



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

Weekly Report - Snowpack / Drought Monitor Update Date: 25 June 2009

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent percent to date shows a few basins holding on to surplus amounts although snow data statistics become less reliable at the end of the water year when any snow on the ground is rare except at the highest elevations (Fig 1).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were below average over most of the West with the largest departures extending from Idaho to Utah (Fig. 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas of central coastal California and northeast New Mexico (**>+4F**) and the greatest negative departures occurred over east-central Nevada and west-central Utah (**<-8F**) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 24 June shows precipitation falling from much of the Central Pacific Northwest, Intermountain West, and over the Northern and Southern Rockies. The remainder of the West was very dry (Fig. 3). Note that during this time of year when rainfall is generally light, it doesn't require very much precipitation to exaggerate the percent of normal values (Fig. 3a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values practically unchanged since last week (Fig. 3b). The driest areas remain over the extreme Northern Tier States and over the extreme Southwest.

WESTERN DROUGHT STATUS

The West: Above normal precipitation once again fell from northern California and Oregon, across northern Nevada and southern Idaho, and into Colorado and Wyoming. A second swath of above normal precipitation fell from western New Mexico up into southern Colorado. This beneficial precipitation eased severe (D2) and moderate drought (D1) as well as abnormal dryness (D0) in northern Nevada and southern Oregon and through central Nevada. Moderate drought (D1) and abnormal dryness (D0) expanded slightly in northern Montana, which largely missed the precipitation this week. Author: Michael Brewer, National Climatic Data 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. 4, 4a, 4b, and 4c).

Weekly Snowpack and Drought Monitor Update Report

SOIL MOISTURE

Soil moisture (Figs. 5a and 5b), 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).

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. 6).

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 (<http://ivm.cr.usgs.gov/viewer/viewer.htm>)

The greenness maps (Fig. 7) show the health and vigor of the vegetation. Generally healthy vegetation is considered an indicator of favorable climatic and environmental conditions. While poor vegetation condition is indicative of droughts and diminished productivity. The USGS greenness maps can be used to evaluate the vegetation condition of a region. The greenness maps are produced with a spatial resolution of 1-km. At this scale the greenness maps are most useful for countywide, statewide, and regional evaluation of vegetation condition.

One of the most important aspects of the USGS greenness mapping is the more than 20-year history of information. Over the last 20 years, droughts have come and gone, there have been years when the vegetation has been lush from ample rain, and there have been the "normal" years. From all of this information it is possible to determine the departure from normal for vegetation condition, much like is done for precipitation.

As a result, it is possible to compare this week's vegetation condition with normal conditions. An above normal condition could indicate wetter or warmer than normal conditions while a below normal condition could indicate colder or dryer than normal conditions. The interpretation of departure from normal will depend on the season and geography of a region.

U.S. HISTORICAL STREAMFLOW

This map, (Fig. 8) 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.

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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>. 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

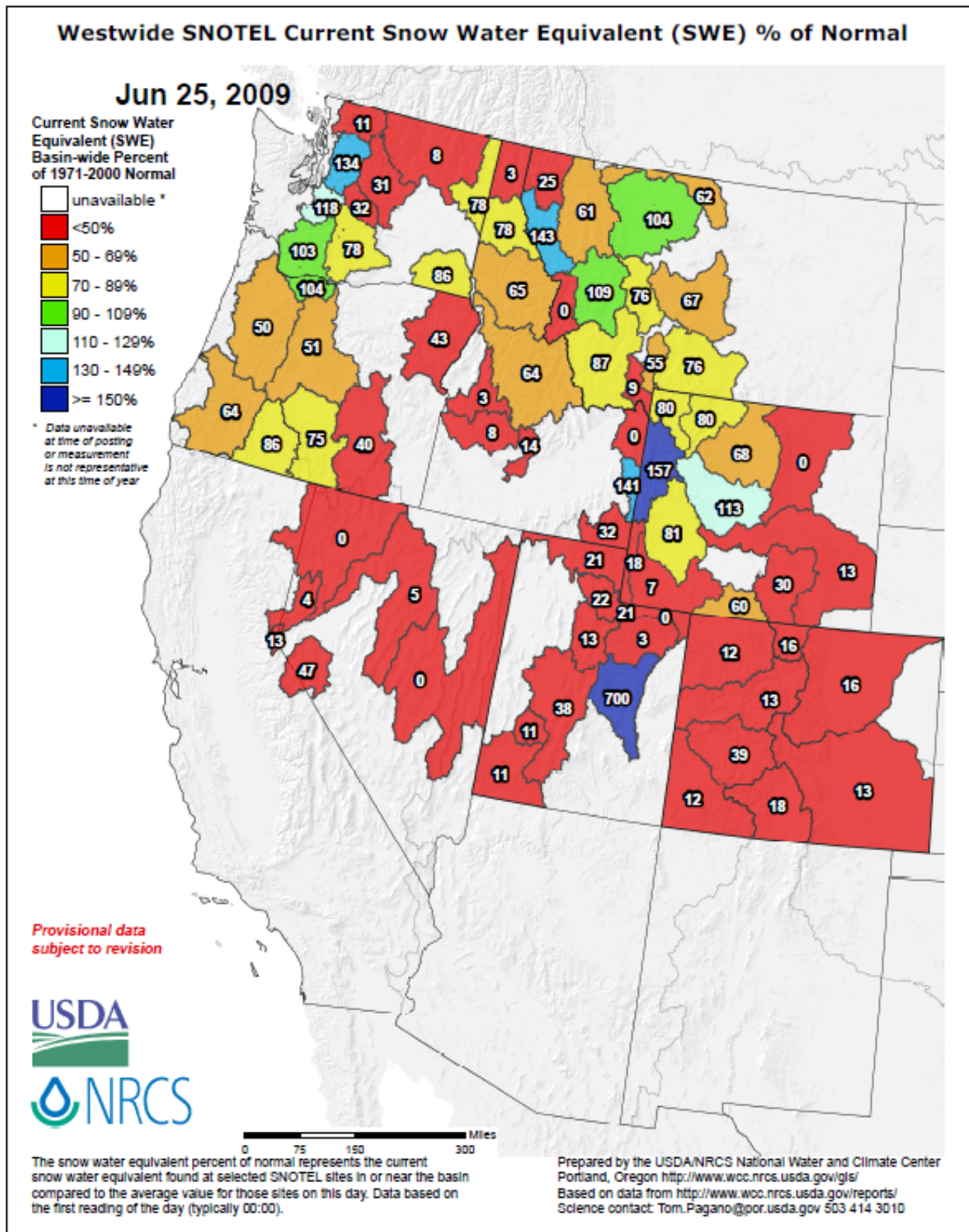


Fig. 1. Snow-water equivalent percent to date shows a few basins holding on to surplus amounts although snow data statistics become less reliable at the end of the water year when any snow on the ground is rare except at the highest elevations.

