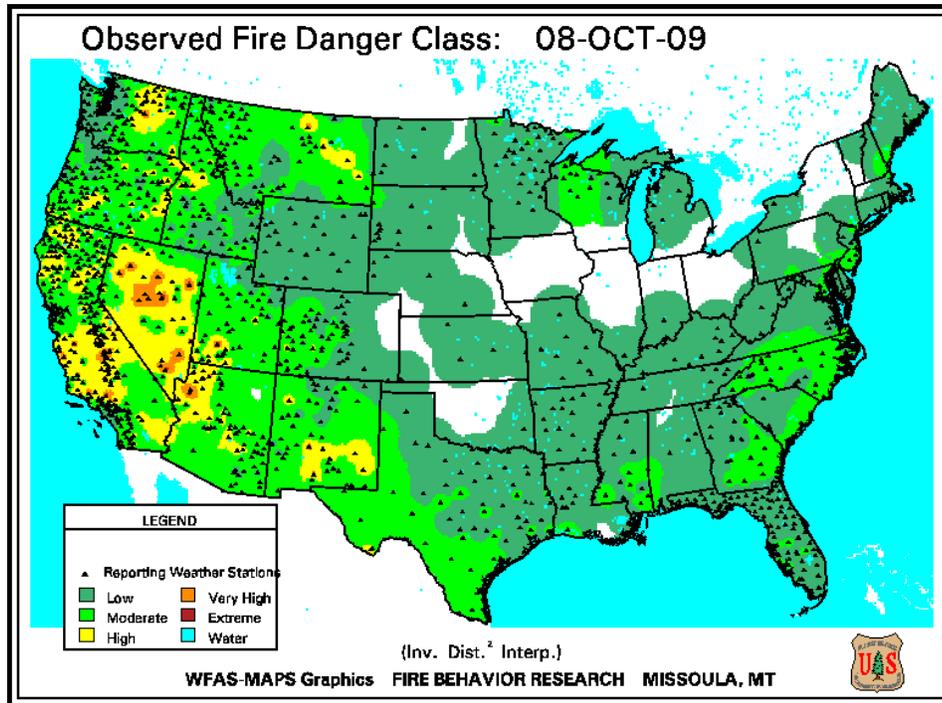


Fig. 5a. Observed Fire Danger Class.

Ref: http://www.wfas.net/images/firedanger/fd_class.gif

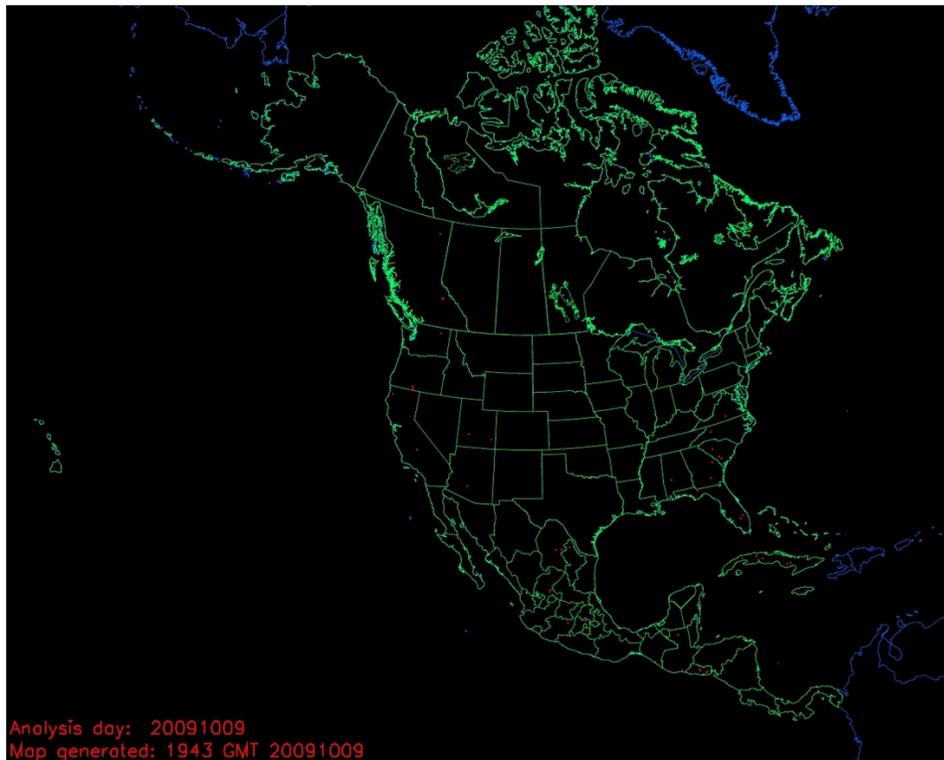


Fig. 5b. Hazard Mapping System Fire and Smoke. Analysis is for 10/09/2009 with fires shown as red dots. Smoke is noted over much of the North-Central Tier States. Smoke, when detected by the analyst, is in gray.

