



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

Weekly Report - Snowpack / Drought Monitor Update **Date: 11 June 2009**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent percent to date shows near normal conditions and some surplus over areas of the Northern Rockies and Northern Cascades. Elsewhere, values continue to dwindle rapidly. Some light snow fell over the Santa Fe and Carson National Forests in northern New Mexico and caused this area's snowpack to increase dramatically since snowfall in June is rather uncommon (Fig 1).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were above average over the Pacific Northwest and below average over the remainder of the West (Fig. 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas of western Washington (>+6F) and the greatest negative departures occurred over the central – eastern Montana (<-15F) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 10 June shows exceptional moisture falling from much of California eastward to the Northern High Plains, the Great Basin, and over western New Mexico. 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 (Fig. 3 and 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 within a few percentage points of last week's values. The only exceptions noted are a significant increase over south central Idaho (up 6%) and significant decrease over southeast Oregon (fell 8%) (Fig. 3b).

WESTERN DROUGHT STATUS

The West: D0 was improved in Nevada around Lake Tahoe, while D2 was expanded in the area to the north and east of Reno. Water supplies for irrigation have continued to be lowered from previous forecasts and this will have a direct impact on the region. A categorical improvement was made over southeast Idaho as indicators on all time scales show this area improving. D0 was expanded in north central Montana while D0 was also expanded out of Montana into northern portions of Wyoming this week. Dry conditions over the last few months have led to this change. Author: Brian Fuchs, 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

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shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 4, 4a, and 4b).

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/>

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

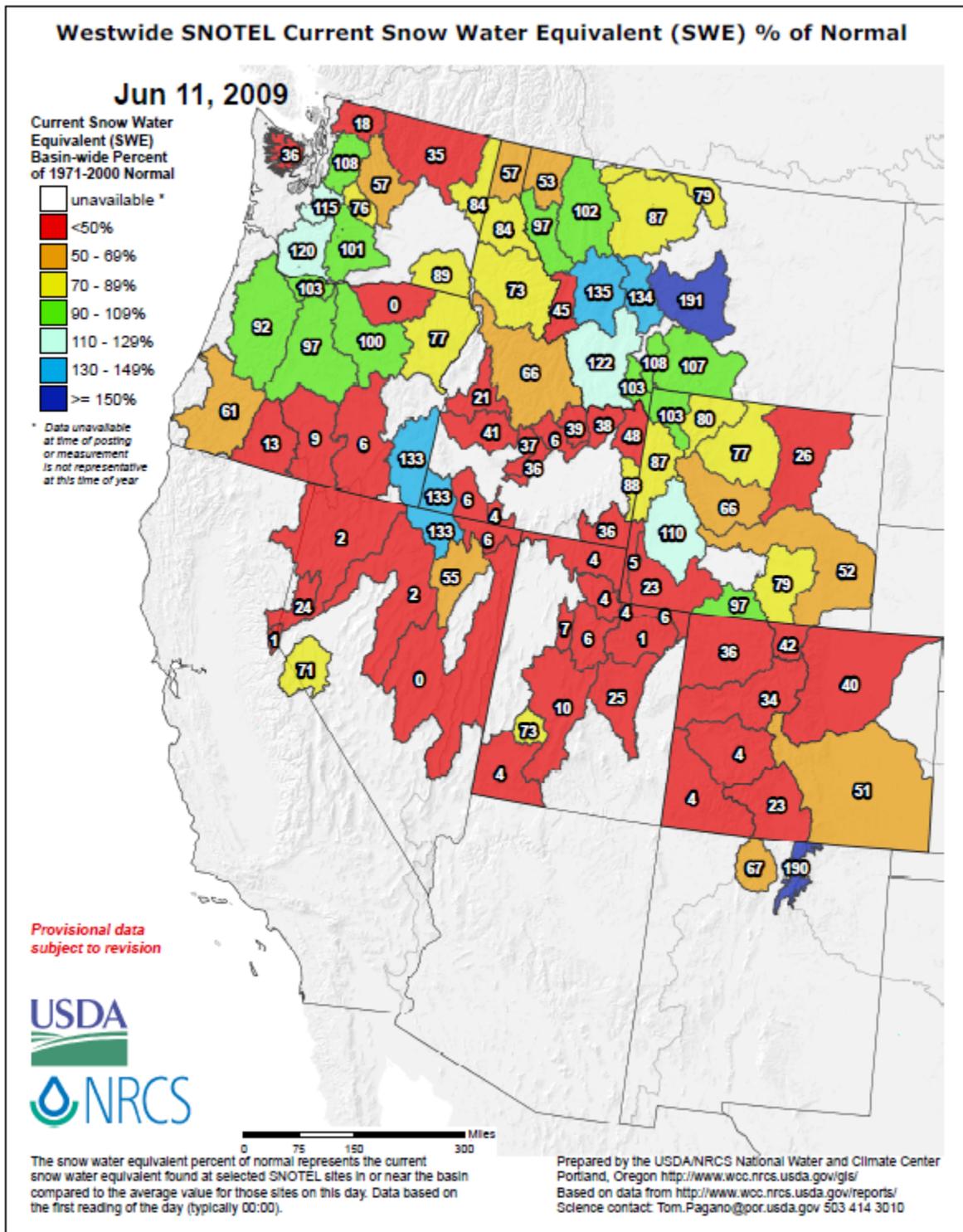


Fig. 1. Snow-water equivalent percent to date shows near normal conditions and some surplus over areas of the Northern Rockies and Northern Cascades. Elsewhere, values continue to dwindle rapidly. Some light snow fell over the Santa Fe and Carson National Forests in northern New Mexico and caused this area's snowpack to increase dramatically since snowfall in June is rather uncommon.

