



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

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**Weekly Report - Snowpack / Drought Monitor Update**      **Date: 19 March, 2009**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** Snow-water equivalent percent to date shows values generally within 10 percent of last week's values with the Cascades increasing and central Arizona decreasing by more than 10 percent. Deficits persist over the areas bordering with Canada while surpluses still exist over the Central Cascades and eastern Nevada (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 the Pacific Northwest and Northern Rockies and decreased over the 4-Corner States (Fig. 1a). This past week's snow depth changes show significant increases over the Pacific Northwest and Northern Rockies while the southern half of the West had significant snow melt (Fig. 1b).

**Temperature:** SNOTEL and ACIS-day station average temperature anomalies were below average across most of the western half of the West and above average over the eastern half. All in all, temperatures were generally within 5 degrees of the long term average across the West (Fig. 2). Specifically, the greatest positive temperature departures occurred over western Nevada (>+6F) and the greatest negative departures occurred over Oregon and Washington (<-8F) (Fig. 2a). This pattern is more reminiscent to expected La Nina conditions.

**Precipitation:** ACIS 7-day average precipitation anomaly for the period ending 18 March shows a very wet week over the Coastal Ranges and Cascades of Oregon and Washington and much of the Northern Rockies with some precipitation over New Mexico. Much drier conditions prevailed over the remainder of the West (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 remaining pretty much unchanged this week (within +/- 4 percent) (Fig. 3a). The Northern Tier States and much of Oregon continue to be below normal. For precipitation totals, departures, and percent of normal for several time periods. See: <http://www.water.gov/> and <http://cig.mesonet.org/~derek/public/droughtmonitoring/>.

## **WESTERN DROUGHT STATUS**

### **The West**

In California, an expansion of moderate drought (D1) was introduced in eastern Fresno and Tulare counties over the Sierra Nevada crest, due to lack of precipitation over recent weeks and low reservoir storage. Colorado's Front Range continues to experience dry conditions. Pueblo has received just .08 inch of precipitation since January 1, and Colorado Springs has measured .26 inch in the same period. As a result, moderate drought conditions are depicted on the map. The area along the Yellowstone River in Montana, between Miles City and Sidney, has been abnormally dry this winter. The last major winter storm to reach this region was in mid-October, and there is little snow cover on the ground. D0 was introduced in Prairie, Dawson and Richland counties. Abnormally dry conditions have also expanded in central Montana due to low winter precipitation and no snow cover. Author: Laura Edwards, Western Regional Climate Center

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

## Weekly Snowpack and Drought Monitor Update Report

### **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

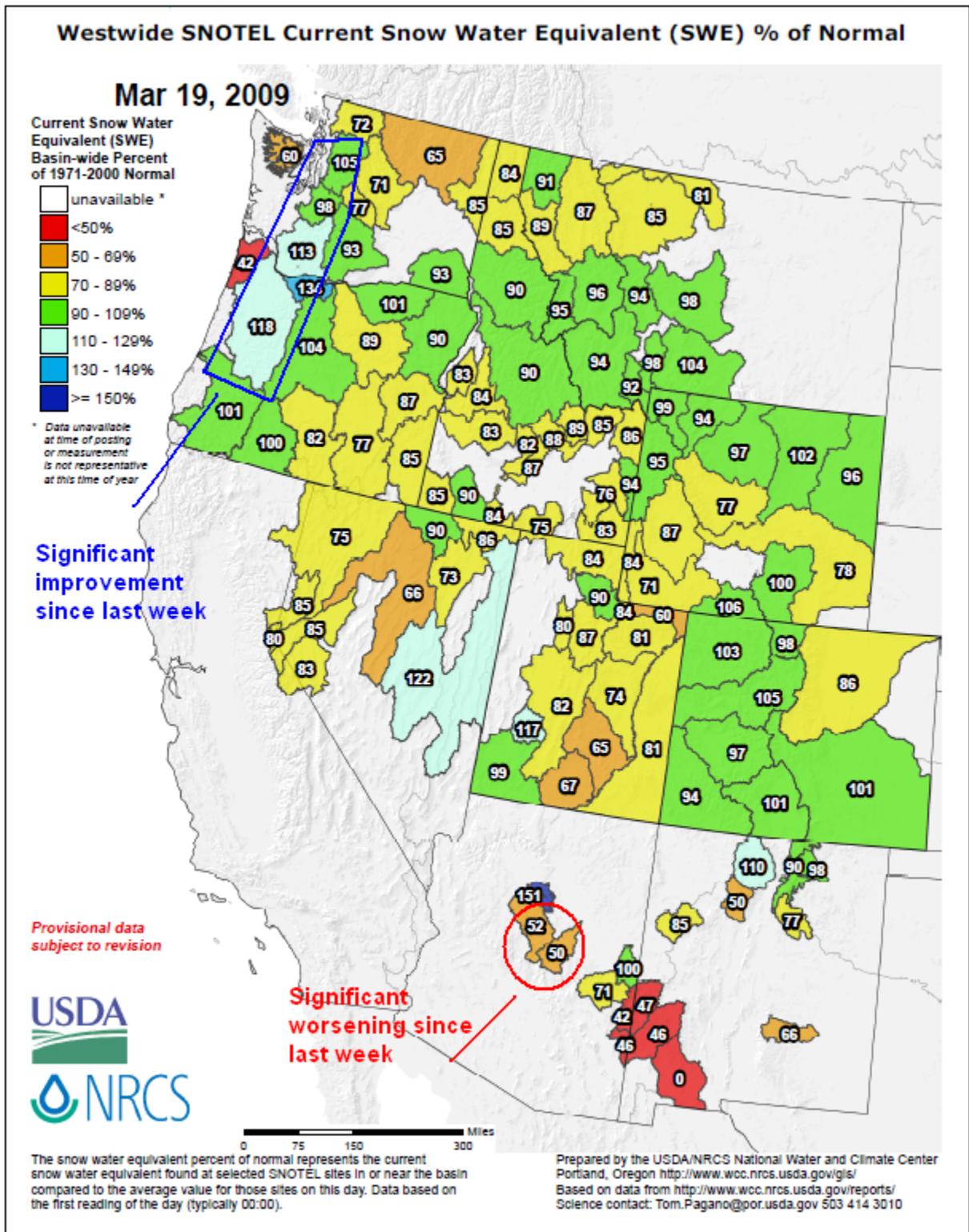


Fig. 1. Snow-water equivalent percent to date shows values within 10 percent of last week's values with a few exceptions as noted. Deficits persist over the areas bordering with Canada while surpluses still exist over the Central Cascades and eastern Nevada.