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

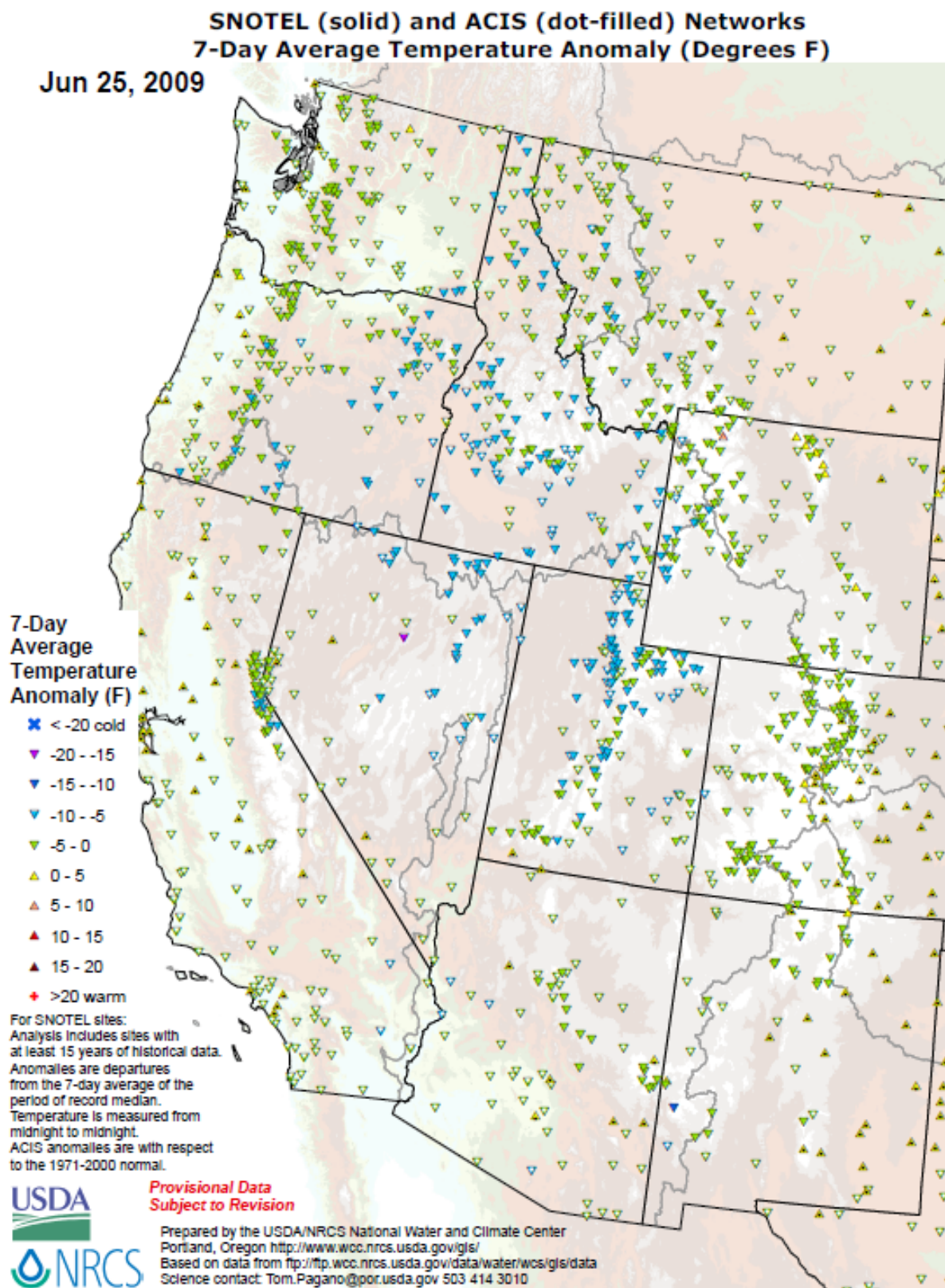
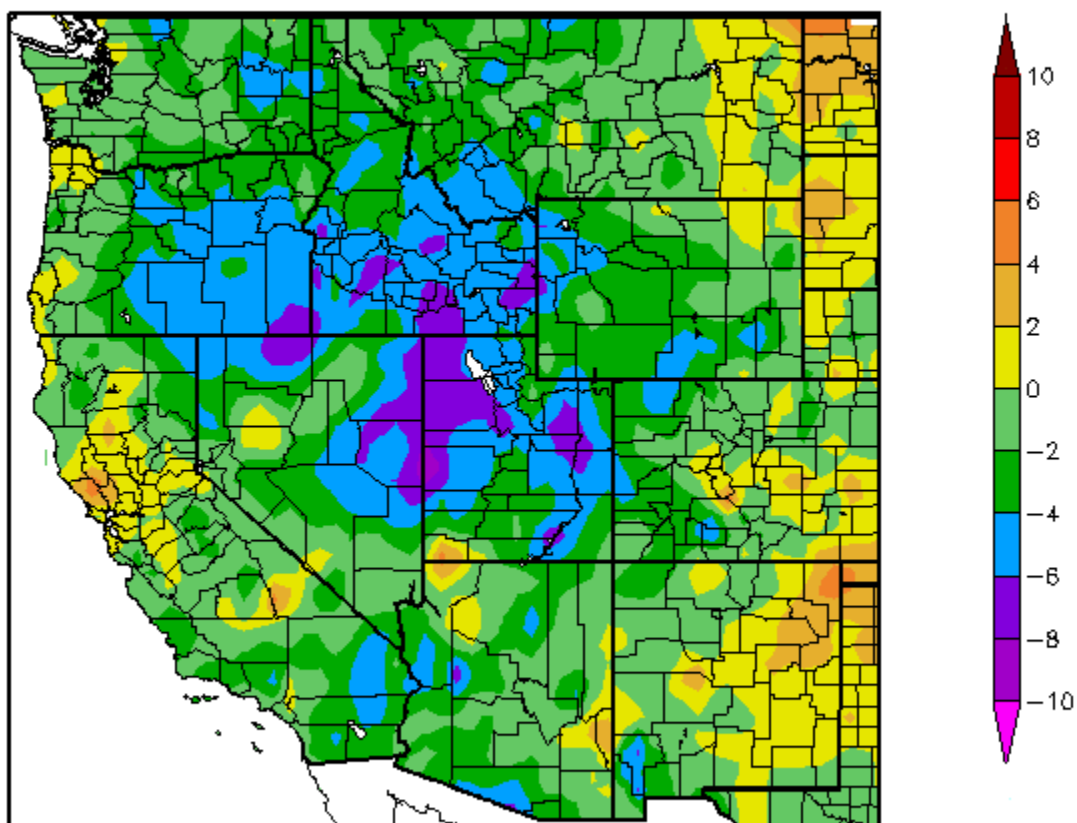


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were below average over most of the West.

