



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

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**Weekly Report - Snowpack / Drought Monitor Update**      **Date: March 29, 2007**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snowpack:** For the 2007 Water Year (WY), the last bastion of near normal snow water-equivalent (SWE) persists over portions of the Northern Cascades and Colorado Front Range (Fig. 1). Conditions continue to deteriorate over California, Arizona, Nevada, and Utah. During this week, SWE increased over northern California, Intermountain (ID), and Great Basin (NV) in response to some moisture and cooler temperatures (Fig. 1a). Snow depths showed some recovery over the Sierra Nevada, Great Basin, Uinta, and Central and Northern Rockies (Fig. 1b) due to a late season winter storm. Currently, this large intense slow moving storm is transiting across Wyoming and adjacent states (Fig. A). Wyoming warnings are calling for snowfall in the range of one to two feet which can only help with the overall water supply situation in this drought prone region of the county:

URGENT - WINTER WEATHER MESSAGE  
NATIONAL WEATHER SERVICE CHEYENNE WY  
820 AM MDT THU MAR 29 2007

...HEAVY SNOW WILL CONTINUE TO AFFECT PORTIONS OF SOUTHEAST WYOMING THROUGH THIS EVENING...

A STRONG STORM SYSTEM CENTERED OVER WESTERN COLORADO THIS MORNING WILL MOVE SLOWLY TO THE NORTHEAST THROUGH TONIGHT. THE TRACK OF THE STORM AND ITS SLOW MOVEMENT WILL PLACE SOUTH CENTRAL AND EAST CENTRAL WYOMING IN A FAVORABLE POSITION TO RECEIVE HEAVY SNOW. ONE TO TWO FEET OF SNOW WILL OCCUR OVER THE HIGHER ELEVATIONS...WITH UP TO FIFTEEN INCHES IN THE LOWER ELEVATIONS FROM THE LARAMIE RANGE WESTWARD...AND ALSO CONVERSE AND NIOBRARA COUNTIES THROUGH THIS EVENING.

URGENT - WINTER WEATHER MESSAGE  
NATIONAL WEATHER SERVICE RIVERTON WY  
343 AM MDT THU MAR 29 2007

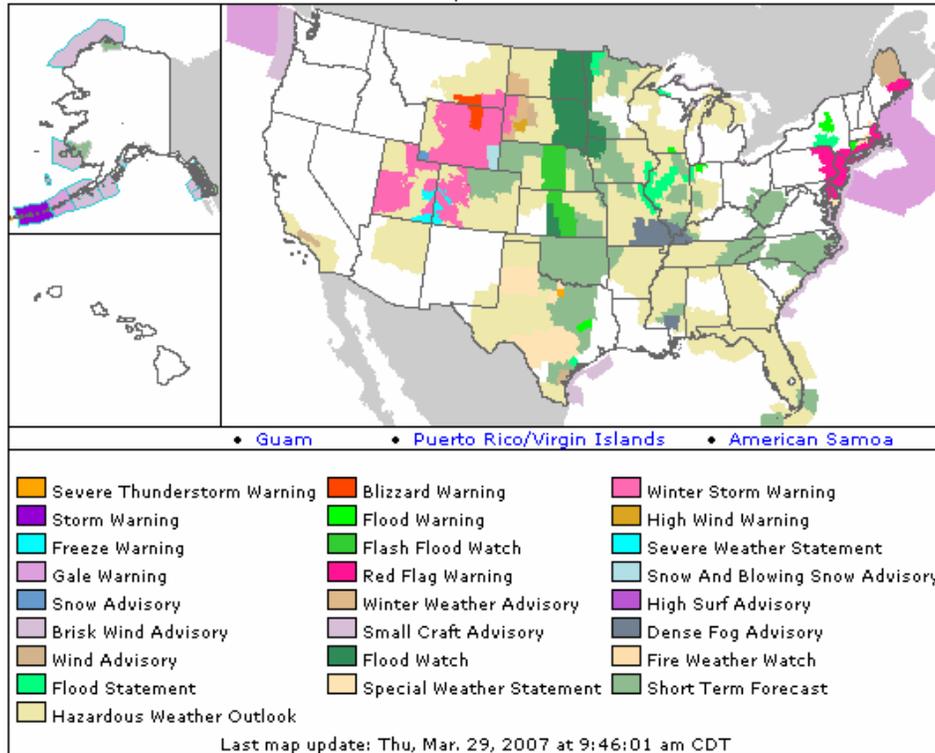
...A MAJOR EARLY SPRING STORM WITH VERY STRONG WINDS WILL CONTINUE THROUGH THE DAY AND EVEN INTO THE EVENING HOURS IN MANY LOCATIONS...

NORTHEAST JOHNSON COUNTY-SOUTHEAST JOHNSON COUNTY-  
INCLUDING THE CITIES OF...BUFFALO...KAYCEE  
343 AM MDT THU MAR 29 2007

THE BLIZZARD WARNING IS NOW IN EFFECT UNTIL MIDNIGHT MDT TONIGHT.

SNOWFALL IS EXPECTED TO INCREASE AGAIN THIS MORNING AND WILL LIKELY BECOME HEAVY AT TIMES THROUGH THE EVENING HOURS. NEW SNOWFALL AMOUNTS OF 5 TO 10 INCHES ARE EXPECTED WITH AMOUNTS AROUND A FOOT NEAR THE FOOTHILLS. BLIZZARD CONDITIONS WILL CONTINUE AS NORTH WINDS BLOW 35 TO 45 MPH WITH GUSTS TO 60 MPH. WINDS WILL NOT BEGIN TO DIMINISH UNTIL THIS EVENING. VISIBILITIES WILL BE REDUCED TO NEAR ZERO AT TIMES AND MANY ROADS WILL LIKELY REMAIN CLOSED TODAY...INCLUDING INTERSTATE 25 AND 90. STAY ABREAST OF THE LATEST FORECAST AND ROAD CONDITIONS AS THIS BLIZZARD CONTINUES TO POUND THE AREA.

## Weekly Snowpack and Drought Monitor Update Report



**Fig A. National Weather Service warnings. Note Central Rockies winter warnings.**

**Temperature:** During the past seven days, temperatures ranged from near normal over the western most ranges in the West to nearly 10°F above normal over the eastern slopes of the Central and Northern Rockies (Fig. 2). The effects of the late winter storm can be seen by the dramatic drop in temperatures during the past 24 hours over the Rockies and Utah ranges (Fig. 2a).

**Precipitation:** During this report period, precipitation (rain and snow) was significant over the Washington Cascades although large amounts fell over the Southern Cascades, Sierra Nevada, Northern Rockies, Colorado Rockies southward, and much of Arizona (Fig. 3). For the Water Year, precipitation has been near normal in basically the same areas where the (SWE) has been near normal with the exception of parts of the Northern Rockies where much of the normal WY moisture has been in the form of rain not snow (Fig. 1 and Fig. 3a).

### WESTERN DROUGHT STATUS

**The West:** Temperatures fell from the previous week’s lofty levels but remained above normal for the 7-day (March 20-26) period. Late in the period, favorably cooler, wetter weather arrived in the West in conjunction with a developing storm. Nevertheless, the overall Western depiction exhibited a worsening trend due to a disappointing winter wet season, prematurely melting snow, and worsening prospects for spring and summer runoff potential. In particular, drought areas of the Southwest and Intermountain West were connected, resulting in a net expansion of moderate drought (D1) across Nevada, Utah, and adjacent areas. Farther south, however, some much-needed precipitation fell across central and southeastern Arizona, helping to slightly reduce the coverage of moderate to severe drought (D1 to D2) (Figs. 4 and 4a).

***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 (Fig. 4, and 4a).

### **SOIL MOISTURE**

Soil moisture (Fig. 5), 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://www.nifc.gov/information.html>. The latest Observed Fire Danger Class is shown in Fig. 6.

