



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

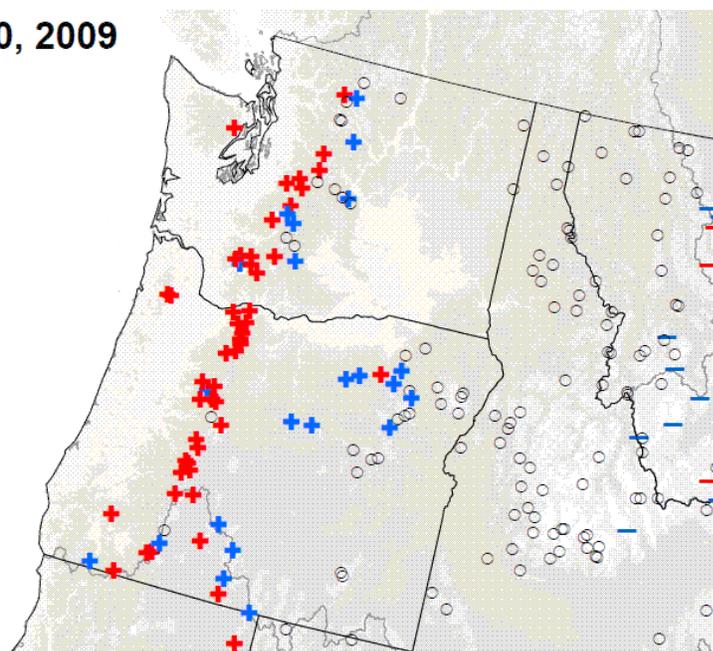
Weekly Report - Snowpack / Drought Monitor Update **Date: 30 July 2009**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: SNOTEL and ACIS-day station average temperature anomalies were within 5 degrees of average over most of the West with the exception of well above average temperatures over parts of the Cascades and Central Arizona Mountains (Fig.1).

SNOTEL Yesterday's Minimum Temperature Records

Jul 30, 2009



Yesterday was one of the hottest days over the Pacific NW in many years and this was reflected by many record maximum minimum temperatures being broken at the NRCS SNOTEL sites over the Cascades (red + new max min record, blue + near record).

See: http://www.wrh.noaa.gov/total_forecast/getprod.php?wfo=pqr&sid=PQR&pil=RER

ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over northwest Oregon and west of the Cascades in Washington (>+10F) and the greatest negative departures occurred over Western High Plains (<-4F) (Fig. 1a).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 29 July shows a mostly dry West with the exception of scattered thunderstorms across the Rockies and northern most areas of Washington (Fig 2 and 2a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows continued surplus values over southern Idaho into Wyoming and eastern Nevada with deficits over the northernmost Tier States, southwest New Mexico, and northwest Oregon (Fig. 2b).

Weekly Snowpack and Drought Monitor Update Report

WESTERN DROUGHT STATUS

The West: Decent monsoonal rains continue to benefit eastern and southeastern New Mexico, where 2-4 inches brought about a removal of D2 and a westward retraction of D0-D1 across the eastern third of the state.

In Montana, improvements continue on the heels of more rains this week. D1 has been removed in northeastern Montana, and some small D2 pockets have been removed in parts of central Montana as well. The D0-D1 line has also been pushed north and west a bit, with additional rains falling as July draws to a close. A return to good water levels has led to the changing of the drought depiction in Montana from "AH" to just "A" to reflect these improvements.

Farther west in the coastal reaches of the Pacific Northwest, the record-setting heat is on, with many heat advisories and an increased risk of fire under a dominating dome of high pressure, which has brought triple-digit heat for many days now. D0 now connects virtually all of the West Coast from Washington to southern California, with only a little stretch of coast at the California/Oregon border showing no form of dryness or drought thus far. Author: Mark Svoboda, National Drought Mitigation Center.

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 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.

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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.

Background of the Tool

Monitoring vegetation health (condition), including drought detection and watch, is based on radiance measurements in the visible (VIS), near infrared (NIR), and 10.3-11.3 micrometers thermal (T) bands (channels) of the Advanced Very High Resolution Radiometer (AVHRR). These measurements are processed to reduce long-term noise. The VIS and NIR values were converted to the Normalized Difference Vegetation Index [$NDVI = (NIR - VIS) / (NIR + VIS)$] and the T to brightness temperature (BT) using a look-up table. The NDVI and BT were filtered in order to eliminate high frequency noise. They were also adjusted for a non-uniformity of the land surface due to climate and ecosystem differences using multi-year NDVI and BT data. The NDVI and BT were converted to the Vegetation Condition Index (VCI), Temperature Condition Index (TCI), and their combination (VT).

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>.

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/cgi-bin/bor.pl>.

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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