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

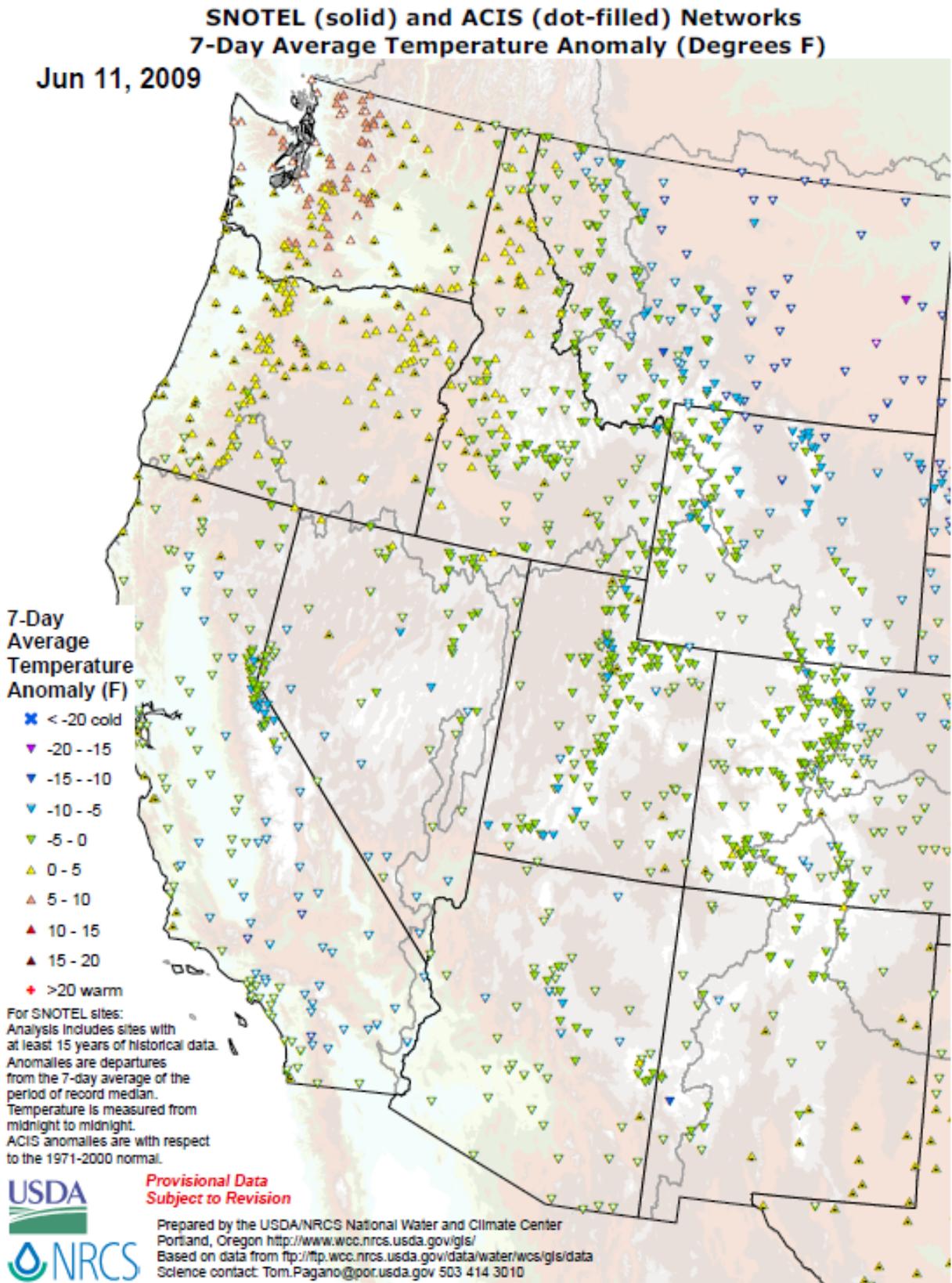
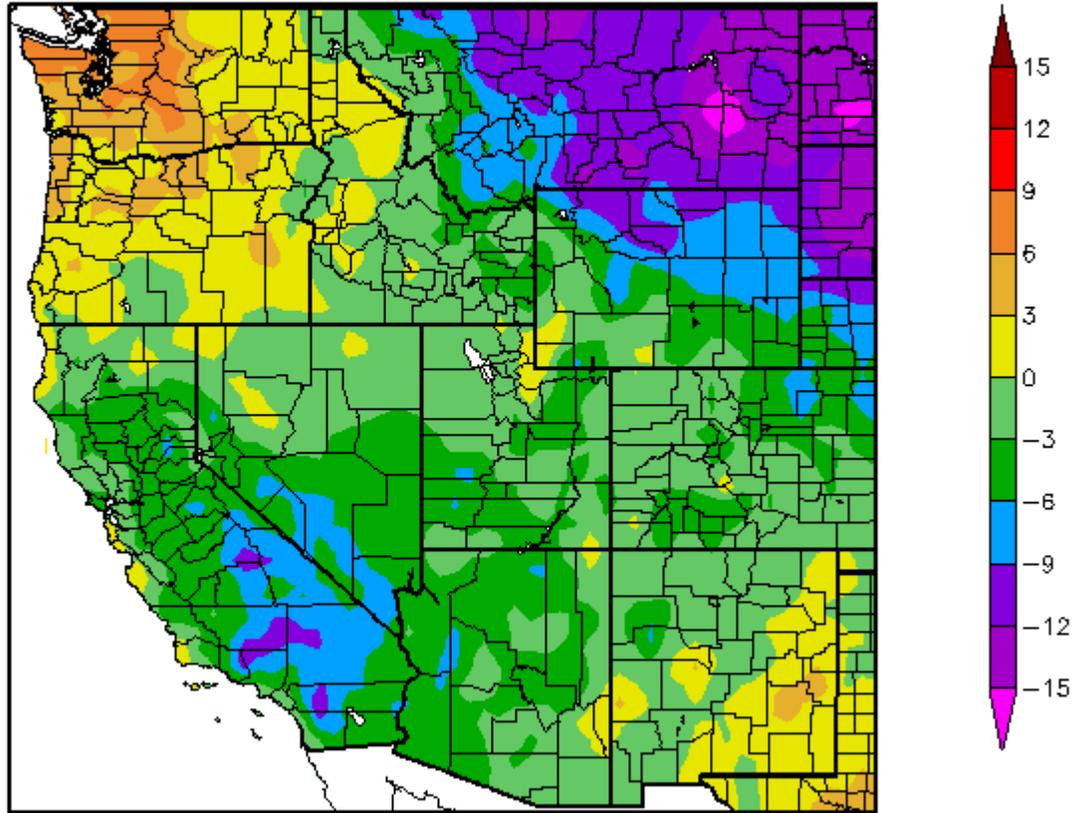


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were above average over the Pacific Northwest and below average over the remainder of the West.