### **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>

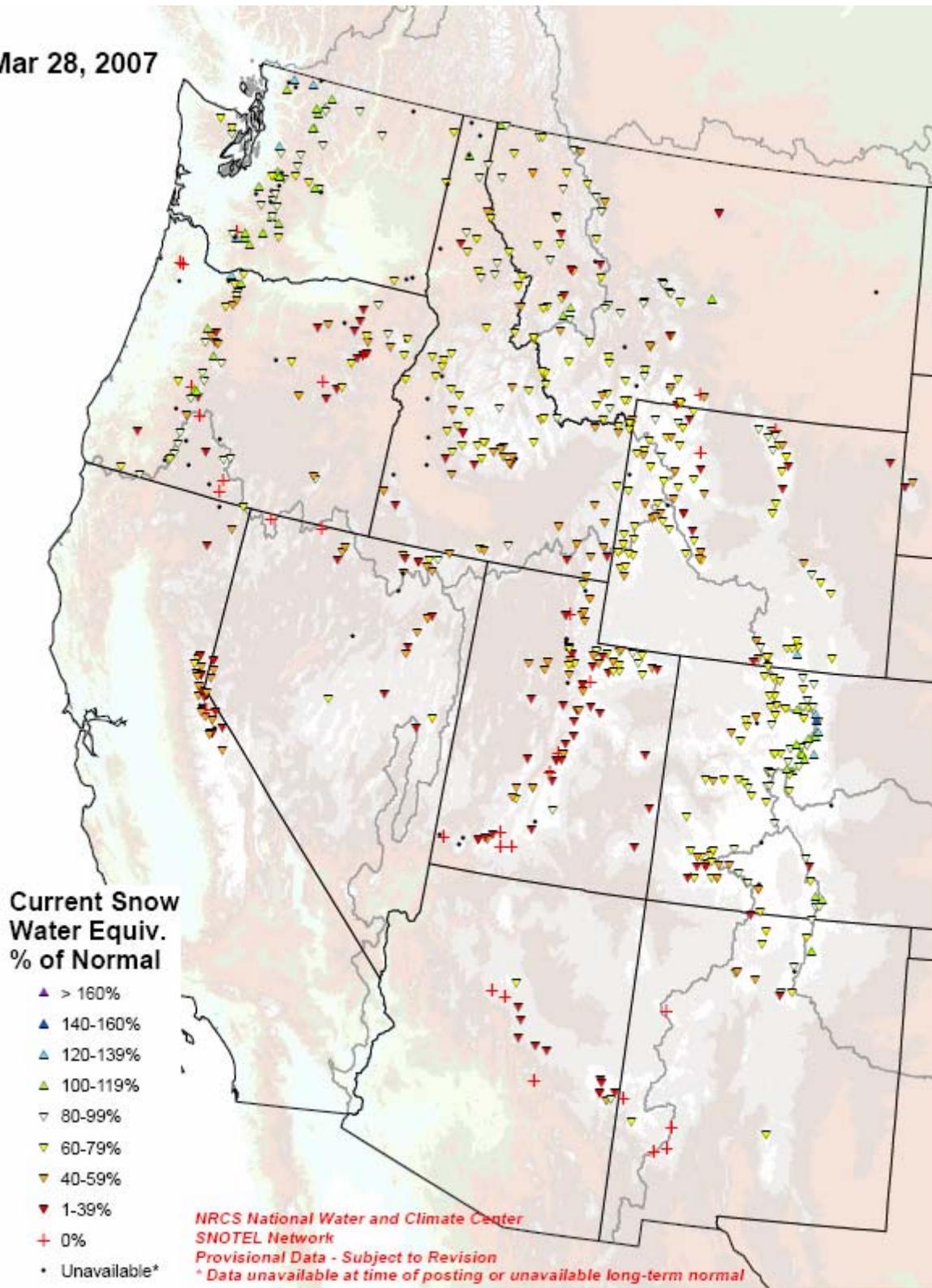
This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/ DANIEL MEYER

Acting Director, Conservation Engineering Division

# Weekly Snowpack and Drought Monitor Update Report

Mar 28, 2007



**Fig. 1: Snow Water-Equivalent as a percent of normal for Water Year 2007.**

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

## Weekly SWE Change

Snow Water Equivalent: Change in Percentiles (wrt/ 1915-2003)  
for the week 20070320 to 20070327 threshold = 10 mm

