



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

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**Weekly Report - Snowpack / Drought Monitor Update    Date: 18 February 2010**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 18 February 2010 shows surpluses over the Southwest and deficits over the Northern Tier States. There were no significant changes since last week (Fig. 1). SNOTEL 7-day snow depth change over the past 7-days reveals increases up to a foot over the Northern Cascades, Northern Wasatch, Uintah, and Montana Rockies. Elsewhere depth decreases up to a foot occurred over the Sierra and 4-Corners Region (fig. 1a).

**Temperature:** SNOTEL and ACIS-day station average weekly temperature were above normal from the Continental Divide westward and were below normal east of the Divide (Fig.2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Northern Washington and Montana ( $>+9^{\circ}\text{F}$ ) and the greatest negative departure occurred over parts of eastern Montana and New Mexico ( $<-12^{\circ}\text{F}$ ) (Fig. 2a).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 17 February shows the bulk of the heaviest precipitation fell over the Olympic and Cascades of Washington. Areas with significant deficits occurred over the remainder of the high country across the West (Fig. 3). In terms of percent of normal, well above normal amounts were scattered across the Northern Tier States. The remainder of the West was particularly dry (Fig. 3a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows most of the West with below normal values. Areas with the greatest percentages remain in the Southwest. There were no significant changes since last week (Fig. 3b).

## **WESTERN DROUGHT STATUS**

**The West:** A mix of improvements and degradations this week for the western United States. With continuing rain, most of the D0 was eliminated from southern California this week. The recent wet pattern has eliminated precipitation deficits and allowed for the improvements. In northern California, D2 was expanded as both upper and lower elevations are well behind normal for the current water year coupled with several dry years recently. D0 was expanded along the Cascades in Washington and Oregon as below-normal snowpack and hydrological issues are becoming more apparent in the region. Dryness in the upper and lower elevations over the last several months has warranted the expansion of D0 and D1 conditions in the state. D0 was expanded to include almost all of Wyoming outside the extreme eastern portions of the state and D1 was expanded in the northwest part of the state. In Montana, D0 and D1 were expanded in response to the low snowpack being recorded this water year. D1 was expanded in the western portions of the state, while a new area of D0 was introduced in the north central. D1 was also introduced into the south central part of the state, being expanded out of Wyoming.

Author: Brian Fuchs, National Drought Mitigation 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 and 4a).

### **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). Another good resource can be found at:

<http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>.

### **U.S. HISTORICAL STREAMFLOW**

[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).

This map, (Fig. 6) 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.

### **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/> and <http://drought.gov>.

### **FOR MORE INFORMATION**

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This

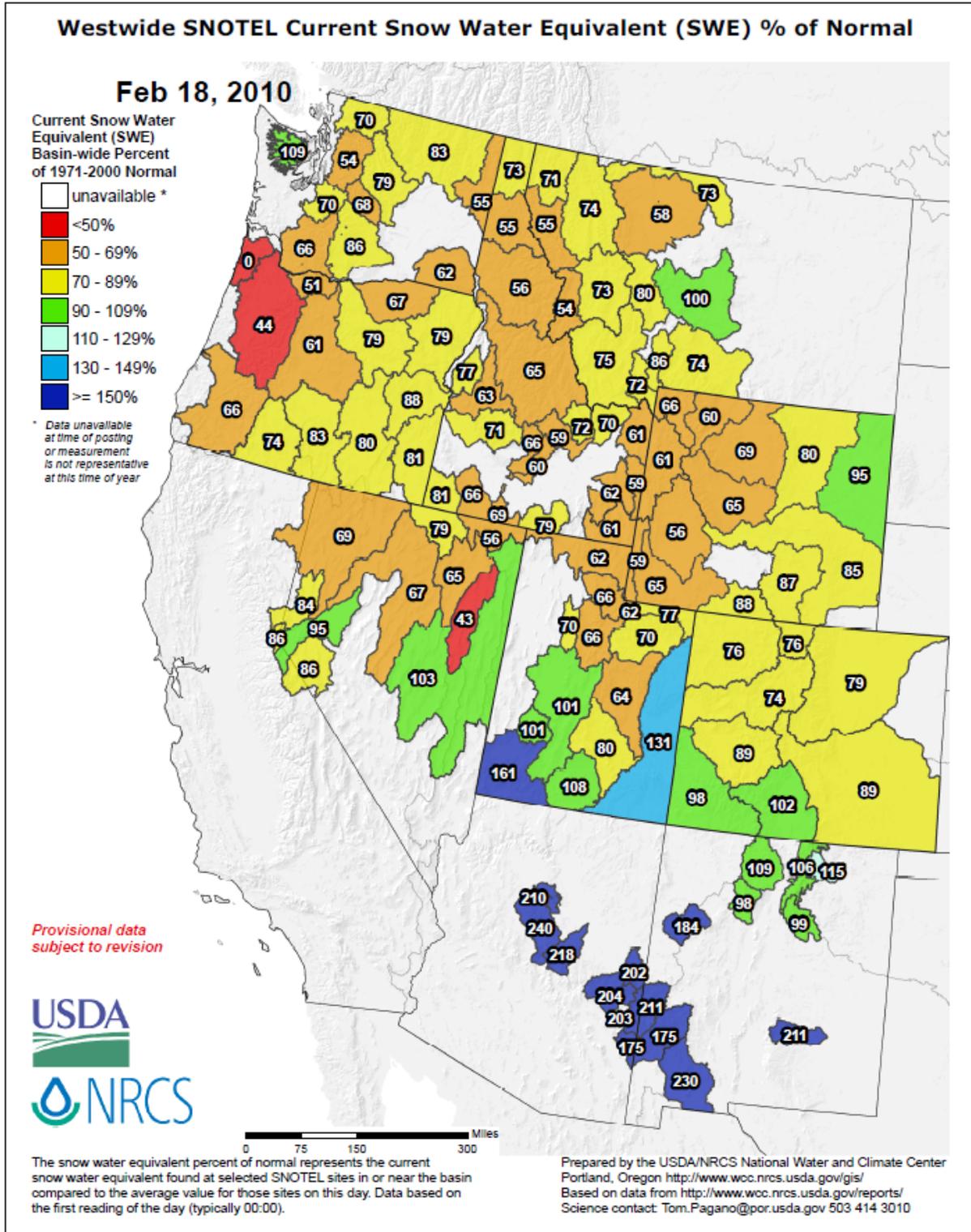
## Weekly Snowpack and Drought Monitor Update Report