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

Jul 30, 2009

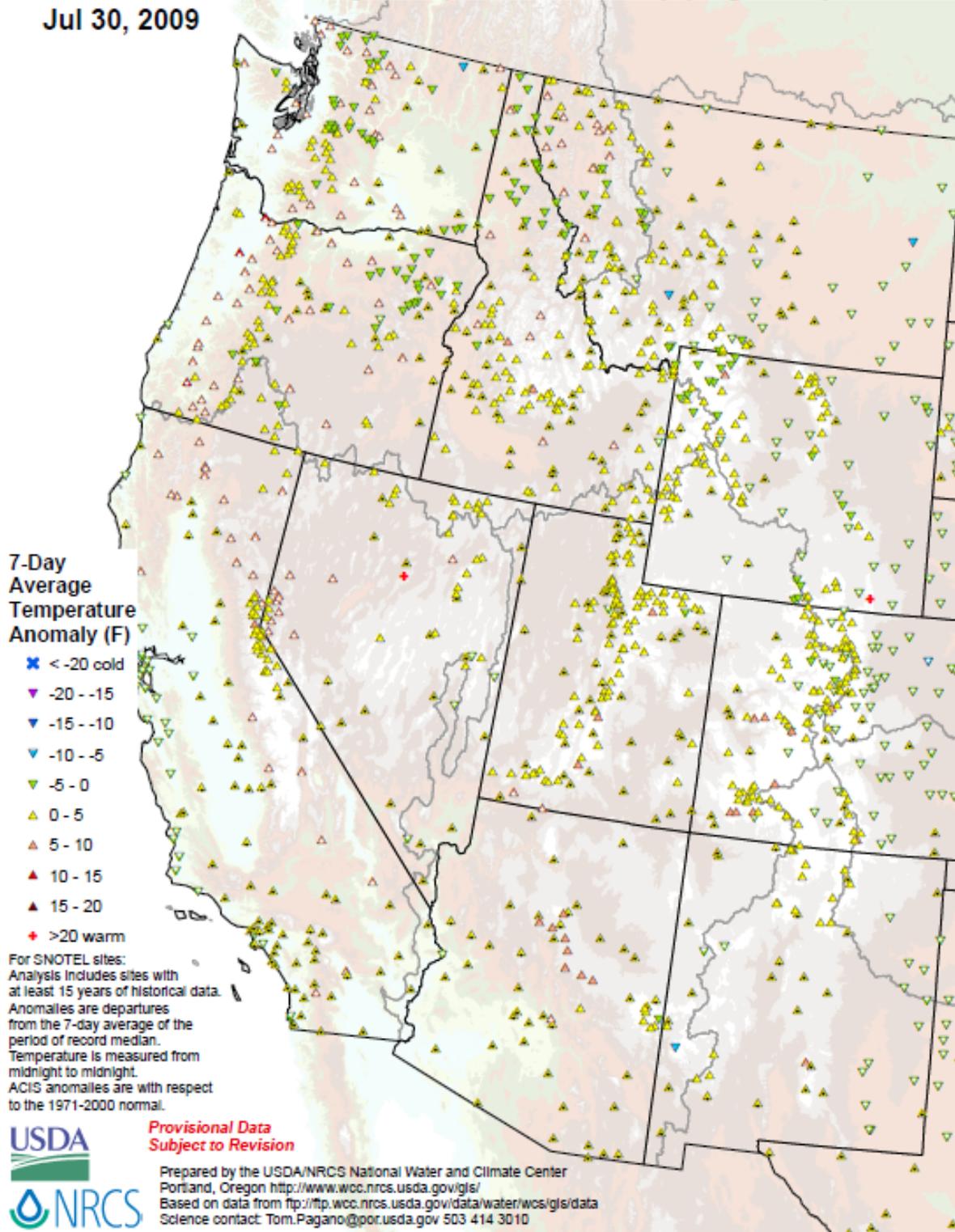
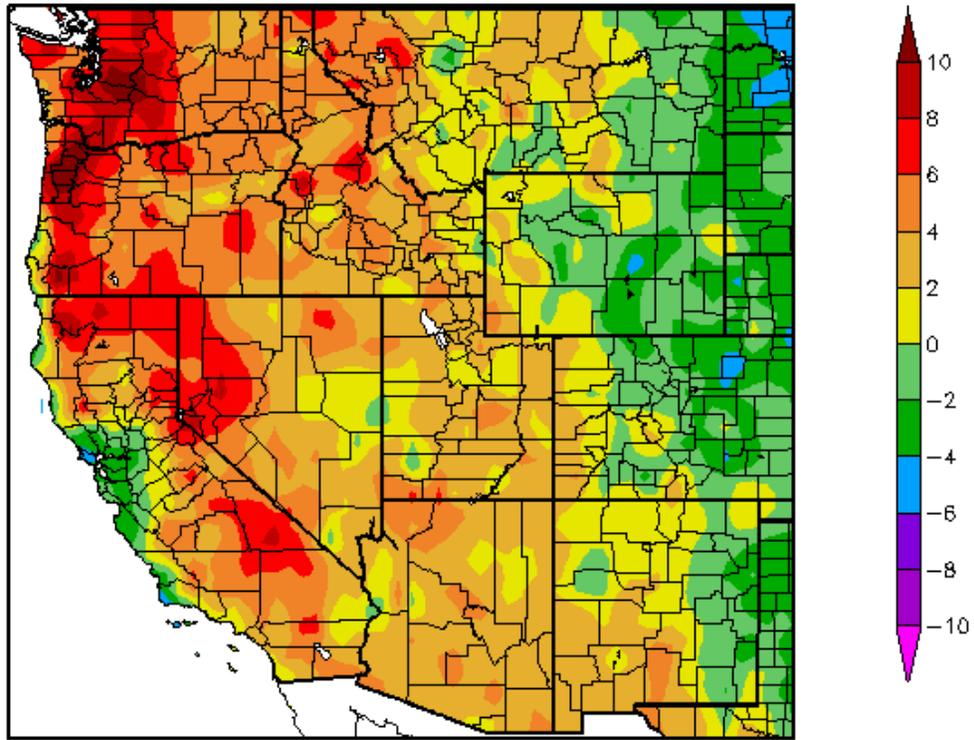


Fig. 1. SNOTEL and ACIS-day station average temperature anomalies were within 5 degrees of average over most of the West with the exception of well above average temperatures over parts of the Cascades and Central Arizona Mountains.

Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Weekly Snowpack and Drought Monitor Update Report

Departure from Normal Temperature (F)
7/23/2009 – 7/29/2009



Generated 7/30/2009 at HPRCC using provisional data.

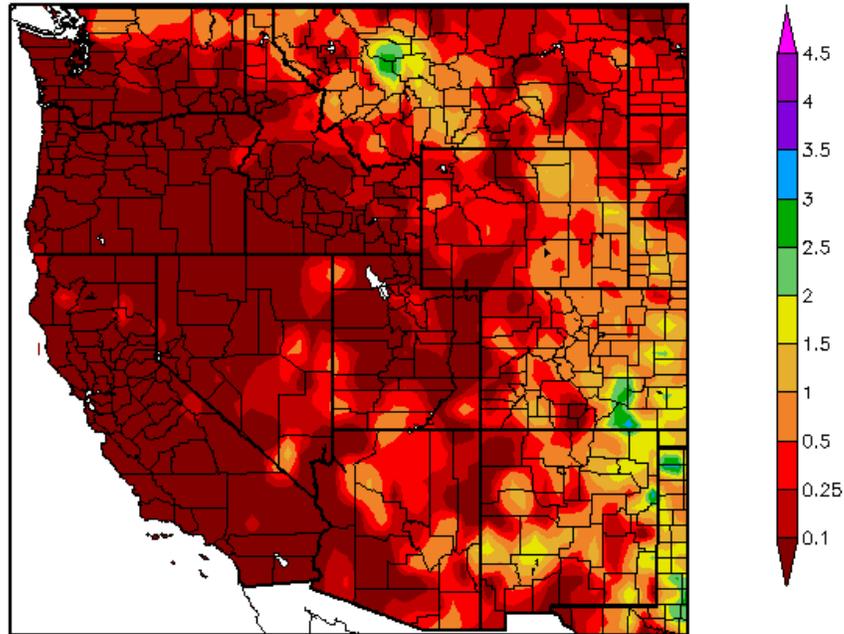
NOAA Regional Climate Centers

Fig. 1a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over northwest Oregon and west of the Cascades in Washington (>+10F) and the greatest negative departures occurred over Western High Plains (<-4F).