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

Departure from Normal Temperature (F)
6/4/2009 – 6/10/2009



Generated 6/11/2009 at HPRCC using provisional data.

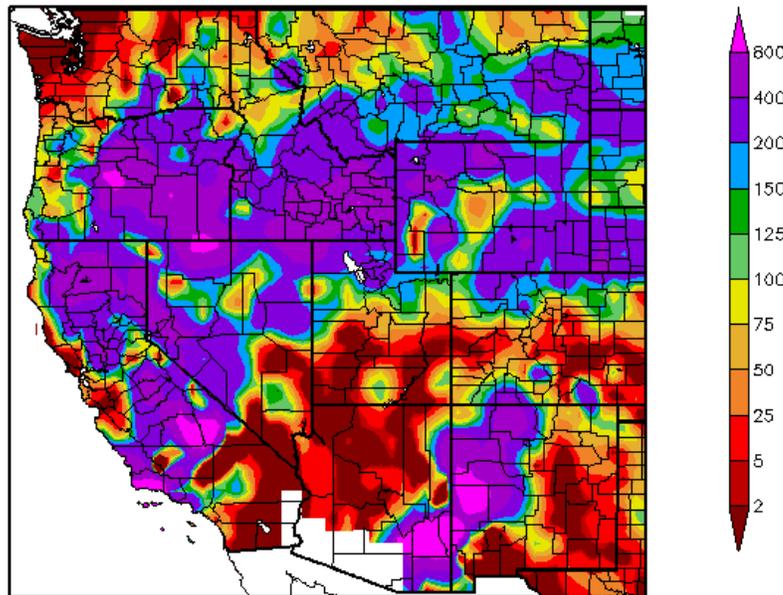
NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas of western Washington (>+6F) and the greatest negative departures occurred over the central – eastern Montana (<-15F).

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

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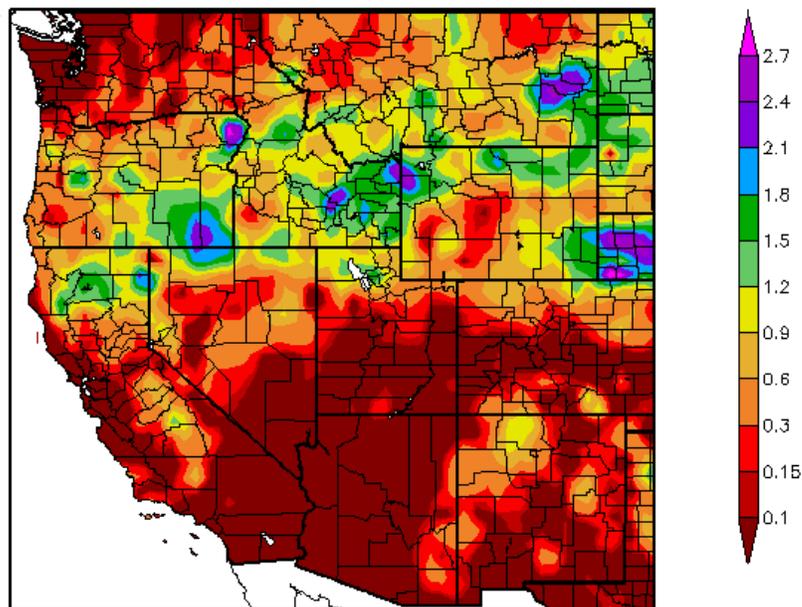
Percent of Normal Precipitation (%)
6/4/2009 – 6/10/2009



Generated 6/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Precipitation (in)
6/4/2009 – 6/10/2009



Generated 6/11/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a. ACIS 7-day average precipitation anomaly for the period ending 10 June shows exceptional moisture falling from much of California eastward to the Northern High Plains, the Great Basin, and over western New Mexico. 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