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

Mar 19, 2009

For guidance only

Improvement

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



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

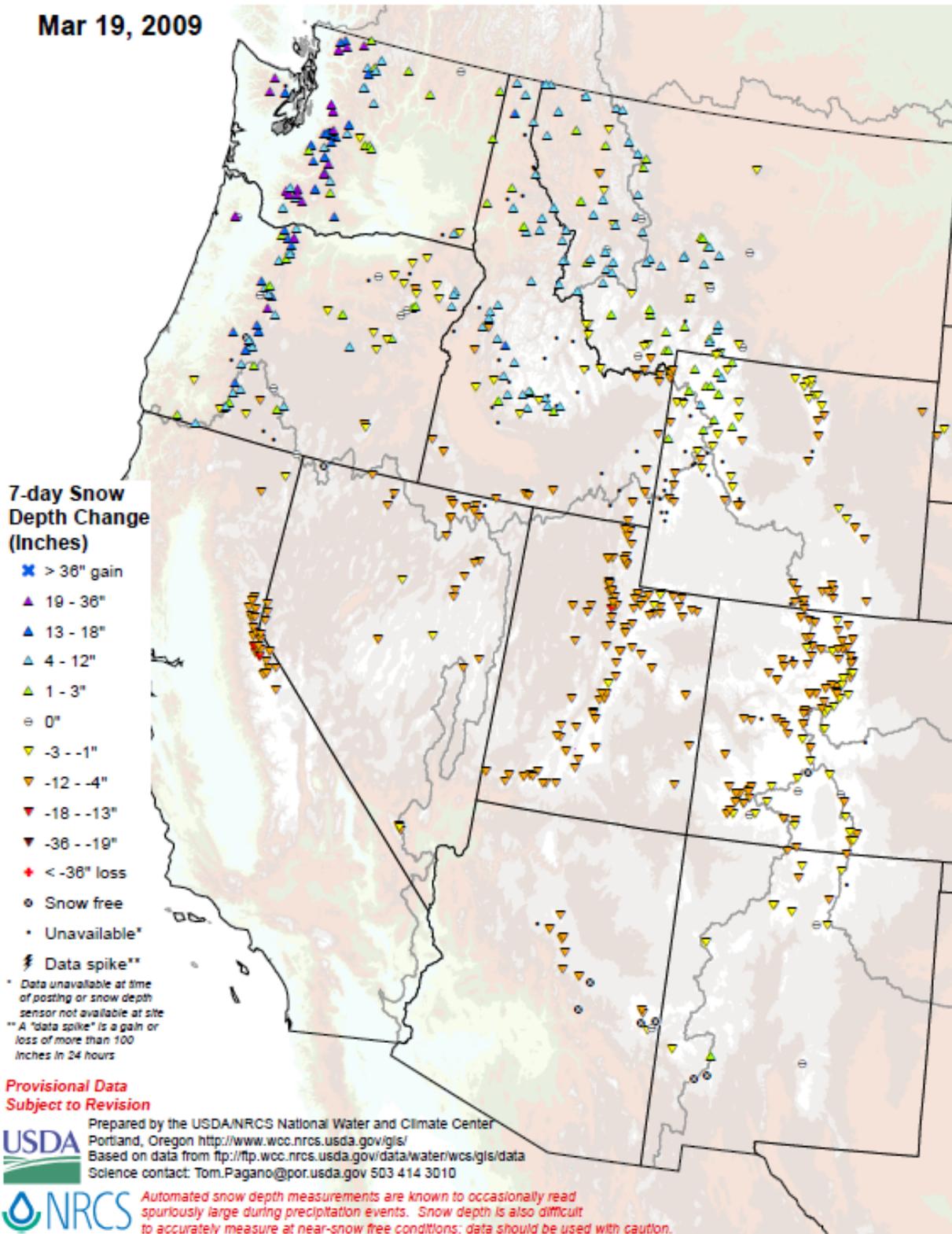
*This is a completely automated objective product based on SNOTEL data. This product is not meant to replace or supersede the official forecasts produced in coordination with the National Weather Service.*

Fig. 1a: Selected preliminary daily water supply forecast changes since last week show that forecast values have increased over the Pacific Northwest and Northern Rockies and decreased over the 4-Corner States.