Ref: <http://www.osdpd.noaa.gov/ml/land/hms.html>.

Weekly Snowpack and Drought Monitor Update Report

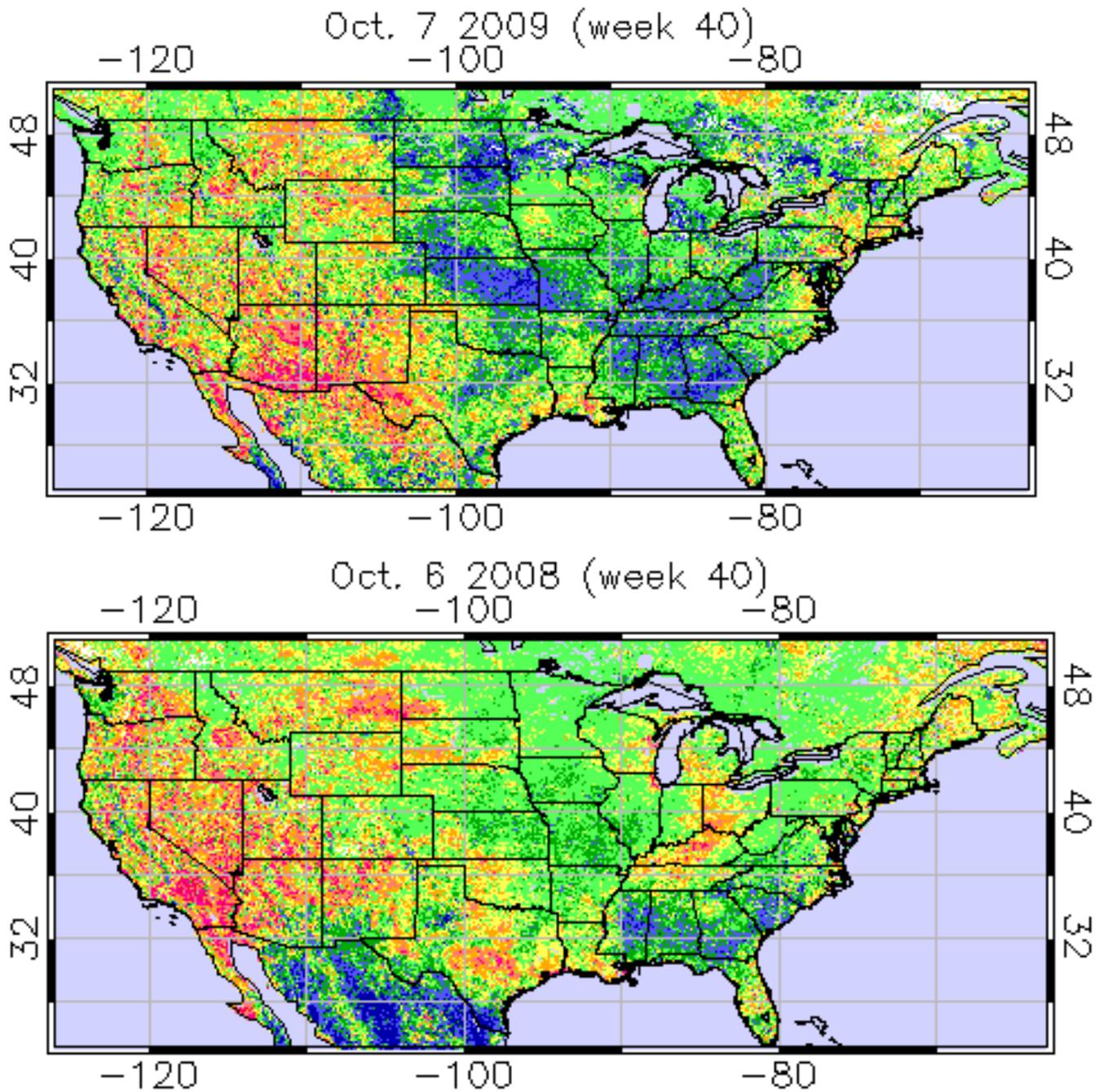
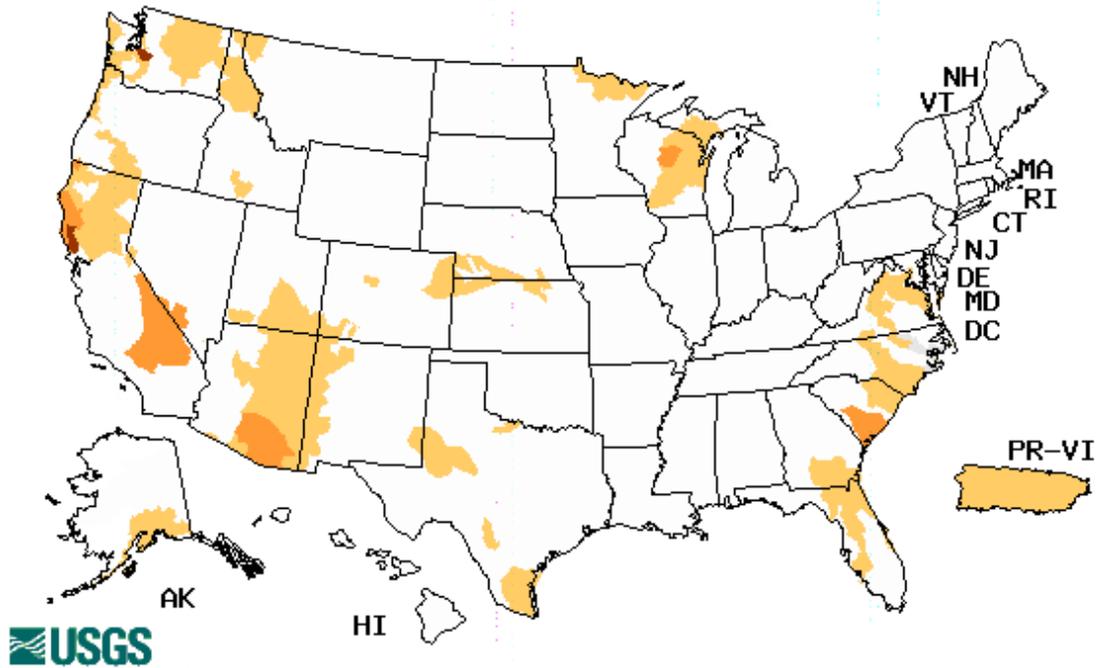