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

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**Fig 1. SNOTEL Snow-Water Equivalent percent of normal values for 18 February 2010 shows surpluses over the Southwest and deficits over the Northern Tier States. There were no significant changes since last week.**

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

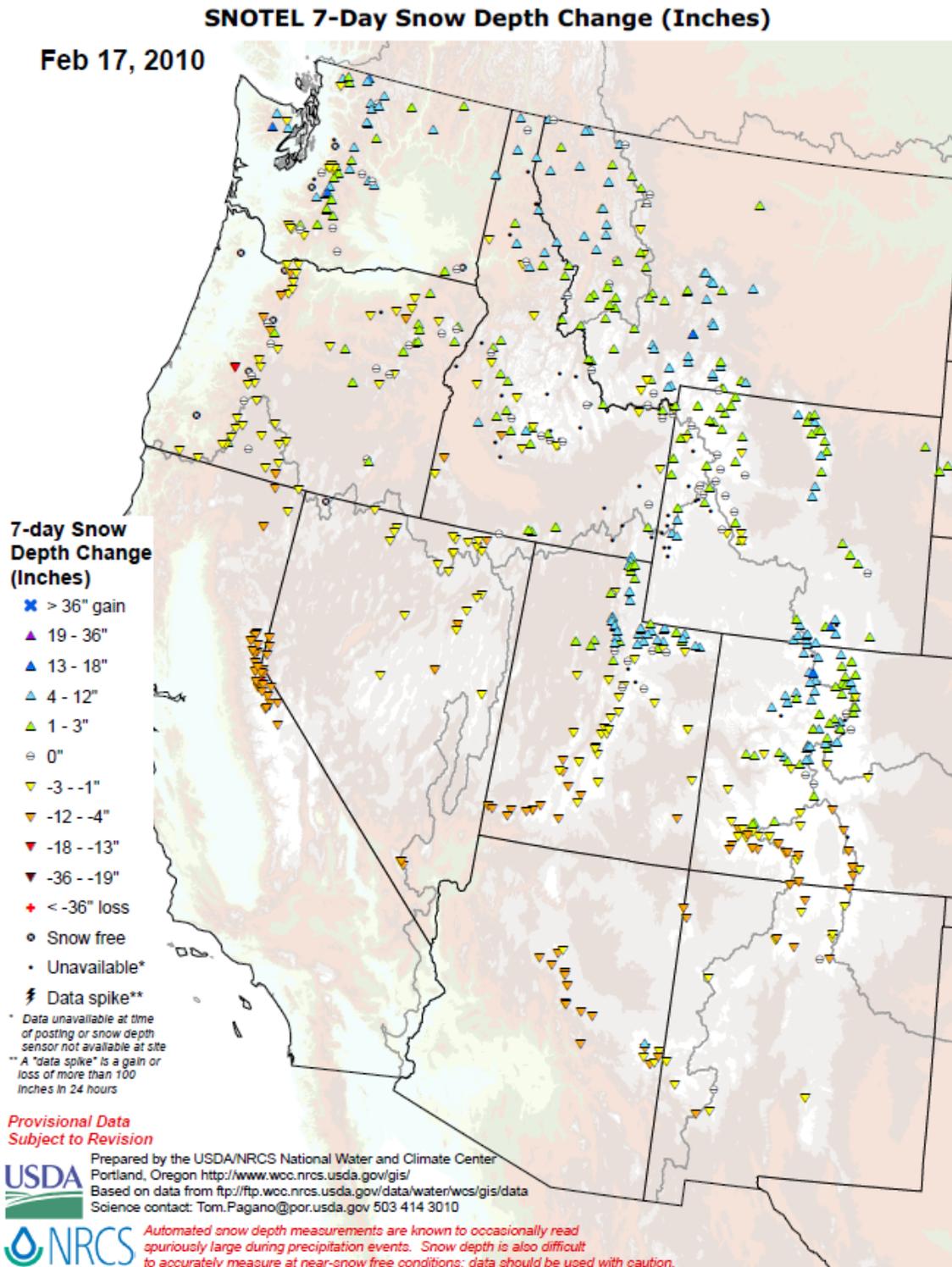
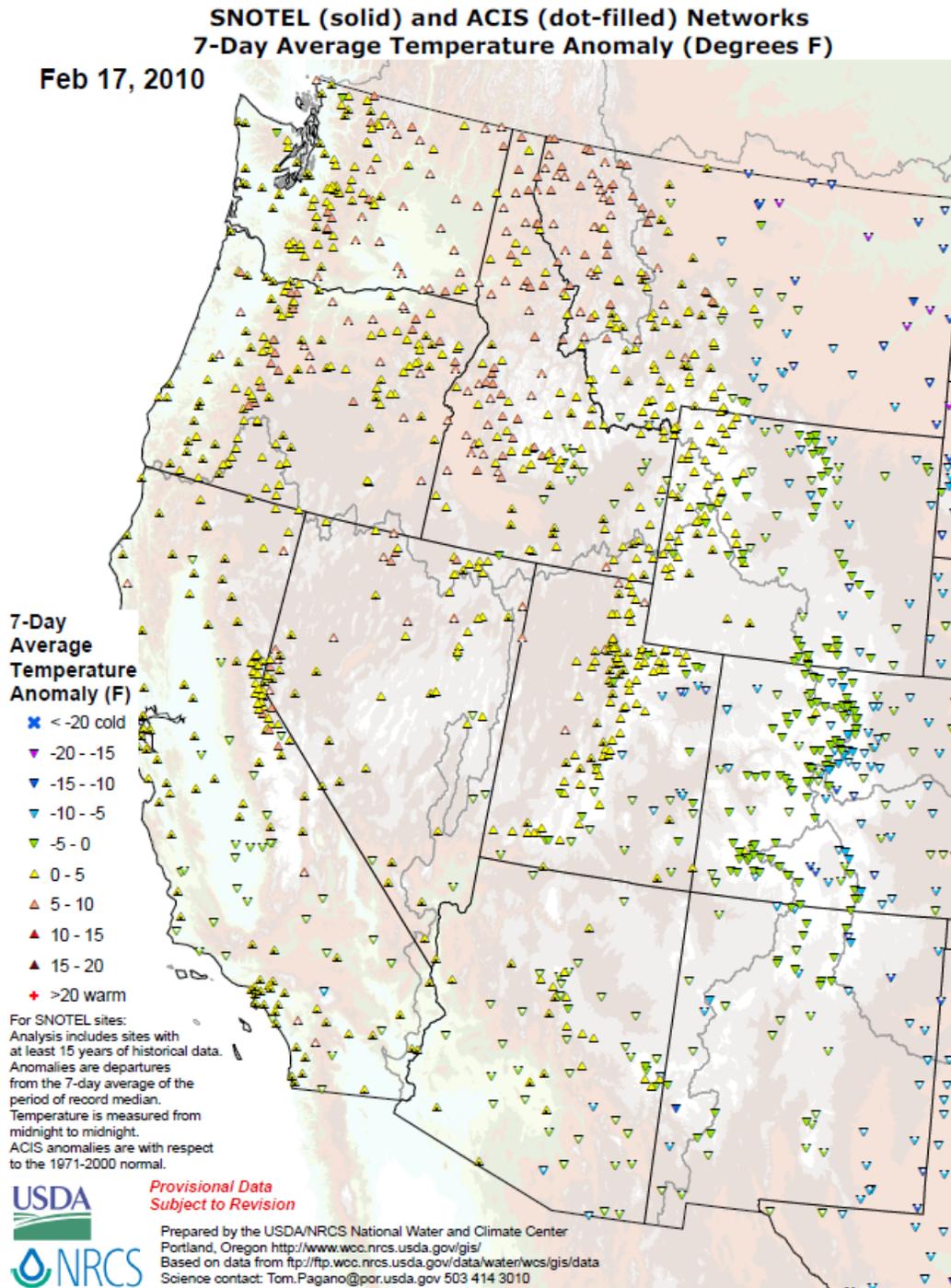


