



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

**Weekly Report - Snowpack / Drought Monitor Update**      **Date: 16 April, 2009**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** Snow-water equivalent percent to date reveals values within 5 percent of last week's totals with the exception of great than 10 percent from eastern Nevada to south-central Idaho and from northern Utah to southeast Idaho. Deficits persist over the areas bordering with Canada while surpluses still exist over most of the Cascades, eastern Nevada, and over isolated basins in Colorado, Wyoming, and Montana (Fig 1). Unofficial forecast changes for the past 7 days in spring and summer streamflow runoff for selected SNOTEL sites show that forecast values have increased over much of the Utah Mountains and Southern Rockies and decreased over the Bighorn Mountains of Wyoming (Fig. 1a). This past week's snow depth changes show late season increases over eastern Nevada, southwest Montana, most of Utah, and southern Colorado. Decreases are noted from eastern Oregon to northern Montana and a line from the Bighorn Mountains to the Central Colorado Rockies (Fig. 1b).

**Temperature:** SNOTEL and ACIS-day station average temperature anomalies were generally below average across the western slope of the Continental Divide and were above average over the eastern slope (Fig. 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over eastern Montana (**>+6F**) and the greatest negative departures occurred over south central Arizona (**<-10F**) (Fig. 2a).

**Precipitation:** ACIS 7-day average precipitation anomaly for the period ending 15 April shows an unusually wet pattern across much of the West. The only areas that experienced drier than average conditions were southern California, the extreme Northern Rockies, and the Eastern High Plains from Montana to northern Colorado (Fig. 3). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values increasing more than 3 percent over much of the Interior West from eastern Nevada and southwest Utah to southwest Montana. Elsewhere, values have remained fairly steady. A drop of 4 percent is noted over northeastern Wyoming (Fig 3a). For precipitation totals, departures, and percent of normal for several time periods. See: <http://www.water.gov/> and <http://ciq.mesonet.org/~derek/public/droughtmonitoring/>.

## **WESTERN DROUGHT STATUS**

**The West:** Precipitation varied across the West, with amounts generally below half an inch and pockets of heavier totals. Two to four inches occurred along parts of the coastal and Sierra Nevada ranges. Mountain snowpack conditions varied as well, with some areas near to above normal for this time of year, and others (especially California to New Mexico) below normal. April 13 USDA crop reports indicated crop progress was behind normal in Wyoming, Utah, Idaho, and Oregon, although for the latter two states it was mainly due to cold or wet weather. D0 was split in southeast Wyoming and D0 and D1 were trimmed in the northwest part of the state. The northern edge of D0 was pulled back in Idaho, but low snowpack water content, groundwater, and lagging streamflow kept the D1 in place. Abnormally dry (D0) conditions expanded in northern Montana, to reflect recent dryness out to the 90-day timescale, and in eastern Arizona and the four corners area, to reflect low snowpack and long-term precipitation deficits. Author: Richard Heim, NOAA National Climatic Data Center

## Weekly Snowpack and Drought Monitor Update Report

***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, 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 National Interagency Coordination Center provides a variety of products that describe the current wildfire status for the U.S. - [http://activefiremaps.fs.fed.us/lq\\_fire2.php](http://activefiremaps.fs.fed.us/lq_fire2.php). The latest Observed Fire Danger Class is shown in Figs. 6 shows the current active wildfires across the West - <http://geomac.usgs.gov/>.

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

### **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/>

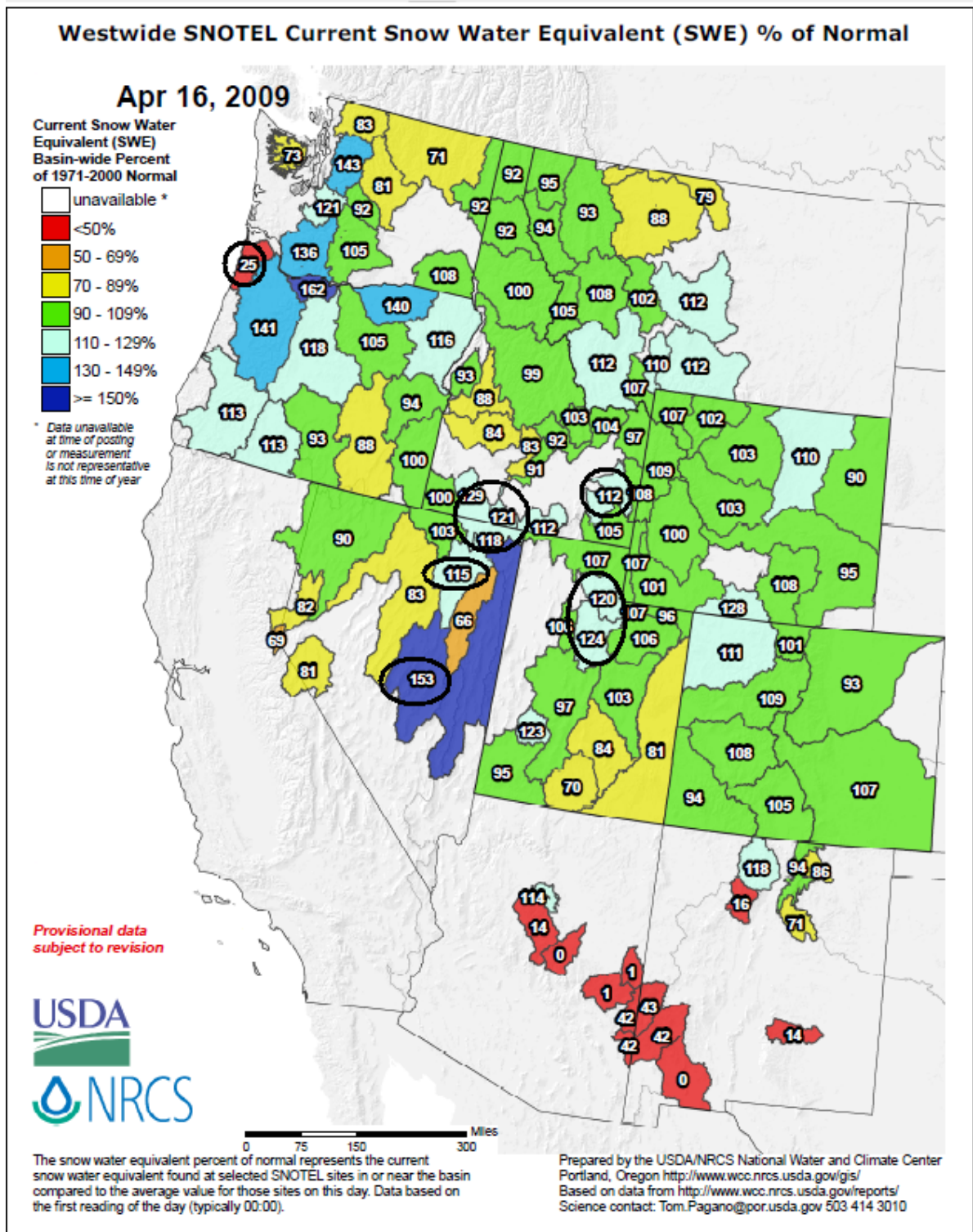
### **FOR MORE INFORMATION**

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 values within 5 percent of last week's values (>10 percent circled basins). Deficits persist over the areas bordering with Canada while surpluses still exist over most of the Cascades, eastern Nevada, and over isolated basins in Colorado, Wyoming, and Montana.**