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

Weekly Snowpack and Drought Monitor Update Report

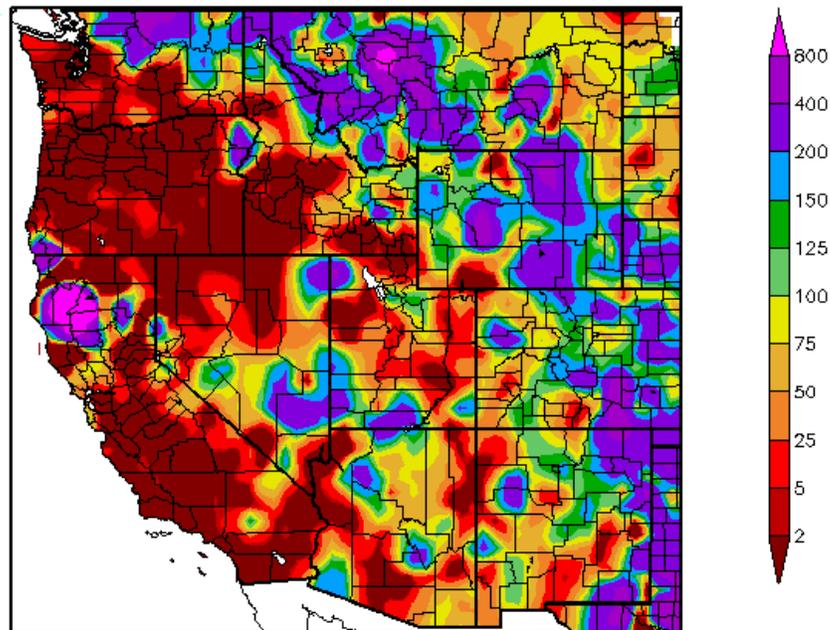
Precipitation (in)
7/23/2009 – 7/29/2009



Generated 7/30/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
7/23/2009 – 7/29/2009



Generated 7/30/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2. and 2a. ACIS 7-day average precipitation amounts for the period ending 29 July shows a mostly dry West with the exception of scattered thunderstorms across the Rockies and northern most areas of Washington. Ref: http://www.hprcc.unl.edu/maps/index.php?action=update_product&product=PNorm

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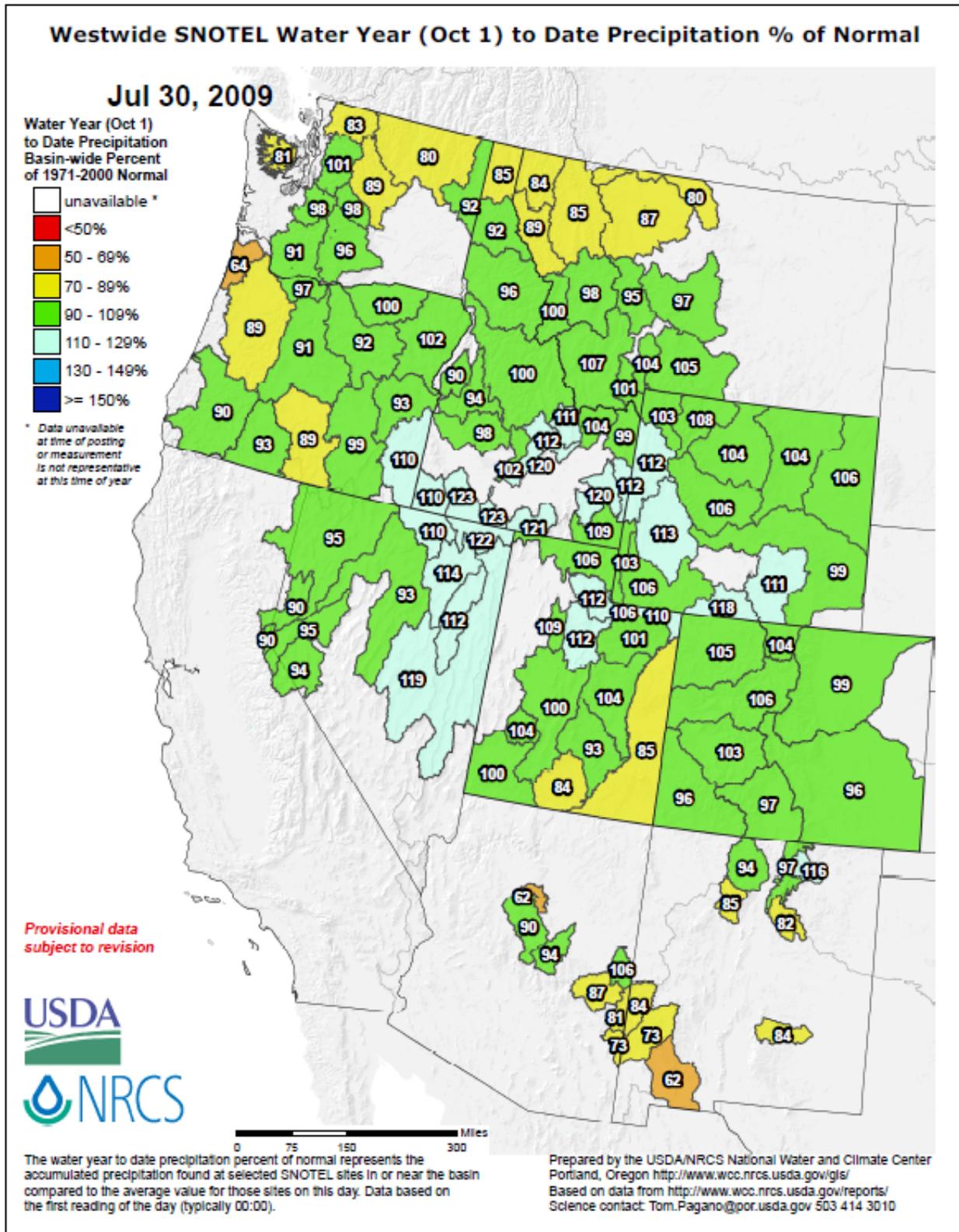
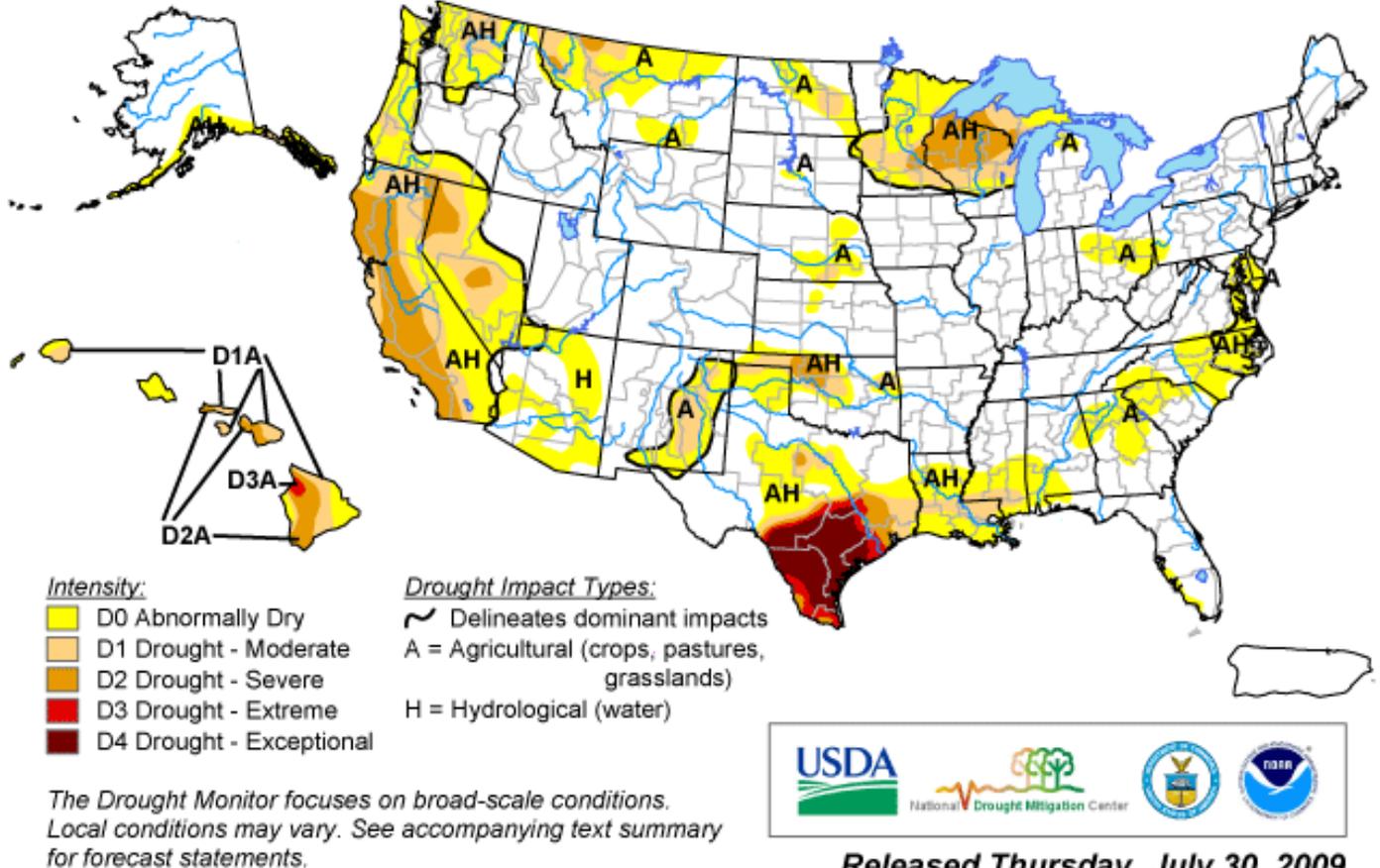


