



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

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## Weekly Report - Snowpack / Drought Monitor Update Date: 11 March 2010

### SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 11 March 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 reveals increases across most of the West excluding the Central Sierra Range and Washington Cascades (fig. 1a).

**Temperature:** ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Wyoming ( $>+8^{\circ}\text{F}$ ) and the greatest negative departure occurred over parts of the California and western Nevada ( $<-8^{\circ}\text{F}$ ) (Fig. 2).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 10 March shows the bulk of the heaviest precipitation fell from Arizona and California northward to western Oregon and Washington. Areas with significant deficits occurred over the Northern Rockies and eastern Oregon and Washington (Fig. 3). In terms of percent of normal, well above normal amounts were scattered across the Great Basin, Arizona and New Mexico. The north-central region of Montana and central Oregon-Washington were particularly dry (Fig 3a). For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. Note marked increases during this week (Fig. 3b).

### WESTERN DROUGHT STATUS

**The West:** Weekly precipitation totals of 0.6 to 3.0 inches were fairly common in several areas, most notably in parts of the Sierra Nevada and western California that are no longer experiencing significant abnormal dryness. However, similar amounts fell on numerous locations from southeastern Nevada through southeastern Arizona, part of the dry area in the central California valleys, and portions of southern Oregon, and the western slopes of the Washington Cascades, along with scattered to isolated locations through the rest of the Rockies, Intermountain West, and interior Pacific Northwest coastal plains.

This precipitation, in conjunction with a series of relatively wet weeks, led to the elimination of D0AH in central and southeastern New Mexico, and some reduction in northwestern parts of the state as well. Farther west, D1 and D2 conditions across southern Nevada and Arizona were reduced due to the recent precipitation and a re-assessment of conditions. Moderate drought was eliminated across southern and northwestern Arizona where significant moisture surpluses have been established over the last 90 days and 12-month totals were within 4 inches of normal. Meanwhile, essentially the middle of the severe drought region in northeast Arizona and the southern reaches of the region in southern Nevada were removed. In the remaining areas of severe drought across Arizona, 24-month precipitation amounts were still only 50 to 70 percent of normal, and 36-month totals ranged from 60 to 80 percent of normal.

Other areas of improvement in the western half of the country included part of north-central Colorado east of the continental divide, where abnormal dryness was trimmed, and north-central Washington, where little rain fell last week but where year-to-date precipitation amounts were significantly above

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normal. The moderate to severe drought in this region improved one category, to range from abnormally dry to moderate drought.

The wet week led to the removal of abnormal dryness in part of the central California Valleys, but for the remainder of the contiguous United States from the Rockies westward, dryness and drought either persisted or intensified relative to last week. Abnormally dry conditions were extended westward in Oregon and Washington as 90-day precipitation amounts declined toward 75 percent of normal. Meanwhile, moderate to severe drought expanded in northeastern and north-central California, southern Oregon, and northwestern Nevada where precipitation has consistently come up short of normal since early in the water year, and where some locations are experiencing their fourth consecutive drier than normal year so far. Conditions in the Klamath Basin have become particularly severe of late, prompting the Governor of Oregon to announce plans to sign a state drought declaration for the region in the near future.

Finally, precipitation and snowpack have been below average for a while across Idaho, Montana, and western Wyoming, and have declined to seriously low levels recently. As a result, D1 and D2 conditions expanded significantly across these regions and adjacent eastern Washington and Oregon. In the western half of Wyoming, snowpack water content was generally below 70 percent of average for the date, and surface water supply indices (SWSI's) were among the lowest 5 to 20 percent of expected values for this time of year. In areas of western Wyoming and adjacent Utah where snowpack water content was below 55 percent of normal for the date, D2 was introduced. Farther north, significant D1 and D2 expansion took place across central and northern Idaho and, to a lesser extent, western Wyoming as seasonal precipitation totals and snowpack water content continued to decline relative to average conditions for early March. During the last 60 days, less than half of normal precipitation fell on northwestern Montana and essentially the northern half of Idaho. Author: **Rich Tinker**, NOAA/NWS/NCEP/Climate Prediction Center.

***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).

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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>.

