



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

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**Weekly Report - Snowpack / Drought Monitor Update Date: 25 February 2010**

**SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 24 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 shows increases greater than a foot over parts of the Sierra, Southern Wasatch, and southwest Colorado Rockies. Despite little if any precipitation, small depth decreases occurred over the Northern Rockies thanks in part to colder than normal temperatures (fig. 1a).



**Mt Adams and Mt Rainier (foreground) taken on 21 Feb at 25,000 ft over northern Oregon shows a snow cover that is deceptively low for this time of year (Photo: Jan Curtis)**

**Temperature:** The SNOTEL and ACIS-day station average weekly temperature map is unable this week. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Northern Washington ( $>+3^{\circ}\text{F}$ ) and the greatest negative departure occurred over parts of southeast Wyoming ( $<-15^{\circ}\text{F}$ ) (Fig. 2).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 24 February shows the bulk of the heaviest precipitation fell over California. Areas with significant deficits occurred over the Northern and Interior West (Fig. 3). In terms of percent of normal, well above normal amounts were scattered across the California and the 4-Corner States. The Northern Rockies and Northern High Plains were particularly dry (Fig 3a). The Water Year that began on October 1, 2009 shows much 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).

## Weekly Snowpack and Drought Monitor Update Report

### WESTERN DROUGHT STATUS

**The West:** An El Niño-driven regime continued to influence Western weather patterns, resulting in drier-than-normal conditions in the Northwest and frequent storms in the Southwest. Widespread precipitation fell in California, the Great Basin, and the Southwest, while only very light showers were noted across the interior Northwest. In northwestern New Mexico, southeastern Utah, and southwestern Colorado, recent precipitation and generally near- to above-average mountain snow packs resulted in a broad reduction in the coverage of abnormal dryness (D0). Some moderate drought (D1) was eliminated in southeastern Utah. From February 18-22, unofficial snowfall totals in western Colorado included 56 inches at Gothic and 36 inches at Coal Bank Pass. Meanwhile, rain and snow returned to California, easing concerns about the general lack of significant storminess in early to mid-February. According to the California Department of Water Resources, the average water content of the high-elevation Sierra Nevada snow pack stood at 23 inches (99 percent of normal for the date) on February 22, compared to a 20-inch value (113 percent of normal) at the end of January. Farther east, parts of the western Great Basin received heavy snow on February 20-21, resulting in a slight reduction of drought coverage. Officially, 23.3 inches of snow fell at the National Weather Service office in Reno, Nevada. Elsewhere, a few degradations were introduced from eastern Washington to northwestern Colorado. For example, some moderate drought (D1) was introduced in eastern Washington, southwestern Wyoming, and extreme northwestern Colorado, while a ribbon of severe drought (D2) was placed along the Idaho-Montana border. On February 23, the water content of the mountain snowpack averaged less than 60 percent of normal in numerous river basins across the northern Rockies and northern Intermountain West, according to USDA's Natural Resources Conservation Service. Author: Brad Rippey, U.S. Department of Agriculture

***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/>.

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### 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>.