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

Departure from Normal Temperature (F)
6/18/2009 – 6/24/2009



Generated 6/25/2009 at HPRCC using provisional data.

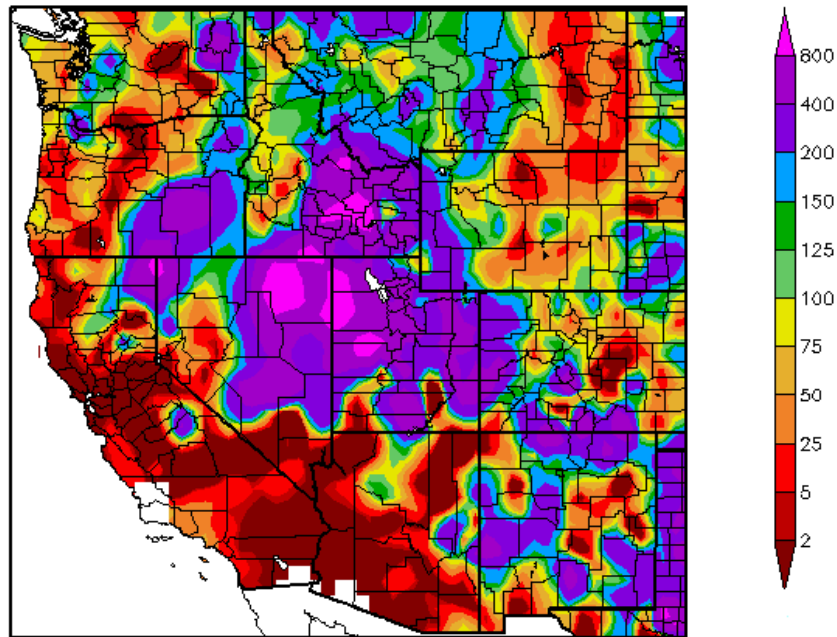
NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas of central coastal California and northeast New Mexico (>+4F) and the greatest negative departures occurred over east-central Nevada and west-central Utah (<-8F).

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

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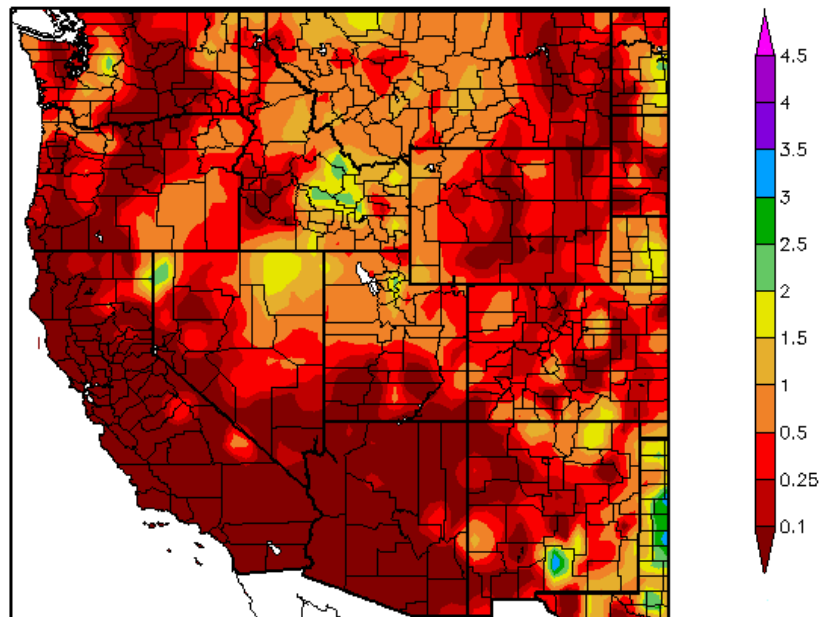
Percent of Normal Precipitation (%)
6/18/2009 – 6/24/2009



Generated 6/25/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Precipitation (in)
6/18/2009 – 6/24/2009



Generated 6/25/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a. ACIS 7-day average precipitation anomaly for the period ending 24 June shows precipitation falling from much of the Central Pacific Northwest, Intermountain, and over the Northern and Southern Rockies. The remainder of the West was very dry. Note that during this time of year when rainfall is generally light, it doesn't require very much precipitation to exaggerate the percent of normal values. Ref: http://www.hprcc.unl.edu/maps/index.php?action=update_product&product=PNorm