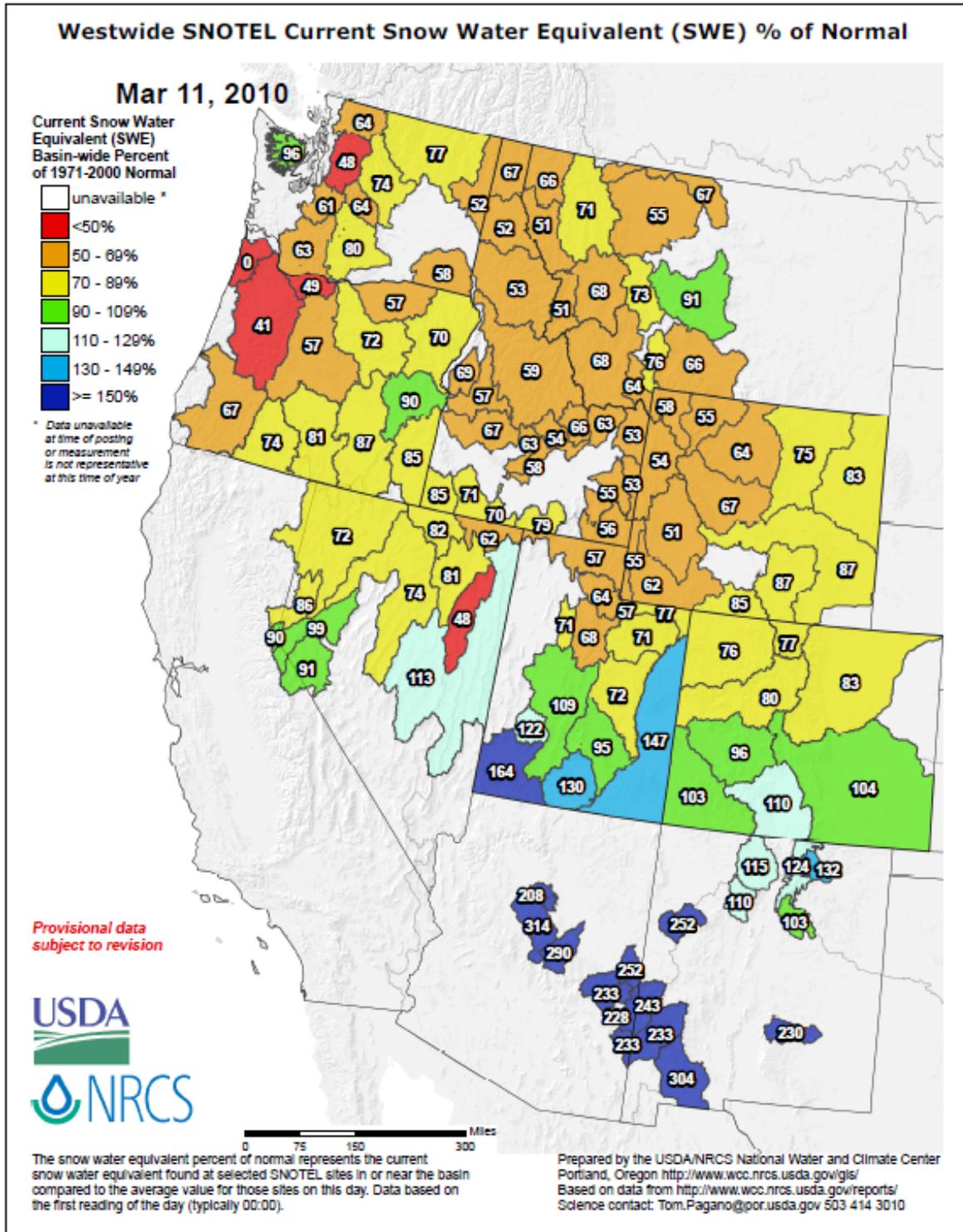
### FOR MORE INFORMATION

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

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**Fig. 1: SNOTEL Snow-Water Equivalent percent of normal values for 11 March 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