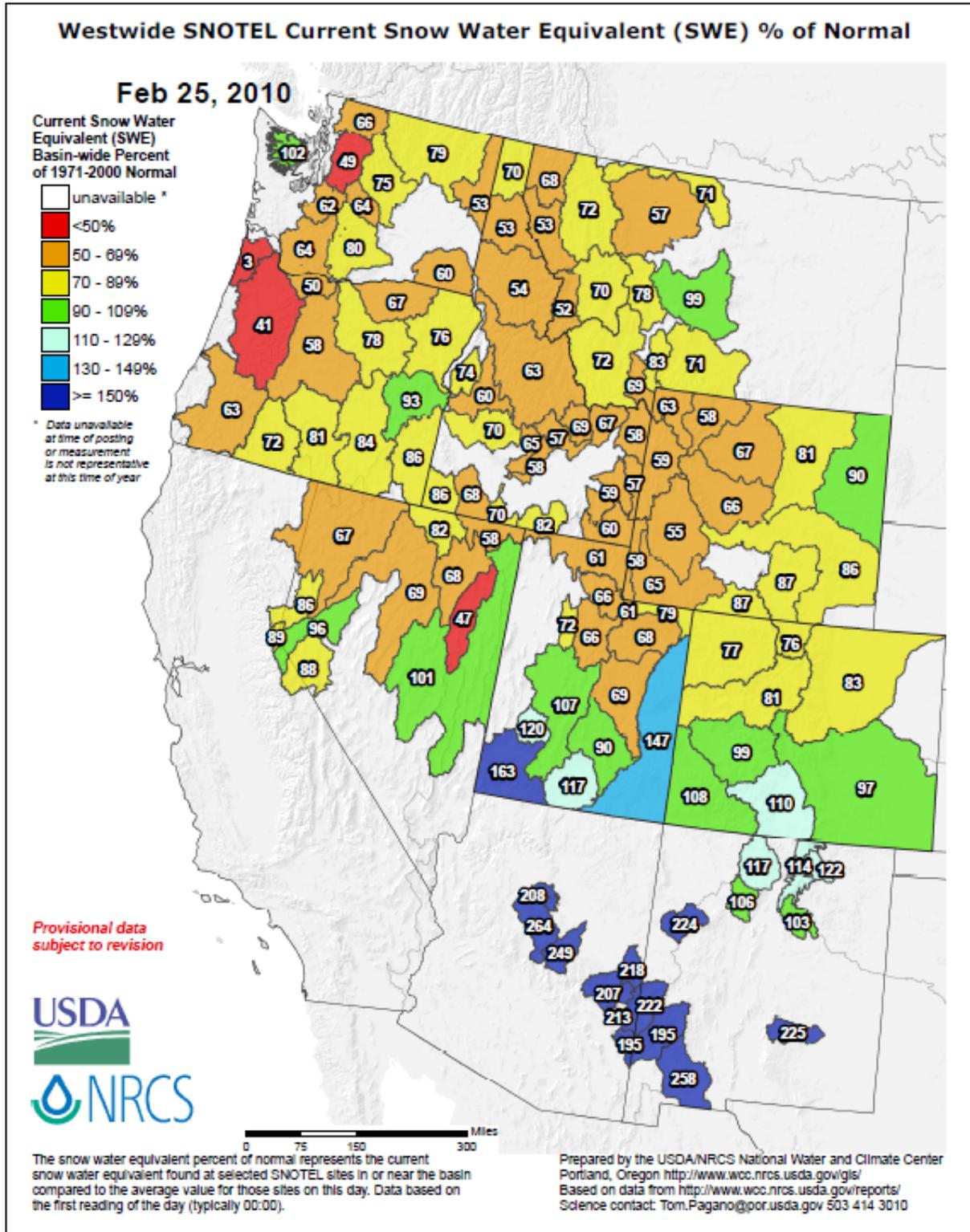
### FOR MORE INFORMATION

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 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. SNOTEL Snow-Water Equivalent percent of normal values for 25 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