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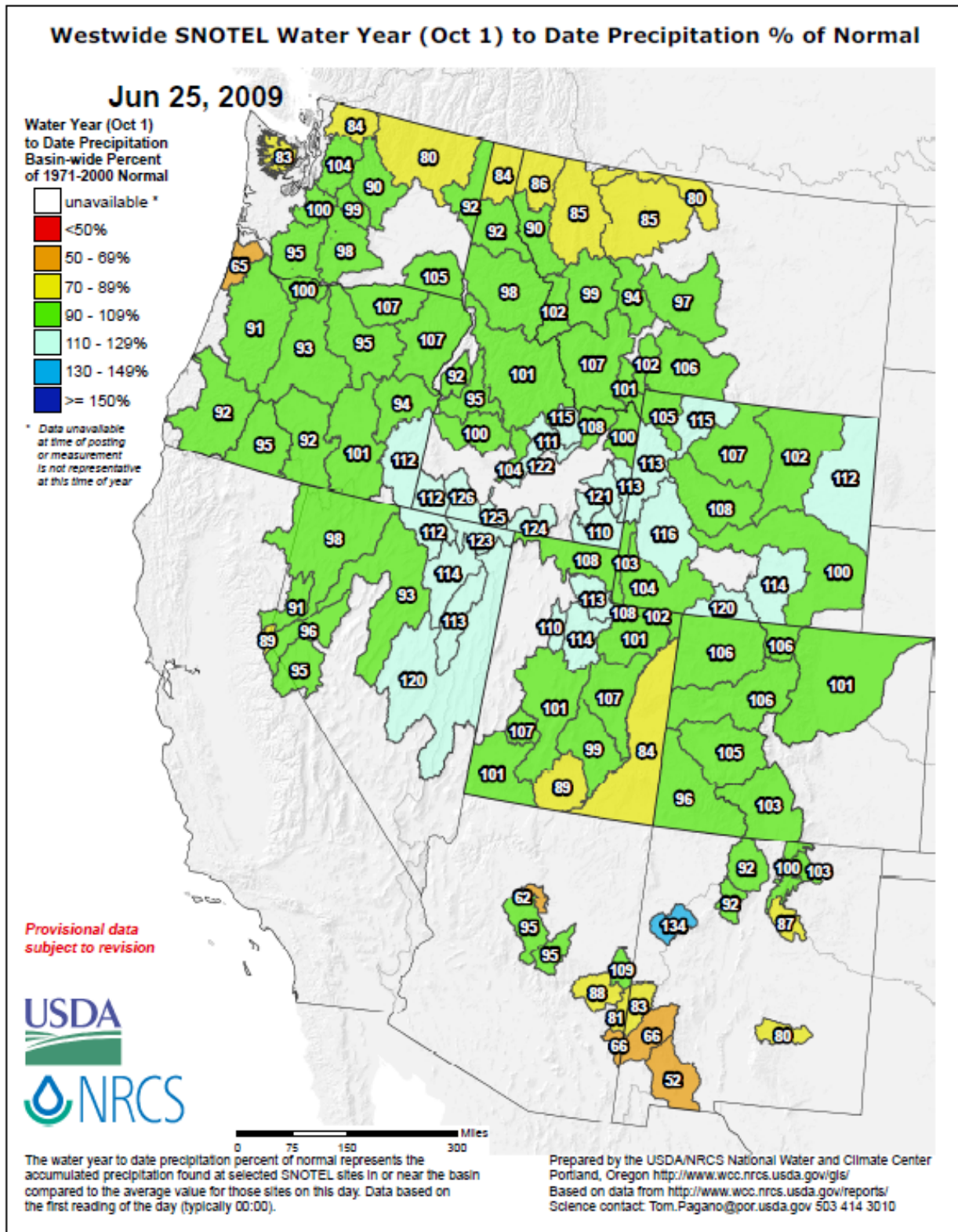
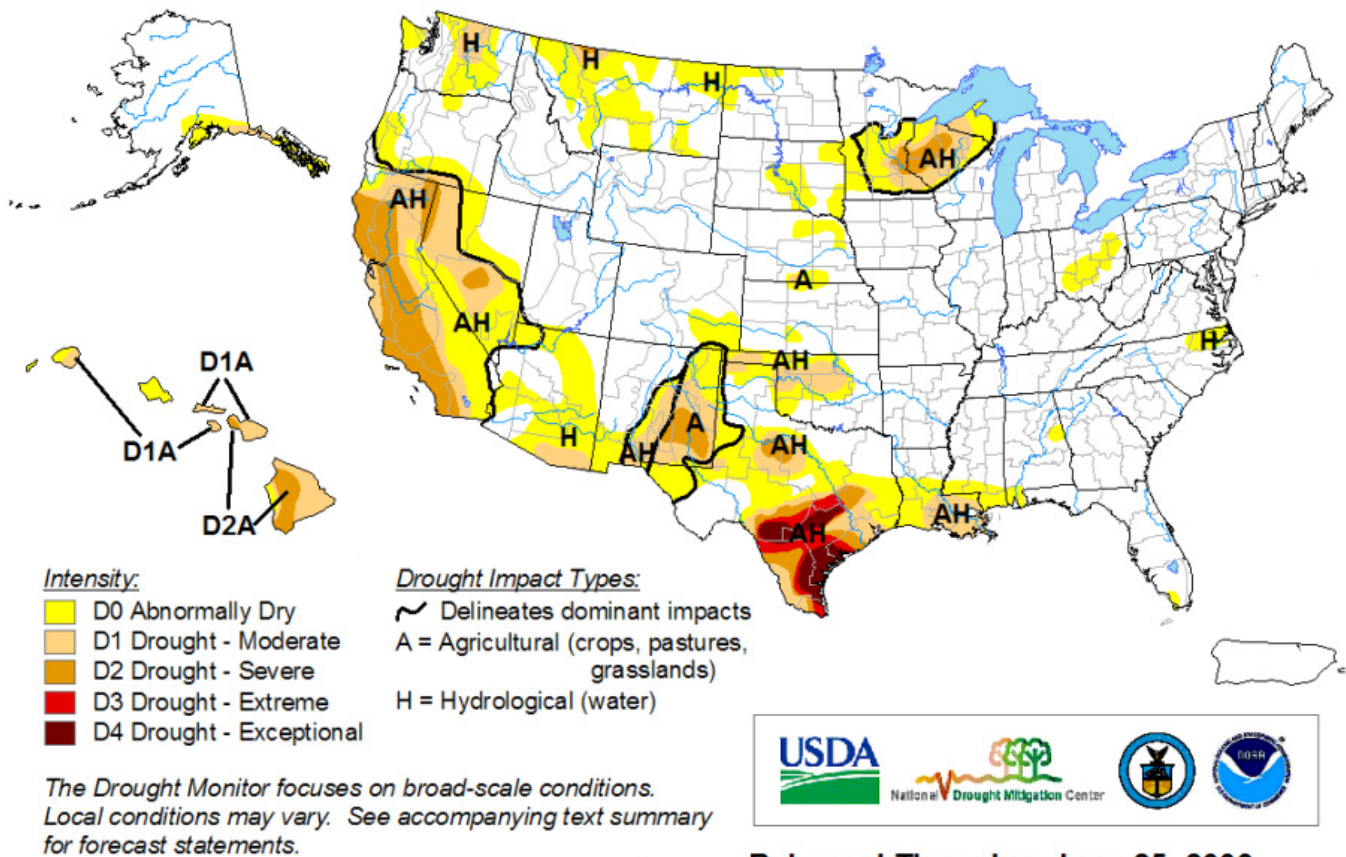


Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values practically unchanged since last week.

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

U.S. Drought Monitor

June 23, 2009
Valid 8 a.m. EDT



Released Thursday, June 25, 2009

Author: Michael Brewer/Liz Love-Brotak, NOAA/NESDIS/NCDC

Fig. 4. Current Drought Monitor weekly summary.