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_swepctnormal\\_update.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf)



## Weekly Snowpack and Drought Monitor Update Report

### 7-Day Guidance Forecast Change as Percent of 1971-2000 Normal

Apr 15, 2009

For guidance only

7-Day Guidance  
Forecast Change  
(% normal)

- ✕ > 20% gain
- ▲ 16 - 20%
- ▲ 11 - 15%
- ▲ 6 - 10%
- ▲ 1 - 5%
- ⊖ no change
- ▼ -5 - -1%
- ▼ -10 - -6%
- ▼ -15 - -11%
- ▼ -20 - -16%
- ✚ > 20% loss
- ⊖ Unavailable\*

\* Forecast unavailable due  
to insufficient realtime data  
or low forecast skill

Provisional Data  
Subject to Revision

0 50 100 200 Miles



Prepared by the USDA/NRCS National Water and Climate Center  
Portland, Oregon [http://www.wcc.nrcs.usda.gov/wsf/daily\\_forecasts.html](http://www.wcc.nrcs.usda.gov/wsf/daily_forecasts.html)  
Based on data from  
[ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/daily\\_forecast/SummaryOutput.csv](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/daily_forecast/SummaryOutput.csv)  
Science contact: Tom.Pagano@por.usda.gov 503 414 3010

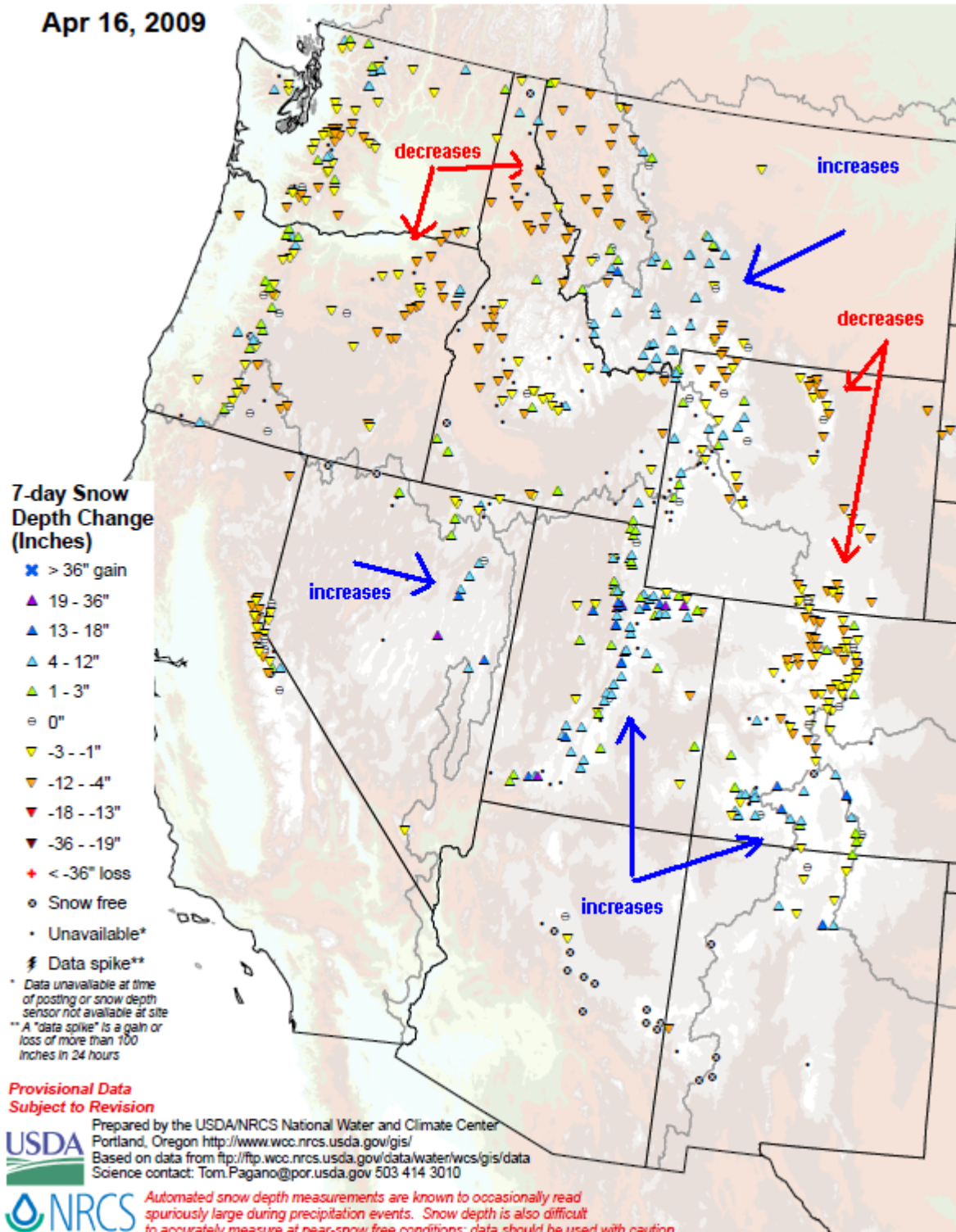
*This is a completely automated objective product  
based on SNOTEL data. This product is not meant  
to replace or supersede the official forecasts produced  
in coordination with the National Weather Service.*

Fig. 1a: Selected preliminary daily water supply forecast changes since last week show that forecast values have increased over much of the Utah Mountains and Southern Rockies and decreased over the Bighorn Mountains of Wyoming.

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/daily\\_forecast/maps/west\\_dailyfcst\\_7daych.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/daily_forecast/maps/west_dailyfcst_7daych.pdf)

**SNOTEL 7-Day Snow Depth Change (Inches)**

**Apr 16, 2009**



**Fig. 1b:** This past week's snow depth changes show late season increases over eastern Nevada, southwest Montana, most of Utah, and southern Colorado. Decreases are noted from eastern Oregon to northern Montana and a line from the Bighorn Mountains to the Central Colorado Rockies.