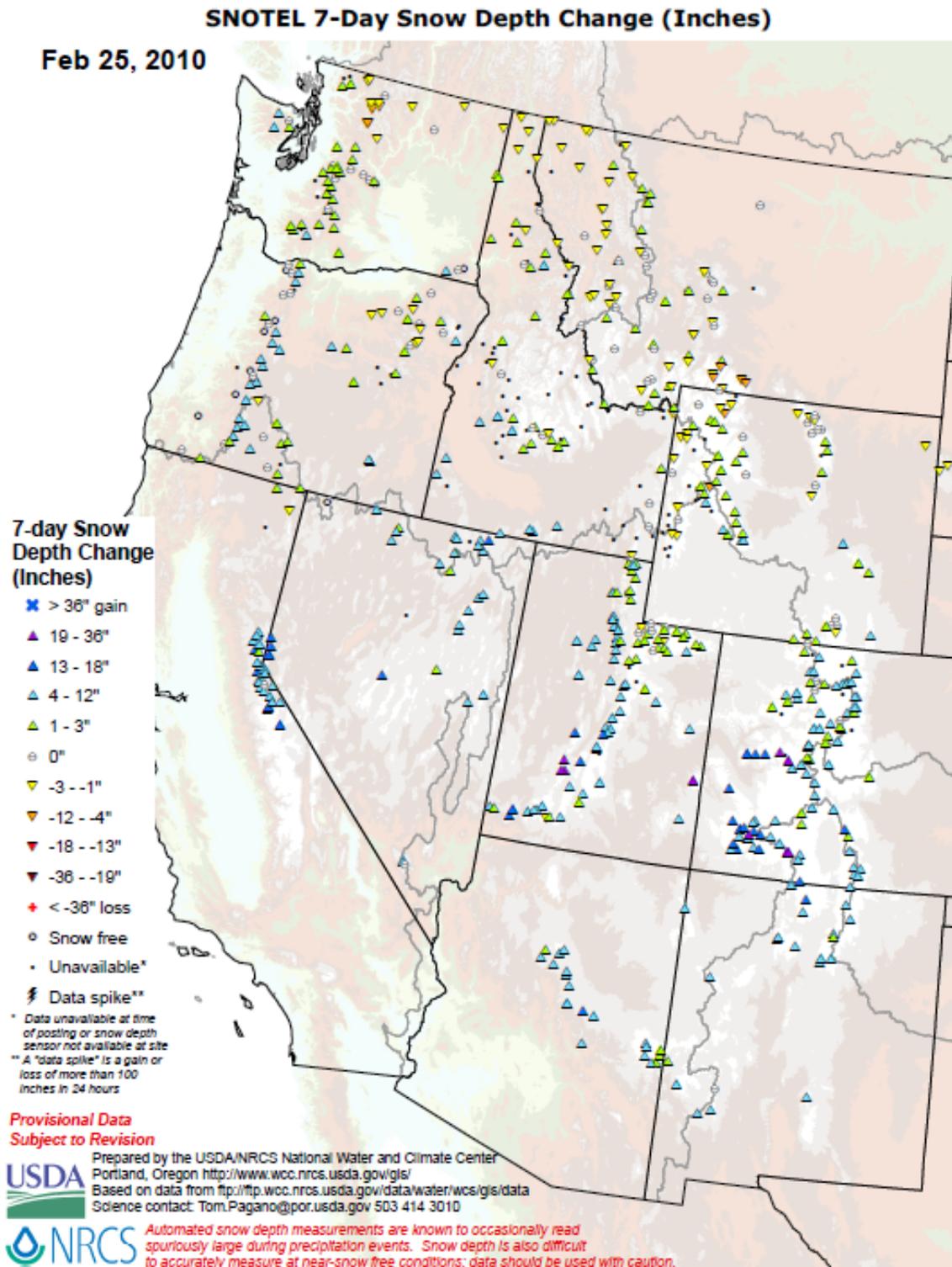
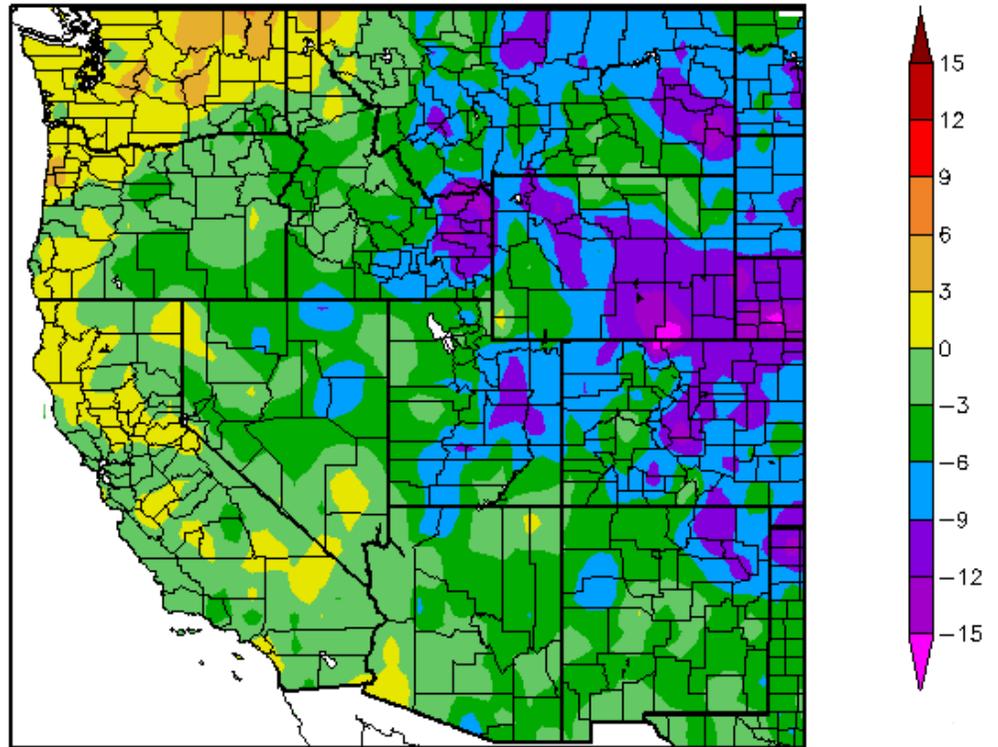


Fig. 1a. SNOTEL 7-day snow depth change reveals increases greater than a foot over parts of the Sierra, Southern Wasatch, and southwest Colorado Rockies. Small depths decreases occurred over the Northern Rockies.

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).

Departure from Normal Temperature (F)  
2/18/2010 – 2/24/2010



Generated 2/25/2010 at HPRCC using provisional data.