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)**

Mar 19, 2009



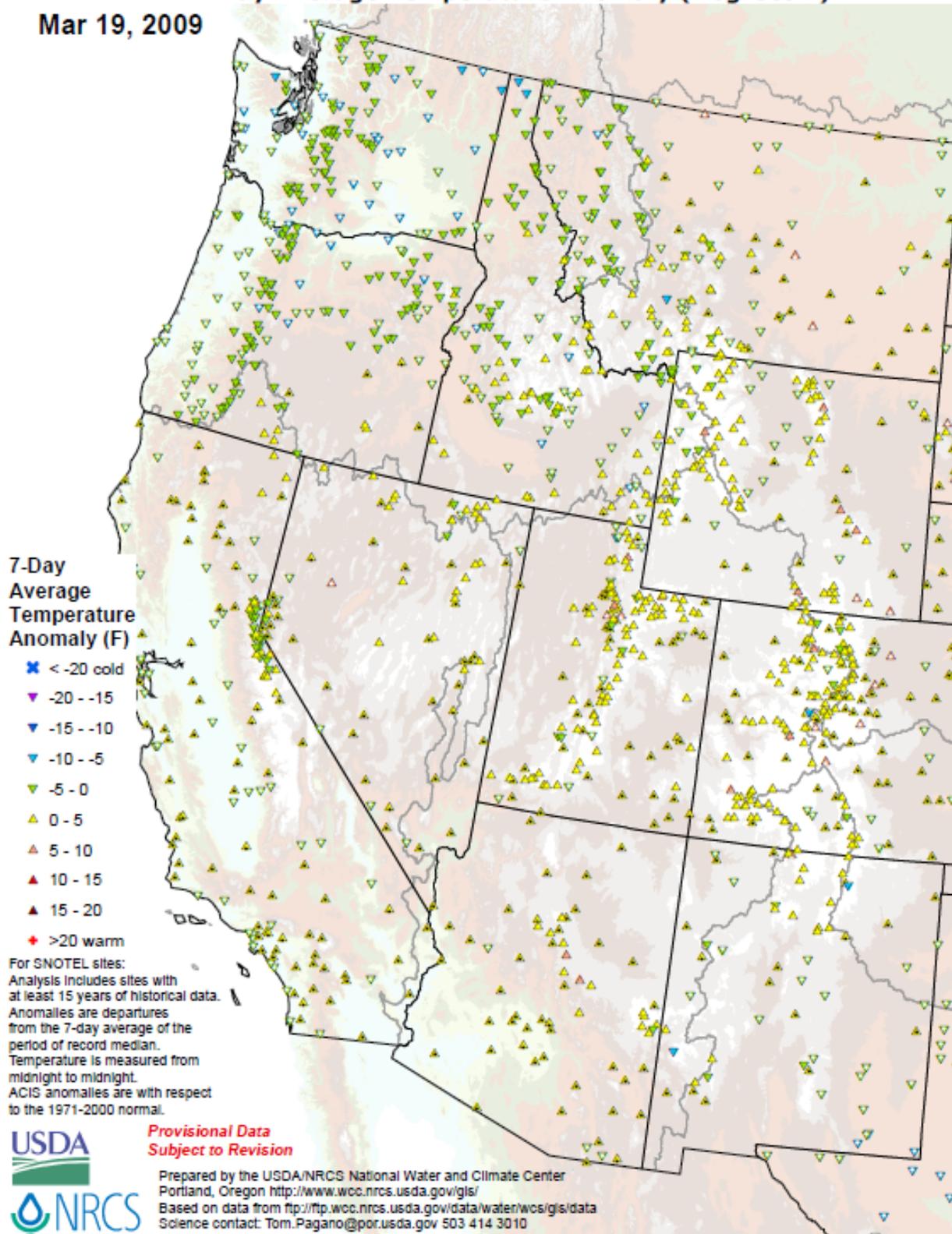
**Fig. 1b: This past week's snow depth changes show significant increases over the Pacific Northwest and Northern Rockies while the southern half of the West had significant snow melt.**

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)

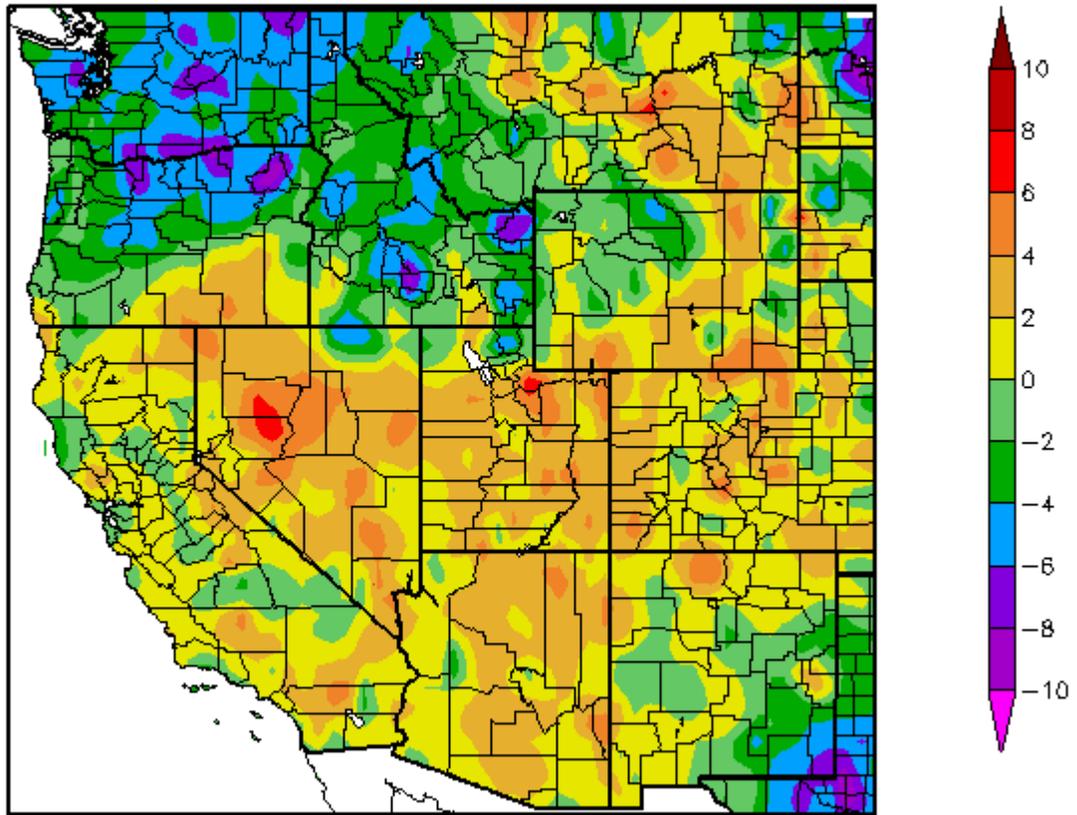
Mar 19, 2009



**Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were below average across most of the western half of the West and above average over the eastern half. All in all, temperatures were generally within 5 degrees of the long term average across the West.**