Fig 2b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows surplus values over southern Idaho into Wyoming and eastern Nevada with deficits over the northernmost Tier States, southwest New Mexico, and northwest Oregon.

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

U.S. Drought Monitor

July 28, 2009
Valid 8 a.m. EDT



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

Fig. 3. Current Drought Monitor weekly summary.

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

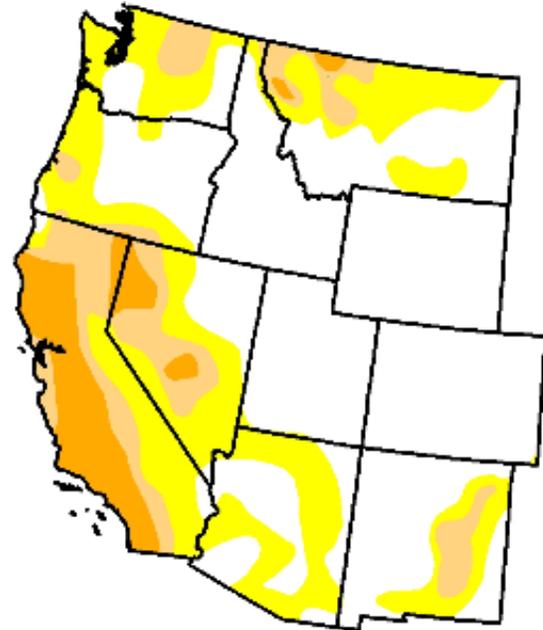
U.S. Drought Monitor

West

July 28, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	57.1	42.9	17.5	7.2	0.0	0.0
Last Week (07/21/2009 map)	54.9	45.1	18.9	7.8	0.0	0.0
3 Months Ago (05/05/2009 map)	38.8	61.2	24.6	6.9	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 (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (07/29/2008 map)	35.5	64.5	31.2	10.2	0.8	0.1



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



Released Thursday, July 30, 2009

Author: Mark Svoboda, National Drought Mitigation Center

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

Fig. 3a. Drought Monitor for the Western States with statistics over various time periods. Regionally, conditions have improved slightly during the past week.

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

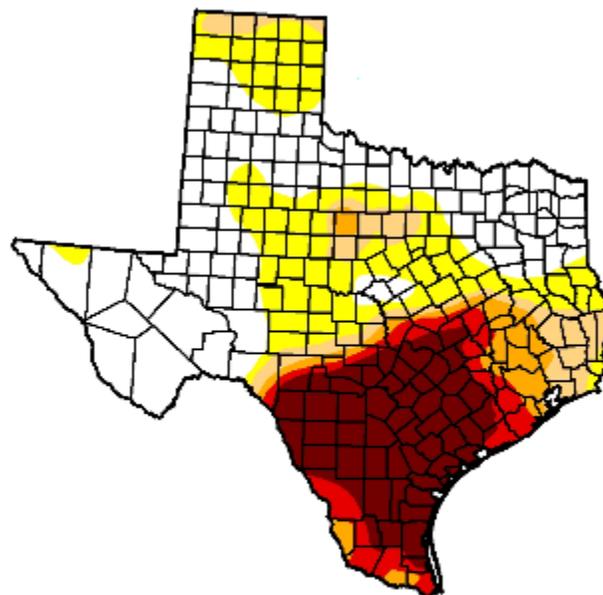
U.S. Drought Monitor

Texas

July 28, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	39.0	61.0	38.1	30.2	24.7	18.7
Last Week (07/21/2009 map)	32.3	67.7	38.7	29.6	24.7	16.5
3 Months Ago (05/05/2009 map)	28.2	71.8	53.7	39.2	21.6	9.7
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0
One Year Ago (07/29/2008 map)	14.3	85.7	68.2	36.4	19.6	3.2



Intensity:

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

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Released Thursday, July 30, 2009