Fig. 6. Vegetation Drought Response Index: Note the comparison to last year. The Central Plains and South Central States show very favorable conditions while Arizona shows stressed condition this week. Last year, California, was the most stressed area.

Ref: http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php

Weekly Snowpack and Drought Monitor Update Report

Thursday, October 08, 2009



Choose a data retrieval option and select a state on the map

State DroughtWatch, State map

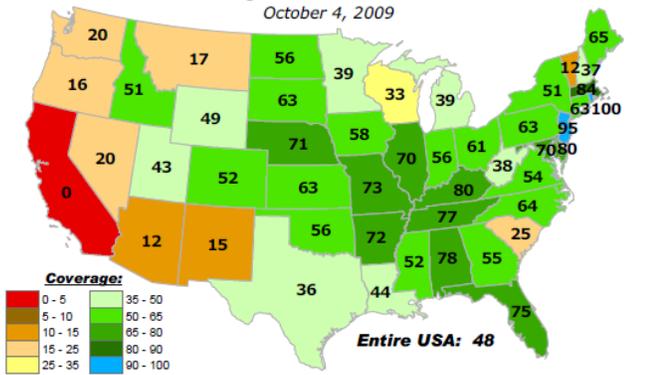
Explanation - Percentile classes				
Low	<=5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are severe over North Coastal California.