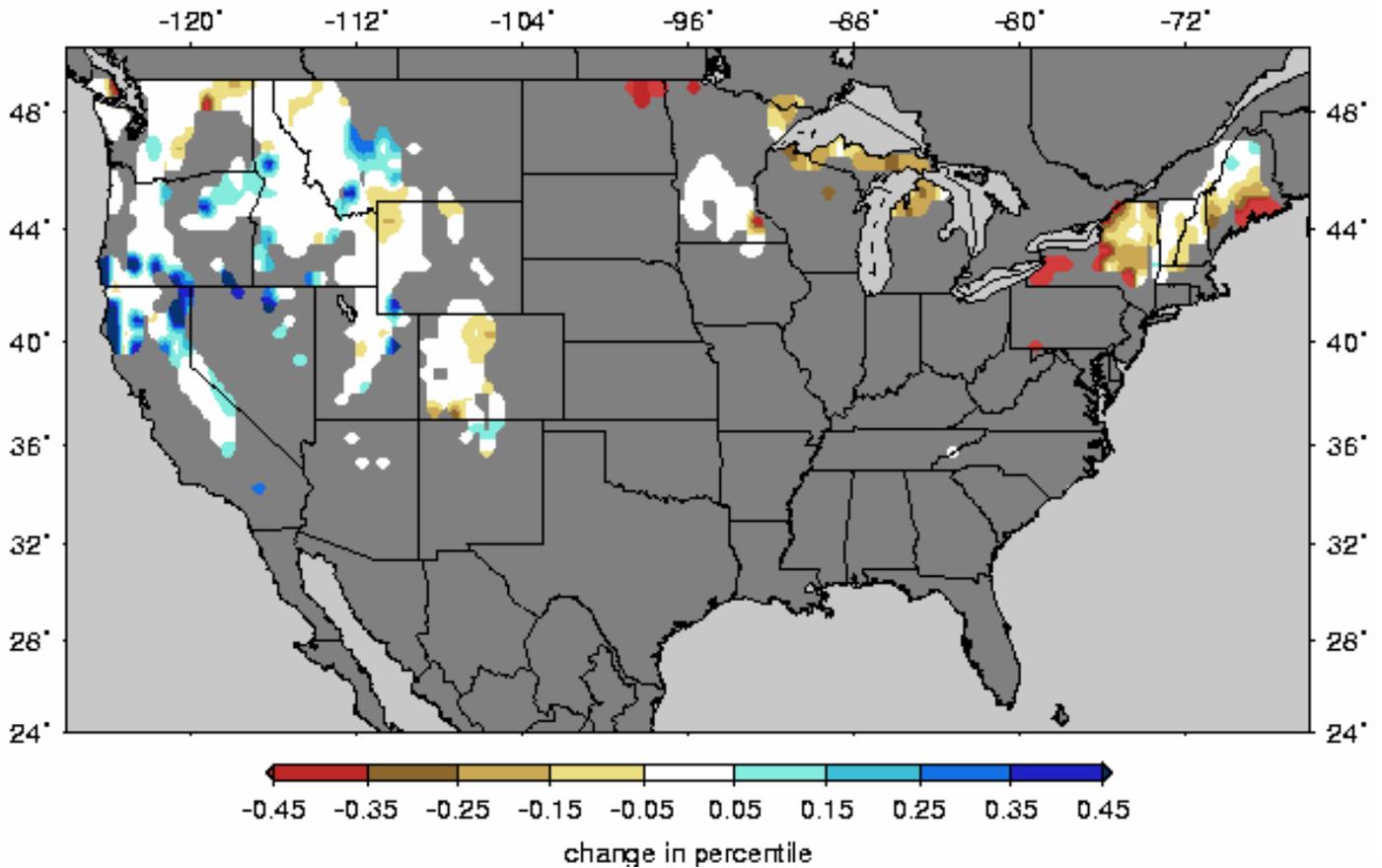
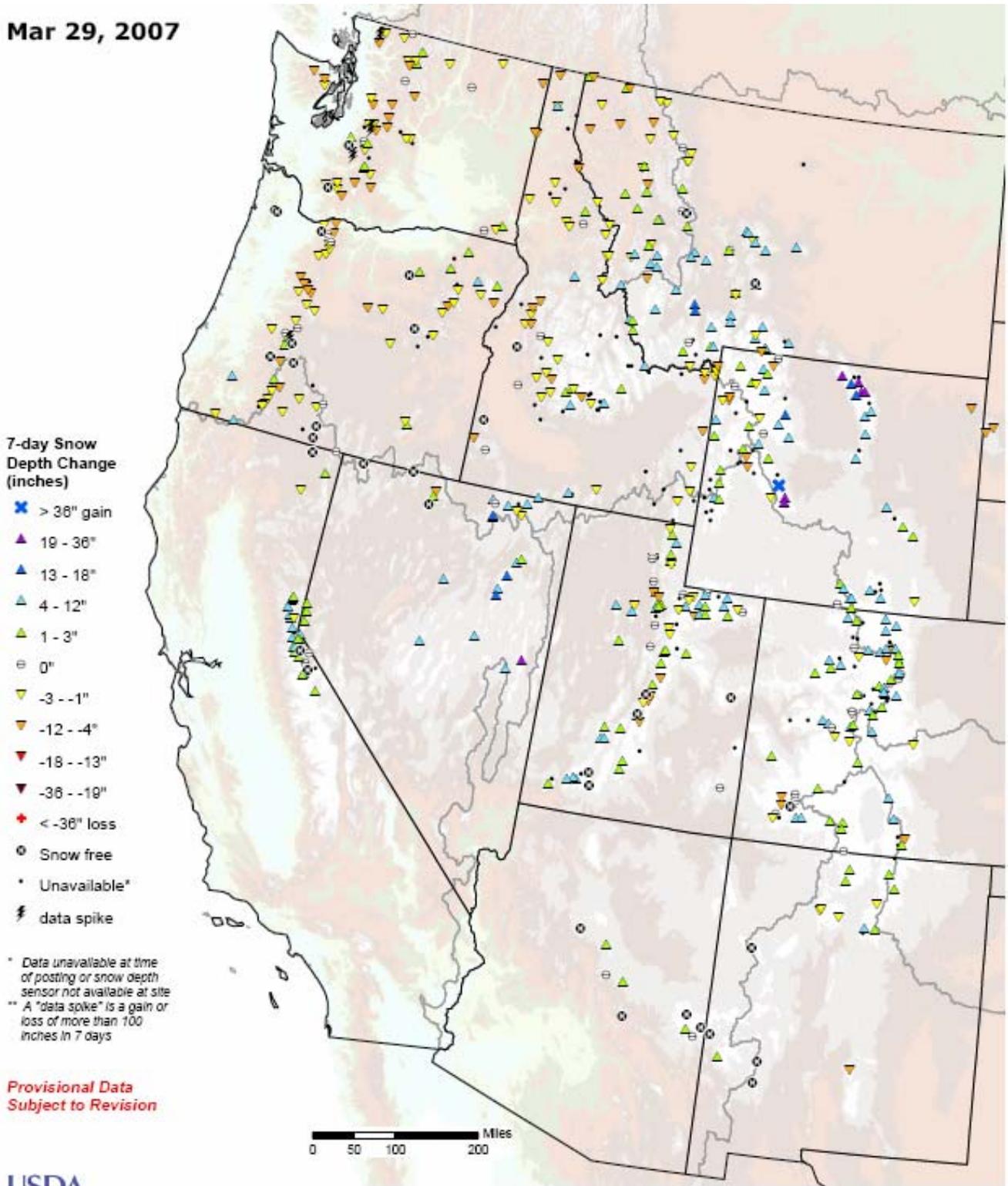


Fig. 1a. Snow Water-Equivalent changes as a percent during the period 20 to 27 March 2007 based on 1915-2003 climatology. Ref: <http://www.hydro.washington.edu/forecast/monitor/index.shtml>

# Weekly Snowpack and Drought Monitor Update Report

Mar 29, 2007



Prepared by the  
 USDA/NRCS National Water and Climate Center  
 Portland, Oregon  
<http://www.wcc.nrcs.usda.gov/gis/>

*Automated snow depth measurements are known to occasionally read spuriously large during precipitation events. Snow depth is also difficult to accurately measure at near-snow free conditions; data should be used with caution.*