Weekly Snowpack and Drought Monitor Update Report

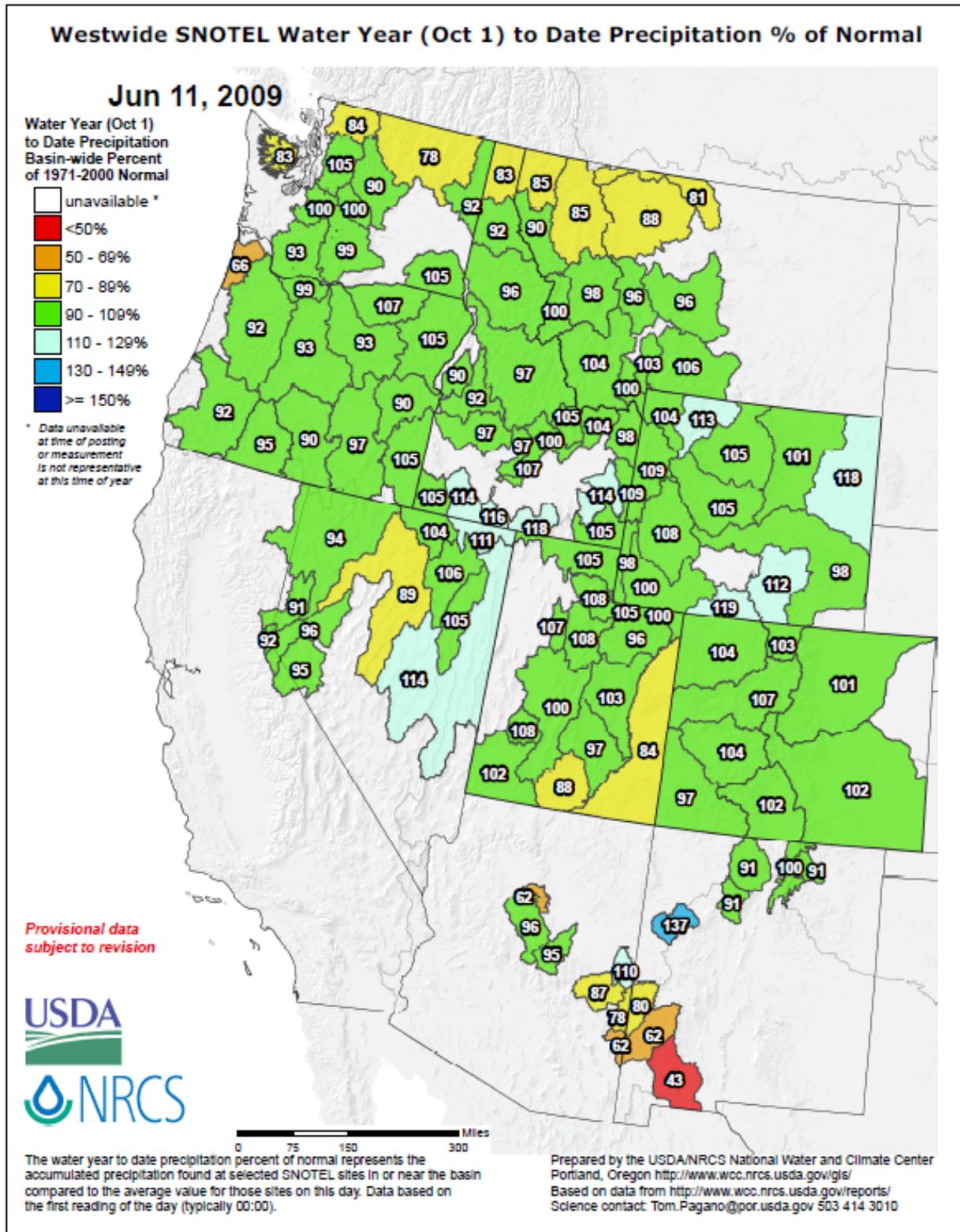
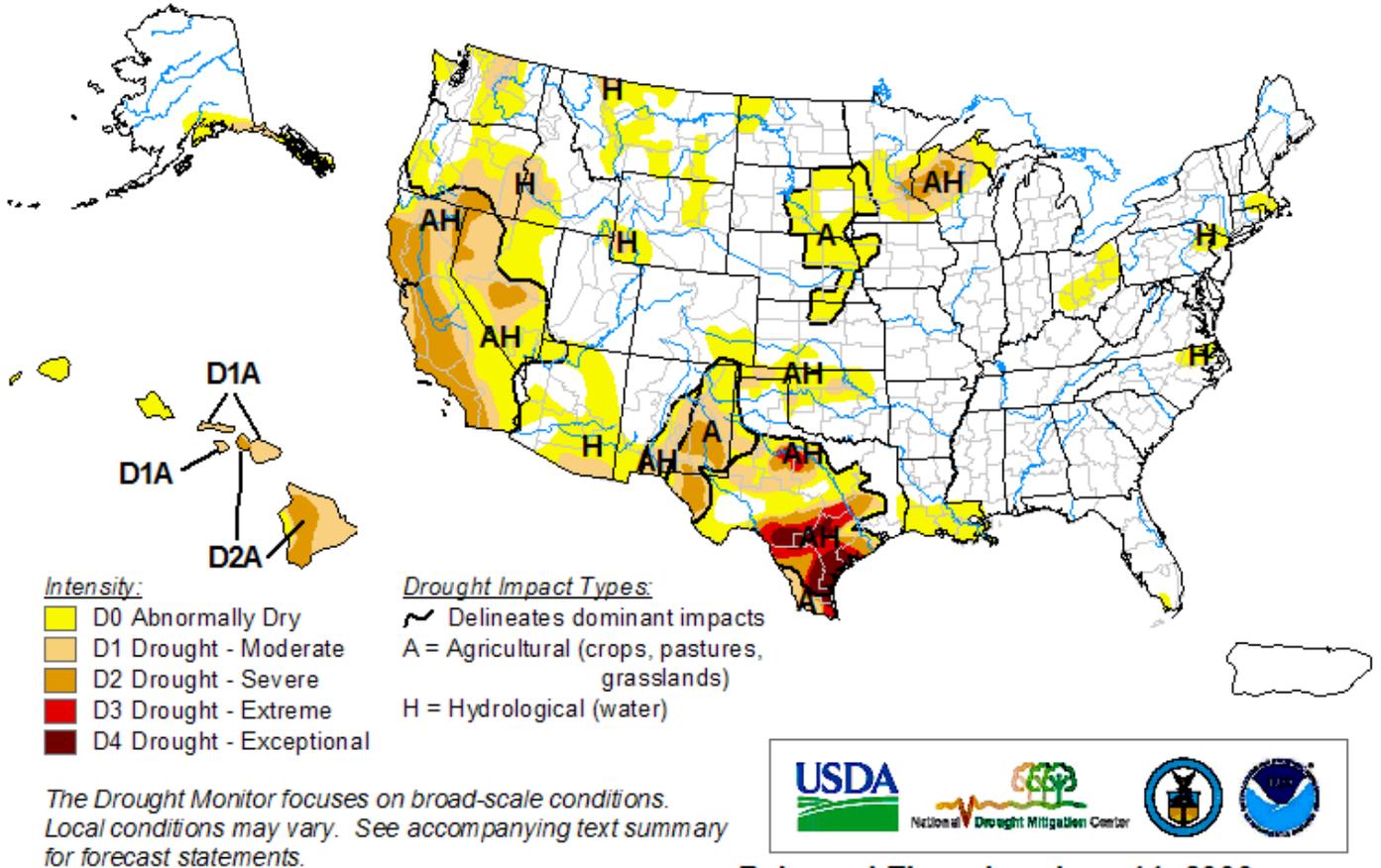


Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values within a few percentage points of last week's values. The only exceptions noted are a significant increase over south central Idaho (up 6%) and significant decrease over southeast Oregon (fell 8%).