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

U.S. Drought Monitor

West

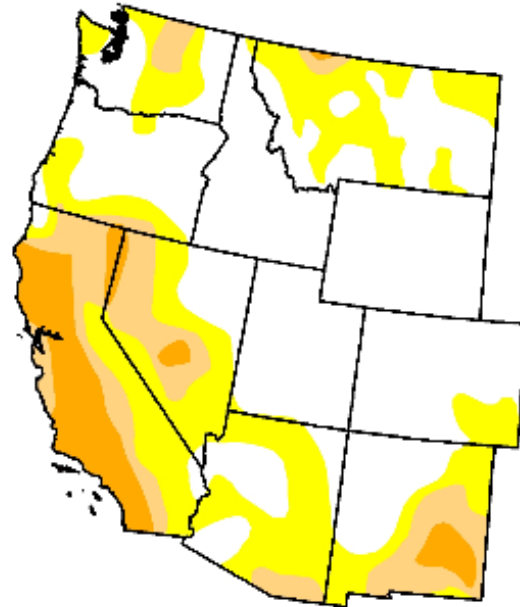
June 23, 2009

Valid 7 a.m. EST

Drought Conditions (Percent Area)						
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	54.7	45.3	18.6	7.4	0.0	0.0
Last Week (06/16/2009 map)	48.3	51.7	20.8	8.0	0.0	0.0
3 Months Ago (03/31/2009 map)	31.7	68.3	28.2	4.2	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 (06/24/2008 map)	40.2	59.8	36.4	9.4	1.8	0.0

Intensity:

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



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, June 25, 2009

Author: M. Brewer/L. Love-Brotak, NOAA/NESDIS/NCDC

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally, conditions have improved a bit during the past week (note circled values).
Ref: http://www.drought.unl.edu/dm/DM_west.htm

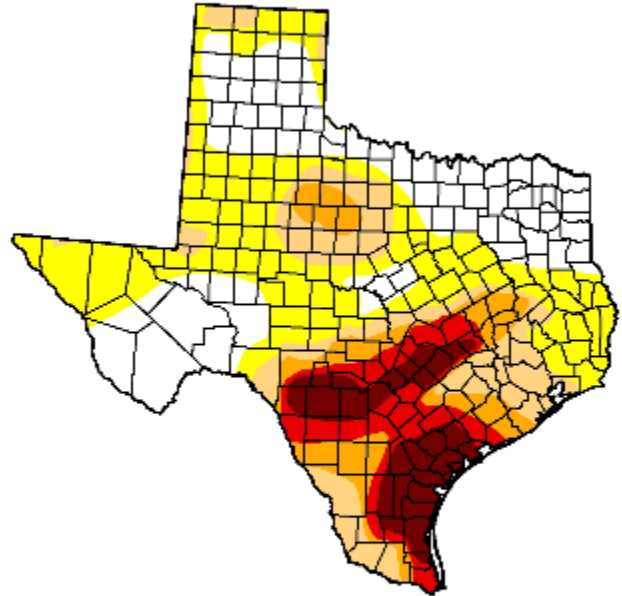
U.S. Drought Monitor

Texas

June 23, 2009

Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	29.7	70.3	38.9	24.1	15.5	8.2
Last Week (06/16/2009 map)	27.0	73.0	45.5	27.8	16.5	7.6
3 Months Ago (03/31/2009 map)	6.7	93.3	80.6	48.3	24.6	7.1
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 (06/24/2008 map)	4.9	95.1	73.5	48.4	27.8	0.4



Intensity:

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

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

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



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Fig. 4b: Texas is the only state with D4 drought condition in the US. Note conditions have improved mostly in the D1-D3 categories but worsened slightly in D4 since last week (noted circled values).

Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S

Drought Monitor Classification Changes for Selected Time Periods

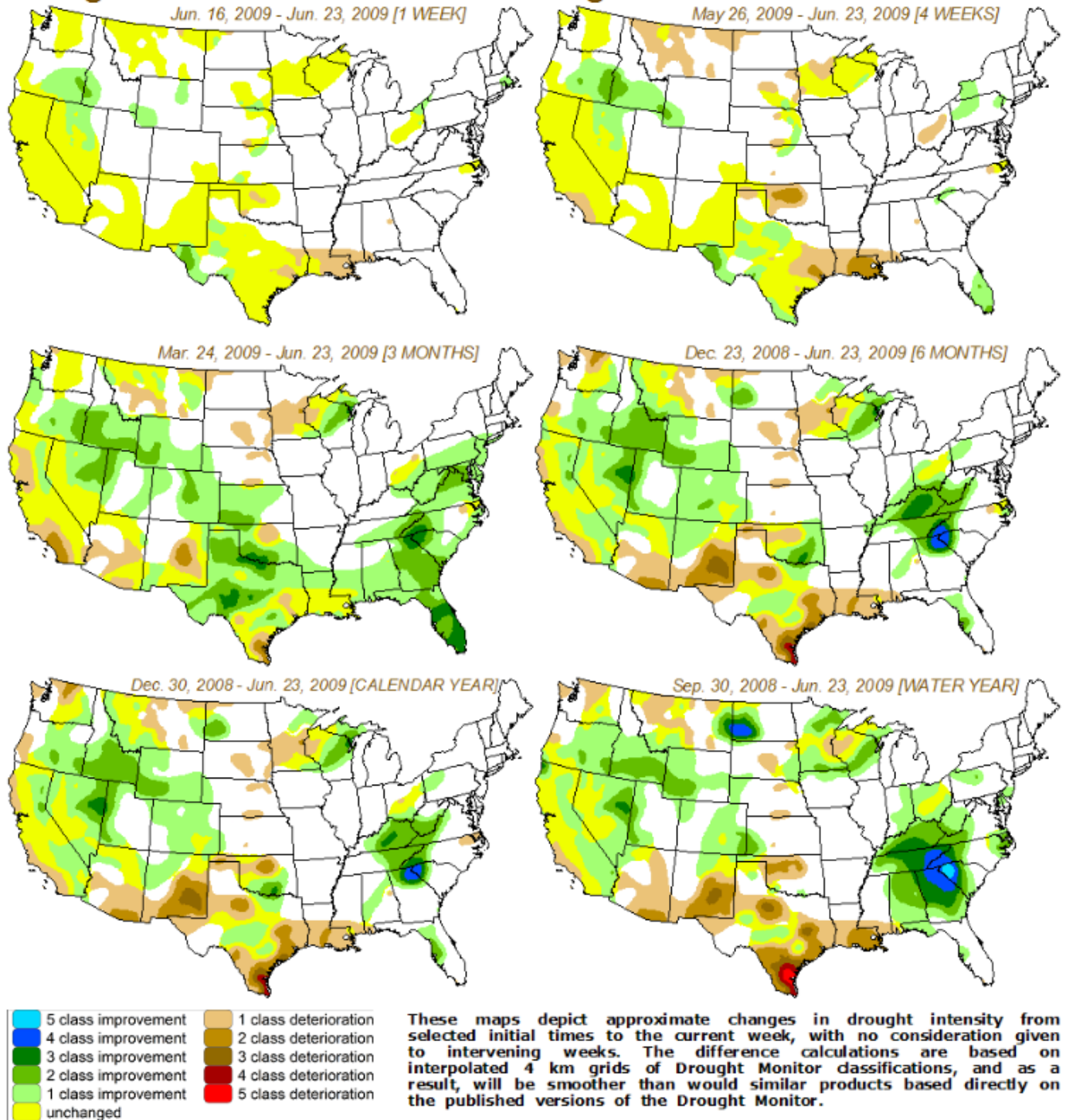
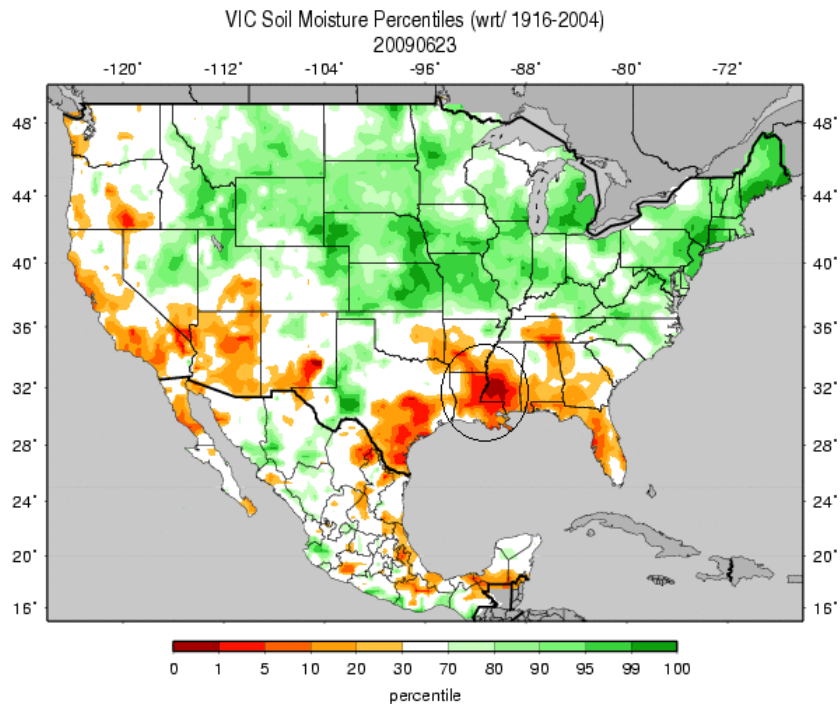