**Fig. 1b. SNOTEL 7-day snow depth change.**

Ref: <http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf>

Weekly Snowpack and Drought Monitor Update Report

Mar 29, 2007

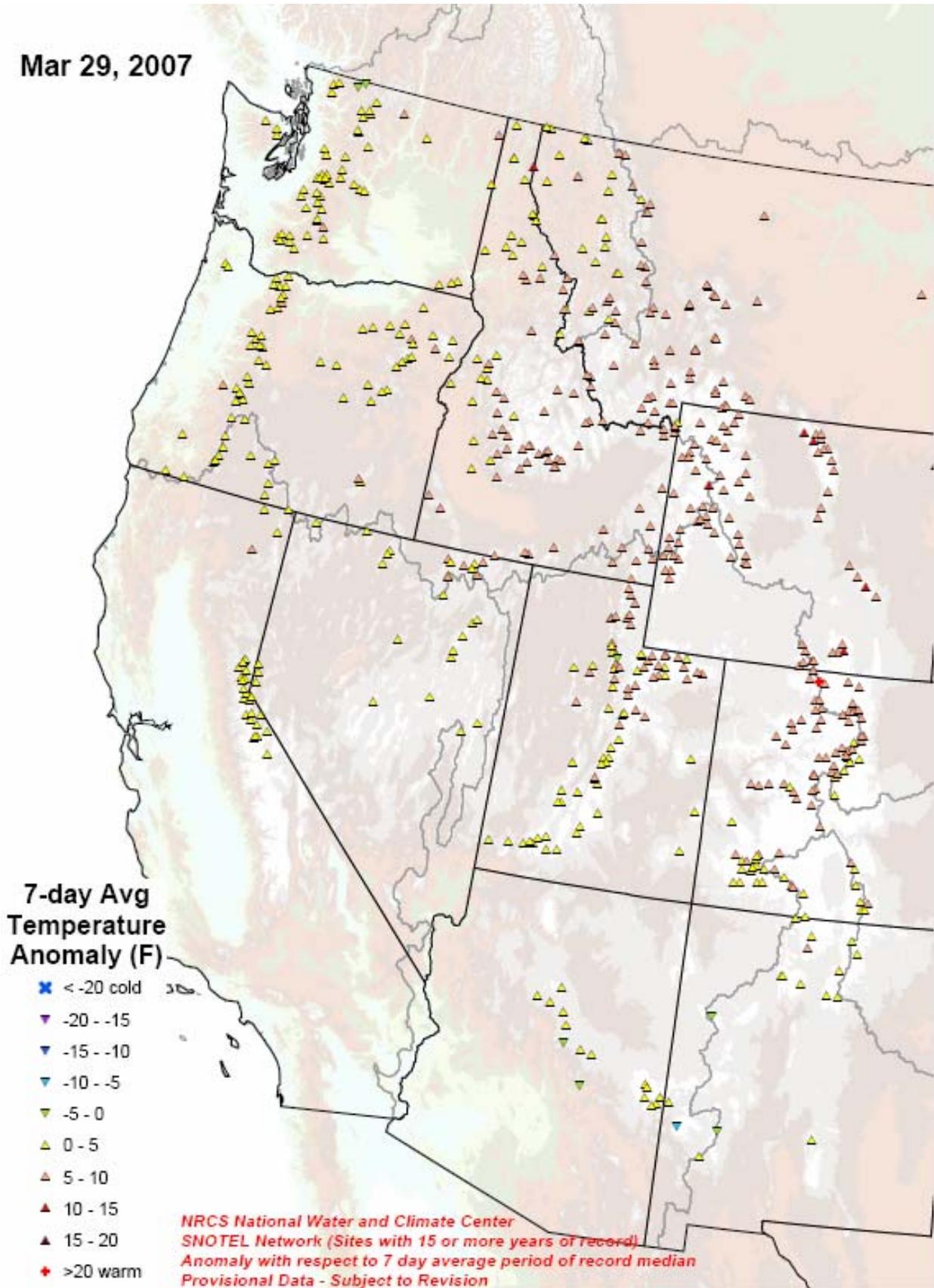


Fig. 2. SNOTEL 7-day average temperature anomaly.

Weekly Snowpack and Drought Monitor Update Report

Mar 29, 2007

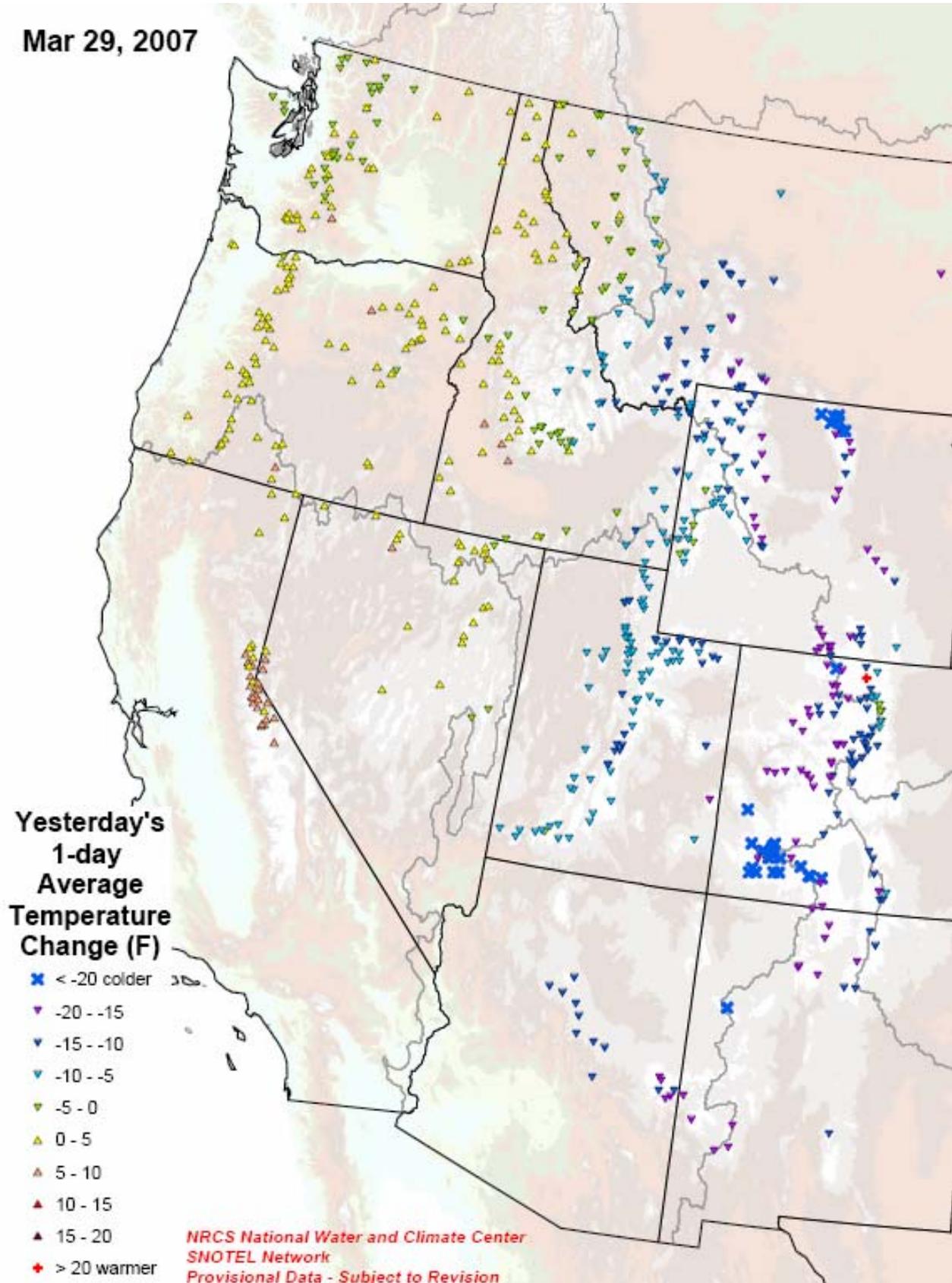


Fig. 2a. SNOTEL average temperature change from 28 to 29 March 2007.

# Weekly Snowpack and Drought Monitor Update Report

March 20, 2007 Drought Monitor  
& Ensuing 7-Day Precipitation (")