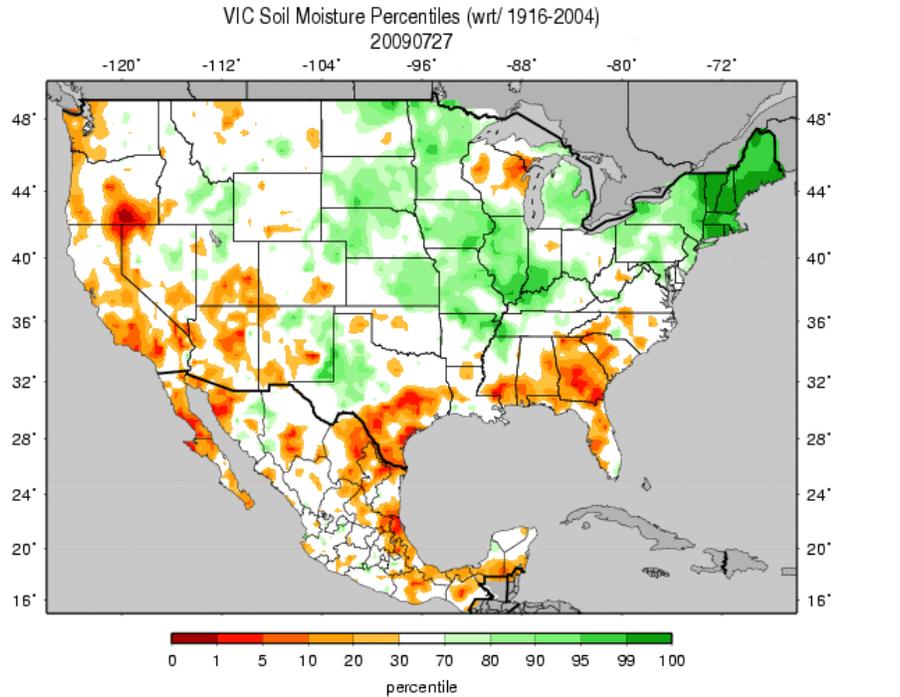
Author: Mark Svoboda, National Drought Mitigation Center

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

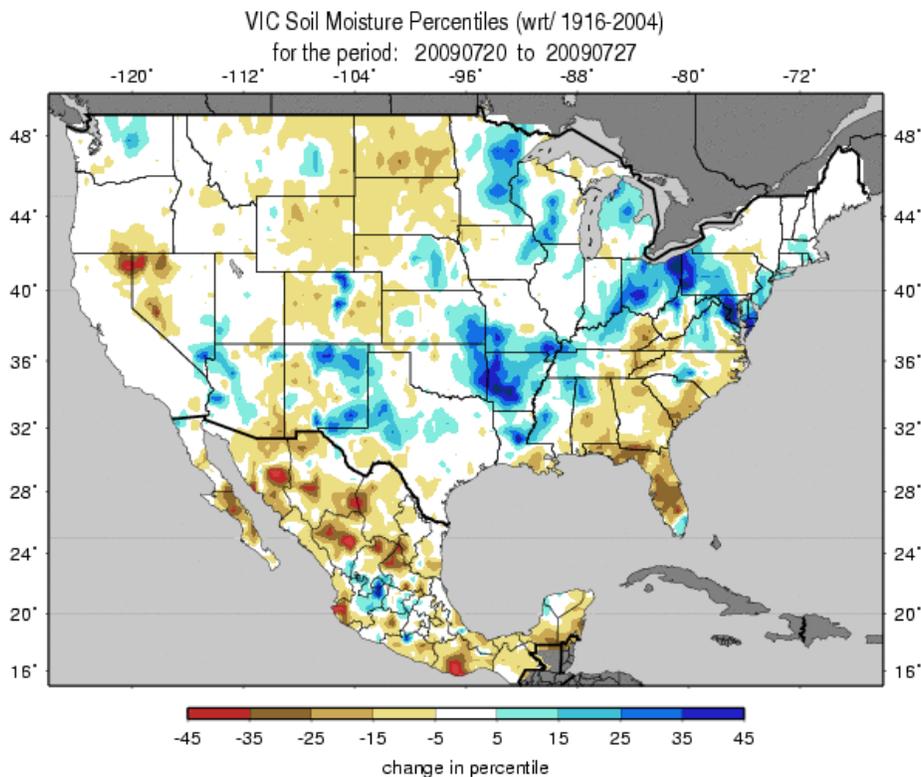
Fig. 3b: Texas is the only state with D4 drought condition in the US. Note no drought designated areas have expanded somewhat since last week. See article: *Texas Scorched by Worst Drought in 50 Years:* <http://online.wsj.com/article/SB124872939604384837.html>.

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 27 July. Near saturation exists over the northeastern region of the country, while excessive dryness is scattered across the Gulf Coast States, Wisconsin, and parts of the West. Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_gnt.gif



Figs. 4b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. Excessive dryness is found over Florida and northeast California. Excessive moisture is found over the Mid-Atlantic States, Minnesota, Arkansas, and the eastern first of New Mexico. Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_gnt_1wk.gif

Weekly Snowpack and Drought Monitor Update Report

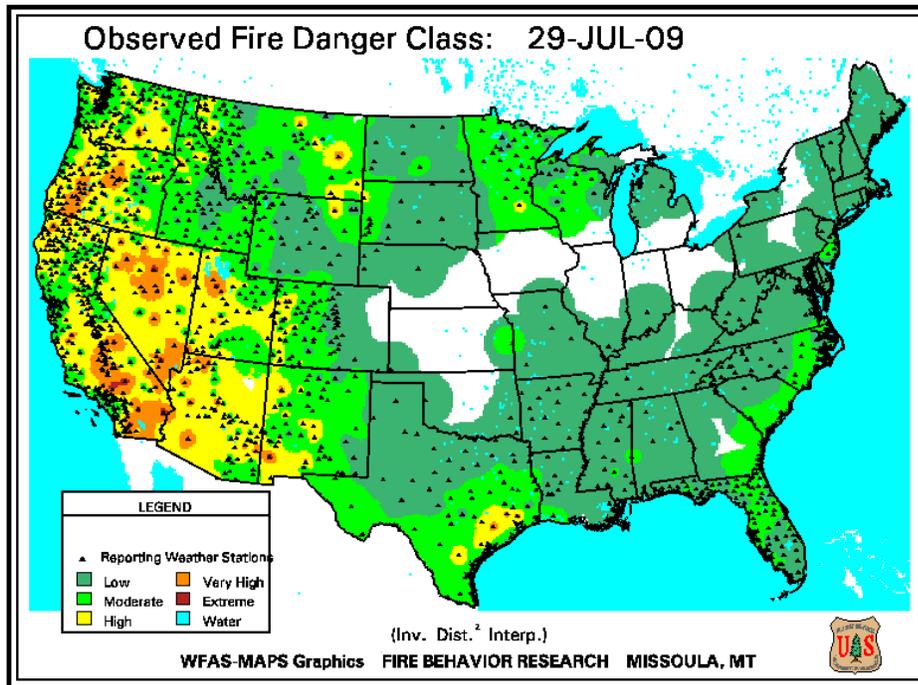


Fig. 5a. Observed Fire Danger Class. Conditions over the West have temporarily improved since last week. Ref: http://www.wfas.net/images/firedanger/fd_class.gif