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gjis/maps/west_wytdprecpcnormal_update.pdf

U.S. Drought Monitor

June 9, 2009
Valid 8 a.m. EDT



Released Thursday, June 11, 2009

Author: Brian Fuchs, National Drought Mitigation Center

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

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

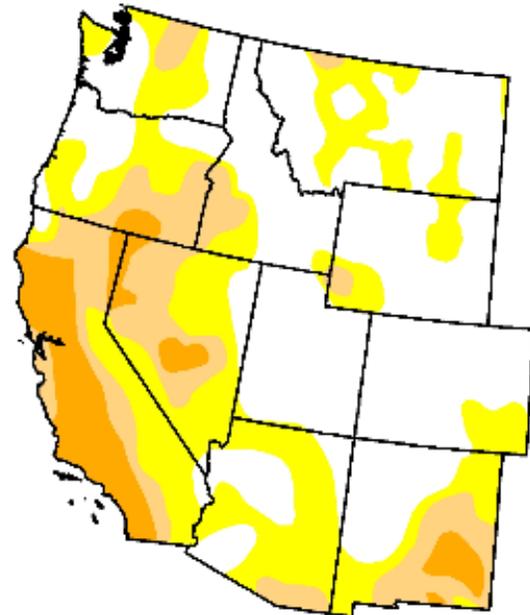
West

June 9, 2009

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	48.8	51.2	22.9	8.3	0.0	0.0
Last Week (06/02/2009 map)	47.5	52.5	23.1	8.2	0.0	0.0
3 Months Ago (03/17/2009 map)	33.4	66.6	25.8	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 (06/10/2008 map)	42.2	57.8	28.2	5.5	0.2	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



Released Thursday, June 11, 2009

Author: Brian Fuchs, National Drought Mitigation Center

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

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally, conditions have remained fairly stable during the past week. Ref: http://www.drought.unl.edu/dm/DM_west.htm

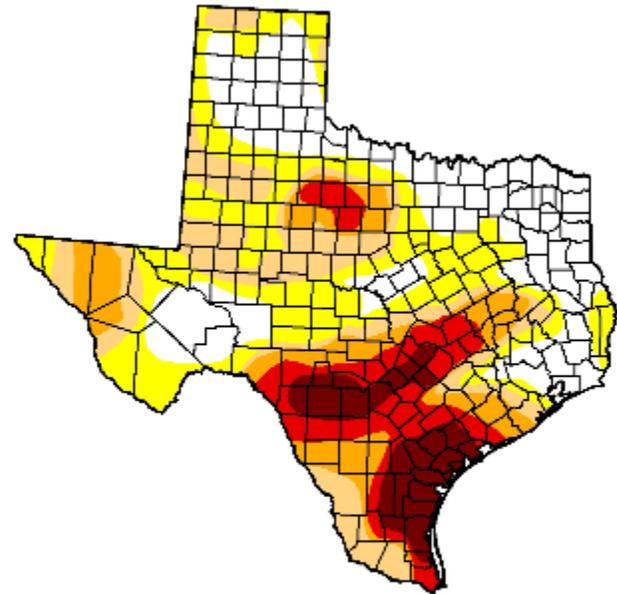
U.S. Drought Monitor

Texas

June 9, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	29.0	71.0	46.2	28.9	17.5	7.6
Last Week (06/02/2009 map)	36.6	63.4	44.3	28.4	16.6	6.5
3 Months Ago (03/17/2009 map)	0.0	100.0	71.0	43.9	19.8	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 (06/10/2008 map)	7.8	92.2	51.4	33.7	6.5	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>



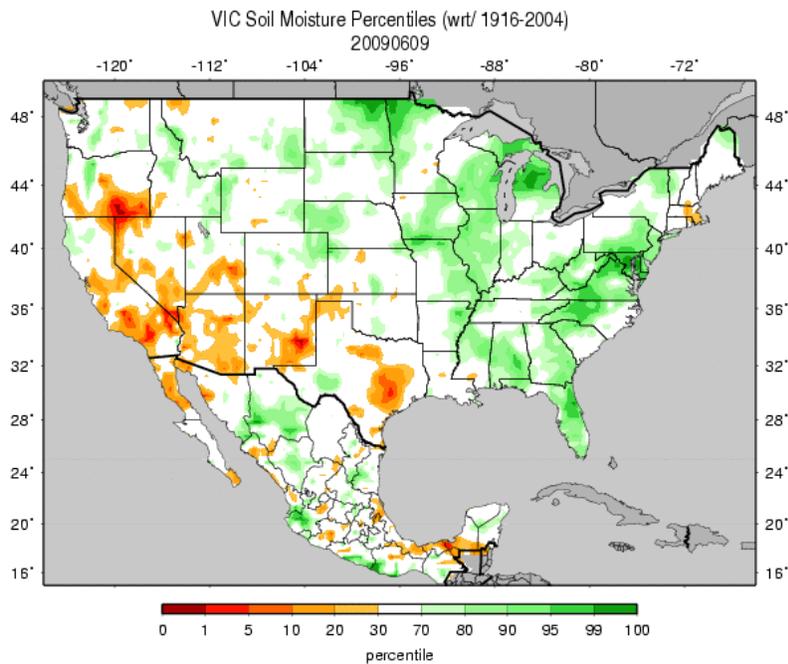
Released Thursday, June 11, 2009

Author: Brian Fuchs, National Drought Mitigation Center

Fig. 4b: Texas is the only state with D4 drought condition in the US. Note some deterioration since last week (mostly due to an increase in D0).