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_snowdepth\\_7ddelta.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf)



## Weekly Snowpack and Drought Monitor Update Report

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

Apr 16, 2009

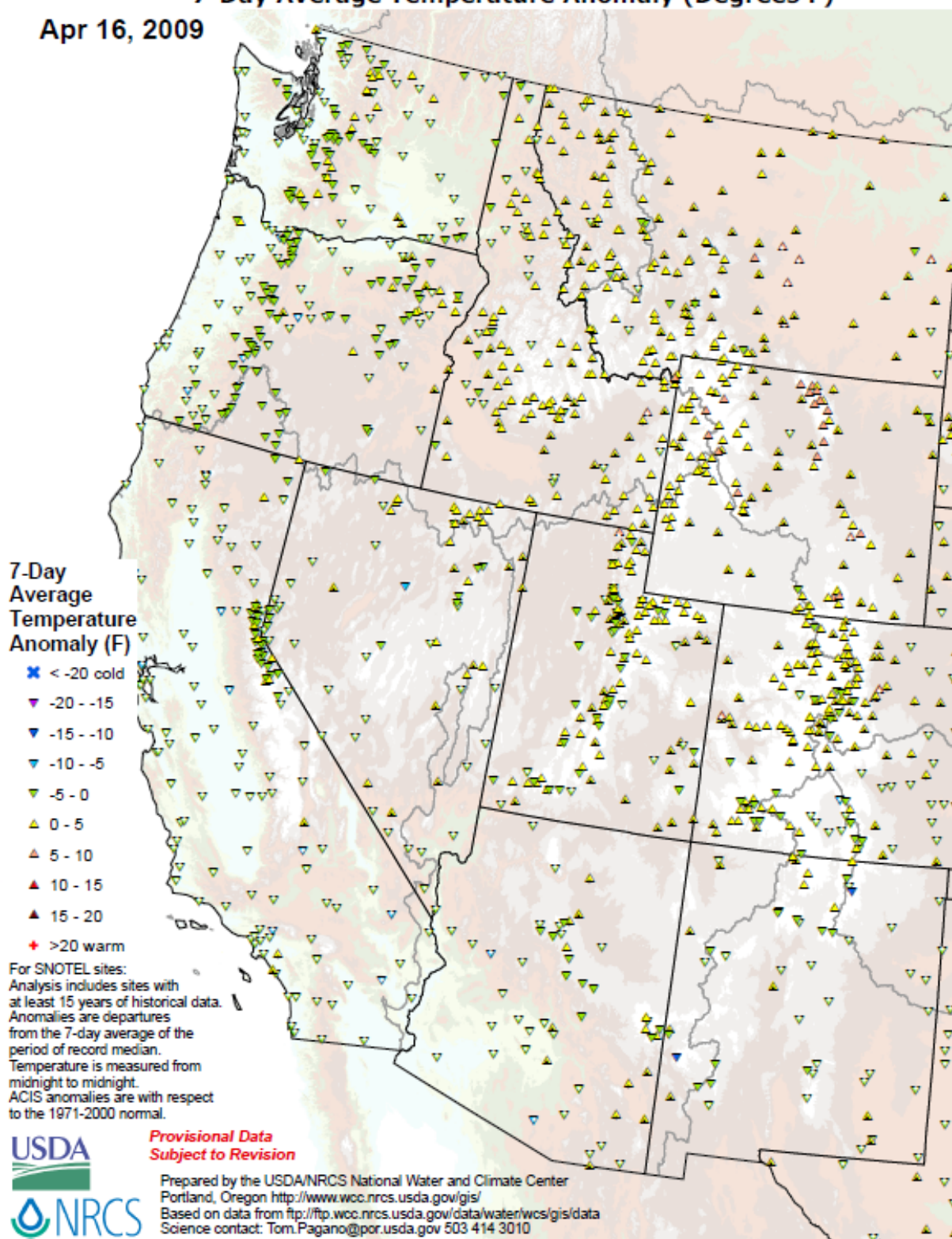
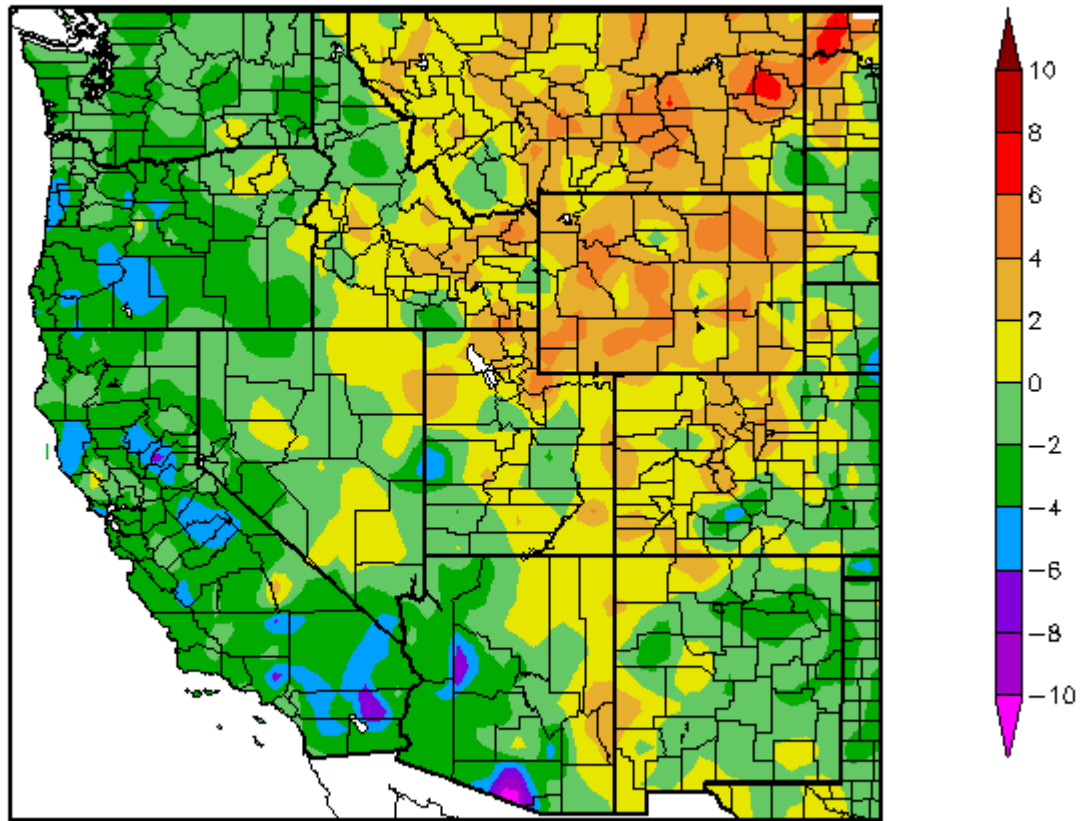


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were below average across the western slope of the Continental Divide and were above average over the eastern slope. Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcc/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)  
4/9/2009 – 4/15/2009