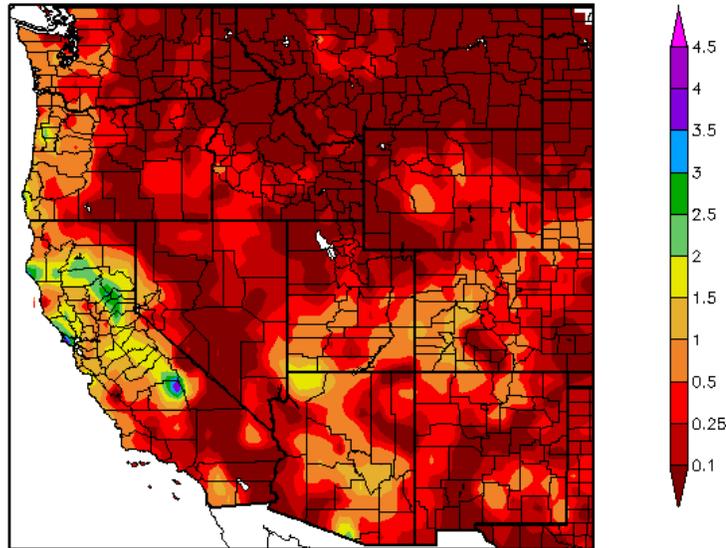
NOAA Regional Climate Centers

**Fig. 2. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Northern Washington (>+3°F) and the greatest negative departure occurred over parts of southeast Wyoming (<-15°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

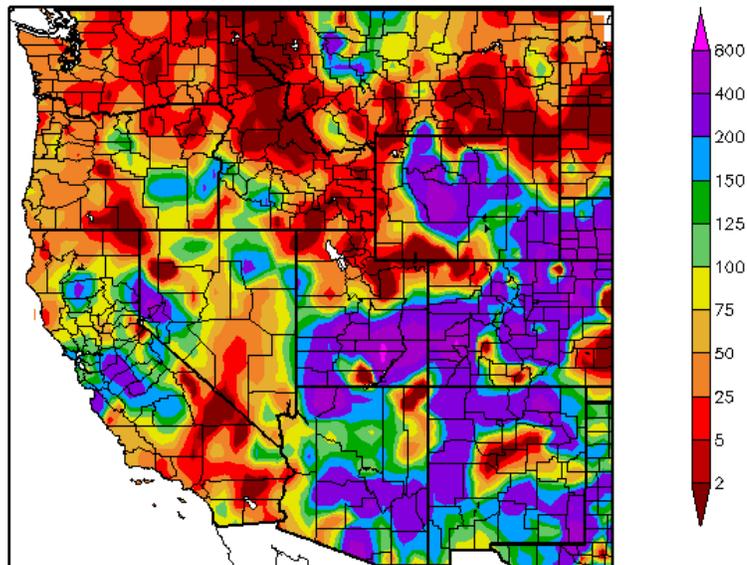
Precipitation (in)  
2/18/2010 - 2/24/2010



Generated 2/25/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)  
2/18/2010 - 2/24/2010