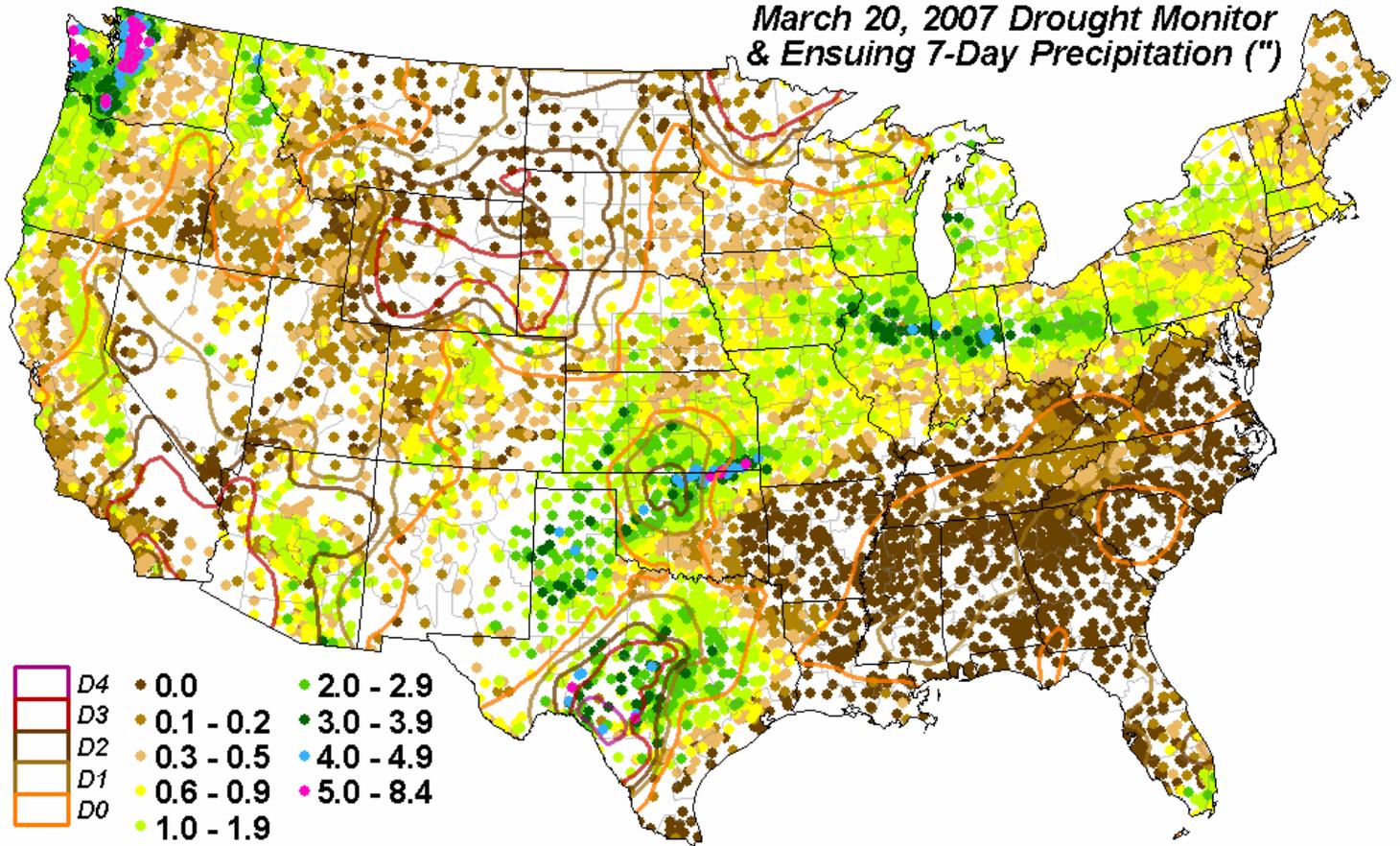


Fig. 3. Preliminary estimates of precipitation totals (inches) for the 7-day period ending March 27, 2007.  
Ref: <http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/usdm-precip-overlay.gif>

# Weekly Snowpack and Drought Monitor Update Report

Mar 29, 2007

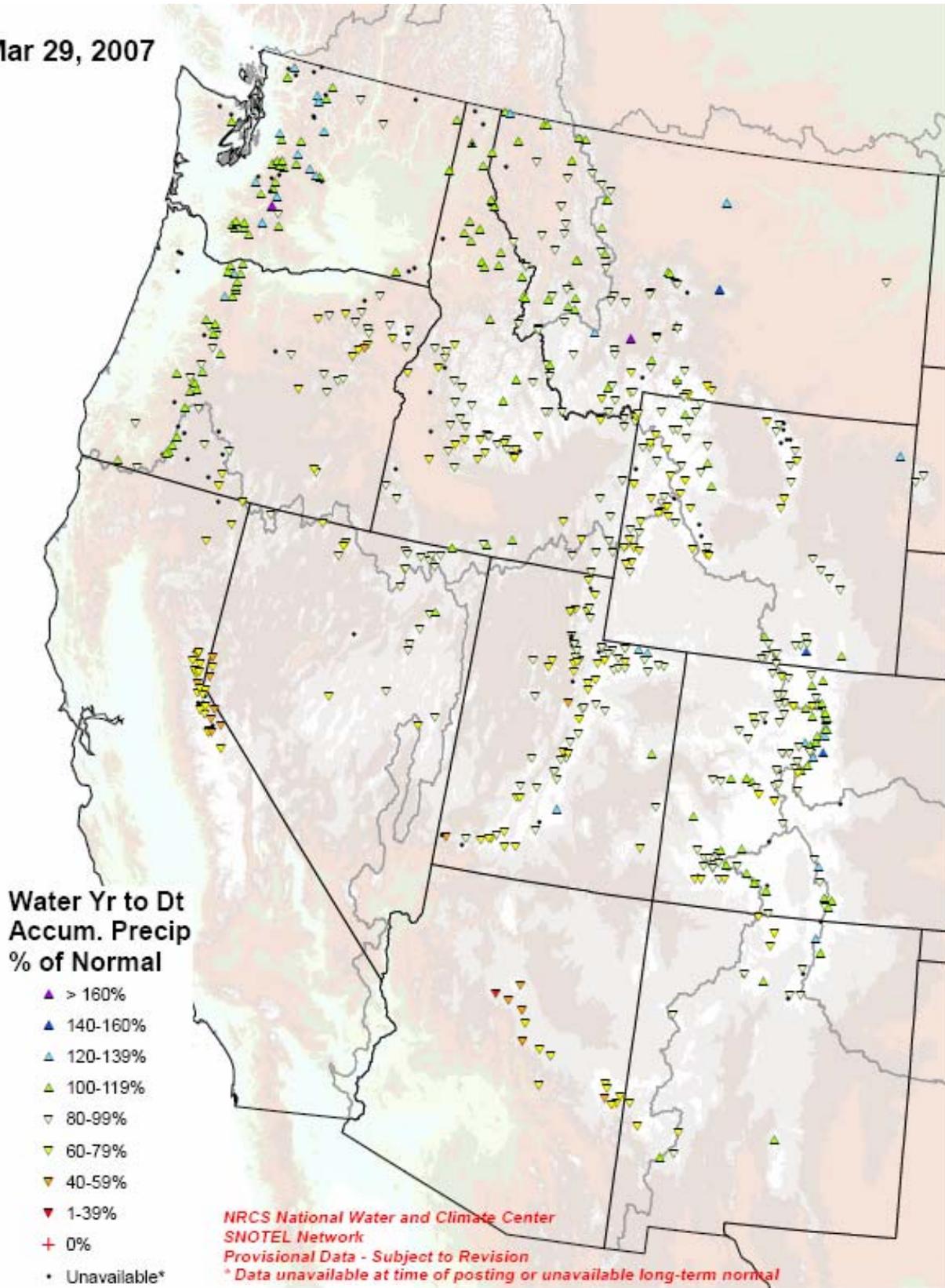


Fig. 3a. SNOTEL station water year (since October 1) precipitation as a percent of normal.  
Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideWYTDPrecipPercent.pdf>