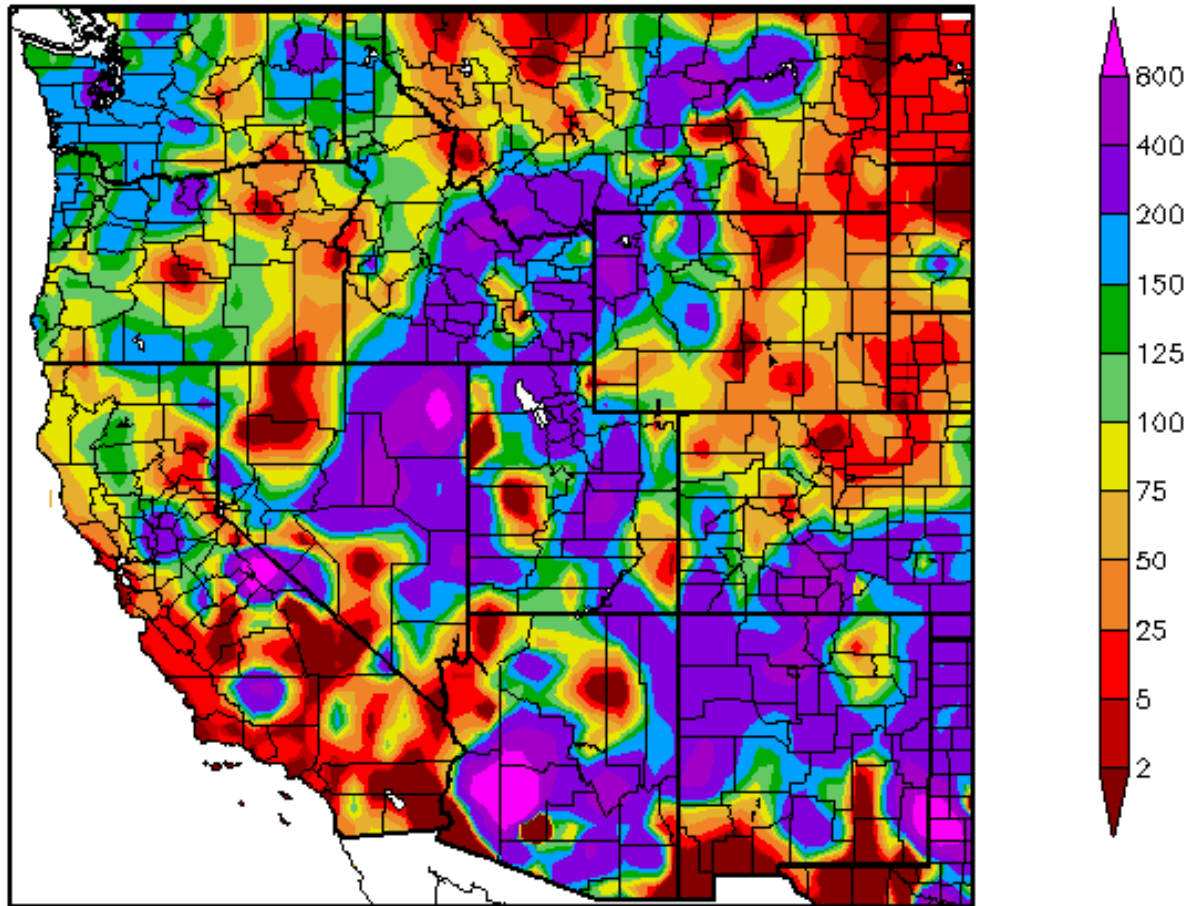
Generated 4/16/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over eastern Montana (>+6F) and the greatest negative departures occurred over south central Arizona (<-10F).**

Ref: [http://www.hprcc.unl.edu/maps/current/index.php?action=update\\_product&product=TDept](http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDept)

Percent of Normal Precipitation (%)  
4/9/2009 – 4/15/2009



Generated 4/16/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 15 April shows an unusually wet pattern across much of the West. The only areas that experienced drier than average conditions were southern California, the extreme Northern Rockies, and the Eastern High Plains from Montana to northern Colorado.** Ref: [http://www.hprcc.unl.edu/maps/index.php?action=update\\_product&product=PNorm](http://www.hprcc.unl.edu/maps/index.php?action=update_product&product=PNorm)