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

Mar 11, 2010

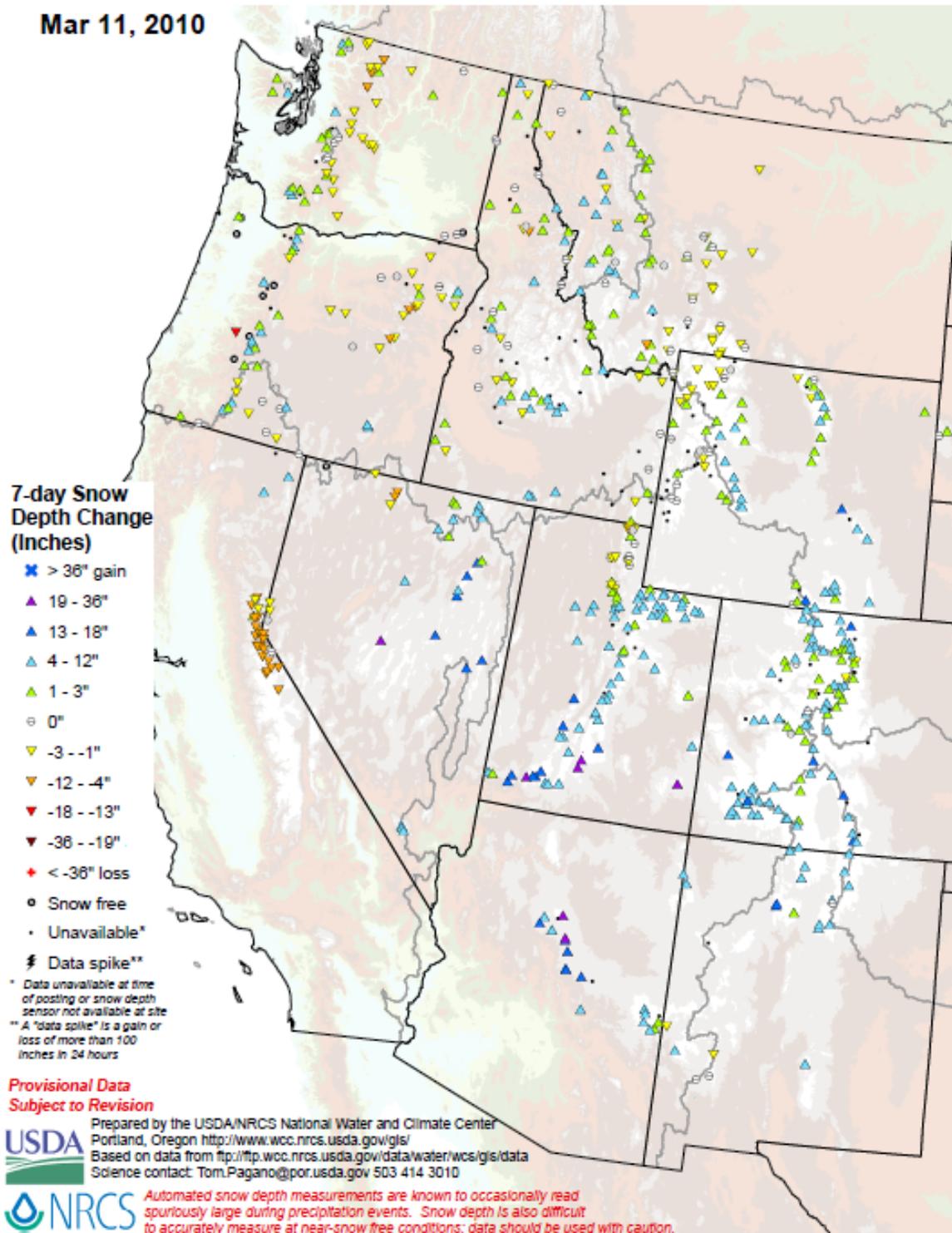
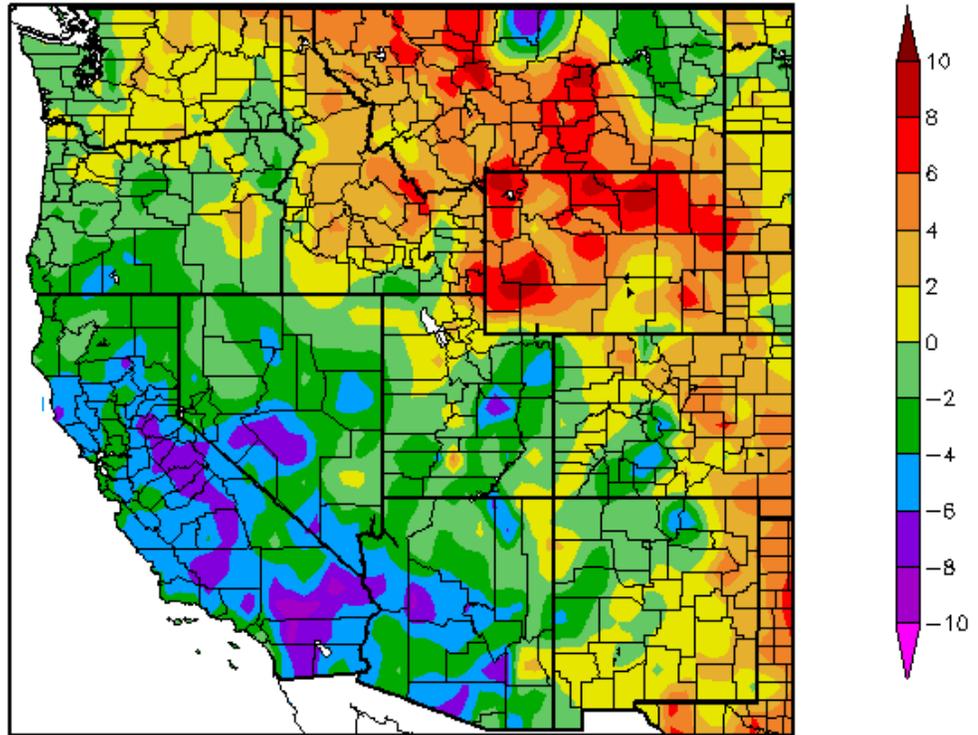