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

Departure from Normal Temperature (F)  
3/12/2009 – 3/18/2009



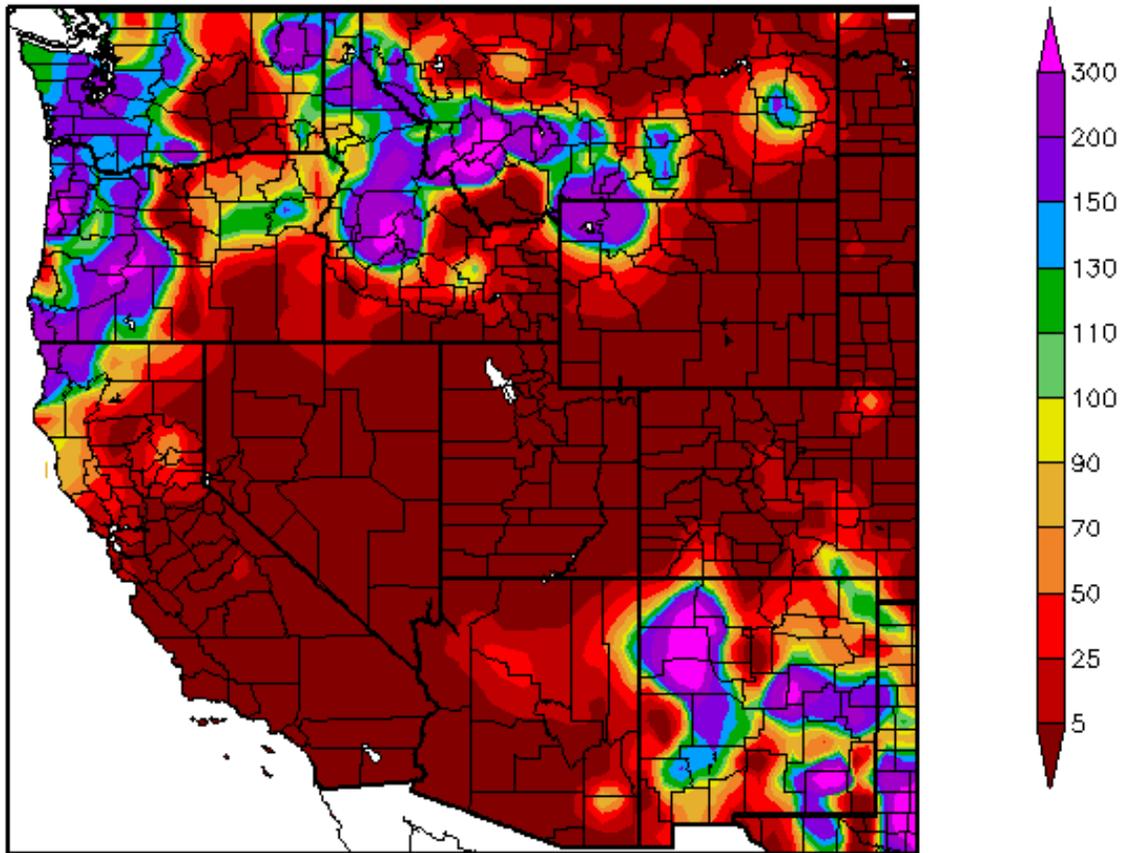
Generated 3/19/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 2a. ACIS 7-day average temperature anomalies: Greatest positive temperature departures occurred over western Nevada (>+6F) and the greatest negative departures occurred over Oregon and Washington (<-8F). This pattern is more reminiscent to La Nina conditions.**

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

Percent of Normal Precipitation (%)  
3/12/2009 – 3/18/2009



Generated 3/19/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 18 March shows a very wet week over the Coastal Ranges and Cascades of Oregon and Washington and much of the Northern Rockies with some precipitation over New Mexico. Much drier conditions prevailed over the remainder of the West.**

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)