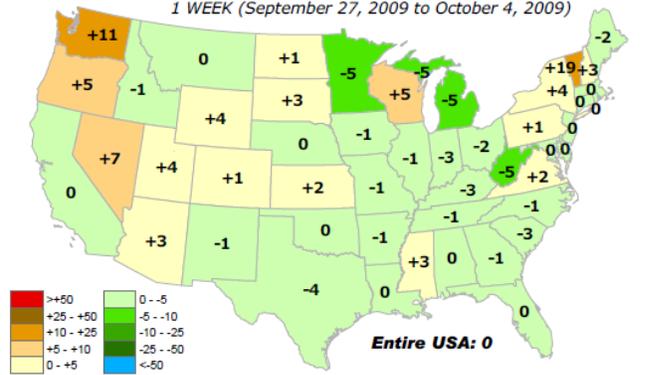
Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>.

Weekly Snowpack and Drought Monitor Update Report

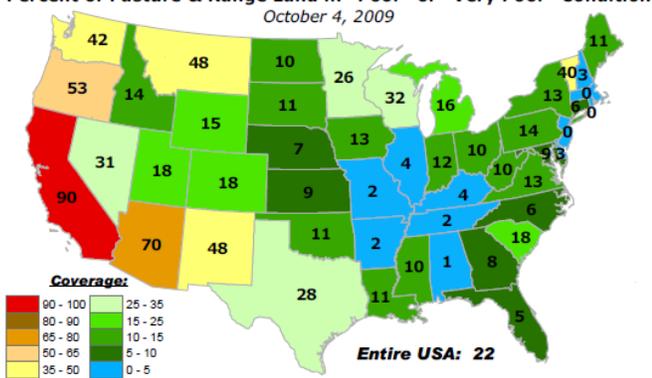
Percent of Pasture & Range Land in "Good" or "Excellent" Condition
October 4, 2009



CHANGE in % of Pasture and Range Lands in "Poor" or "Very Poor" Condition
1 WEEK (September 27, 2009 to October 4, 2009)



Percent of Pasture & Range Land in "Poor" or "Very Poor" Condition
October 4, 2009



CHANGE in % of Pasture and Range Lands in "Poor" or "Very Poor" Condition
4 WEEKS (September 6, 2009 to October 4, 2009)

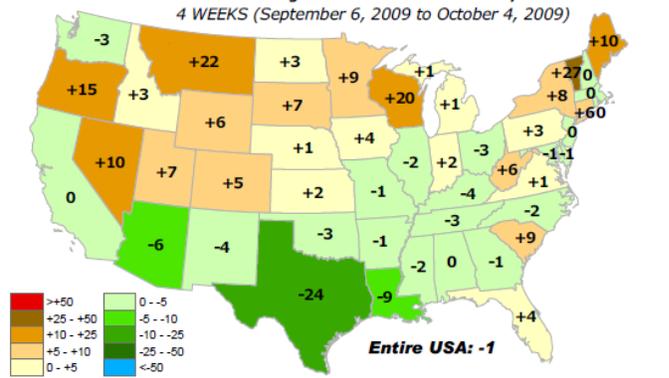


Fig. 8. Current Pasture and Range Land conditions and changes over the last week and last month.

Ref: <http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/pasture-range-statewide-conditions.pdf>

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary -- October 6, 2009

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.

Early in the week (Sep. 29-Oct. 5), a complex frontal system, embedded with several waves of low pressure, slowly tracked from the central U.S. toward the East Coast, bringing wet weather to much of the eastern half of the country. The associated cold front finally moved off the Atlantic Coast early Sunday morning, as the primary storm center lifted northward from the Great Lakes into southern Ontario. A broad area of high pressure moved across the eastern half of the Nation in the wake of this storm, producing relatively cool, dry weather. Towards the end of the period, the first major winter storm of the season moved across the northern and central Rockies, bringing over a foot of snow to some mountain locations. In Hawaii, windward slopes received heavy downpours during the latter half of the week. Alaska remained stormy, wet, and cool, with heavy precipitation along the southern and southeastern coasts and light to moderate precipitation further inland to the north.

The Atlantic Coast States and Ohio Valley: After a relatively dry start, wet conditions returned to the region as a frontal system moved in from the west. Rainfall amounts generally ranged from 2 inches in parts of New England to less than 1 inch across New York, New Jersey, Pennsylvania, and Delaware, while Virginia remained mostly dry. In the central Appalachians, spotty light to moderate amounts (0.25 inch to 1 inch) of rain were reported, but did little to mitigate recent dryness there. Little if any rain fell across the Carolinas until October 4th and 5th, when 1 to 1.5 inches of rain fell over northern portions of South Carolina. Respectable improvements in the current drought were made to South Carolina, based on this recent rainfall and local stream flow conditions. In addition, evaporation has been greatly reduced due to the low cloudiness. In the Ohio Valley, several inches of rain prompted the elimination of D1 drought conditions, an overall decrease in the spatial coverage of D0 conditions, and a removal of the agricultural type impact label.