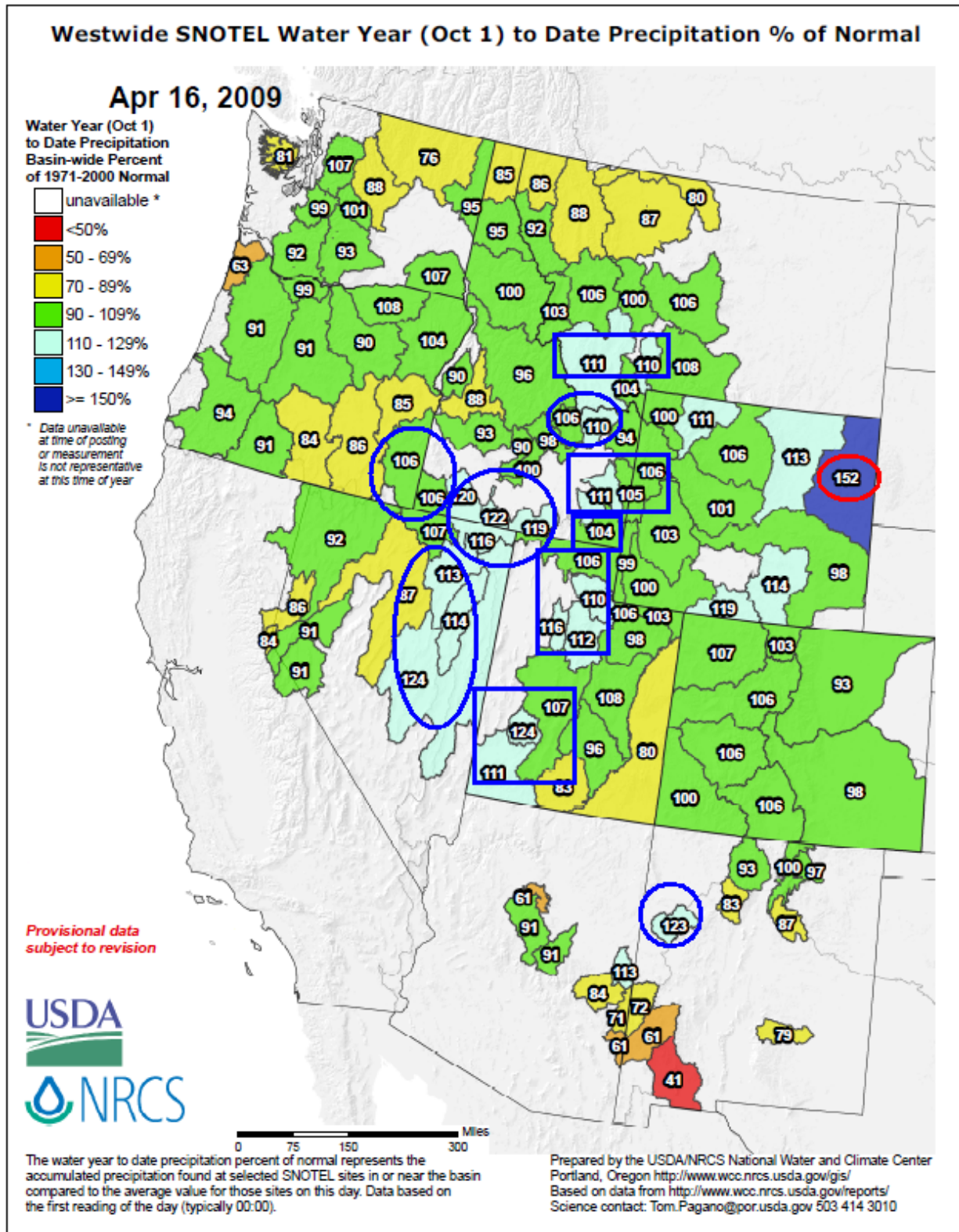


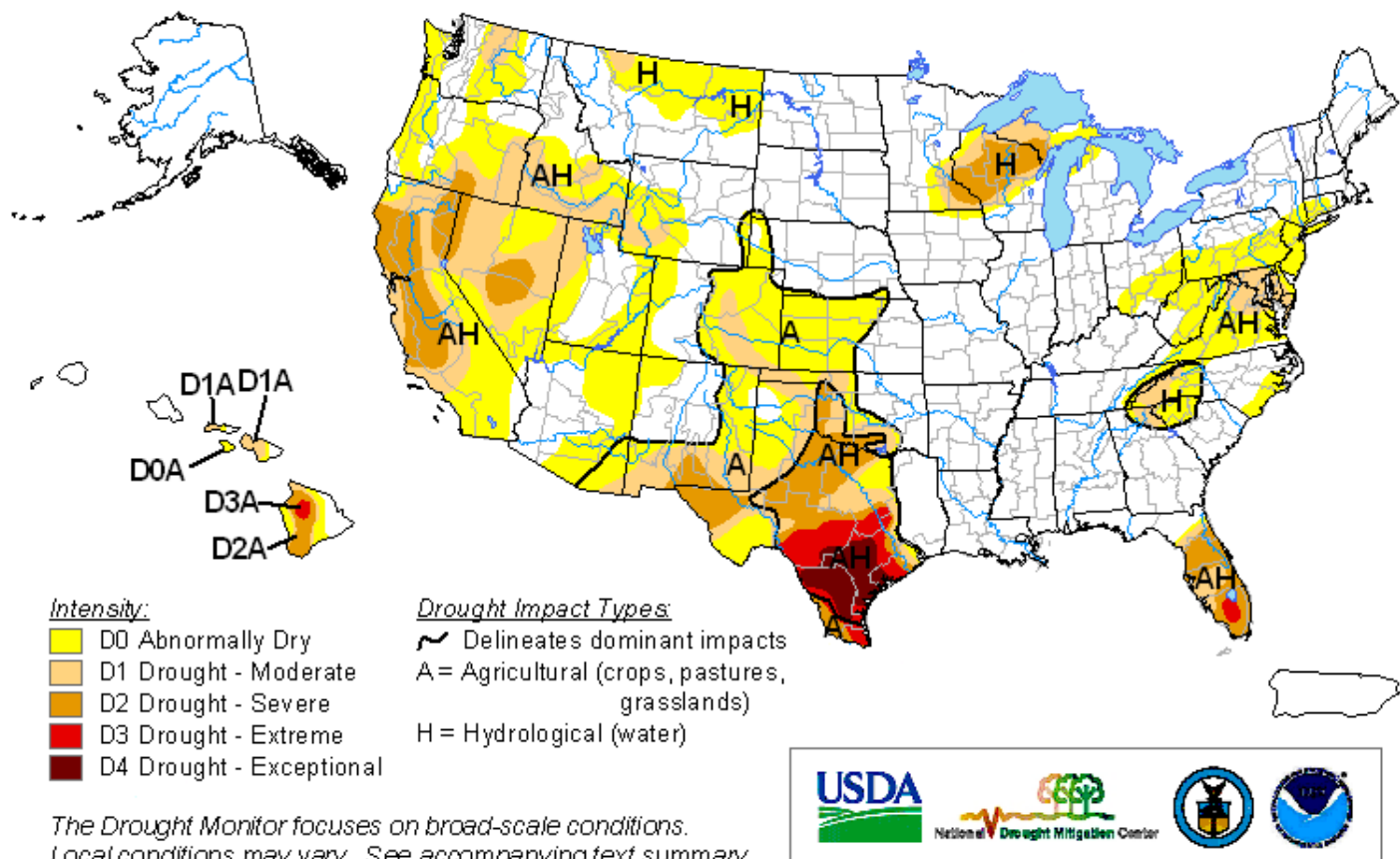
Fig 3a. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values increasing more than 3 percent over much of the Interior West from eastern Nevada and southwest Utah to southwest Montana. Elsewhere, values have remained fairly steady. A drop of 4 percent is noted over northeastern Wyoming.

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecpcnormal\\_update.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf)

# U.S. Drought Monitor

April 14, 2009

Valid 8 a.m. EDT



Released Thursday, April 16, 2009

Author: Richard Heim, 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

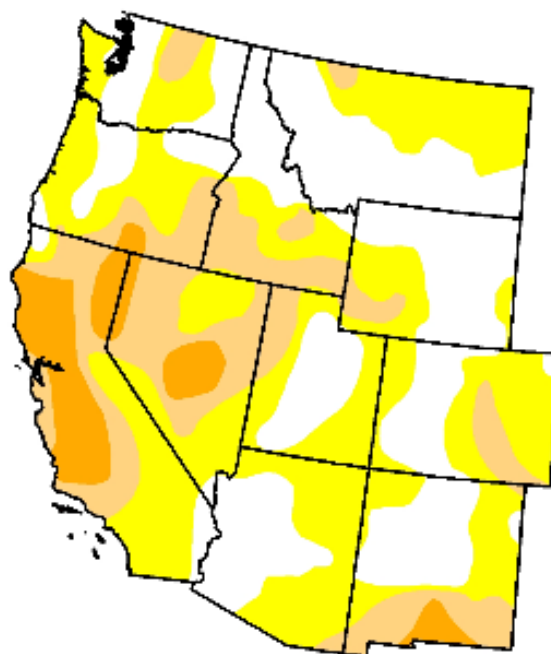
April 14, 2009

Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.7	65.3	25.6	7.1	0.0	0.0
Last Week (04/07/2009 map)	36.5	63.5	26.3	7.1	0.0	0.0
3 Months Ago (01/20/2009 map)	43.2	56.8	28.2	9.8	1.7	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 (04/15/2008 map)	40.5	59.5	35.0	8.4	0.0	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, April 16, 2009