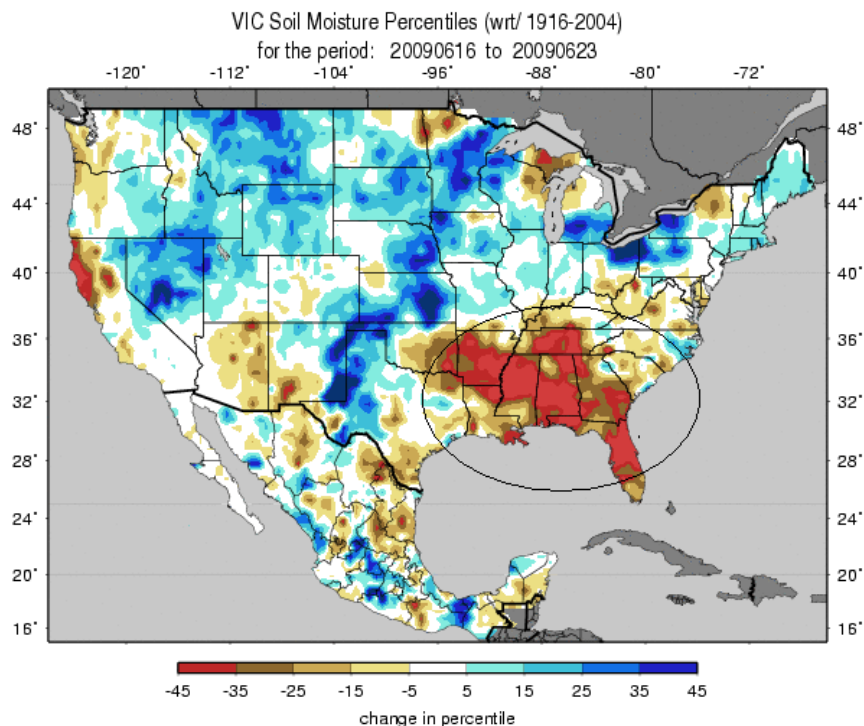
Fig. 4c: Drought Monitor Classification Changes for Selected Time Periods. Note worsening over southern Louisiana and improvement over Oregon and western Texas this week (top left map).

Weekly Snowpack and Drought Monitor Update Report



Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 23 June (no significant change this week except for some drying– circled area). Near saturation exists over the extreme Northern Plain and much of the Appalachians from North Carolina to Vermont, while excessive dryness is scattered across the West from southern Louisiana to Oregon. Ref:

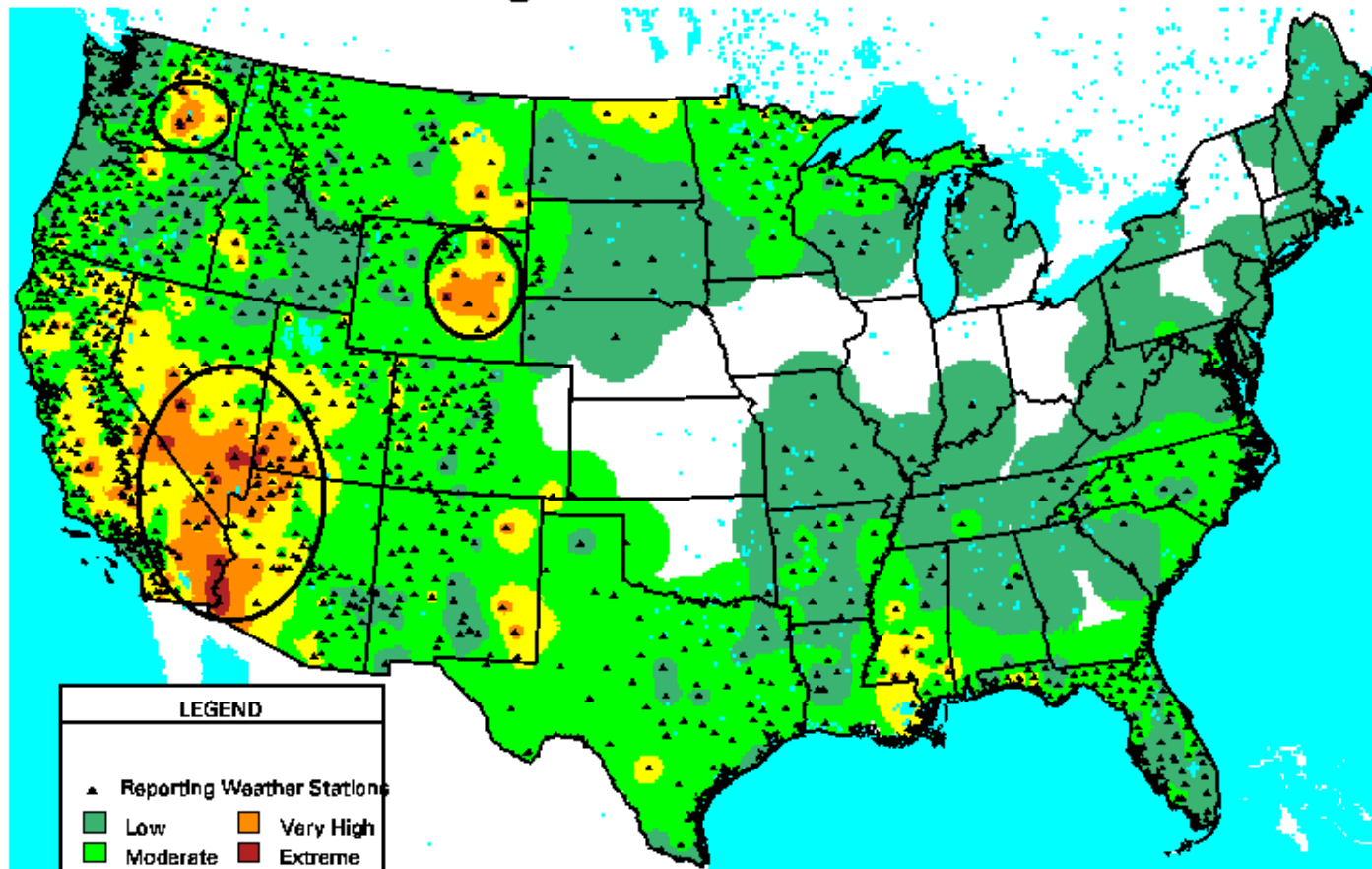
http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif



Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. There was significant moistening in a band extending from west Texas to Minnesota and from Nevada to Montana. Excessive drying (due largely to excess heat) is noted over the Gulf Coast States and north coastal California. Ref:

http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt_1wk.gif

Observed Fire Danger Class: 24-JUN-09



LEGEND	
▲ Reporting Weather Stations	
Low	Very High
Moderate	Extreme
High	Water

(Inv. Dist.² Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCH MISSOULA, MT



Fig. 6. Observed Fire Danger Class. Three new areas very high or worse areas have developed over the West during the past week (note circled areas).

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

Vegetation Drought Response Index
Complete

June 15, 2009

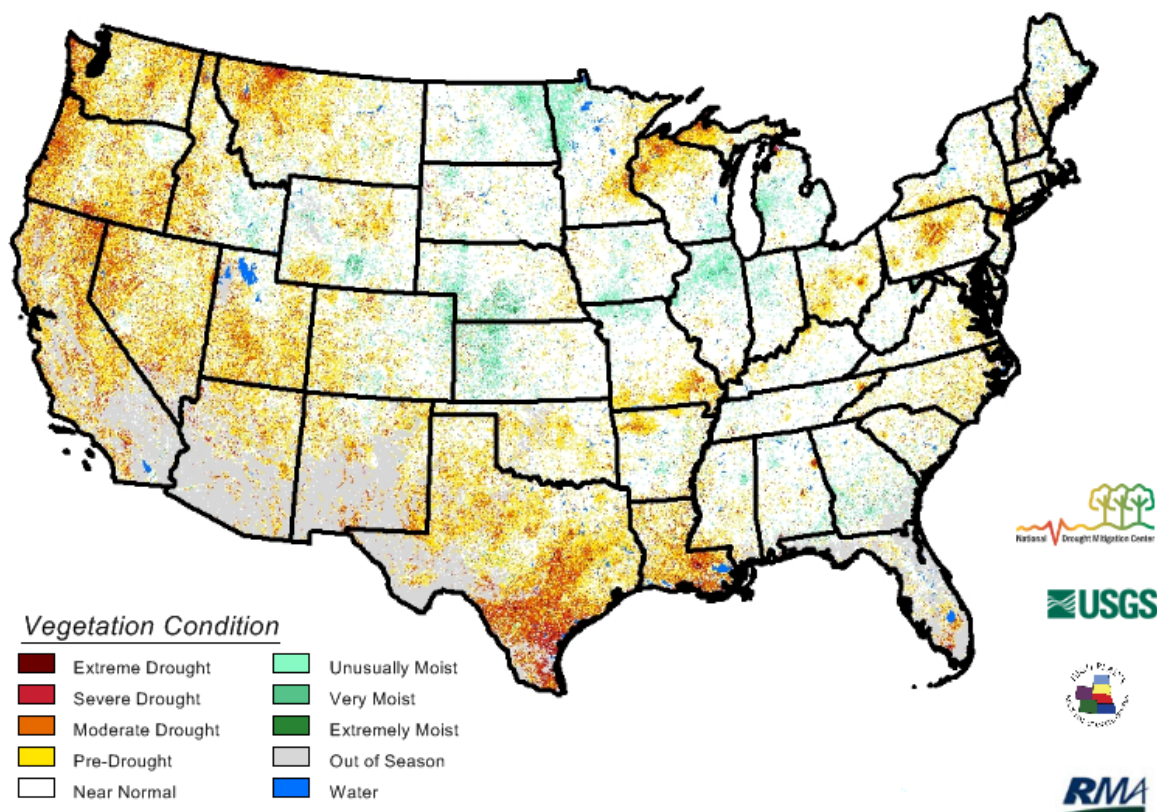


Fig. 7. Vegetation Drought Response Index: This is a new product being developed here at the NDMC along with several partners to show vegetation stress. (No update this week).
Ref: http://drought.unl.edu/vegdr/VegDRI_Main.htm?EV.