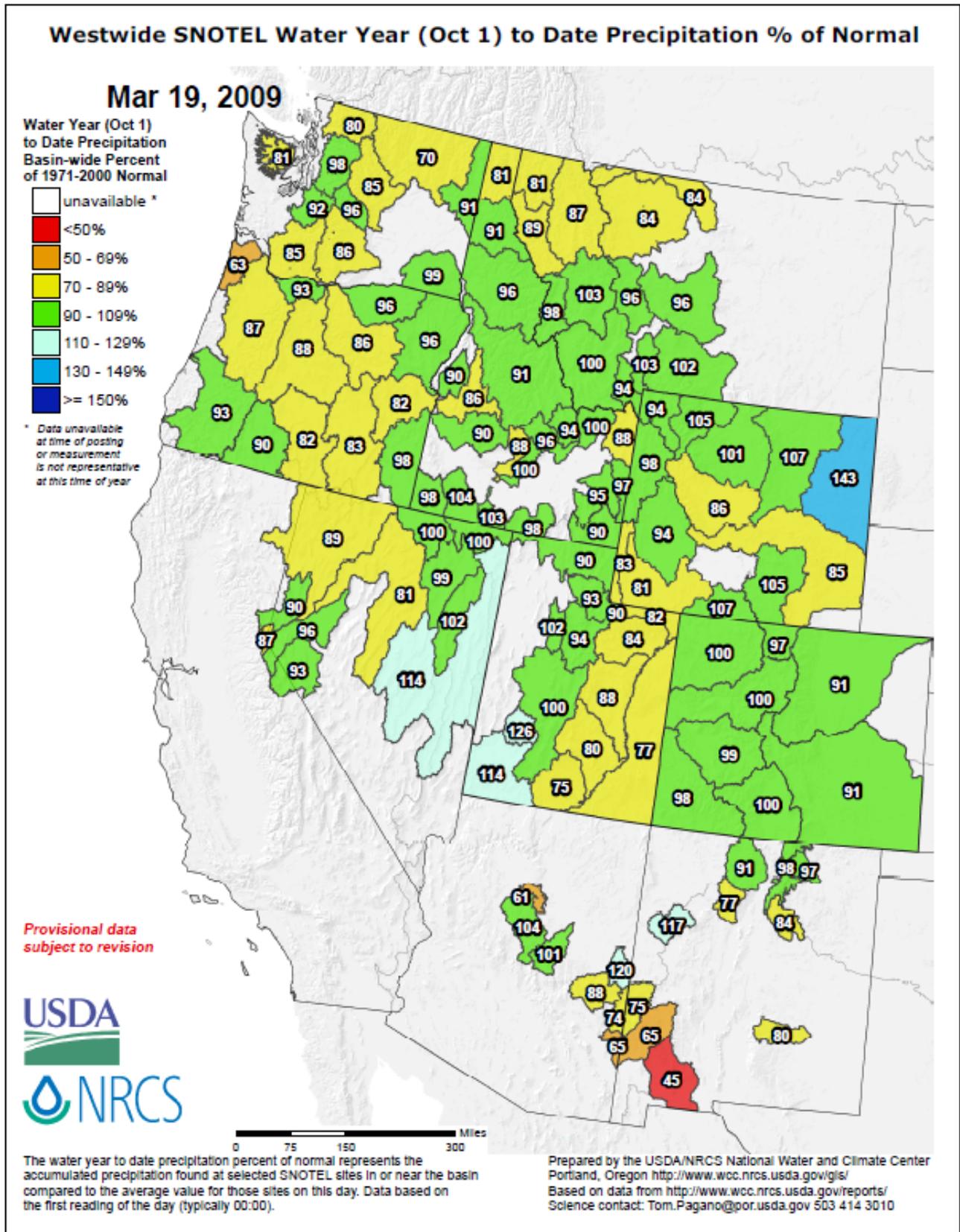
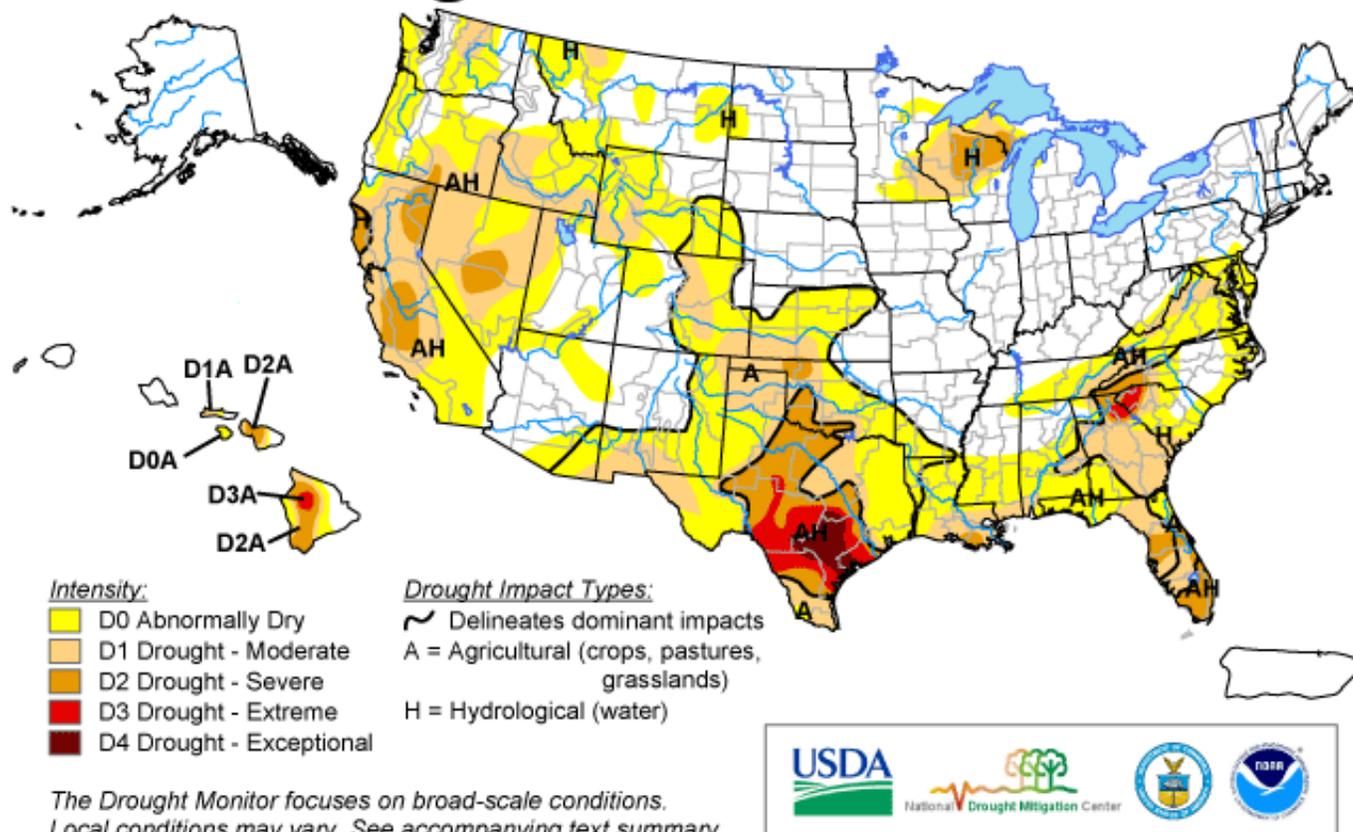


Fig 3a. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values remaining pretty much unchanged this week (within +/- 4 percent). Ref: [http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecpcnormal\\_update.pdf](http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf)

# U.S. Drought Monitor

March 17, 2009

Valid 8 a.m. EDT



Released Thursday, March 19, 2009

Author: Laura Edwards, Western Regional Climate Center

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

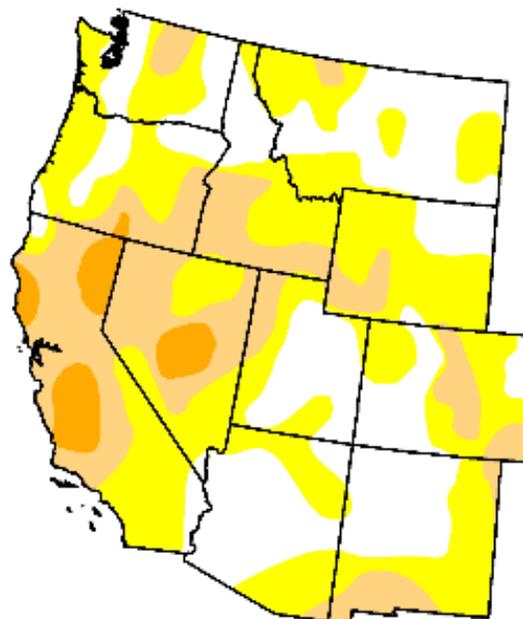
## West

March 17, 2009

Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	33.4	66.6	25.8	4.2	0.0	0.0
Last Week (03/10/2009 map)	33.7	66.3	25.1	4.2	0.0	0.0
3 Months Ago (12/23/2008 map)	31.5	68.5	30.1	9.0	0.4	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 (03/18/2008 map)	42.3	57.7	36.2	16.0	0.0	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, March 19, 2009**