Fig. 1a: SNOTEL 7 day snow depth change reveals increases across most of the West excluding the Central Sierra Range and Washington Cascades.

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

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### Departure from Normal Temperature (F) 3/4/2010 – 3/10/2010



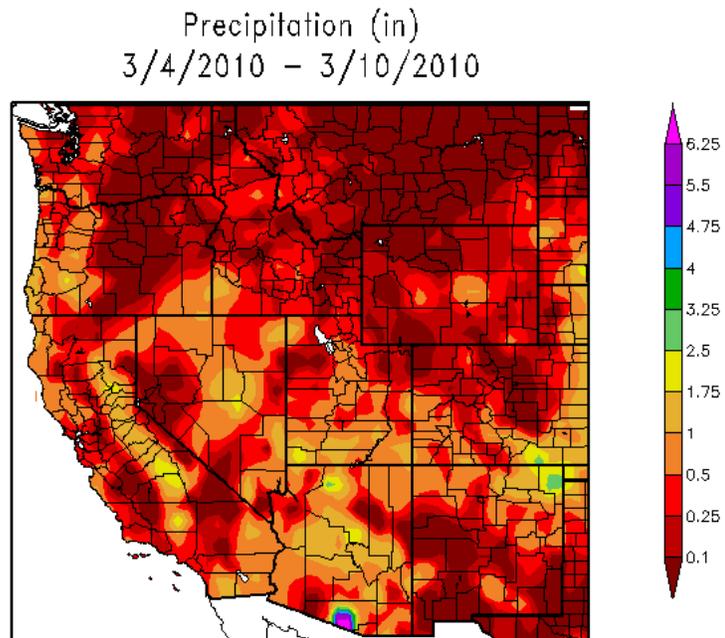
Generated 3/11/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 2: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of Wyoming (>+8°F) and the greatest negative departure occurred over parts of the California and western Nevada (<-8°F).**