Fig. 1a. SNOTEL 7-day snow depth change over the past 7-days reveals increases up to a foot over the Northern Cascades, Northern Wasatch, Uintah, and Montana Rockies. Elsewhere depth decreases up to a foot occurred over the Sierra and 4-Corners Region. Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_snowdepth\\_7ddelta.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf).

# Weekly Snowpack and Drought Monitor Update Report

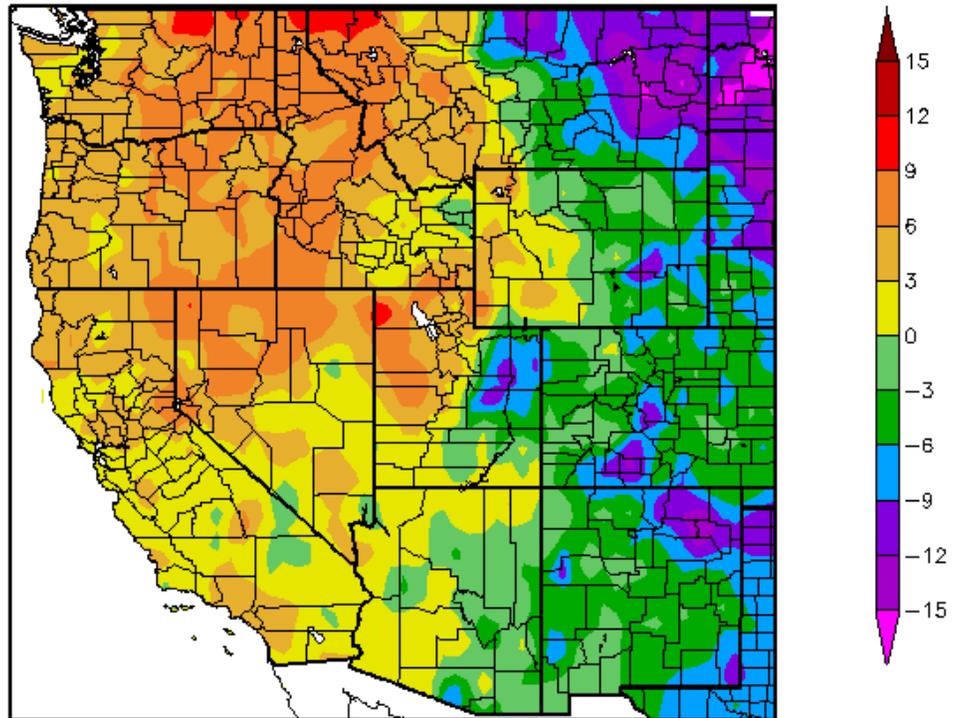


**Fig. 2. SNOTEL and ACIS-day station average weekly temperature were above normal from the Continental Divide westward and were below normal east of the Divide.**