**Author: Laura Edwards, Western Regional Climate Center**

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

**Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. No significant change this week.** Ref: [http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm)

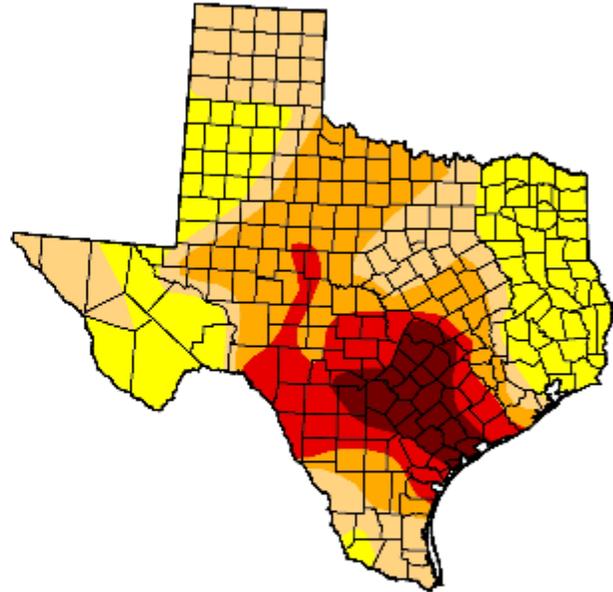
# U.S. Drought Monitor

## Texas

March 17, 2009  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.0	100.0	71.0	43.9	19.8	7.1
Last Week (03/10/2009 map)	0.0	100.0	84.3	45.8	22.4	9.6
3 Months Ago (12/23/2008 map)	47.6	52.4	24.6	15.0	9.1	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 (03/18/2008 map)	30.6	69.4	56.9	15.8	3.9	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>

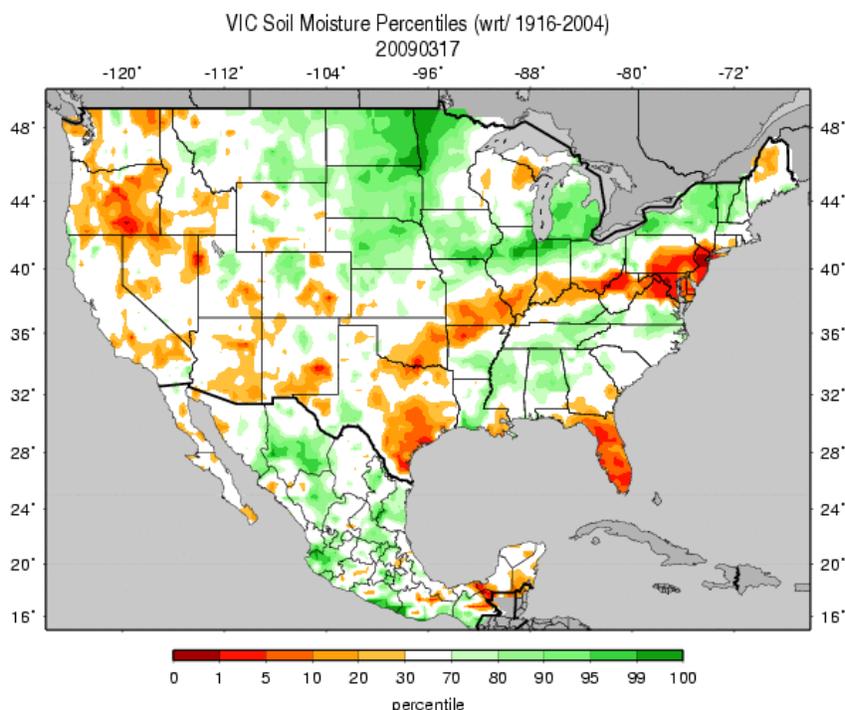


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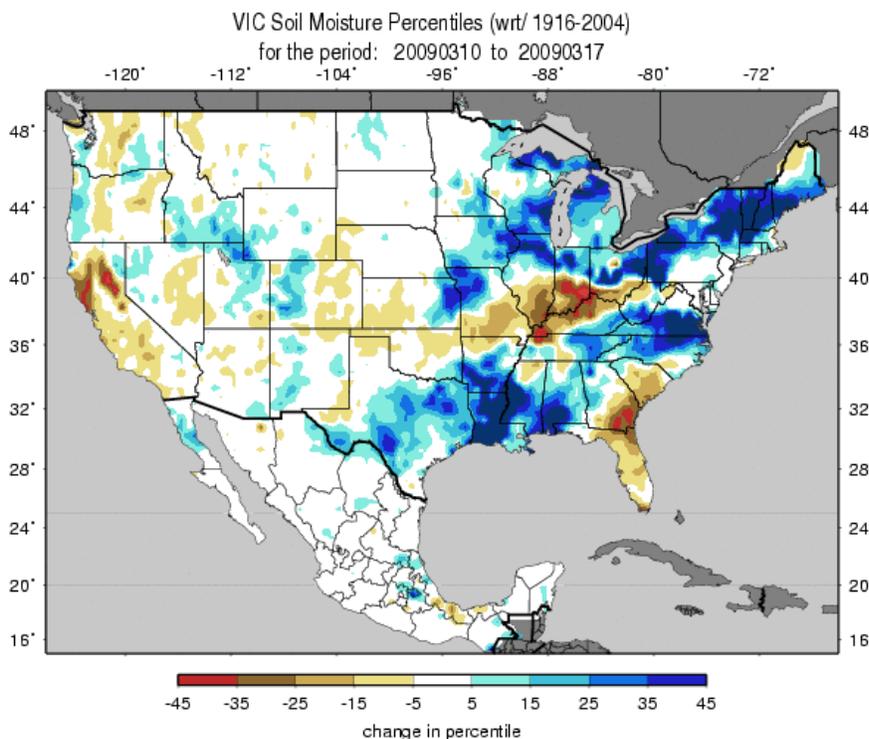
**Fig. 4b: Texas is the only state with D4 drought condition in the US. Note some improvements since last week.** Ref: [http://www.drought.unl.edu/dm/DM\\_southeast.htm](http://www.drought.unl.edu/dm/DM_southeast.htm)

## 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 dominates from New Jersey to eastern Texas and Florida. Oregon still remains drier than average.