# U.S. Drought Monitor

March 27, 2007  
Valid 8 a.m. EDT

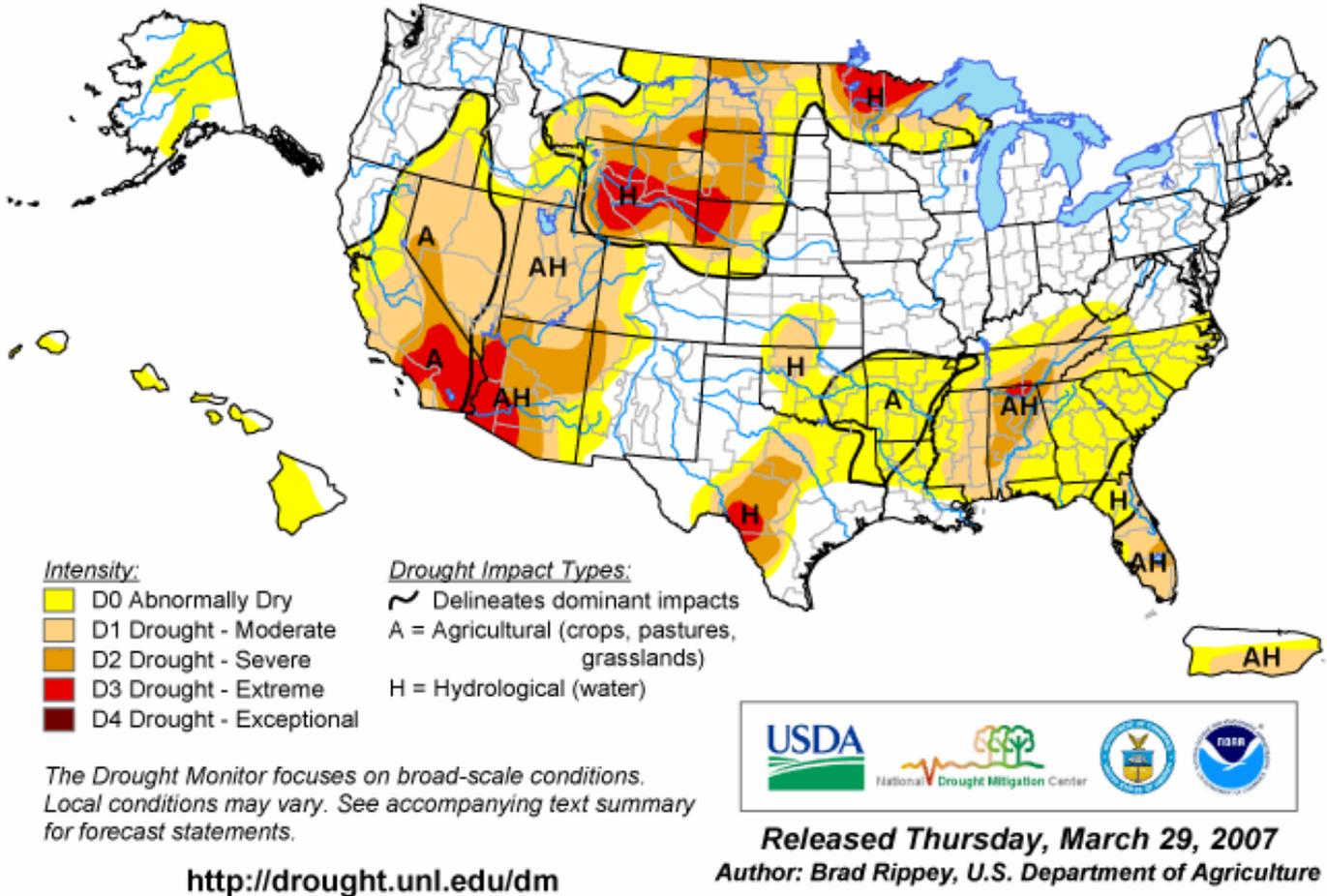


Fig. 4. Current Drought Monitor weekly summary.

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

# U.S. Drought Monitor West

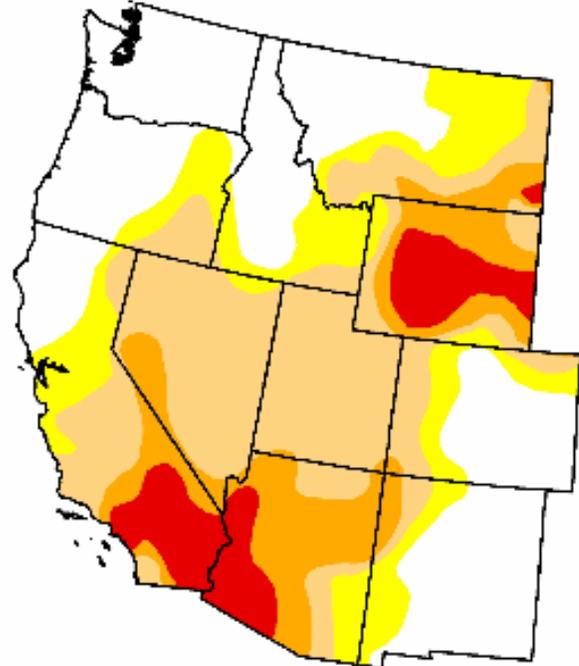
March 27, 2007  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.6	65.4	49.7	20.8	8.1	0.0
Last Week (03/20/2007 map)	36.7	63.3	34.7	19.7	8.1	0.0
3 Months Ago (01/02/2007 map)	51.2	48.8	25.8	9.4	4.0	0.0
Start of Calendar Year (01/02/2007 map)	51.2	48.8	25.8	9.4	4.0	0.0
Start of Water Year (10/03/2006 map)	43.5	56.5	33.5	16.9	5.2	0.0
One Year Ago (03/28/2006 map)	60.4	39.6	25.4	15.1	5.0	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

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



Released Thursday, March 29, 2007  
Author: Brad Rippey, U.S. Department of Agriculture

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

Weekly Snowpack and Drought Monitor Update Report

Soil Moisture Percentiles (wrt/ 1915-2003)  
20070327

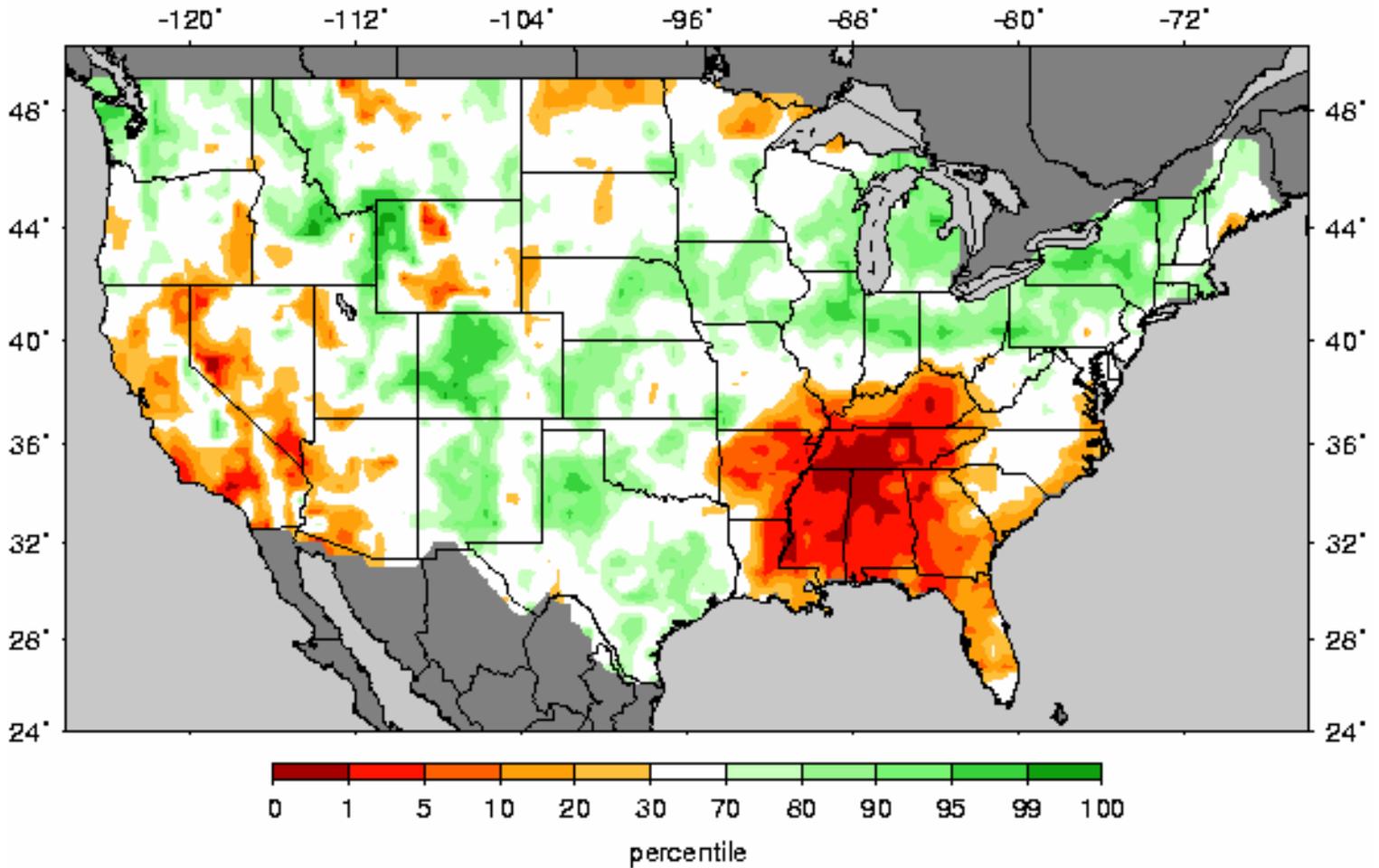


Fig. 5: Soil Moisture Ranking Percentile based on 1915-2003 climatology. (source: Univ. of Washington). Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.sm\\_qnt.gif](http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.sm_qnt.gif)