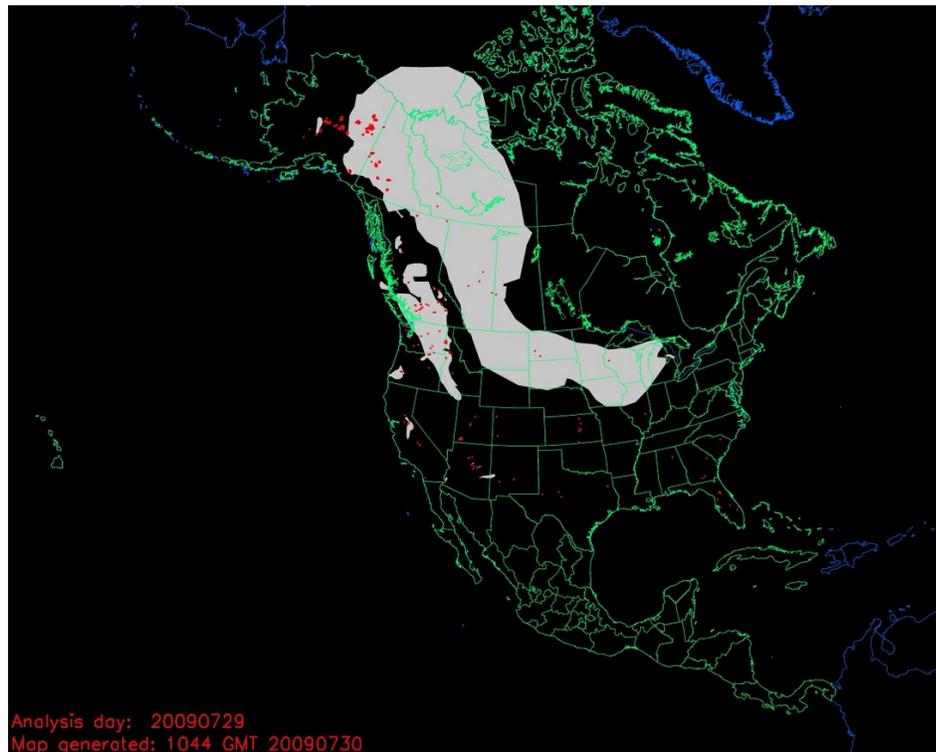


Fig. 5b. Hazard Mapping System Fire and Smoke. Analysis for day 7/29/2009 last updated at 7/30/2009 10:47:29 GMT Fires are in red. Fire size has been increased so fires are visible in this large view. Smoke, when detected by the analyst, is in gray. The large smoke plume is from a large fire is near Ft Yukon, Alaska. Ref: <http://www.osdpd.noaa.gov/ml/land/hms.html>.

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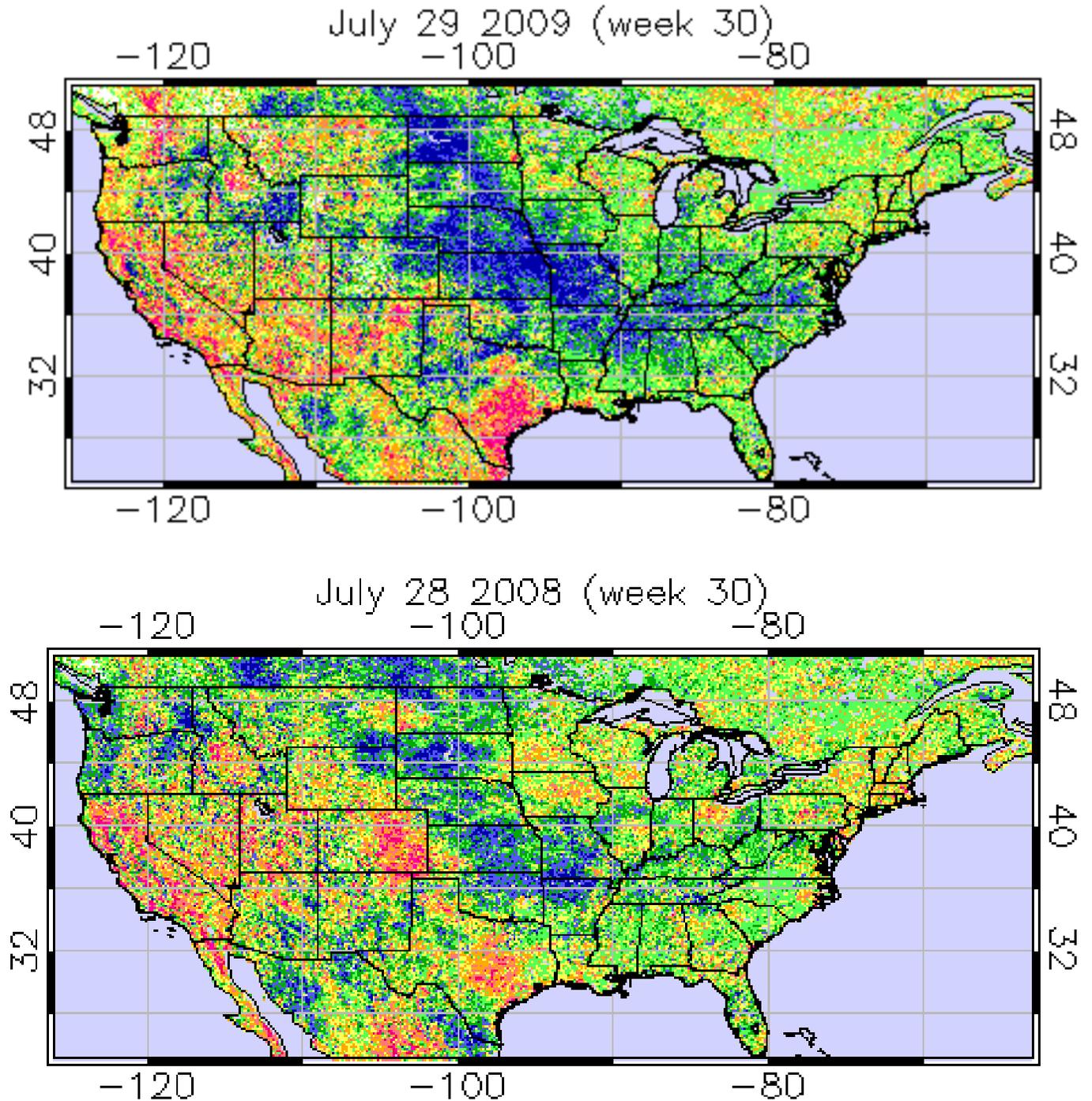
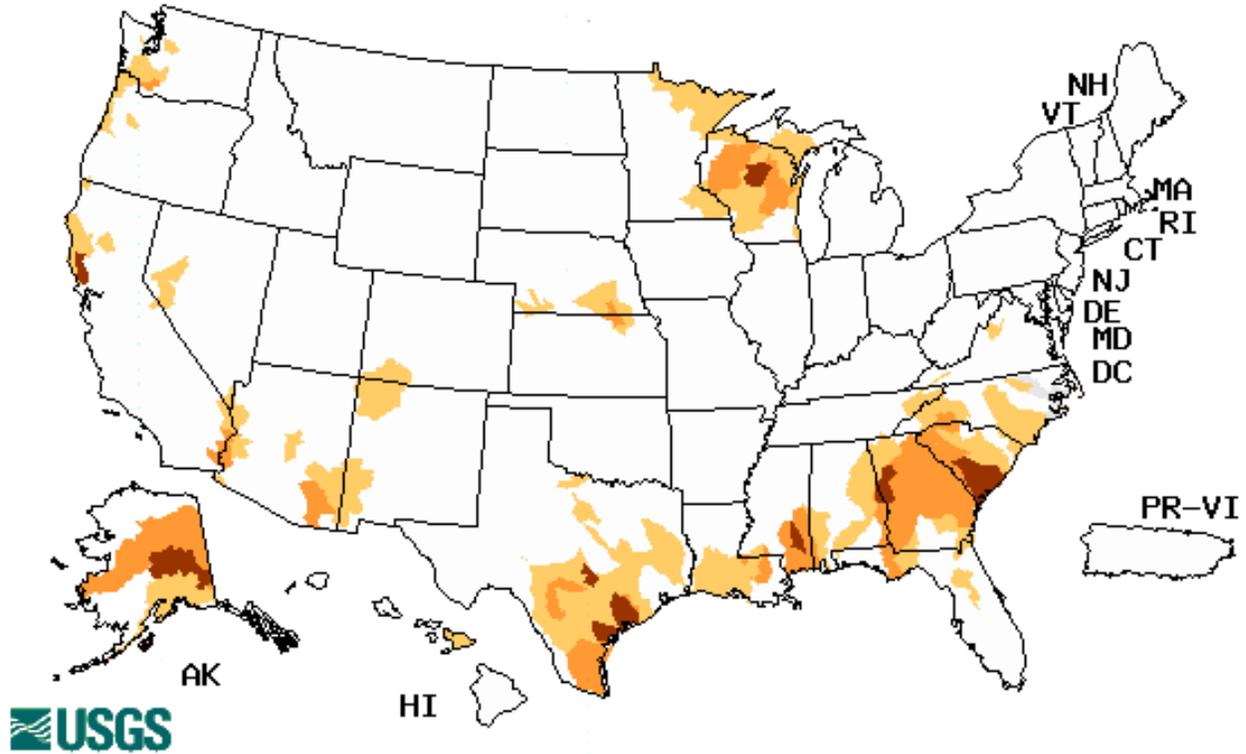