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

## Weekly Snowpack and Drought Monitor Update Report

### Departure from Normal Temperature (F) 2/11/2010 – 2/17/2010



Generated 2/18/2010 at HPRCC using provisional data.

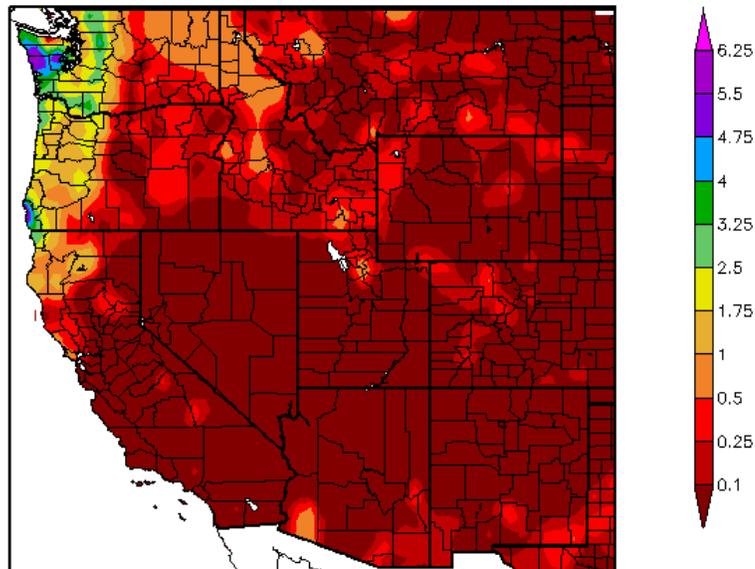
NOAA Regional Climate Centers

**Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Northern Washington and Montana (>+9°F) and the greatest negative departure occurred over parts of eastern Montana and northeastern New Mexico (<-12°F).**

Ref: [http://www.hprcc.unl.edu/maps/current/index.php?action=update\\_daterange&daterange=7d](http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d)

## Weekly Snowpack and Drought Monitor Update Report

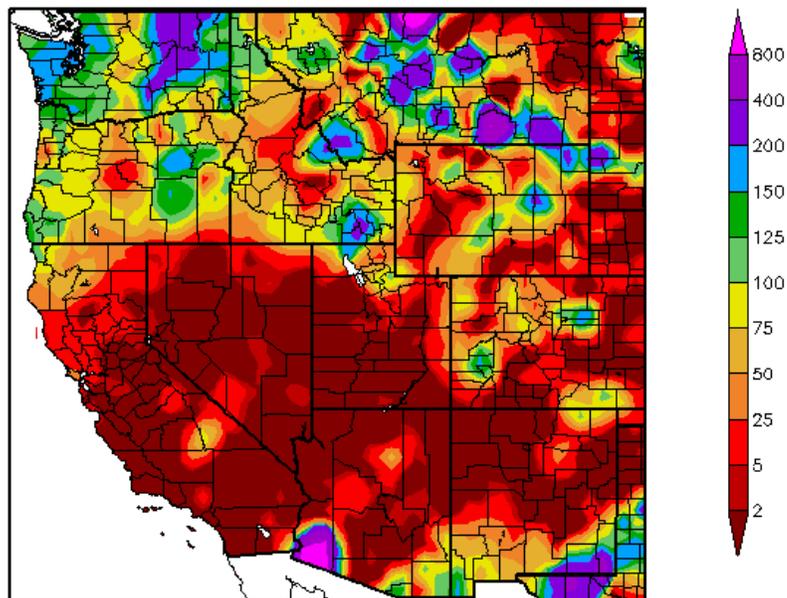
Precipitation (in)  
2/11/2010 - 2/17/2010



Generated 2/18/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)  
2/11/2010 - 2/17/2010