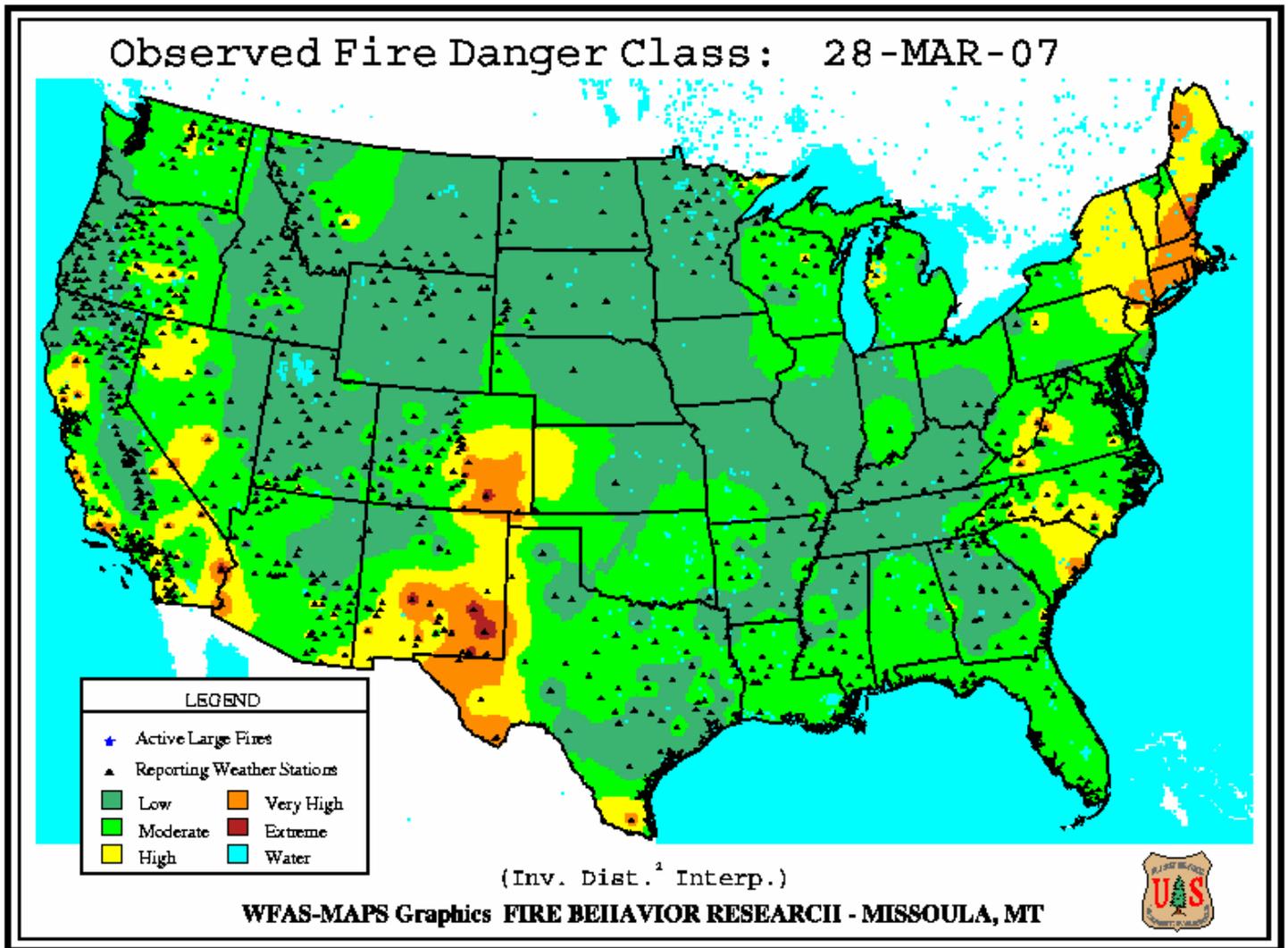
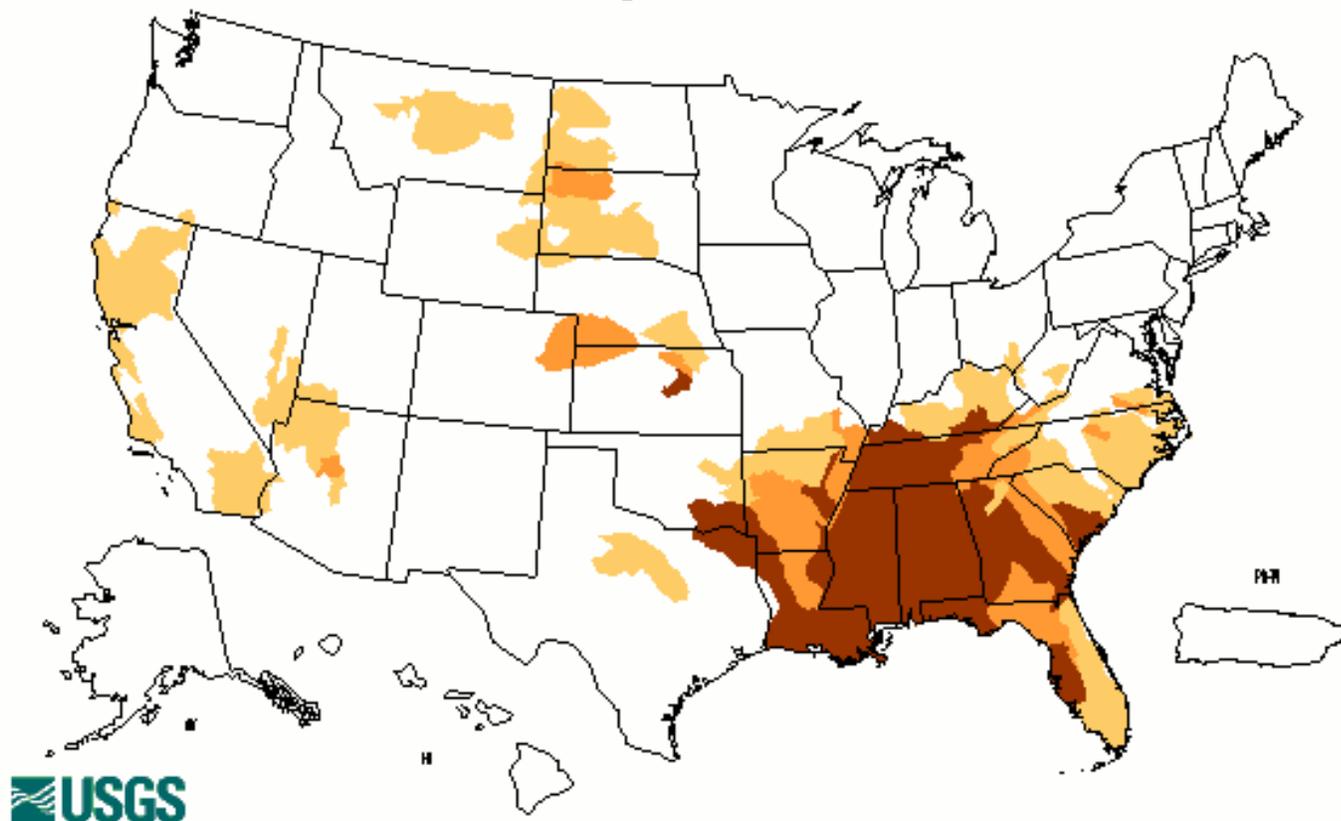


Fig. 6. Observed Fire Danger Class. Source: Forest Service Fire Behavior Research – Missoula, MT  
Ref: [http://www.fs.fed.us/land/wfas/fd\\_class.gif](http://www.fs.fed.us/land/wfas/fd_class.gif)

# Weekly Snowpack and Drought Monitor Update Report

Wednesday, March 28, 2007



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

Fig. 7. Map of below normal 7-day average streamflow compared to historical stream flow for the day of the year. Ref: USGS <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- March 27, 2007

*The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is:*

<http://www.cpc.ncep.noaa.gov/products/forecasts/>.