Fig. 6. Vegetation Drought Response Index: Note the comparison to last year. The Central and Northern Great Plains are very favorable while Texas, California, and north-central Washington shows very stressed conditions this week. Last year, California and Colorado were the most stressed states. Ref: http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php

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Wednesday, July 29, 2009

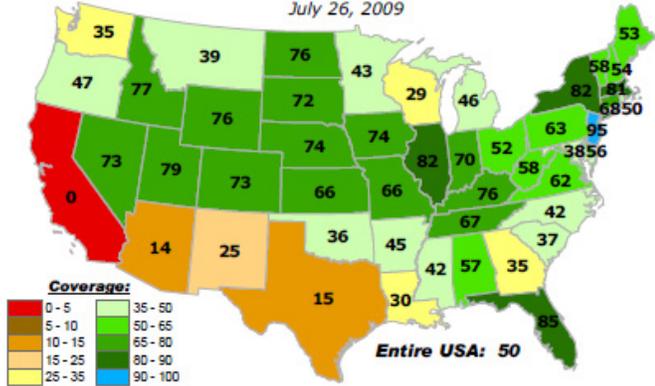


Explanation - Percentile classes				
Low	<=5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

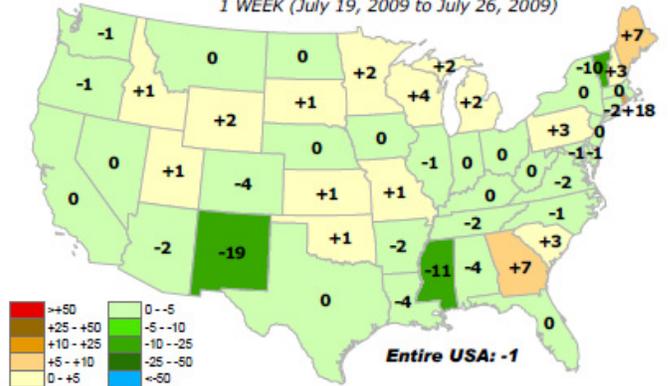
Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Severe flows over parts of Texas to South Carolina and Wisconsin persist this week. Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

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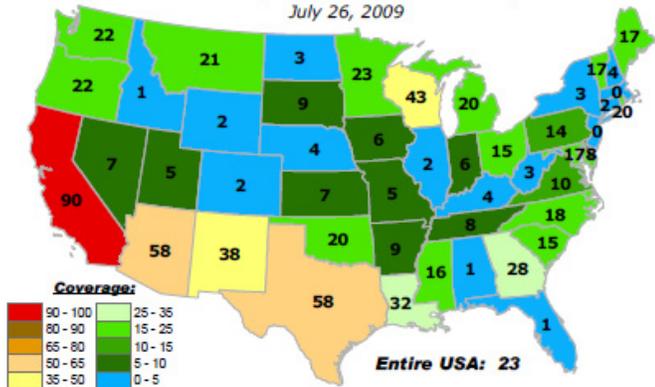
Percent of Pasture & Range Land in "Good" or "Excellent" Condition
July 26, 2009



CHANGE in % of Pasture and Range Lands in "Poor" or "Very Poor" Condition
1 WEEK (July 19, 2009 to July 26, 2009)



Percent of Pasture & Range Land in "Poor" or "Very Poor" Condition
July 26, 2009



CHANGE in % of Pasture and Range Lands in "Poor" or "Very Poor" Condition
4 WEEKS (June 28, 2009 to July 26, 2009)

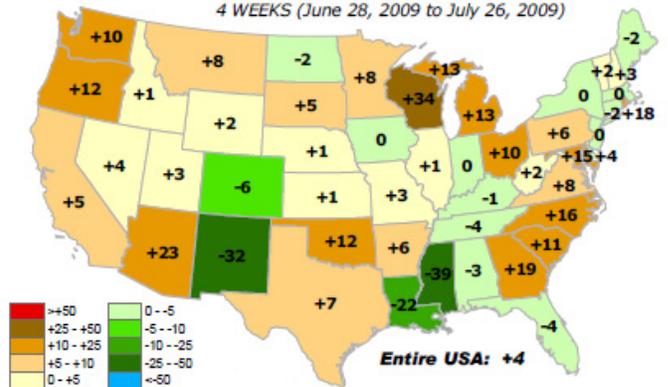


Fig. 8. Current Pasture and Range Land conditions and changes over the last week and last month.