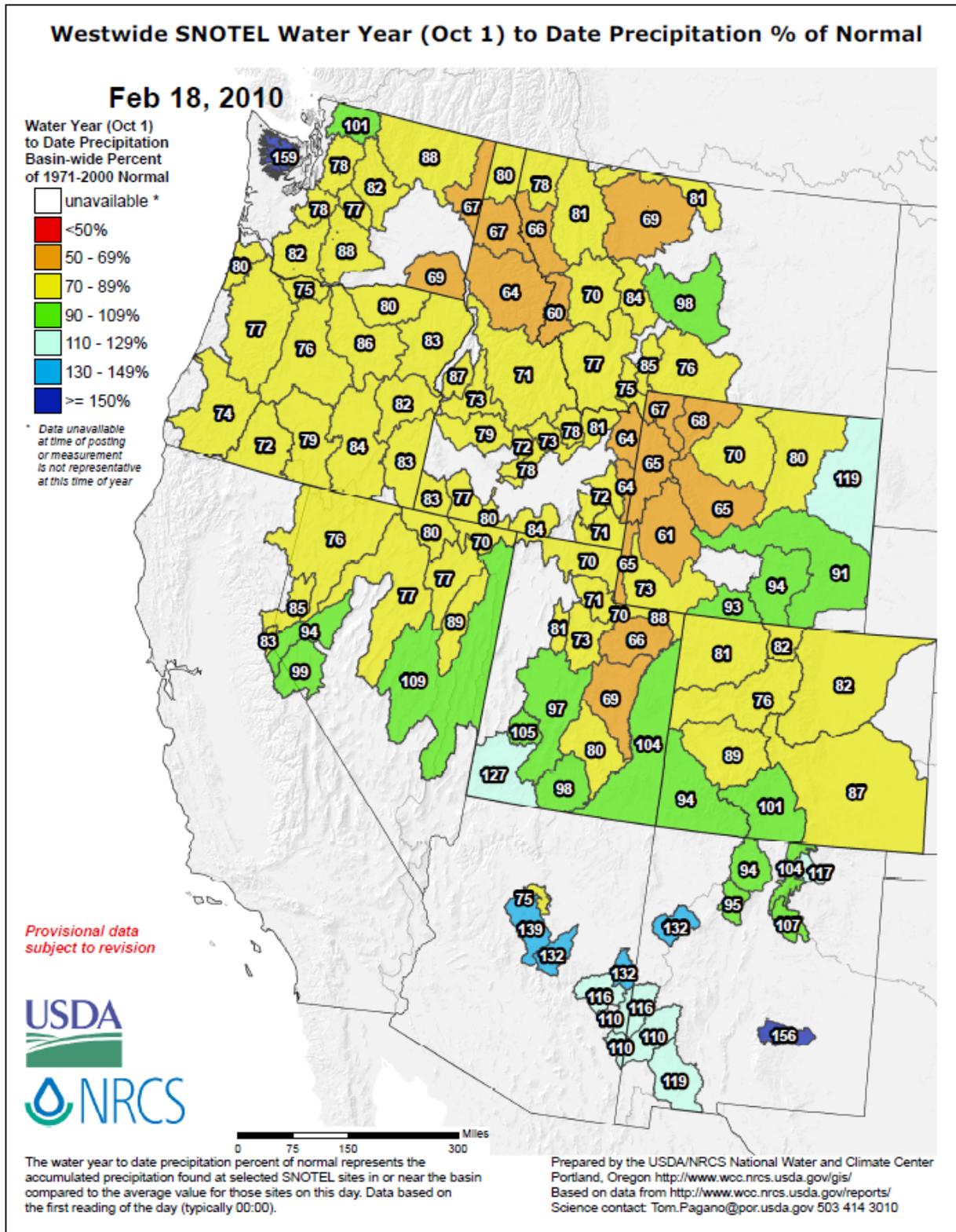


Generated 2/18/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. and 3a.** ACIS 7-day average precipitation amounts for the period ending 17 February shows the bulk of the heaviest precipitation fell over the Olympic and Cascades of Washington. Areas with significant deficits occurred over the remainder of the high country across the West. In terms of percent of normal, well above normal amounts were scattered across the Northern Tier States. The remainder of the West was particularly dry. Ref: <http://www.hprcc.unl.edu/maps/current/>