**The West:** Temperatures fell from the previous week's lofty levels but remained above normal for the 7-day (March 20-26) period. Late in the period, favorably cooler, wetter weather arrived in the West in conjunction with a developing storm. Nevertheless, the overall Western depiction exhibited a worsening trend due to a disappointing winter wet season, prematurely melting snow, and worsening prospects for spring and summer runoff potential. In particular, drought areas of the Southwest and Intermountain West were connected, resulting in a net expansion of moderate drought (D1) across Nevada, Utah, and adjacent areas. Farther south, however, some much-needed precipitation fell across central and southeastern Arizona, helping to slightly reduce the coverage of moderate to severe drought (D1 to D2).

**The Plains and Upper Midwest:** March has been a little wetter than previous months across the upper Great Lakes region, but conditions ranging from abnormally dry (D0) to extreme drought (D3) persisted. For example, March 1-27 precipitation totaled 4.04 inches (150 percent of normal) in Marquette, Michigan, following an extremely dry period from June 2006 to February 2007. From June to February, Marquette's precipitation of 19.32 inches (71 percent of normal) was the third-driest such 9-month period there since 1961. One significant drought impact that continued to plague the upper Great Lakes region was the unusually low surface elevation of Lake Superior. At the end of February 2007, the average water level of Lake Superior stood at 599.7 feet above mean sea level, 1.3 feet below the February 2006 daily mean and 1.6 feet below the long-term February daily mean. The Lake Superior record minimum February daily mean surface elevation of 599.6 feet was established in 1926.

Meanwhile, conditions remained unchanged across the northern half of the Plains but mostly improved farther south. Abundant rains (2 inches or more) fell across the northwestern half of Oklahoma and south-central and southeastern Kansas, helping to eradicate the lingering pocket of severe drought (D2) and reducing the coverage of abnormal dryness (D0) and moderate drought (D1). Heavy rainfall also struck central and south-central Texas, eliminating exceptional drought (D4) and significantly shrinking the areal extent of other drought categories. Month-to-date rainfall climbed to 5.64 inches in San Antonio, Texas, representing its third-wettest March behind 6.12 inches in 1992 and 5.91 inches in 1921. In contrast, short-term dryness (D0A) expanded to cover parts of eastern Oklahoma and northeastern Texas. In eastern Oklahoma, March 1-27 rainfall totaled just 0.49 inch (16 percent of normal) in Muskogee and 0.80 inch (23 percent) in McAlester.

**Southeast:** Record-setting warmth enveloped the Southeast, aggravating the effects of persistently dry weather. On March 25, temperatures exceeded the 90° mark as far north as Augusta, Georgia (91°F). For the week (March 20-26), temperatures averaged as much as 15-20°F above normal across the interior Southeast. A precipitation study of northern Alabama (Climate Division 1) showed that rainfall for the most recent 26-month stretch (January 2005 – February 2007) totaled 98.02 inches, the lowest in that region for any corresponding period

## Weekly Snowpack and Drought Monitor Update Report

since January 1954 – February 1956, when 96.87 inches fell. In addition, short-term dryness intensified across the Southeast. Through March 27, month-to-date rainfall totaled less than one-third of an inch and was less than 10 percent of normal at several locations, including Fayetteville, Arkansas (0.29 inch), and Greenwood, Mississippi (0.17 inch).

Agriculturally, Southeastern dryness was a double-edged sword: planting advanced rapidly, but pastures, winter grains, and emerging summer crops were growing under increasingly stressful conditions. Irrigation continued in Florida's citrus groves to maintain favorable conditions during the bloom period, and some Southeastern producers were already watering corn and other emerging summer crops. By March 25, Mississippi's corn was 76 percent sown (36 percent emerged), versus the 5-year planting average of 20 percent. However, USDA rated Mississippi's topsoil moisture 84 percent very short to short, and pastures were rated 36 percent very poor to poor, up from 19 percent a week ago. In Florida, topsoil moisture was 90 percent very short to short, while pastures were rated 80 percent very poor to poor.

Coverage of dryness and drought was expanded to cover the Southeast in its entirety, with the exception of the western and central Gulf Coast regions. An area of extreme drought (D3) was introduced along the Alabama-Tennessee border, while moderate to severe drought (D1 to D2) covered areas from the southern Appalachians and adjacent western slopes southwestward to the coastal areas of Alabama and Mississippi. In addition, severe drought continued to expand in the vicinity of Florida's Lake Okeechobee, which fell to 10.55 feet on March 27 and stood just 1.58 feet above the record-low average surface elevation established on May 24, 2001. Since 1932, the level of Lake Okeechobee has fallen to 10.50 feet or below during just seven droughts: 1956, 1962, 1971, 1981, 1990, and 2001.

**Alaska, Hawaii, and Puerto Rico:** Once again, there were no changes in the depiction of dryness and drought for Alaska and Puerto Rico. Mainland Alaska's abnormally dry (D0) areas experienced another cold, dry week, while heavy rain (locally 2 to 6 inches) in Puerto Rico uncannily fell just north of the areas affected by dryness (D0) and moderate drought (D1). Isolated weekly totals approaching 2 inches across the southwestern quadrant of Puerto Rico were insufficient to change the drought depiction. Puerto Rico also noted a continuation of unusually warm conditions; for example, San Juan posted 33 consecutive days with above-normal daily average temperatures from February 22 to March 26. San Juan also collected a daily-record high of 92°F on March 23. Meanwhile, relatively tranquil conditions returned to Hawaii, following mid-month downpours across portions of the western and central islands. Farther east, on the Big Island, short-term rainfall deficits began to mount, even in non-dry areas. For example, Hilo's March 1-27 rainfall totaled just 4.25 inches (34 percent of normal), but the year-to-date sum stood at 30.71 inches (99 percent).

**Looking Ahead:** From March 28 to April 2, a classic spring storm will affect much of the nation. Locally severe thunderstorms will erupt on the Plains March 28-30, followed by generally weaker, early-April showers and thunderstorms across the eastern one-third of the U.S. Meanwhile, heavy, late-March snow will gradually shift from Utah and western Colorado northward into eastern Montana and parts of the western Dakotas. Rain showers will return to the Midwest toward the end of March and spread into the Northeast in early April. According to the National Weather Service, storm-total precipitation may reach 1 to 3 inches across the majority of the Plains and the upper Midwest, with some higher amounts possible in north-central Texas and near the Montana-Wyoming border. Elsewhere, mostly dry weather, accompanied by a return to warm weather, will prevail into early April from California to the southern Rockies. Mostly dry weather will also persist in the southern Atlantic region, including Florida.

## Weekly Snowpack and Drought Monitor Update Report

The NWS 6- to 10-day outlook for April 3-7 calls for near- to above-normal precipitation across the majority of the U.S. Mostly dry weather will be confined to eastern Alaska and the southern two-thirds of the West, while wet conditions will be most likely across Texas and the Great Lakes and Northeastern states. Unusually warm weather will prevail across much of the West and Southeast, while cooler-than-normal conditions will be confined to areas from the northern and central Plains into the Northeast.

**Author:** [Brad Rippey, U.S. Department of Agriculture](#)

### **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 March 28, 2007