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 improvement over much of the eastern half of the country with the exception of Indiana, Kentucky and Georgia. Northern California has deteriorated significantly as well during the week.

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)

# Observed Fire Danger Class: 18-MAR-09

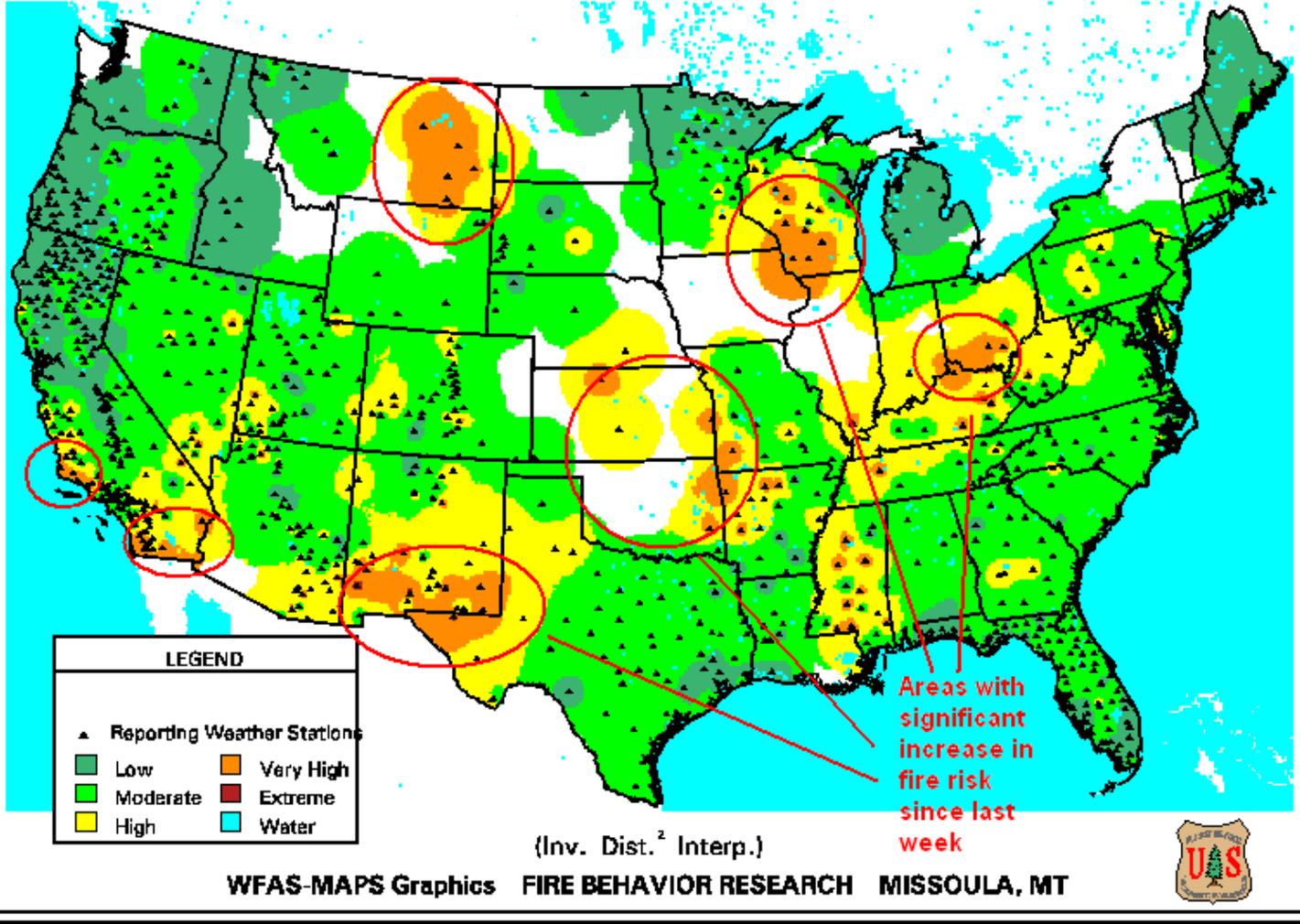


Fig. 6. Observed Fire Danger Class. Conditions have deteriorated across scattered regions of the US since last week. Source: Forest Service Fire Behavior Research – Missoula, MT.  
Ref: [http://www.fs.fed.us/land/wfas/fd\\_class.gif](http://www.fs.fed.us/land/wfas/fd_class.gif)