## Weekly Snowpack and Drought Monitor Update Report

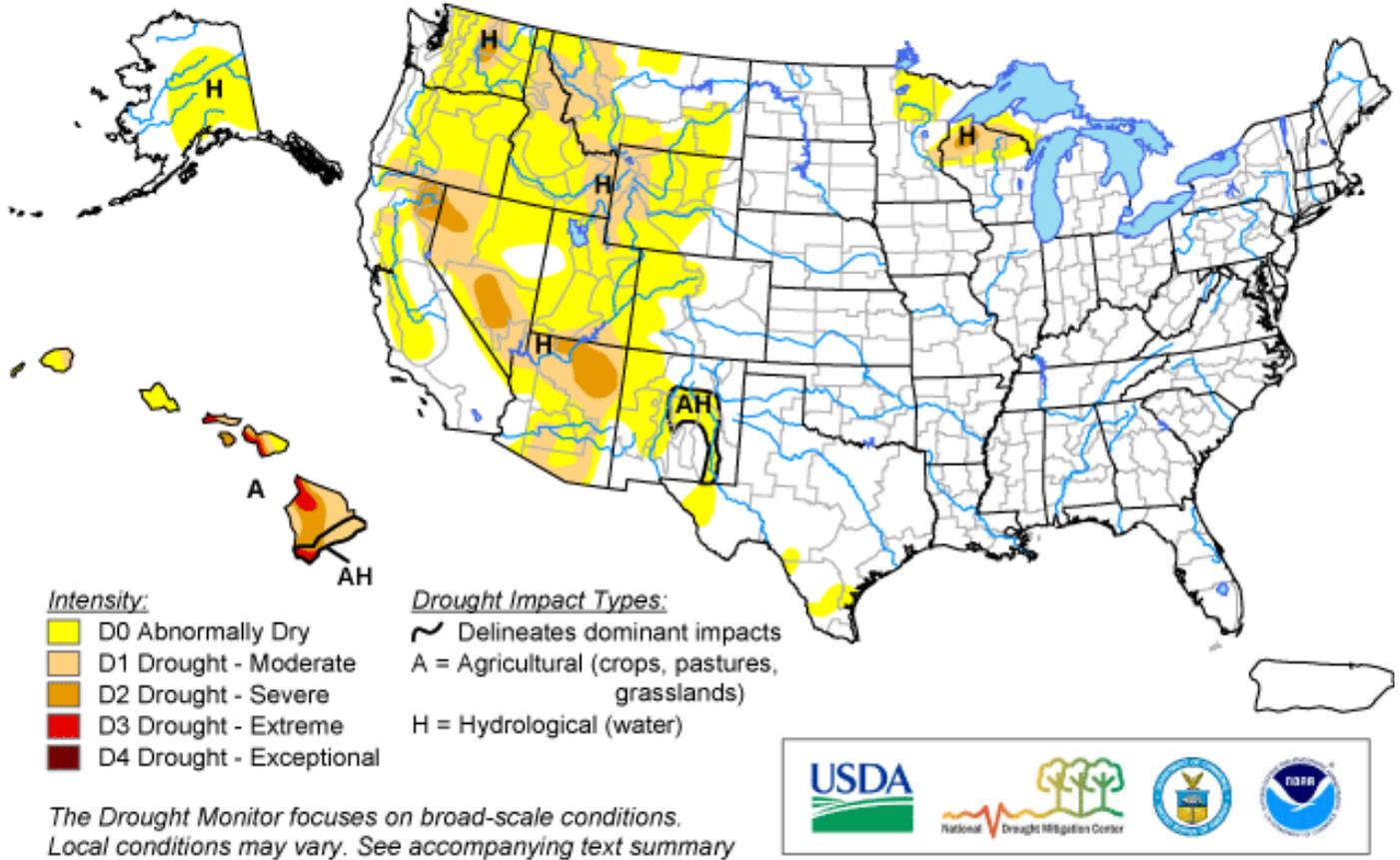


**Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows most of the West with below normal values. Areas with the greatest percentages remain in the Southwest. There were no significant changes since last week.**

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

February 16, 2010  
Valid 7 a.m. EST



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



**Released Thursday, February 18, 2010**  
Author: Brian Fuchs, National Drought Mitigation Center

**Fig. 4. Current Drought Monitor weekly summary.** Note Hawaii is the only state that is in D3 Drought.  
Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

# U.S. Drought Monitor West

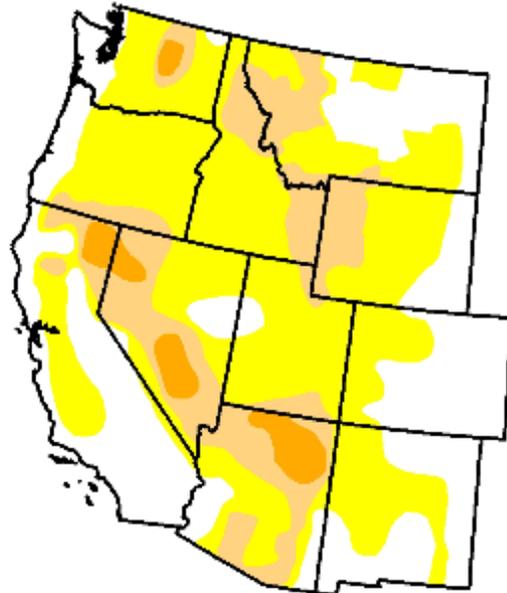
February 16, 2010  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	33.2	66.8	21.0	3.6	0.0	0.0
Last Week (02/09/2010 map)	36.6	63.4	18.3	3.3	0.0	0.0
3 Months Ago (11/24/2009 map)	47.4	52.6	28.6	11.6	0.5	0.0
Start of Calendar Year (01/05/2010 map)	40.1	59.9	30.6	9.9	0.5	0.0
Start of Water Year (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (02/17/2009 map)	37.6	62.4	24.4	10.1	2.2	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

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



Released Thursday, February 18, 2010

Author: Brian Fuchs, National Drought Mitigation Center

**Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally there was significant improvement since last week. Note Extreme drought in Arizona has been removed on this week's depiction. Ref: [http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm). Useful California data Links:**

Forecast of Unimpaired Runoff:

<http://cdec.water.ca.gov/cgi-progs/iodir?s=b120>

Full Natural Flow Data:

Daily FNF

[http://cdec.water.ca.gov/cgi-progs/snowsurvey\\_ro/FNF](http://cdec.water.ca.gov/cgi-progs/snowsurvey_ro/FNF)

Monthly FNF

[http://cdec.water.ca.gov/cgi-progs/snowsurvey\\_ro/FNFSUM](http://cdec.water.ca.gov/cgi-progs/snowsurvey_ro/FNFSUM)

Seasonal FNF

[http://cdec.water.ca.gov/cgi-progs/snowsurvey\\_ro/FLOWOUT](http://cdec.water.ca.gov/cgi-progs/snowsurvey_ro/FLOWOUT)

Precipitation Data:

Latest Northern Sierra 8-Station Precipitation Index: <http://cdec.water.ca.gov/cgi-progs/queryDaily?s=8SI&d=today>

Northern Sierra 8-Station Precipitation Tabulation Table: [http://cdec.water.ca.gov/cgi-progs/products/8-Stations\\_Tab.pdf](http://cdec.water.ca.gov/cgi-progs/products/8-Stations_Tab.pdf)

Latest San Joaquin 5-Station Precipitation Index

<http://cdec.water.ca.gov/cgi-progs/queryDaily?s=5SI&d=today>

2010 WY Precipitation Summary

<http://cdec.water.ca.gov/cgi-progs/precip/PRECIPSUM>

Snow Data:

Latest Snow Sensor Report

<http://cdec.water.ca.gov/cgi-progs/snow/PAGE6>

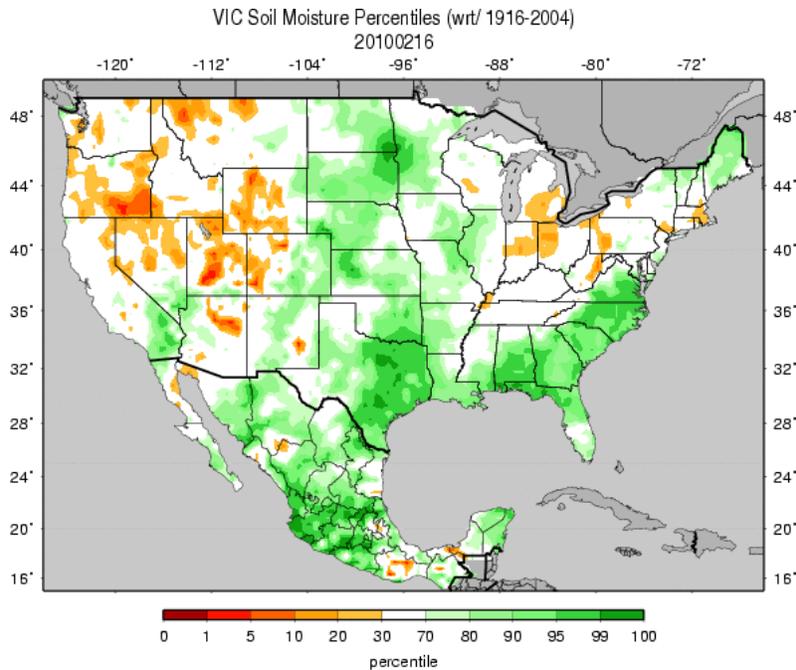
Latest Statewide Summary of Snow Water Equivalents

<http://cdec.water.ca.gov/cgi-progs/snow/DLYSWEQ>

Monthly Snow Course Report

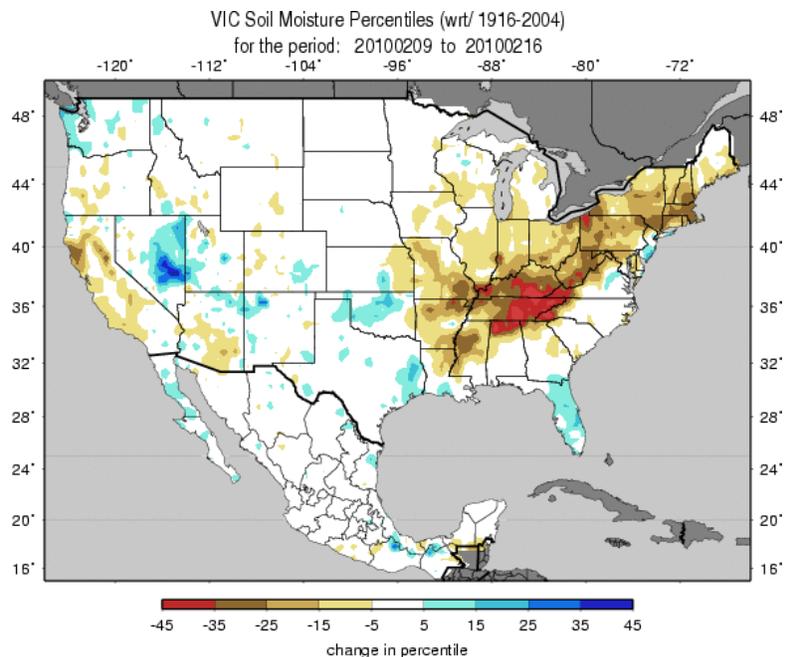
<http://cdec.water.ca.gov/cgi-progs/snow/COURSES>

## Weekly Snowpack and Drought Monitor Update Report



**Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 16 February. An El Niño pattern of drier over the Northern Tier States and moister over the Southern Tier States dominates.**

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 the week. A drier week over the Tennessee River Valley to New England is noted. However, snowfall that occurred over this region has apparently not yet melted. Nevada had the greatest increase.**

[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)