Author: Richard Helm, NOAA/NESDIS/NCDC

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Conditions have remained essentially unchanged during the past week. Ref: [http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm)



# U.S. Drought Monitor

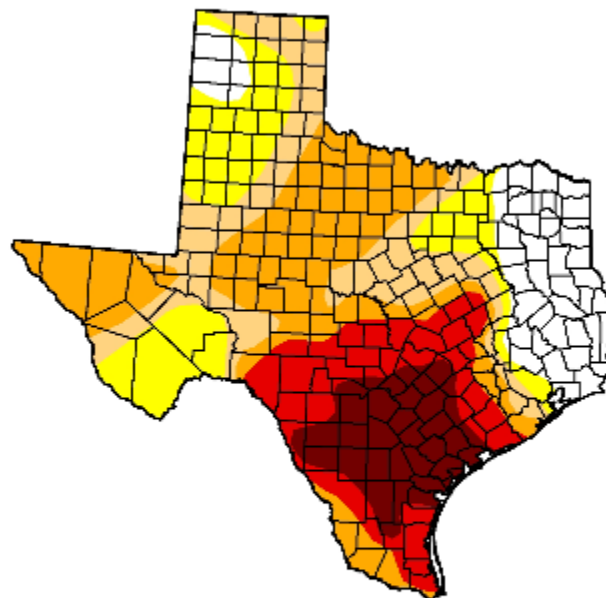
## Texas

April 14, 2009  
Valid 7 a.m. EST

Drought Conditions (Percent Area)						
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	14.9	85.1	68.2	50.6	25.1	11.5
Last Week (04/07/2009 map)	6.7	93.3	79.1	53.5	24.6	7.1
3 Months Ago (01/20/2009 map)	26.9	73.1	45.8	22.2	16.0	4.2
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 (04/15/2008 map)	36.2	63.8	45.0	18.4	10.5	3.3

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

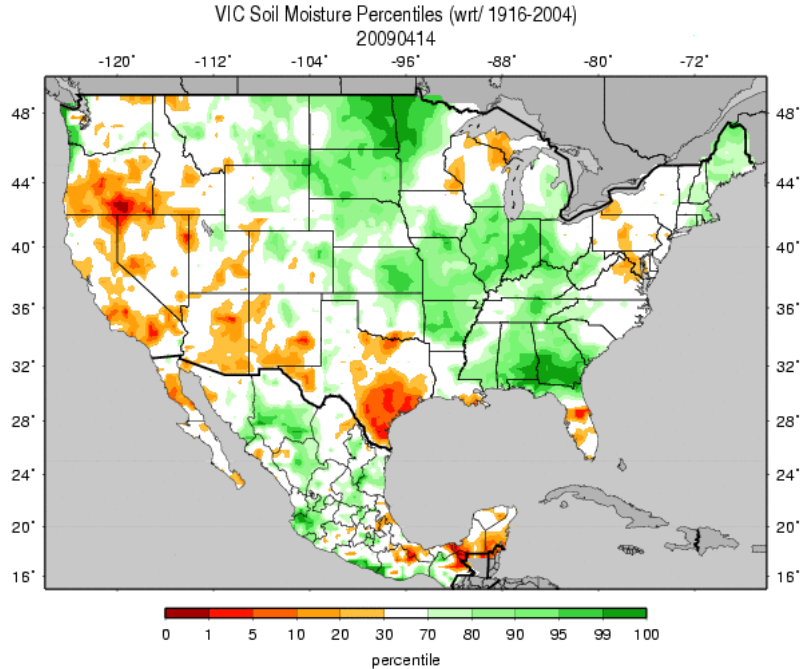
<http://drought.unl.edu/dm>



Released Thursday, April 16, 2009  
Author: Richard Heim, NOAA/NESDIS/NCDC

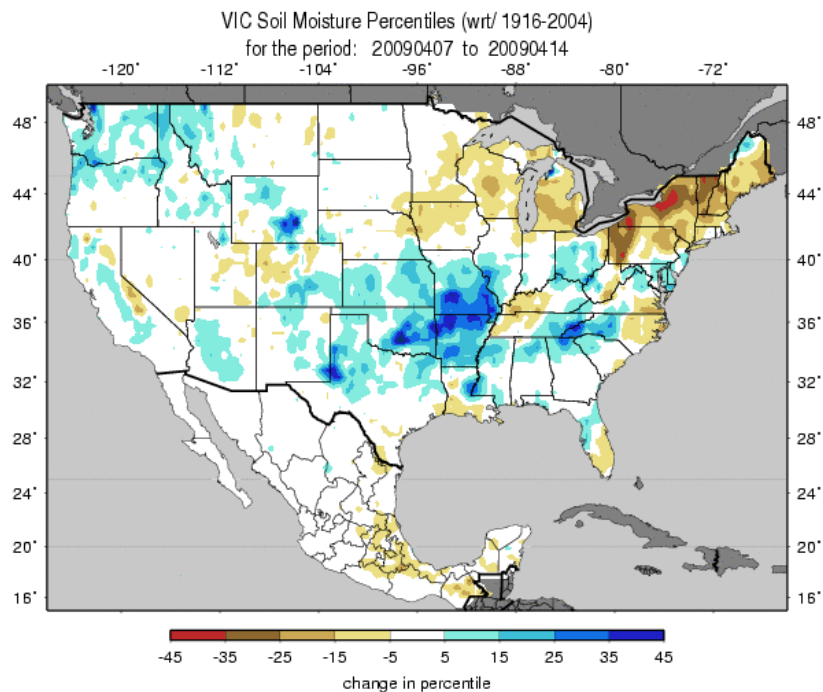
Fig. 4b: Texas is the only state with D4 drought condition in the US. Note further deterioration in D4 since last week but a decrease in overall drought. [http://www.drought.unl.edu/dm/DM\\_state.htm?TX,S](http://www.drought.unl.edu/dm/DM_state.htm?TX,S)

## Weekly Snowpack and Drought Monitor Update Report



**Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology for this past week. Near saturation exists over the Northern Plain while excessive dryness is scattered across the West from Texas to northern Washington. Central Florida continues to exhibit much drier condition as well.**

Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_qnt.gif](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. Note major moistening over the Middle Mississippi River Valley and much of Wyoming. Drying trend returns to the Northeast and Upper Great Lakes regions.**

Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_qnt.1wk.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif)