## Map of below normal 7-day average streamflow compared to historical streamflow for the day of year (United States)

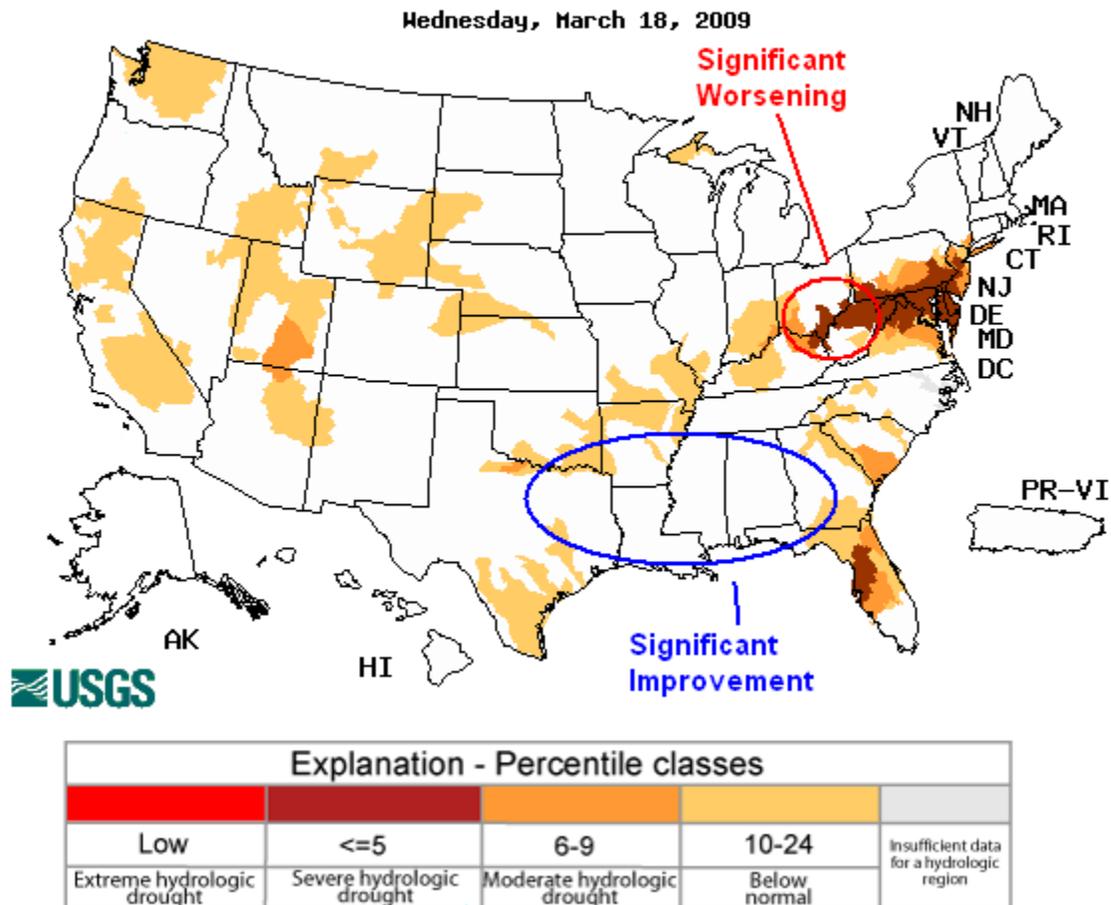


Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are very poor from New Jersey to eastern Kentucky and western Florida during the past week. Significant improvement is noted over the Deep South. Elsewhere, over the Northern Tier States, cold temperatures have probably frozen rivers and thus do not necessarily reflect accurate flows.

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

## National Drought Summary -- March 17, 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/>.*

Texas, North Carolina and Virginia received beneficial rainfall this week, with some areas greening up just in time for St. Patrick's Day. Colorado's Front Range and Florida are among the regions that experienced worsening drought conditions.

### The Plains

Drought relief finally came in the form of significant rainfall to areas of eastern, central, and northern Texas into Oklahoma. One-category improvements were made in a swath from west of San Antonio to southeastern Oklahoma. Weekly precipitation totals of three to five inches were common throughout this region. In the Big Bend, moderate drought was reduced to abnormally dry conditions (D0) in Presidio and western Brewster counties, with over an inch of rainfall this week. In eastern Texas, wet conditions also prevailed east of Interstate 45, expanding the area of D0.

### The South

Florida's drought conditions continue to degrade and a lack of rainfall pushed the east coastal counties into the severe category from Kennedy Space Center to West Palm Beach. On the west coast north of Naples, another dry week caused a one-category deterioration to moderate, or D1 conditions. The Suwannee and Santa Fe river basins in the north have had consistently low streamflow. In combination with little or no precipitation, this region fell into moderate drought as well. The central coast of Louisiana continues to experience a deficit of precipitation over the last 90 days, and moderate drought was introduced. The southwest counties of the state locally received two inches or more of precipitation, bringing a one-category improvement there. Rainfall amounts as heavy as four to six inches locally fell this week in central Alabama and east into Georgia, but this was primarily in the drought-free region so no change was made in these states.

### The East

Southeastern Pennsylvania, northern Maryland and northern Delaware are still dry after one of the driest Februaries on record in the region. For the last 90 days, locations in this area have measured about half of normal precipitation, with deficits of four to six inches. Abnormally dry, or D0, was introduced. In southwestern Virginia, the extent of moderate drought was reduced due to significant rainfall. The steady, multi-day rainfall event was welcome and brought 1.5 to 3.5 inches of precipitation across this area. In southern Virginia and North Carolina, drought conditions improved this week, also reflecting a four-day rainfall event that increased streamflow and raised groundwater levels. Two to three inches fell in central North Carolina into Virginia, as abnormally dry conditions improved to near normal. Western North Carolina also experienced improvement in the region of moderate drought, and the D1 region was scaled back.

### The West

In California, an expansion of moderate drought (D1) was introduced in eastern Fresno and Tulare counties over the Sierra Nevada crest, due to lack of precipitation over recent weeks and low reservoir storage. Colorado's Front Range continues to experience dry conditions. Pueblo has received just .08 inch of precipitation since January 1, and Colorado Springs has measured .26 inch in the same period. As a result, moderate drought conditions are depicted on the map. The area along the Yellowstone River in Montana, between Miles City and Sidney, has been abnormally dry this winter. The last major winter storm to reach this region was in mid-October, and there is little snow cover on the ground. D0 was introduced in Prairie, Dawson and Richland counties.

## Weekly Snowpack and Drought Monitor Update Report

Abnormally dry conditions have also expanded in central Montana due to low winter precipitation and no snow cover.

### **Hawaii, Alaska and Puerto Rico**

Rainfall over the last two weeks on the Big Island has improved drought in the southern area. The severe and moderate drought regions have reduced in extent this week. Alaska and Puerto Rico had no change this week.

### ***Looking Ahead:***

Early in the next drought monitoring period, a front is forecast to push its way through the southern Plains and off the east coast. Moisture from the Gulf of Mexico could produce some precipitation from the central United States into the northeast. Over the weekend a system will move onshore in the West. Coastal regions are projected to receive heavy rainfall with snow at higher elevations. Orographically enhanced precipitation will fall on the western slopes of the mountains from the Sierra Nevada to the Rocky Mountains. Early next week, the eastern states will have a strong ridge following the weekend cold front that could prevent much rainfall. In the longer range overall, the six to ten day forecast calls for above average temperatures throughout the Plains states from North Dakota to western Tennessee and below normal temperatures over all of Alaska and the southern tip of Florida. For the same period, precipitation is projected to be below normal in northwest Alaska, the Intermountain region and Southwest, and East Coast. Above normal precipitation for the six to ten day period is expected in the Pacific Northwest and central states.

**Author:** Laura Edwards, Western Regional Climate 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: 19 March 2009