Weekly Snowpack and Drought Monitor Update Report

Wednesday, February 17, 2010

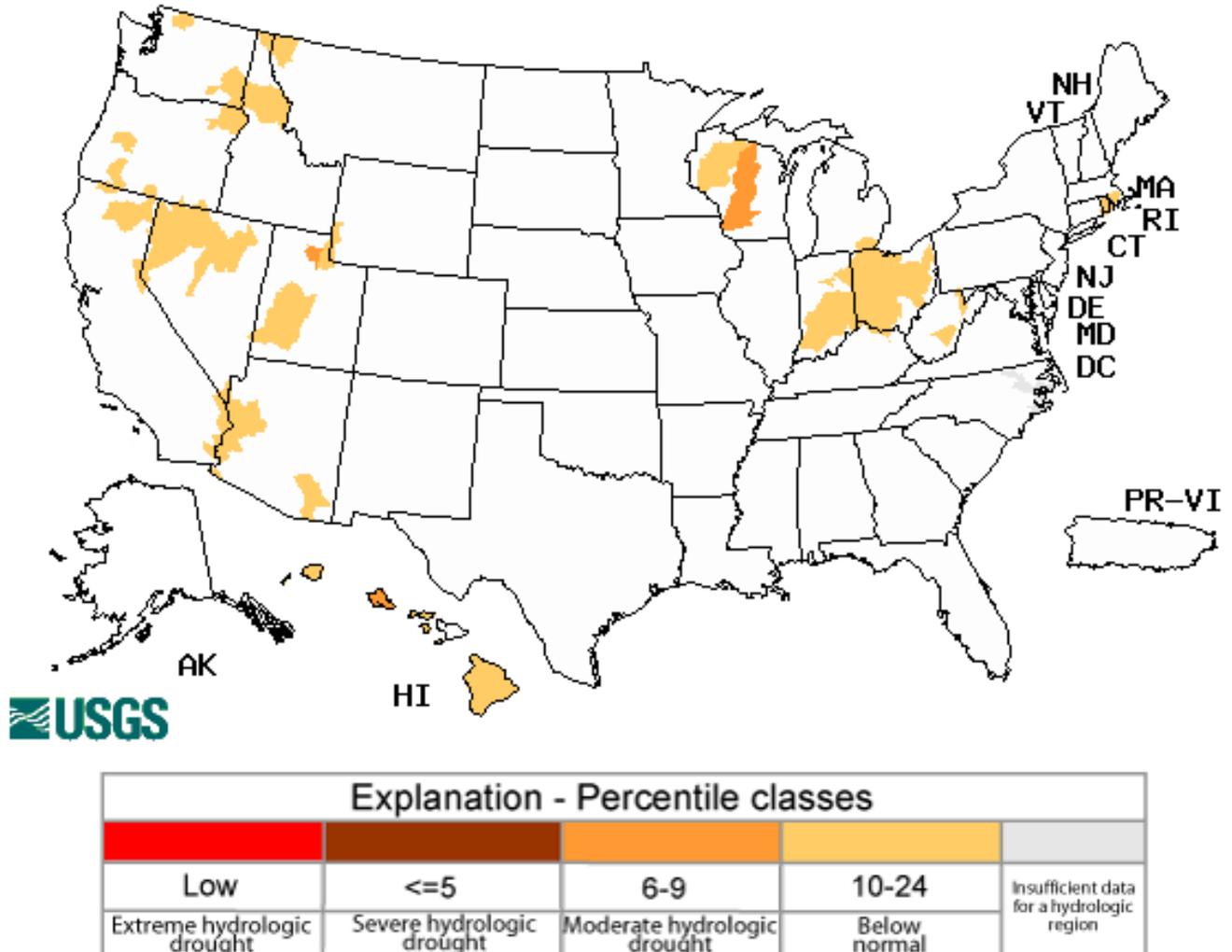


Fig. 6. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Note, many streams are frozen and thus the flows become more unreliable during the winter. However, most of the nation is experiencing normal flows for this time of year with the exception of central Wisconsin.

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- February 16, 2010

*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:** Precipitation, including significant snowfall, was common over much of Texas this week. Winter weather in the Dallas metro brought upwards of a foot of wet snow, and areas farther south recorded more rain, continuing the wet pattern across the state. At the DFW airport in Dallas/Ft.Worth, 12.5 inches of snow was recorded over a 24-hour period (February 11-12). This is the greatest 24-hour snowfall total on record at DFW since record keeping began in the area back in 1899. D1 was eliminated in south Texas, leaving just a few counties in abnormally dry conditions based on long-term deficits. This is the first time Texas is drought free since November 2007.

**The West:** A mix of improvements and degradations this week for the western United States. With continuing rain, most of the D0 was eliminated from southern California this week. The recent wet pattern has eliminated precipitation deficits and allowed for the improvements. In northern California, D2 was expanded as both upper and lower elevations are well behind normal for the current water year coupled with several dry years recently. D0 was expanded along the Cascades in Washington and Oregon as below-normal snowpack and hydrological issues are becoming more apparent in the region. Dryness in the upper and lower elevations over the last several months has warranted the expansion of D0 and D1 conditions in the state. D0 was expanded to include almost all of Wyoming outside the extreme eastern portions of the state and D1 was expanded in the northwest part of the state. In Montana, D0 and D1 were expanded in response to the low snowpack being recorded this water year. D1 was expanded in the western portions of the state, while a new area of D0 was introduced in the north central. D1 was also introduced into the south central part of the state, being expanded out of Wyoming.

**Alaska and Hawaii and Puerto Rico:** No changes were made this week in Alaska or Puerto Rico. In Hawaii, the current drought intensified on the islands of Lanai and Molokai. On Lanai, D2 was expanded to include the entire island; on Molokai, D1 expanded over the rest of the island. Both islands are seeing significant deterioration of pastures with the drought, causing agricultural impacts. Hydrological issues on the Big Island continue, forcing more of the southeast flank of the island to go from A to AH for impact designation. Some residents on water catchments have to haul water, which is causing a significant economic impact on the Puna district on the east side of the island.

**Looking Ahead:** During the next 5 days (February 18-22), temperatures are going to remain cool over much of the United States. Temperatures will range from 12 to 15 degrees Fahrenheit below normal over the central Plains to 3-6 degrees below normal over the southern tier of the country. Temperatures are expected to be 3-6 degrees above normal over the Pacific Northwest and upper portions of New England. Precipitation looks to be widespread during this time, with precipitation maxima over Arkansas, Colorado and the California coast. The Climate

## Weekly Snowpack and Drought Monitor Update Report

Prediction Center 6-10 day forecast (February 23-27) shows much of the eastern two-thirds of the United States having the best chance for below-normal temperatures, with the coolest readings expected over the Mid Atlantic states. Most of Alaska and into the Pacific Northwest show a very good likelihood of above-normal temperatures during this time. Dry conditions over the Great Lakes and New England regions should be expected while the best chances for above-normal precipitation will be over much of the southern United States, with the best chances over east Texas, Louisiana and Florida.

**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 February 17, 2010