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

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National Drought Summary -- July 28, 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/>.

The Northeast and Mid-Atlantic: As has been the case across much of the East this summer, cool weather remained entrenched over much of the region with some relief coming in the form of rains during the past week across parts of Maryland and eastern North Carolina. As a result, abnormally dry (D0) conditions have retreated in Maryland near Washington, D.C., area. To the south, slight improvement is also depicted this week along the southern coast of North Carolina in the Wilmington region, where 2-4 inches of rain fell. Improvement is also noted south and east of Charlotte where beneficial rains fell as well. The opposite holds true in the western part of the state, where D0 has again pushed west and north toward the Tennessee border.

Southeast: Most of the region remains status quo this week, but a few changes are worth noting. Temperatures across much of the Southeast stayed in the normal range. The introduction of a small tongue of D0 is noted in southwestern coastal Florida where wet-season rainfall deficits continue to accrue during the wet season after a below-normal dry season as well. The D0 stretches south from the Tampa Bay area to the western reaches of Everglades National Park in Monroe County. A quiet week with minimal rainfall in Georgia and Alabama leaves them unchanged this week.

The Gulf Coast: Heavy rains (2-6 inches) fell across most of western Mississippi, southern Arkansas, northern Louisiana, and eastern/northeastern Texas. Most of these areas saw a 1-category improvement, leading to a reduction of D0/D1 in the region. However, many of the remaining areas still in D0/D1 are sitting at just 50-75% of normal precipitation for the year.

The Plains: A mixed bag of conditions this week, resulting in both improvements and degradation noted. Starting in the north, North Dakota has been quite dry after all the flooding that made the news earlier this year, although the cooler weather has helped mitigate more serious impacts. The D0 has expanded out of Minnesota and spilled into North Dakota from the southeastern corner of the state to the north central counties. In addition, an area of D1 has also been introduced in a core area of east-central North Dakota where 4-7 inch deficits (25-50% of normal) have accumulated over the past 90 days.

Most of Oklahoma experienced a cool week, with temperatures generally running 4-6 degrees below normal. The only good rains in Oklahoma, though, were contained to parts of the extreme Panhandle and southeastern corner, where 2-4 inches were reported. This has led to the peeling back of D0 in the extreme western tip of the Panhandle and across portions of east-central Oklahoma. On the other hand, an introduction of D1 is noted in northeast Oklahoma and an introduction of new D2 is marked in northwest Oklahoma after yet another dry week. The cooler temperatures have helped, but not enough to offset the slowly deepening drought.

Several locations in extreme southeastern Colorado and southwestern Kansas reported rainfall totals of 2-4 inches or more leading to the removal of Abnormally Dry (D0) conditions there this week.

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Texas also sees a combination of degradation and improvements this week. The mixed bag starts with improvements in west-central Texas around the Midland area where pockets of 2 inches or more were reported. This results in D0 pulling eastward in this region and northward through the Texas Panhandle too. The heaviest rains in the state the past week fell across eastern and particularly northeastern Texas, where 3-6 inches fell as of the cutoff this week, with more coming after the deadline and more on the way. Improvements are warranted as both D0 and D1 were pushed south and west. The same can't be said for most of southern Texas, however, where record heat and no significant rains (most places not getting anything measurable) have coupled to increase the impacts of their exception, protracted drought. A slight expansion of D1-D4 is noted here, where many locales are looking at July readings challenging the all-time warmest months on record, with most days exceeding triple digits.

Upper Midwest: Rains managed to miss most of the worst drought-affected portions of Wisconsin and Minnesota, but some parts of north-central Minnesota did see enough to push the D0 and D1 slightly eastward and southward this week around Duluth and brought some relief to locations along the Minnesota-Wisconsin border. Conditions worsened in the western third of the state, leading to some slight expansion of D1 there and extending D0 into North Dakota as well.

The West: Decent monsoonal rains continue to benefit eastern and southeastern New Mexico, where 2-4 inches brought about a removal of D2 and a westward retraction of D0-D1 across the eastern third of the state.

In Montana, improvements continue on the heels of more rains this week. D1 has been removed in northeastern Montana, and some small D2 pockets have been removed in parts of central Montana as well. The D0-D1 line has also been pushed north and west a bit, with additional rains falling as July draws to a close. A return to good water levels has led to the changing of the drought depiction in Montana from "AH" to just "A" to reflect these improvements.

Farther west in the coastal reaches of the Pacific Northwest, the record-setting heat is on, with many heat advisories and an increased risk of fire under a dominating dome of high pressure, which has brought triple-digit heat for many days now. D0 now connects virtually all of the West Coast from Washington to southern California, with only a little stretch of coast at the California/Oregon border showing no form of dryness or drought thus far.

Hawaii, Alaska and Puerto Rico: Hawaii and Puerto Rico remain unchanged this week. Over the past week, Alaska benefitted from some heavy coastal rains (3-6 inches), leading to some removal and readjustment of D0 and D1.

Looking Ahead: Over the next 5 days (July 30-August 3), temperatures across the United States are expected to be dominated once again by upper-level ridging in the West and troughing in the East. This should result in above-normal temperatures across most of the West and below-normal temperatures from the Rockies eastward to the Atlantic and even down into the Southeast and Gulf Coast states. The greatest anomalies most likely will be across the northern tier states. As for precipitation, the West looks to remain dry except for some monsoonal flow across eastern New Mexico and up into Colorado. The upper Midwest, southern Plains, Southeast, and the East all stand a good chance of seeing beneficial rainfall over this period.

The 6-10 day forecast (August 4 – August 8) calls for some relief from high temperatures in the West, with normal to below-normal readings expected. Cooler-than-normal temperatures are also likely across the Upper Midwest and into the Northeast. Warmer temperatures can be expected across most of eastern and southeastern Alaska as well as across the southern United States from the Four Corners region to northern Florida and Georgia. Below-normal

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precipitation is called for in eastern Alaska, the Upper Peninsula of Michigan, the Great Basin, and parts of the Southwest, continuing across southern Oklahoma and most of Texas into the coastal reaches of the Gulf Coast states. Above-normal rains are more likely across the coastal reaches of the Pacific Northwest, and from the Corn Belt into the Mid-Atlantic and Northeast.

Author: Mark Svoboda, National Drought Mitigation Center.

Dryness Categories

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

Drought Intensity Categories

D1 ... Moderate Drought

D2 ... Severe Drought

D3 ... Extreme Drought

D4 ... Exceptional Drought

Drought or Dryness Types

A ... Agricultural

H ... Hydrological

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