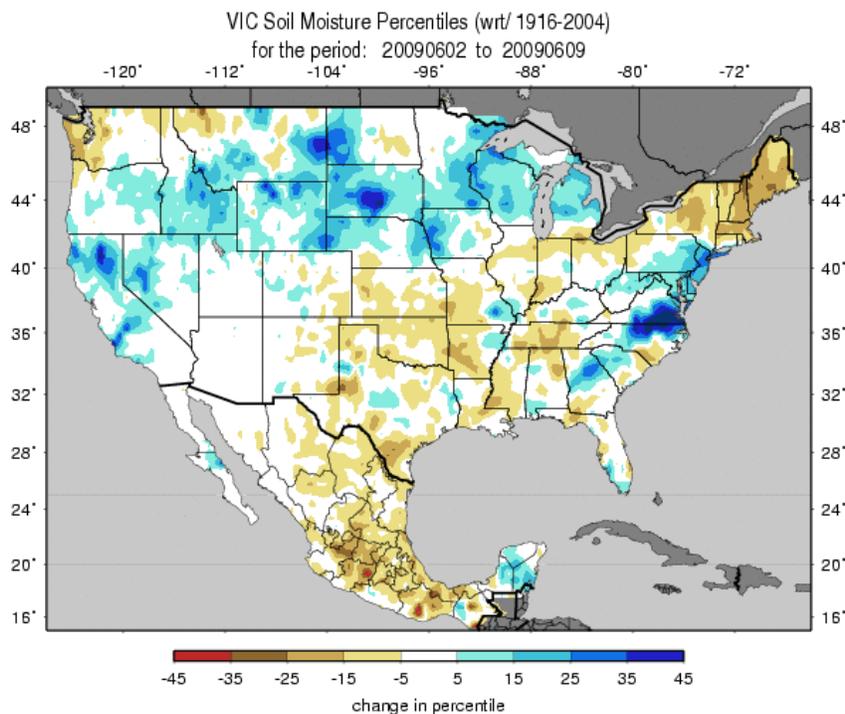
Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S

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Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 9 June. Near saturation exists over the extreme Northern Plain and much of the mid-West into Florida, and the Mid-Atlantic States while excessive dryness is scattered across the West from Texas to Oregon.

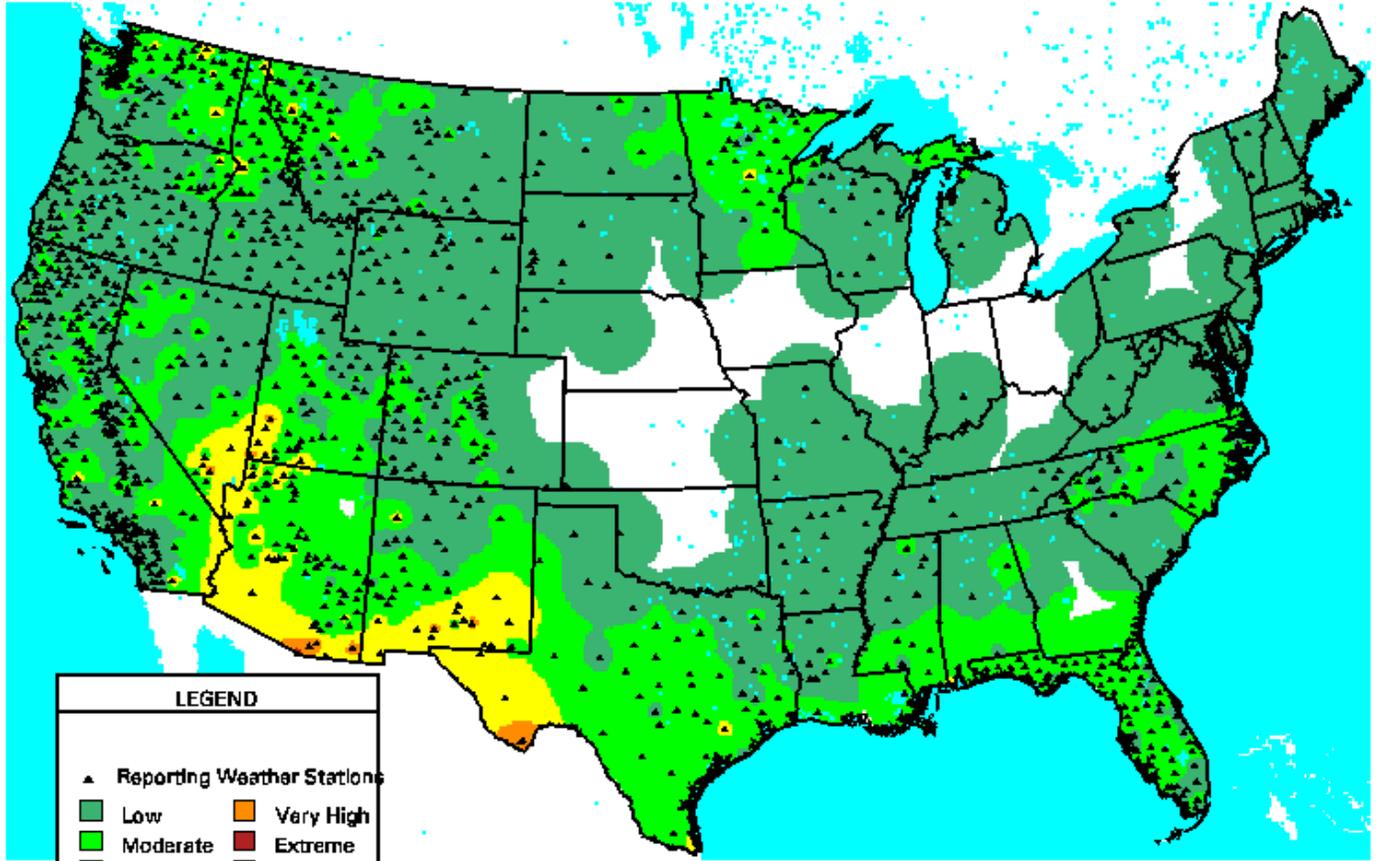
Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif



Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. There was significant moistening over the Central East Coast, Central Great Lake States west to northern California. Excessive drying is noted over New England and the Central Plains – Lower Mississippi River Valley. Ref:

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

Observed Fire Danger Class: 10-JUN-09



LEGEND	
▲	Reporting Weather Stations
Green	Low
Light Green	Moderate
Yellow	High
Orange	Very High
Red	Extreme
Light Blue	Water

(Inv. Dist.² Interp.)