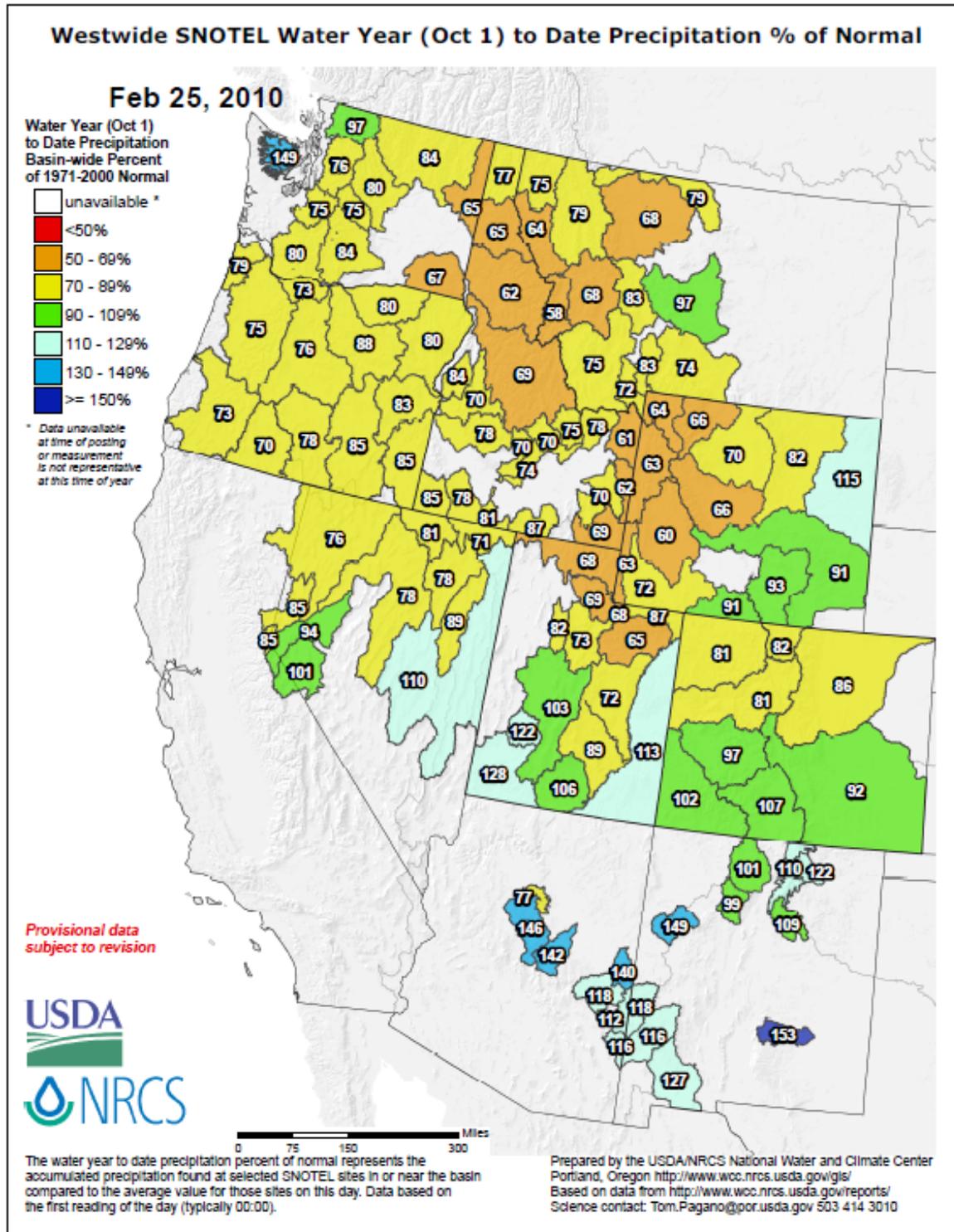


Generated 2/25/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. and 3a. ACIS 7-day average precipitation amounts for the period ending 24 February shows the bulk of the heaviest precipitation fell over California. Areas with significant deficits occurred over the Northern and Interior West. In terms of percent of normal, well above normal amounts were scattered across the California and the 4-Corner States. The Northern Rockies and Northern High Plains were particularly dry. Ref: <http://www.hprcc.unl.edu/maps/current/>**