Weekly Snowpack and Drought Monitor Update Report

Wednesday, June 24, 2009

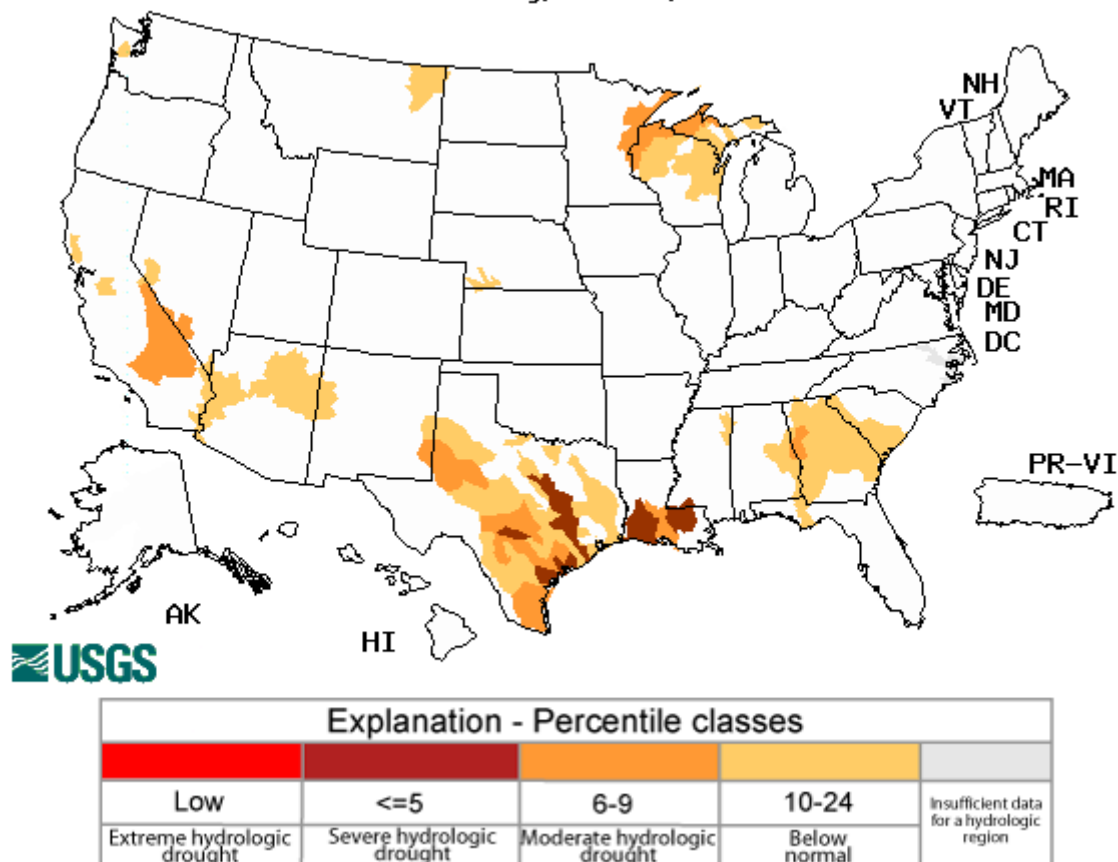


Fig. 8. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions over parts of Texas and now Louisiana are considered severe.

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

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary – June 23, 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/>.

Beneficial precipitation fell this week again in a swath from northeastern California and southern Oregon all the way to the mid-Atlantic and up into New England. Precipitation also fell throughout the southeastern Plains, and parts of the south. Little precipitation fell along the Gulf of Mexico, in southern Texas, or in the Southwest.

The East: Moderate to much above normal precipitation (2 inches or more) fell in the Northeast with the highest totals falling in southeastern New York and southeastern Maine (4 plus inches). Western Pennsylvania, extreme western New York, and Massachusetts received above normal precipitation, easing the abnormal dryness (D0) in these areas. Rain fell last week throughout much of the mid-Atlantic and down from northern Mississippi and Alabama to North Carolina. The area of abnormal dryness in North Carolina largely missed the beneficial precipitation and remains unchanged in this week's depiction. Above normal precipitation across northern New Jersey, northeast Pennsylvania, and southern New York eliminated the abnormal dryness (D0) there.

The Great Lakes Region: Most of the drought-affected areas of the region missed the beneficial precipitation that again fell just to their south and east. Continued long-term deficits resulted in largely unchanged drought classifications in this region.

The Midwest and Plains: This week's precipitation was highly variable through the Plains. Every state in the region saw areas of above normal precipitation. Additionally, the areas of the Dakotas, Minnesota saw much below normal precipitation. Abnormal dryness eased slightly in western North Dakota and parts of Nebraska. Moderate drought (D1) conditions were introduced into south central Nebraska. Western Texas received much needed precipitation this week, resulting in improvement in moderate and severe drought categories and abnormal dryness along the New Mexico border. Extreme drought (D3) was also removed, due to lessening of impacts, from the Haskell county area. Southern and eastern Texas missed much of this rain. Moderate drought (D1) was extended over the Houston area as a result. Much of Oklahoma, with the exception of the panhandle, missed this precipitation as well. In Oklahoma, moderate drought (D1) expanded slightly in the central part of the state. Locally heavy precipitation fell in northeast Oklahoma, southeast Kansas, and into central Missouri with totals exceeding four inches for the week in select locations.

The West: Above normal precipitation once again fell from northern California and Oregon, across northern Nevada and southern Idaho, and into Colorado and Wyoming. A second swath of above normal precipitation fell from western New Mexico up into southern Colorado. This beneficial precipitation eased severe (D2) and moderate drought (D1) as well as abnormal dryness (D0) in northern Nevada and southern Oregon and through central Nevada. Moderate drought (D1) and abnormal dryness (D0) expanded slightly in northern Montana, which largely missed the precipitation this week.

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Hawaii, Alaska and Puerto Rico: Drought conditions remained mostly unchanged across the Hawaiian Islands, in Alaska, and in Puerto Rico. In Hawaii, drought intensified in Kauai. Precipitation was near to above normal for much of Alaska, with the exception of around Anchorage. Precipitation again fell in Puerto Rico this week, particularly along the northwestern coast.

Looking Ahead: Above normal precipitation is expected from the northern Midwest, through the northern Great Lakes, and throughout the mid-Atlantic and New England June 25 – 29, 2009. Additional precipitation is expected in the West, stretching from Idaho down into Arizona. Summer thunderstorm activity is expected in Florida. In intense drought areas, such as Texas, little relief is expected. Temperatures are expected to be above normal extending from the Southeast to the mid-Atlantic and westward to the Plains. The west coast is largely expected to see below normal temperatures during this period.

For the ensuing 5 days (June 30 – July 4, 2009), the odds favor cooler-than-normal conditions in the Northwest and the Northeast. The interior of the country, from the Rocky Mountains to the mid-Atlantic and Southeast, is expected to see above normal temperatures. Precipitation is expected to be above normal in the Southeast, in northern New England, and in select locations in the Southwest and the upper Plains. Below normal precipitation is expected from the southern Plains into the Great Lakes and along the West Coast. Odds favor dry and warm conditions throughout most of Alaska.

Author: [Michael Brewer, National Climatic Data Center, NOAA](#)

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

Updated June 25, 2009