WFAS-MAPS Graphics FIRE BEHAVIOR RESEARCH MISSOULA, MT



Fig. 6. Observed Fire Danger Class. Note last week's extreme conditions over the Lower Colorado River Basin have improved this week.

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

**Vegetation Drought Response Index
Complete**

June 1, 2009

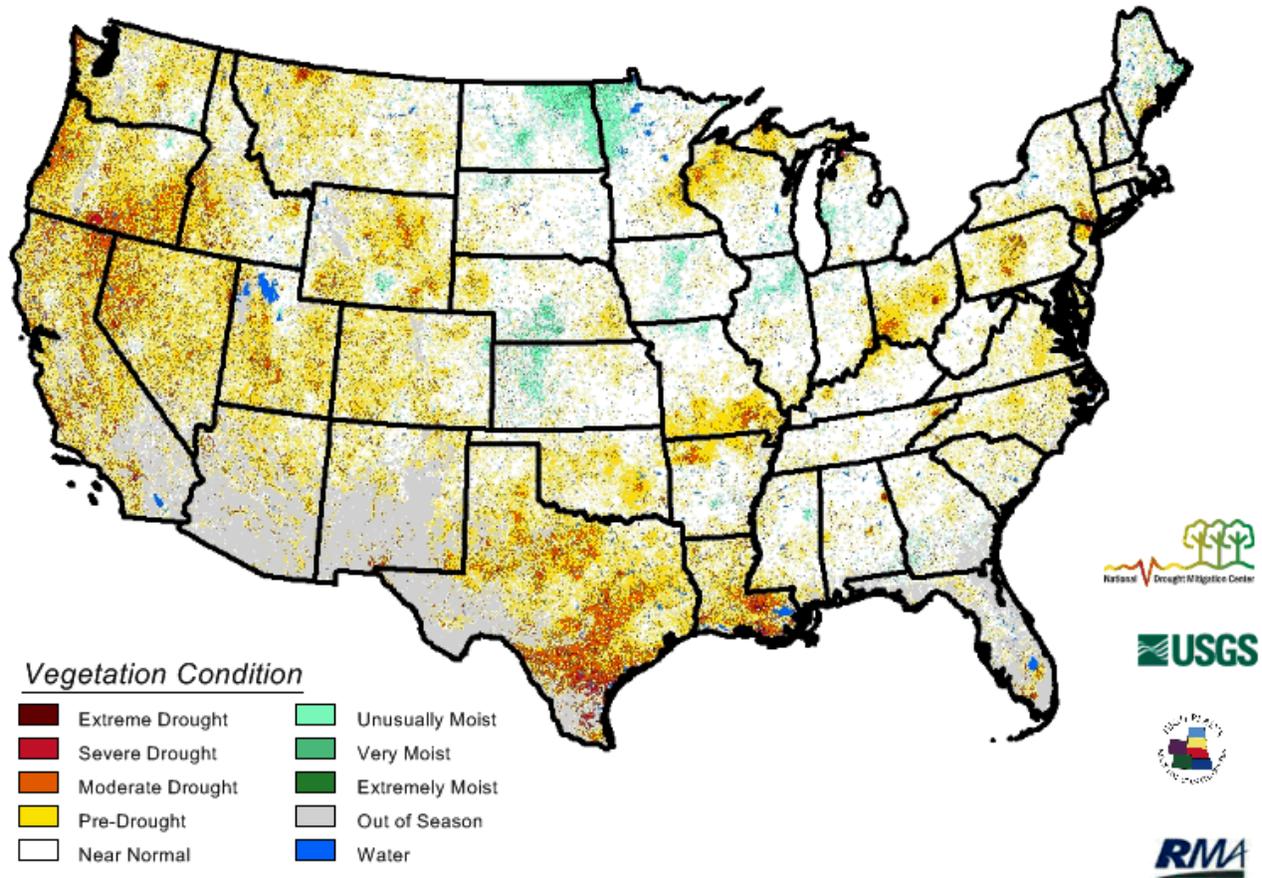
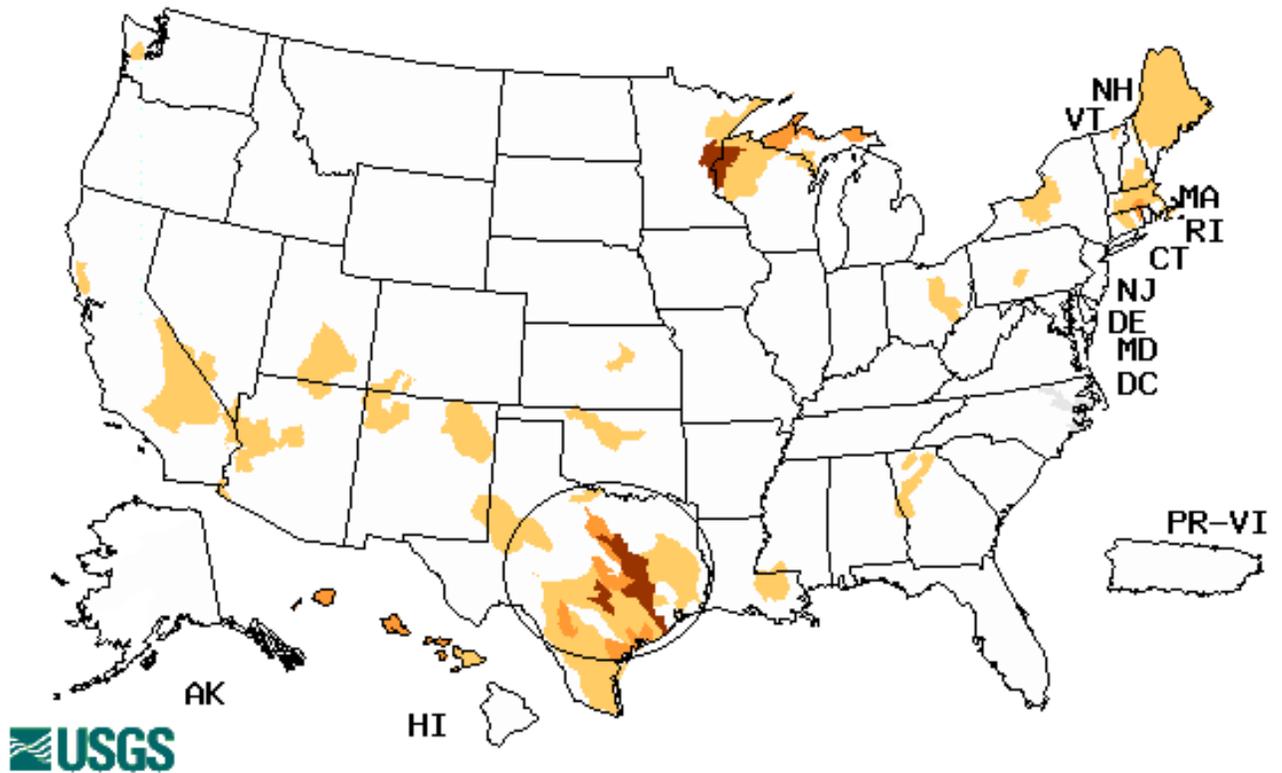