## Weekly Snowpack and Drought Monitor Update Report

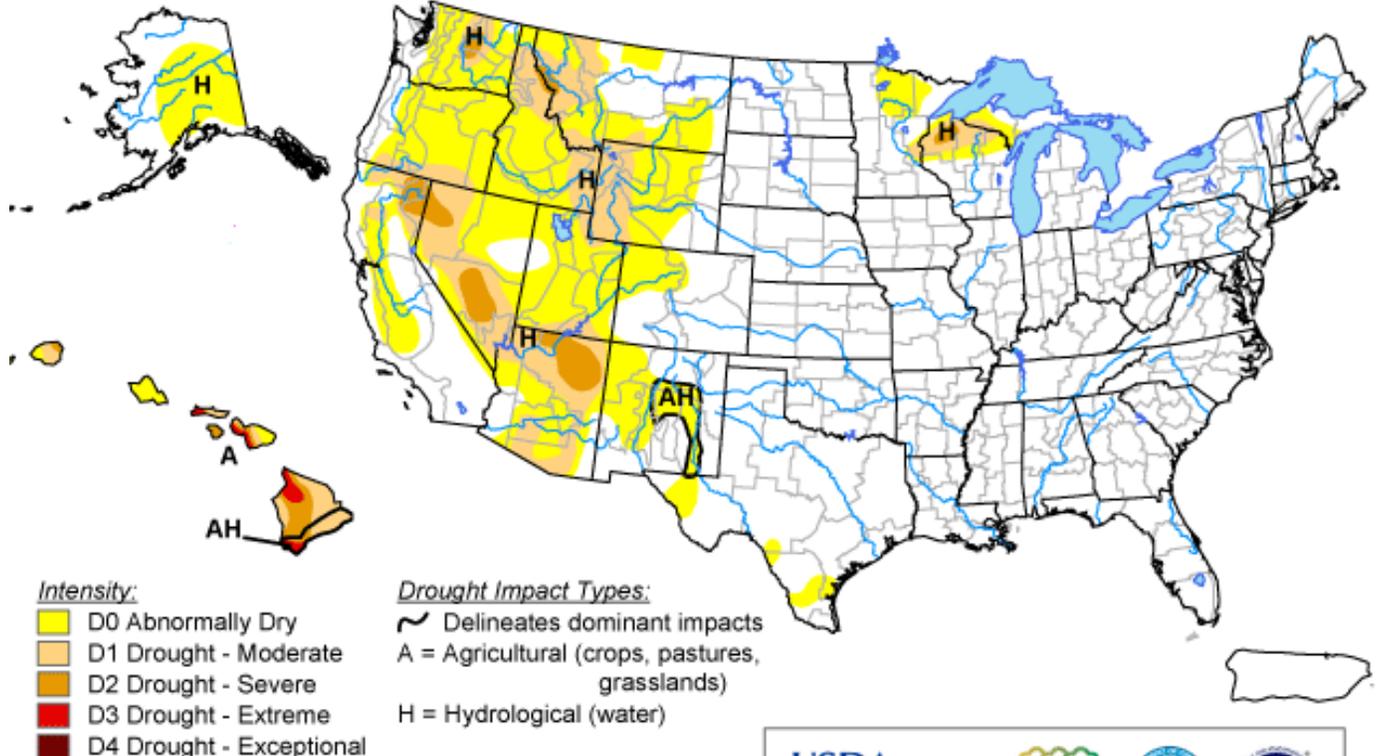


**Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows much of the West with below normal values. Areas with the greatest percentages remain in the Southwest. There were no significant changes since last week.**

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 23, 2010  
Valid 7 a.m. EST



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 25, 2010  
Author: Brad Rippey, U.S. Department of Agriculture

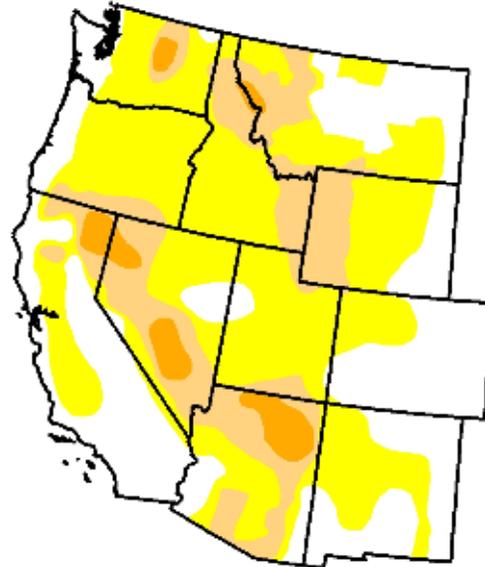
Fig. 4. Current Drought Monitor weekly summary. Note Hawaii is the only state that is in D3 Drought. Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

# U.S. Drought Monitor West

February 23, 2010  
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.1	65.9	21.6	3.9	0.0	0.0
Last Week (02/16/2010 map)	33.2	66.8	21.0	3.6	0.0	0.0
3 Months Ago (12/01/2009 map)	46.8	53.2	28.7	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 (02/24/2009 map)	37.2	62.8	26.5	9.0	2.0	0.0



Intensity:



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 25, 2010  
Author: Brad Rippey, U.S. Department of Agriculture

**Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally there were no significant changes since last week.**

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>

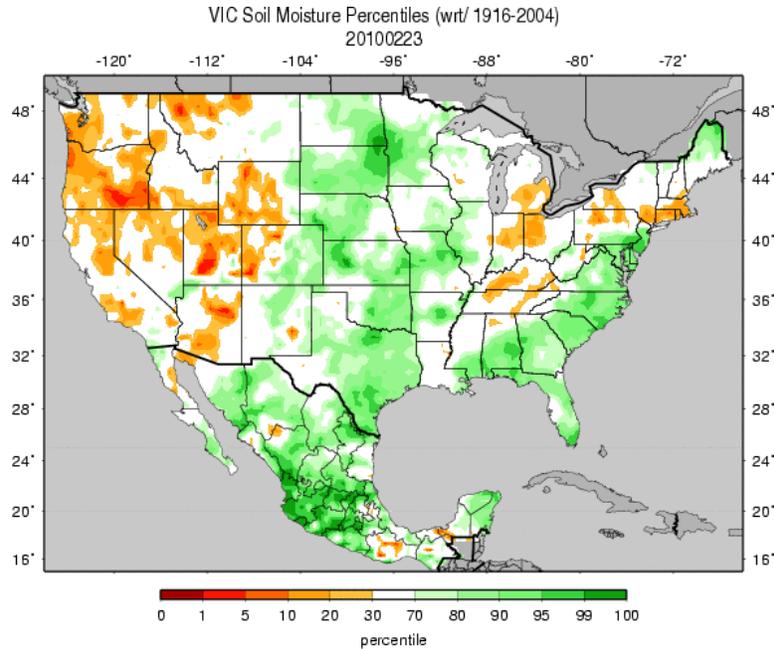
Latest Statewide Summary of Snow Water Equivalents