The Southern Plains and Gulf Coast Region: Once again, widespread, beneficial rains (generally 2 to 3 inches, locally up to 8 inches) fell across much of central and eastern Texas, Louisiana, Mississippi and southern Arkansas. The slowly-meandering front responsible for this rain brought very significant short-term relief for south-central portions of Texas, and many stream flow gauges are at or above normal. However, longer-term, hydrologic drought (12 to 24 months) still remains in many areas. In general, one to two category improvements were made across the region. The middle to lower Rio Grande Valley and adjacent parts of southwestern Texas missed out on the recent precipitation, so a sizable area of D2 to D3 drought conditions persists there. In Louisiana, another week of heavy rain (generally 2 to 4 inches, locally up to 6 inches) resulted in the removal of most of the remaining D0 area.

The Midwest: Cool weather and heavy rains (generally 2 to 4 inches) across eastern South Dakota, northern Iowa, and central and southern Minnesota justified 1 to 2 category improvements over these areas. Moderate rainfall amounts (1 to 2 inches) fell over central and eastern North Dakota, southern Iowa, western and northern Wisconsin, and much of the Upper Peninsula of Michigan, contributing to a 1 category improvement. There has also been a noticeable boost in stream flows in the Wisconsin/Minnesota area compared to just

Weekly Snowpack and Drought Monitor Update Report

one week ago. However, D2 to D3(H) remained over northern Wisconsin and east-central Minnesota, where significantly less rain fell.

The Central Plains: Light rains (up to 0.5 inch) were reported over eastern and southern Nebraska. Despite recent rainfall, considerable dryness still remains in the previous 30 and 90 day periods. Several light to moderate rainfall events are needed to bring top soil moisture back to normal. Therefore, some slight expansion of D0 was warranted across eastern and southern Nebraska.

The West: The first major winter storm of the season brought up to an inch of precipitation (liquid equivalent) in western Montana and most of Idaho, with southwestern portions of these states receiving 2 inches or more. This equates to a foot or more of snow across some of the higher elevations. Accordingly, the area of D0 in southwestern Montana was trimmed back. In Arizona, rainfall has been on the light side during the past 4 months (JJAS), and temperatures were above normal. As this was the tenth driest monsoon on record (since the late 1800's), drought conditions worsened and became more widespread. Arizona now heads into the winter wet season with substantial deficits accumulated during the summer months.

Hawaii, Alaska and Puerto Rico: In Hawaii, windward slopes of the Big Island received heavy downpours (1 to locally 3 inches) on Thursday and Friday, with Kauai, Oahu, and Maui getting their share of rain (generally less than an inch, but locally 2 to 8 inches) over the weekend. Although some improvements may have occurred on windward sides of the Islands, this will be reassessed next week, and slight adjustments in the drought designations may then be needed. Generally, under an inch of precipitation was observed in interior southeastern Alaska, and no adjustments were made to the D0 area there.

Looking Ahead: For the ensuing 5 days (October 8-12), 1.5 inches or more of rain is expected across the eastern half of Texas. With the agricultural component of the Texas drought under control, this additional rainfall can go towards alleviating the long-term, hydrologic drought by boosting groundwater supplies. More snow and very cold temperatures are in store for western Montana, but west of the Continental Divide, little if any precipitation is forecast. In the upper Midwest and the northern Plains, light amounts (less than 0.25 inch) of precipitation (rain and snow) will provide little in the way of additional drought relief for the region. One-half inch or more of rain is predicted for the Carolinas, which will provide additional short-term relief.

For the ensuing 6-10 day period (October 13-17), a fairly wet period appears to be in store for the northern Pacific Coast, the northern Intermountain West and northern Rockies. Below-median precipitation is forecast for much of the southern tier of states and mainland Alaska. Temperatures for this period are expected to be above normal across the West and most of Alaska, and below normal across the East. **Author:** [Anthony Artusa](#), [CPC/NCEP/NWS/NOAA](#)

Updated: 9 October 2009