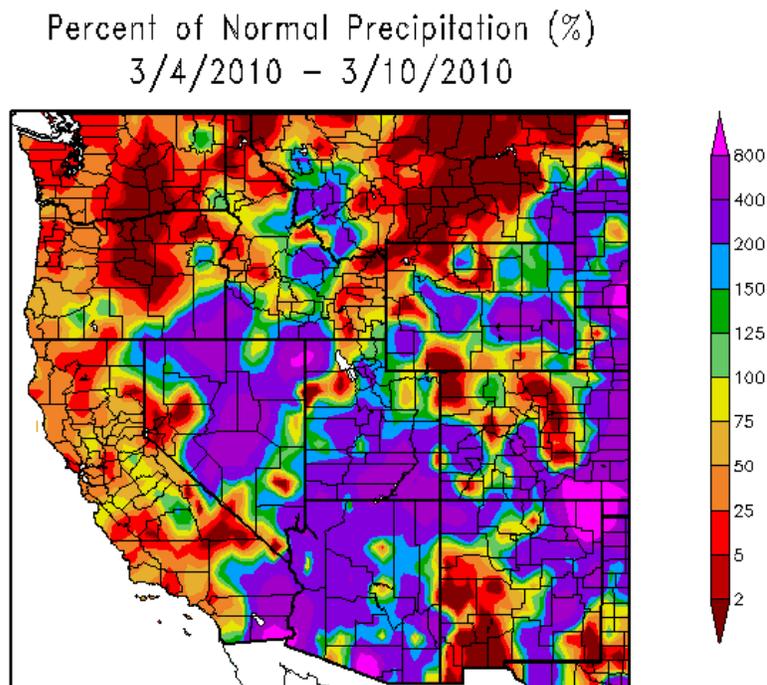
Ref: [http://www.hprcc.unl.edu/maps/current/index.php?action=update\\_daterange&daterange=7d](http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d)

## Weekly Snowpack and Drought Monitor Update Report



Generated 3/11/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers



Generated 3/11/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. and 3a:** ACIS 7-day average precipitation amounts for the period ending 10 March shows the bulk of the heaviest precipitation fell from Arizona and California northward to western Oregon and Washington. Areas with significant deficits occurred over the Northern Rockies and eastern Oregon and Washington. In terms of percent of normal, well above normal amounts were scattered across the Great Basin, Arizona and New Mexico. The north-central region of Montana and central Oregon-Washington were particularly dry. Ref: <http://www.hprcc.unl.edu/maps/current/>

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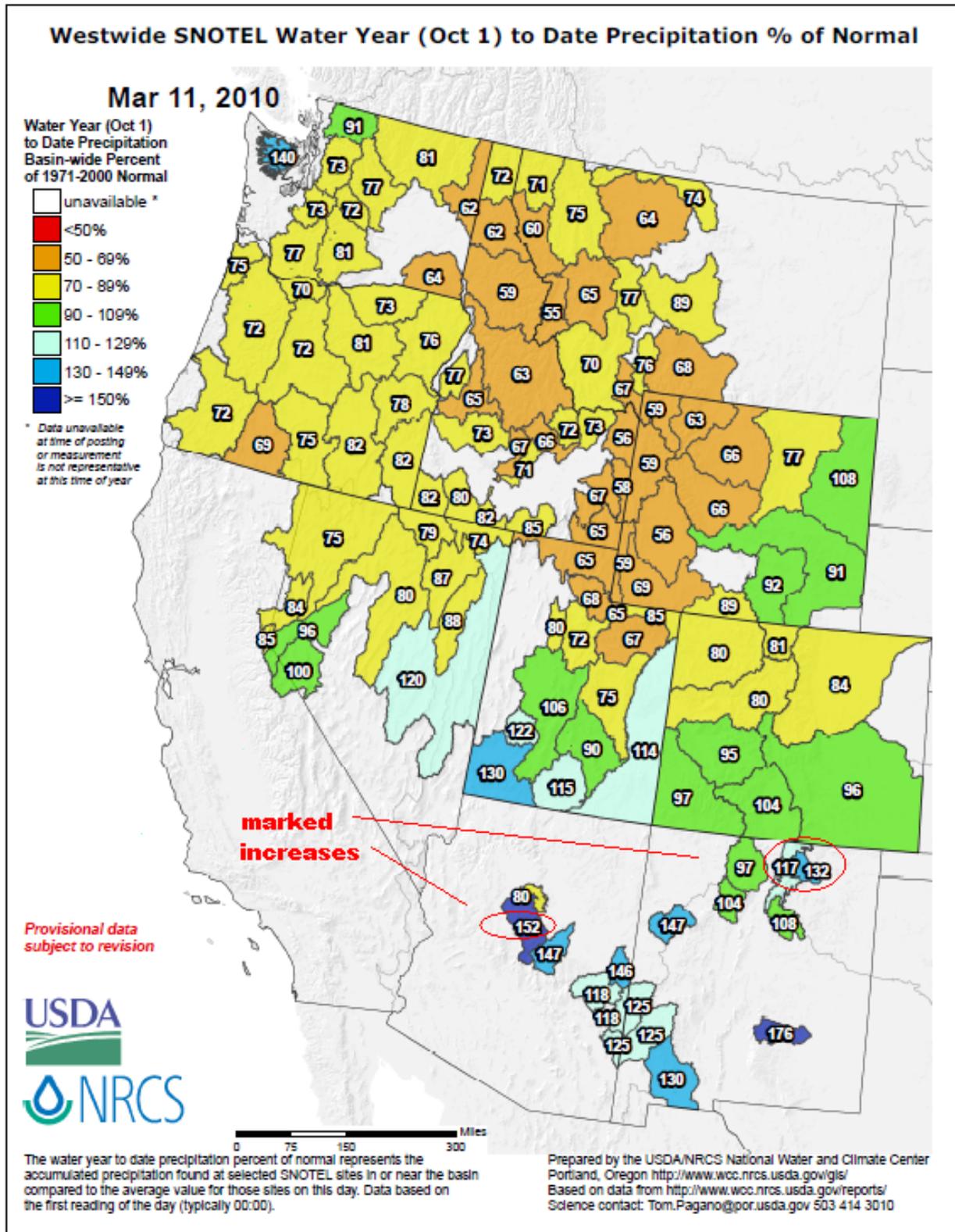