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

Monthly Snow Course Report

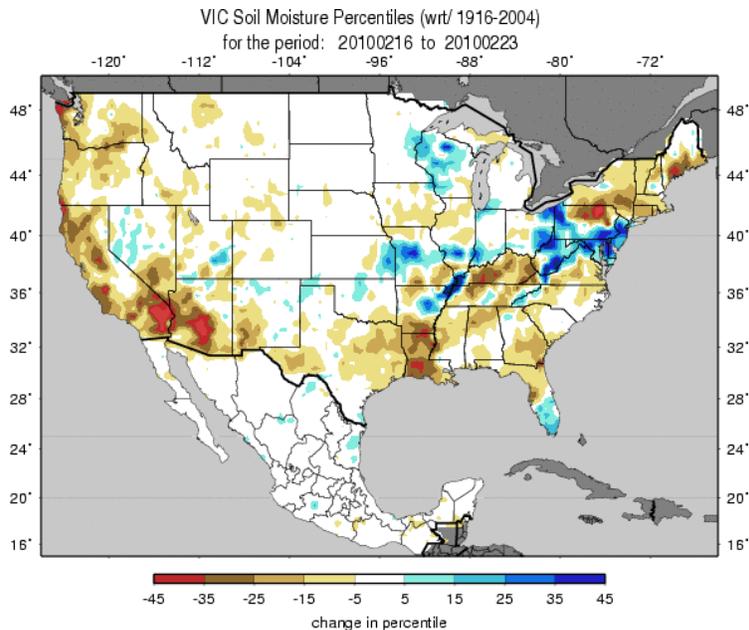
<http://cdec.water.ca.gov/cgi-progs/snow/COURSES>

## Weekly Snowpack and Drought Monitor Update Report



**Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 23 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)

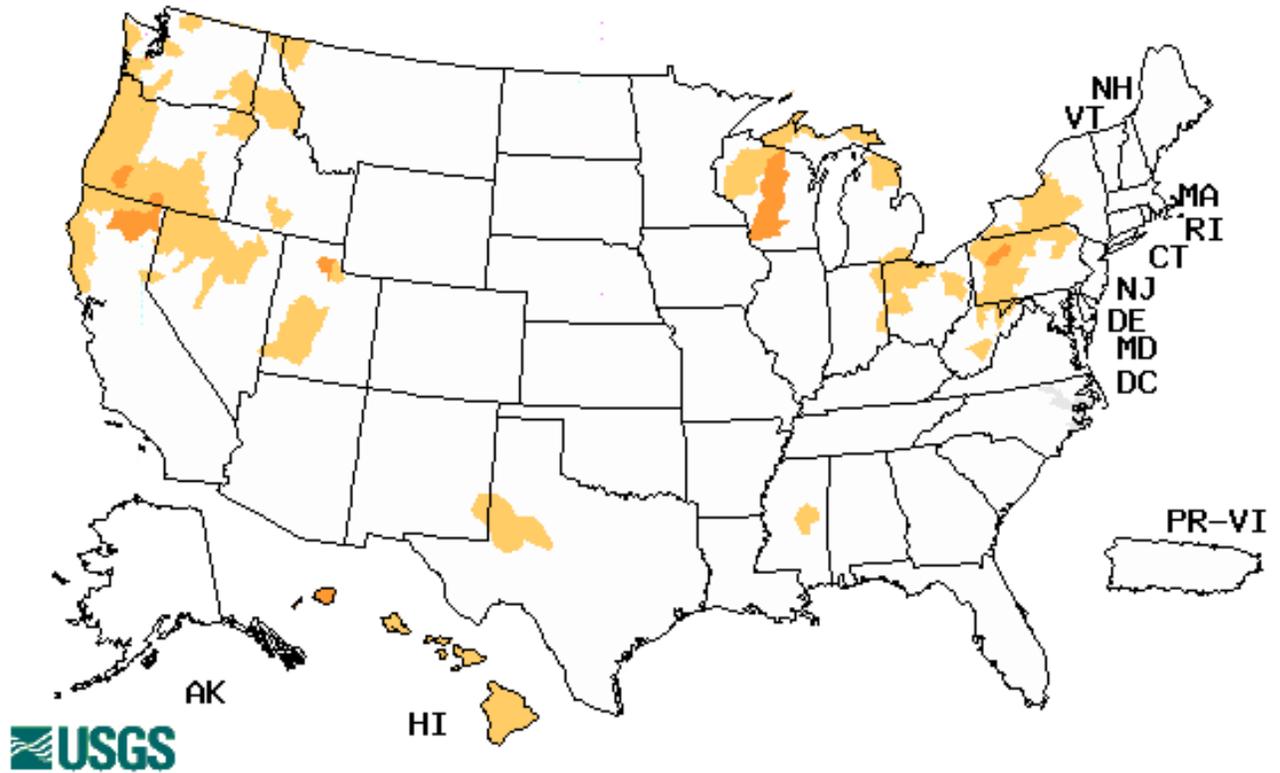


**Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for the week shows that the country is drier over the West and wetter over the Plains and Eastern Seaboard. A drier week over the Lower Colorado and Lower Mississippi River Valleys and New England is noted. However, snowfall that occurred over the Mid-Atlantic States two weeks ago has finally melted as revealed by a marked increase in soil moisture.**

[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)

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Wednesday, February 24, 2010



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. 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 and northern California.