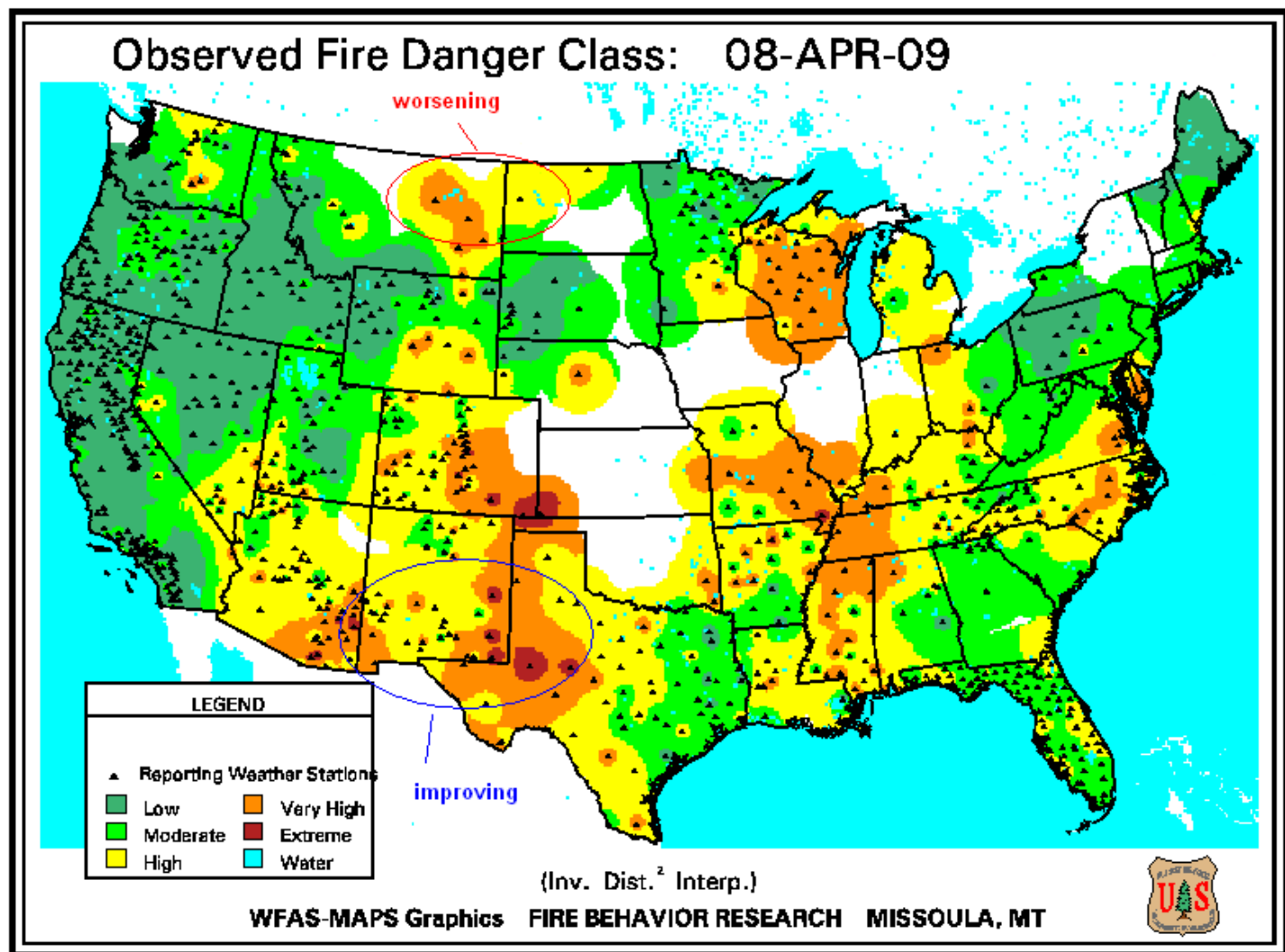


Fig. 6. Observed Fire Danger Class. Conditions continue to be extreme scattered across western Texas, eastern New Mexico, and extreme southeast Colorado. **Not Updated**

Source: Forest Service Fire Behavior Research – Missoula, MT.

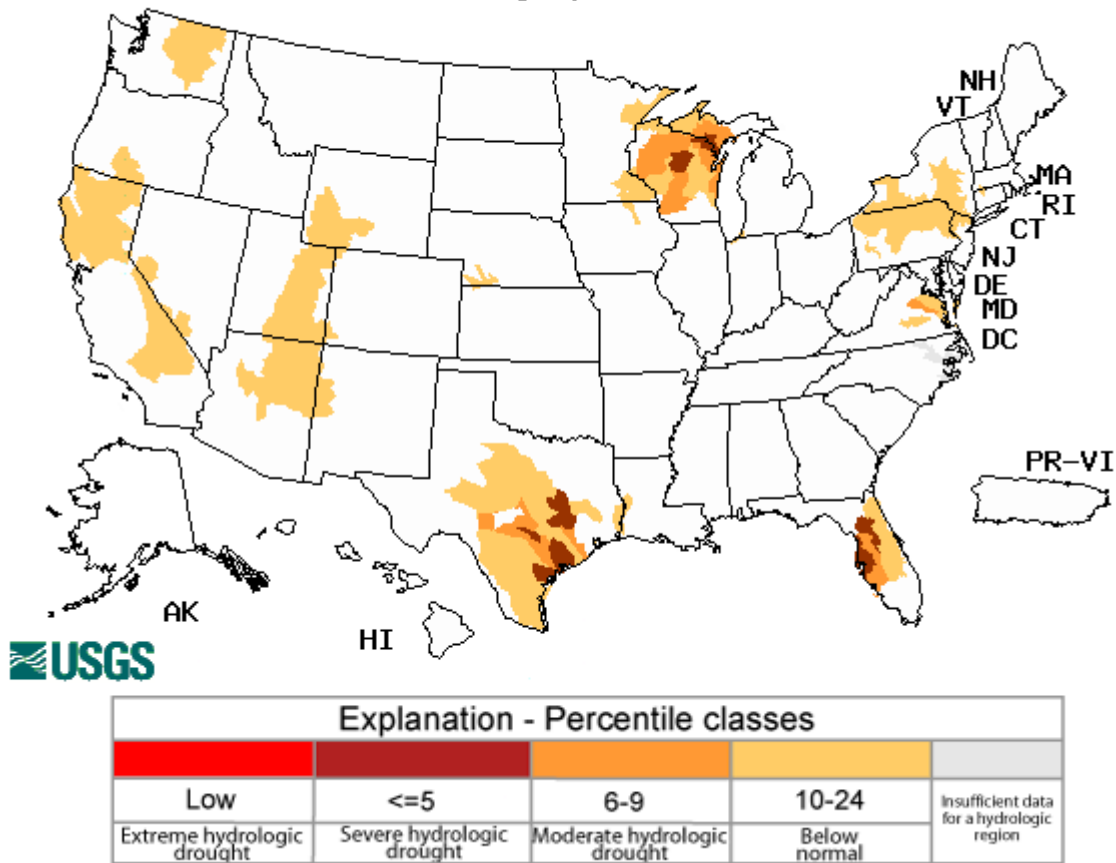
Ref: [http://www.fs.fed.us/land/wfas/fd\\_class.gif](http://www.fs.fed.us/land/wfas/fd_class.gif)

Note: The Forest Service Web server is currently undergoing routine maintenance or has encountered an unexpected problem. We are working to bring the Web server back online as swiftly as possible.