Fig 3b. For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. Note marked increases during this week.

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 9, 2010  
Valid 7 a.m. EST

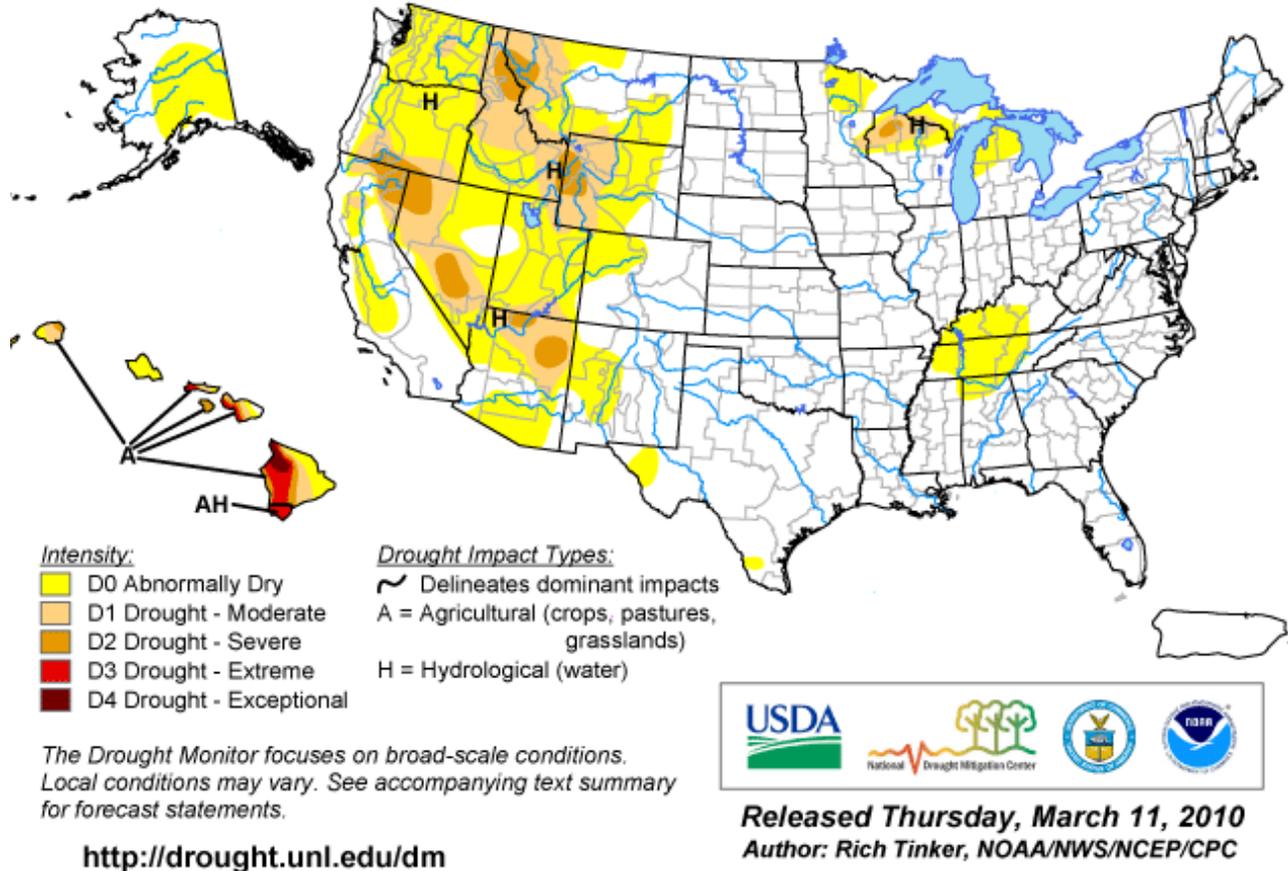


Fig. 4. Current Drought Monitor weekly summary. Note Hawaii is the only state that is in D4 Drought. Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

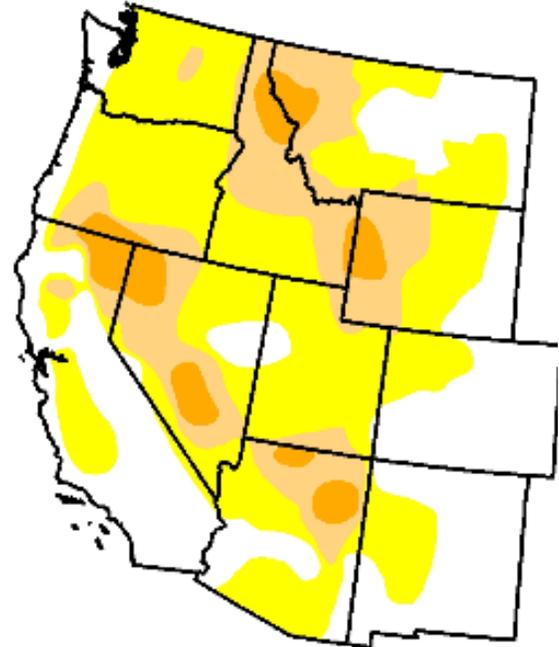
# U.S. Drought Monitor

## West

March 9, 2010  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	36.0	64.0	23.0	5.7	0.0	0.0