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- February 23, 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:** Rain continued to chip away at the lingering dryness (D0) in southern Texas, where totals in excess of an inch resulted in a small reduction in the D0 area along the Gulf Coast. In Corpus Christi, Texas, where the 2009 rainfall of 20.61 inches was 11.65 inches below normal, precipitation from December 1, 2009, to February 23, 2010, totaled 11.14 inches (6.24 inches above normal). Elsewhere in Texas, San Antonio received 8.66 inches of precipitation during the first 54 days of the year (January 1 – February 23), compared with 8.43 inches during the first 8 months of 2009.

**Upper Great Lakes Region:** Little or no precipitation fell across drought areas of the upper Great Lakes region, resulting in no change to the depiction. North-central Minnesota was also dry, although a small reduction in the coverage of abnormal dryness (D0) was introduced based on further analysis of precipitation and snow cover data.

**The West:** An El Niño-driven regime continued to influence Western weather patterns, resulting in drier-than-normal conditions in the Northwest and frequent storms in the Southwest.

Widespread precipitation fell in California, the Great Basin, and the Southwest, while only very light showers were noted across the interior Northwest. In northwestern New Mexico, southeastern Utah, and southwestern Colorado, recent precipitation and generally near- to above-average mountain snow packs resulted in a broad reduction in the coverage of abnormal dryness (D0). Some moderate drought (D1) was eliminated in southeastern Utah. From February 18-22, unofficial snowfall totals in western Colorado included 56 inches at Gothic and 36 inches at Coal Bank Pass. Meanwhile, rain and snow returned to California, easing concerns about the general lack of significant storminess in early to mid-February. According to the California Department of Water Resources, the average water content of the high-elevation Sierra Nevada snow pack stood at 23 inches (99 percent of normal for the date) on February 22, compared to a 20-inch value (113 percent of normal) at the end of January. Farther east, parts of the western Great Basin received heavy snow on February 20-21, resulting in a slight reduction of drought coverage. Officially, 23.3 inches of snow fell at the National Weather Service office in Reno, Nevada. Elsewhere, a few degradations were introduced from eastern Washington to northwestern Colorado. For example, some moderate drought (D1) was introduced in eastern Washington, southwestern Wyoming, and extreme northwestern Colorado, while a ribbon of severe drought (D2) was placed along the Idaho-Montana border. On February 23, the water content of the mountain snowpack averaged less than 60 percent of normal in numerous river basins across the northern Rockies and northern Intermountain West, according to USDA's Natural Resources Conservation Service.

**Alaska, Hawaii, and Puerto Rico:** Puerto Rico remained free of dryness and drought, while no changes were made in Alaska. However, Alaska's season-long "snow drought" has left more

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than one-third of the state abnormally dry (in D0). Through February 23, Alaskan season-to-date snowfall totals included 21.6 inches (36 percent of normal) in Fairbanks and 33.2 inches (42 percent) in McGrath. In Hawaii, agricultural impacts on Kauai led to further drought degradation. Severe drought (D2) was introduced in northeastern Kauai, while moderate drought (D1) was expanded to cover much of the eastern two-thirds of the island. Elsewhere in Hawaii, the drought depiction remained unchanged from last week.

**Looking Ahead:** During the next 5 days (February 25 – March 1), an active weather pattern will prevail across the West, South, and East. In particular, precipitation could total as much as 2 to 4 inches in the Pacific Coast States, while some additional snow may fall across parts of the southern Plains. In the Northeast, rainfall could reach 3 to 5 inches near the New England coast, while snowfall could reach 2 to 3 feet across the interior. A prolonged period of high winds will accompany the Northeastern precipitation. Cold weather will persist into next week across much of the nation, with light freezes (temperatures near or slightly below 32 degrees F) possible as far south as interior southern Florida on February 26. The Climate Prediction Center 6- to 10-day forecast for March 2-6 calls for a continuation of near- to below-normal temperatures across the majority of the U.S. Warmer-than-normal weather will be confined to the nation's northern tier. Meanwhile, below-normal precipitation across the Intermountain West, Rockies, Plains, and Midwest will contrast with wetter-than-normal conditions in parts of California and from the Gulf Coast region into the southern Atlantic States.

**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 February 24, 2010