Fig. 7. Vegetation Drought Response Index: This is a new product being developed here at the NDMC along with several partners to show vegetation stress (note: as of 1 June 2009).
Ref: http://drought.unl.edu/vegdiri/VegDRI_Main.htm?EV.

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Wednesday, June 10, 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. 8. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions over parts of Texas have worsened and have remained constant over much of northwestern Wisconsin and central eastern Minnesota during the past week.

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

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary – June 9, 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/>.

Northeast and Mid-Atlantic, and Carolinas: D0 was expanded this week into portions of Massachusetts, Connecticut, and Rhode Island. D0 was eliminated from Georgia, western North Carolina, and western South Carolina.

Gulf Coast and Florida: Continuing rains over much of the state have allowed for the removal of all moderate drought from south Florida; just a small pocket of D0 remains along the southwest coast where the rains have lagged behind other areas. Despite a dry winter and spring, no impacts are being reported at this time, as the last several weeks have brought abundant precipitation. D0 was introduced this week into southern Louisiana as precipitation over the last several months has fallen well below normal.

Midwest: D0 was introduced into Ohio this week. The new area of D0 has fallen behind in precipitation over the last several months. This area of Ohio was also very dry at the end of summer and into fall in 2008. There have been no reported impacts in this region, but conditions could change rapidly as we go into a typically warmer period and water demands increase. D0 was improved over portions of western Iowa and southwestern Minnesota in response to recent rains alleviating concerns in this area. The D1/D2 regions in Minnesota and Wisconsin did record rain this week, but it was only enough to stave off any further deterioration; no improvements were warranted.

The Plains: A very active week over portions of the region has allowed for some improvements to areas of D0 that had just been introduced. In portions of Nebraska, 2 to 3 inch rain totals for the week were common along the Platte River corridor, with some locations reporting hail that wiped out crops over thousands of acres in southeast Nebraska. D0 was improved in portions of central and eastern Nebraska as well as in the panhandle of the state. In areas that did not see the heavy rains, D0 was expanded into south central and north central portions of the state. In South Dakota, D0 was improved along the western edge as well as in the eastern portions of the state. North Dakota had a slight improvement to the D0 from rains over the last week.

In Oklahoma and Kansas, a dry week prompted the expansion of D0 into southern Kansas and the introduction of D1 in northern Oklahoma. In Texas this week, it was noted that the most recent rains over the last several months have had little to no impact on the hydrology in the state, with rivers, streams, and reservoirs lagging as some locations have had improvements.

Many changes were made across the state this week, with D0/D1 expanded in the northern panhandle, D2 improved in the southern tip of the state, D2/D3/D4 expanded in south central Texas, and D0 expanded in central Texas. Even in areas where some good rains fell during the spring months, agricultural and hydrological concerns are still having issues related to the long-term dryness in the region.

The West: D0 was improved in Nevada around Lake Tahoe, while D2 was expanded in the area to the north and east of Reno. Water supplies for irrigation have continued to be lowered

Weekly Snowpack and Drought Monitor Update Report

from previous forecasts and this will have a direct impact on the region. A categorical improvement was made over southeast Idaho as indicators on all time scales show this area improving. D0 was expanded in north central Montana while D0 was also expanded out of Montana into northern portions of Wyoming this week. Dry conditions over the last few months have led to this change.

Alaska and Hawaii: No changes in Alaska for this week. In Hawaii, impacts to the agriculture interests in the state have prompted degradation over much of the Islands. On Maui, D1 was expanded over the entire island and D2 was introduced along the western edge. On the Big Island, a 1-category degradation over the eastern half of the island took place, with D1 conditions introduced. On Lanai and Molokai, D1 now covers all of both islands.

Looking Ahead: During the next 5 days (June 11-15), temperatures continue to be below normal over much of the United States. Departures will range from 6-9 degrees Fahrenheit below normal over the Plains to 9-12 degrees below normal over California. Temperatures should be a little above normal over Texas and through the Southeast, with temperatures ranging 3-6 degrees Fahrenheit above normal. An active precipitation pattern will continue to follow the jet stream, with precipitation maxima over portions of Missouri and Kentucky.

Precipitation chances are also greatest over New England, the Central Plains, and into the northern Rocky Mountains.

The Climate Prediction Center 6-10 day forecast (June 16-20) shows temperatures are expected to be below normal over the western half of the United States, New England, and portions of Alaska's northern coast and Aleutian Islands. Above-normal temperatures are forecasted over the southern Plains and into the Southeast. During this time, above-normal precipitation is projected over the High Plains, Rocky Mountains, and into the Pacific Northwest. The east coast and into Florida also show above-normal chances for precipitation. Below-normal precipitation is shown over Alaska, Texas, and northern Minnesota during this time frame as well.

Author: Brian Fuchs, 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

Updated: 18 June 2009