## Weekly Snowpack and Drought Monitor Update Report

Wednesday, April 15, 2009



**Fig. 7.** Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are very poor over western Florida, Texas, and Wisconsin-Upper Michigan during the past week. For information on the Red River Valley flood, see:

[http://ahps2.wrh.noaa.gov/ahps2/ahps\\_warnings.php?wfo=fgf](http://ahps2.wrh.noaa.gov/ahps2/ahps_warnings.php?wfo=fgf)

<http://www.crh.noaa.gov/ahps2/index.php?wfo=fgf&view=1,1,1,1,1,1,1,1&toggles=10,7,8,2,9,15,6>

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary – April 14, 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/>.*

Two vigorous low pressure systems moved across the Lower 48 States in an active weather pattern this U.S. Drought Monitor (USDM) week, dumping beneficial precipitation over southern drought areas. Two to four-inch rains were widespread from Oklahoma and Kansas to the Ohio Valley and Southeast.

**The Southeastern and Mid-Atlantic States:** Locally heavy rains (4 inches or more) fell over the non-drought areas of Mississippi, Georgia, and the Florida panhandle, but lesser amounts reached the southern Appalachian drought areas. One to two-inch rains resulted in the retreat of D0 and D1 over South Carolina and D1 over parts of western North Carolina. Agricultural, water supply, and forestry conditions were improved but D0 and D1 remained, especially over western North Carolina, to reflect long-term precipitation deficits and low ground water conditions in some areas. D0 was also pulled back in West Virginia.

The rains largely missed central and southern Florida during this USDM week. In southern Florida, D2 expanded and a spot of D3 was added to reflect worsening rainfall deficits and groundwater levels, and growing fire danger. The South Florida Water Management District on April 10 issued an emergency burn ban order for campfires and other open burning on District lands open for recreation. Dry season (starting November 1) rainfall through April 12 was 3.72 inches at Miami (which is 9.62 inches below normal), 4.08 inches at Fort Lauderdale (12.98 inches below normal), and 2.57 inches at Belle Glades (9.80 inches below normal).

To the north in the Mid-Atlantic and Northeast, beneficial rains fell but, like last week, they were much more modest with totals amounting to half an inch to locally 2 inches around the Chesapeake Bay. Topsoil moistened and stream levels rose, but longer-term hydrological impacts remained. Many wells showed ground water levels well below average in spite of slight increases, and long-term precipitation deficits remained. The only improvements made this week were a slight pullback of D0 in eastern Connecticut and eastern Long Island.

**The Great Lakes and Upper Mississippi Valley Region:** The growing season is just beginning in this region. April 13 USDA crop reports and Midwest Regional Climate Center models indicate worsening soil moisture conditions in southeast Minnesota to adjoining Wisconsin. West Central Wisconsin had 25% soil moisture in very short to short condition. Three-month precipitation deficits were growing and streamflow levels were dropping. In La Crosse, Wisconsin, 2009 has started 2.90 inches below normal, which is the tenth driest start to the year on record and the driest since 1958. In Rochester, Minnesota, it is the seventh driest start to a year and the driest since 1972. D2 expanded into southeast Minnesota from Wisconsin, with corresponding expansion of the D1 and D0. It's too early in the growing season to add an A impact indicator, but the soil moisture conditions are setting up this region for AH impacts in a few weeks if good rains don't come.

**The Plains:** A reassessment of the heavy snows that tracked through the central Plains before this period resulted in pullback of D0 in the Nebraska panhandle. But the greatest improvements came to Oklahoma and Texas. D0, D1, and D2 were pulled back in central and eastern Oklahoma, but D2 in west central Oklahoma, which missed significant rainfall this week, expanded slightly to the Texas state line. The D0 in southern Arkansas was eliminated and D0, D1, and D2 were pulled

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back in central and eastern Texas, where impacts were changed from A to AH. D0 and D1 retreated in the Texas panhandle and adjacent New Mexico, and D2 was sliced in west Texas near the Pecos River. The northern fringes of D3 and D4 shrank in parts of central Texas, but in other parts of central Texas D3 expanded. Deep South Texas missed this week's rains, so D3 and D4 expanded in that region.

**The West:** Precipitation varied across the West, with amounts generally below half an inch and pockets of heavier totals. Two to four inches occurred along parts of the coastal and Sierra Nevada ranges. Mountain snowpack conditions varied as well, with some areas near to above normal for this time of year, and others (especially California to New Mexico) below normal. April 13 USDA crop reports indicated crop progress was behind normal in Wyoming, Utah, Idaho, and Oregon, although for the latter two states it was mainly due to cold or wet weather. D0 was split in southeast Wyoming and D0 and D1 were trimmed in the northwest part of the state. The northern edge of D0 was pulled back in Idaho, but low snowpack water content, groundwater, and lagging streamflow kept the D1 in place. Abnormally dry (D0) conditions expanded in northern Montana, to reflect recent dryness out to the 90-day timescale, and in eastern Arizona and the four corners area, to reflect low snowpack and long-term precipitation deficits.

**Alaska, Hawaii, and Puerto Rico:** The USDM depiction across Hawaii remained unchanged this week. Both Alaska and Puerto Rico are not showing signs of any significant dryness or drought at this time.

**Looking Ahead:** Two weather systems will affect the Lower 48 States during April 16-20. The first system will leave behind beneficial rain over the eastern U.S., especially central Florida and the Northeast, as it exits the country. The second -- a large, strong, wet low pressure system over the western U.S. at the beginning of the forecast period -- is forecast to slowly move across the central and eastern parts of the country during the next 5 days. This second system will bring beneficial precipitation to most of the drought areas. A widespread area of one inch or more of precipitation is expected from the southern Plains to Montana, with locally 3 or more inches. Temperatures will vary as the weather systems move across the country, with warmer-than-normal air ahead and cooler air behind the systems.

According to the CPC 6- to 10-day and 8- to 14-day forecasts (covering the period April 21-29), precipitation chances will be above normal for southern Texas and the Great Lakes to Northeast, but below normal for much of the West and mid-Mississippi Valley to Southeast. The forecasts are calling for above-normal temperatures across the western U.S. and generally colder-than-normal conditions in the east. Alaska is expected to be dry with above-normal temperatures in the north and below-normal temperatures in the south.

**Author:** Richard Heim, NOAA National Climatic Data 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: 16 April 2009

04/16/2009

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