Last Week (03/02/2010 map)	34.9	65.1	21.1	3.8	0.0	0.0
3 Months Ago (12/15/2009 map)	43.0	57.0	28.4	9.9	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 (03/10/2009 map)	33.7	66.3	25.1	4.2	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*

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

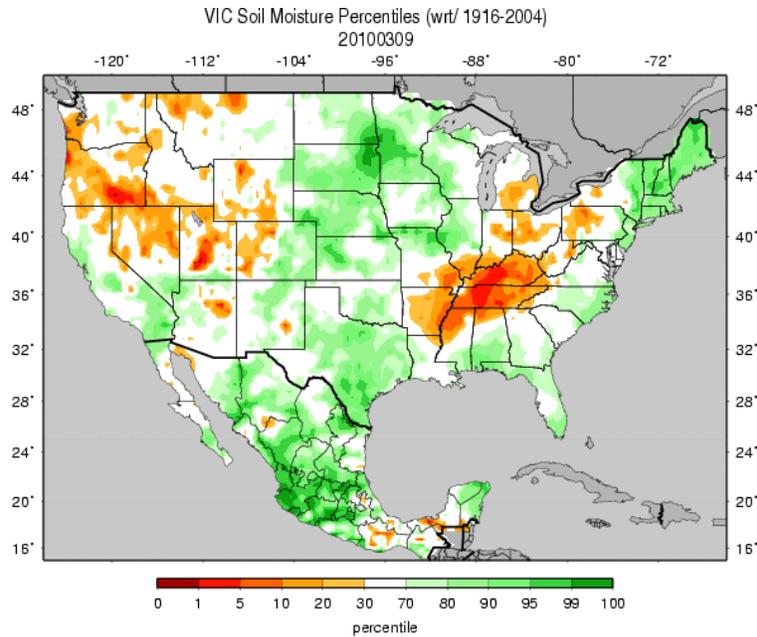


**Released Thursday, March 11,**  
Author: R. Tinker, CPC/

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

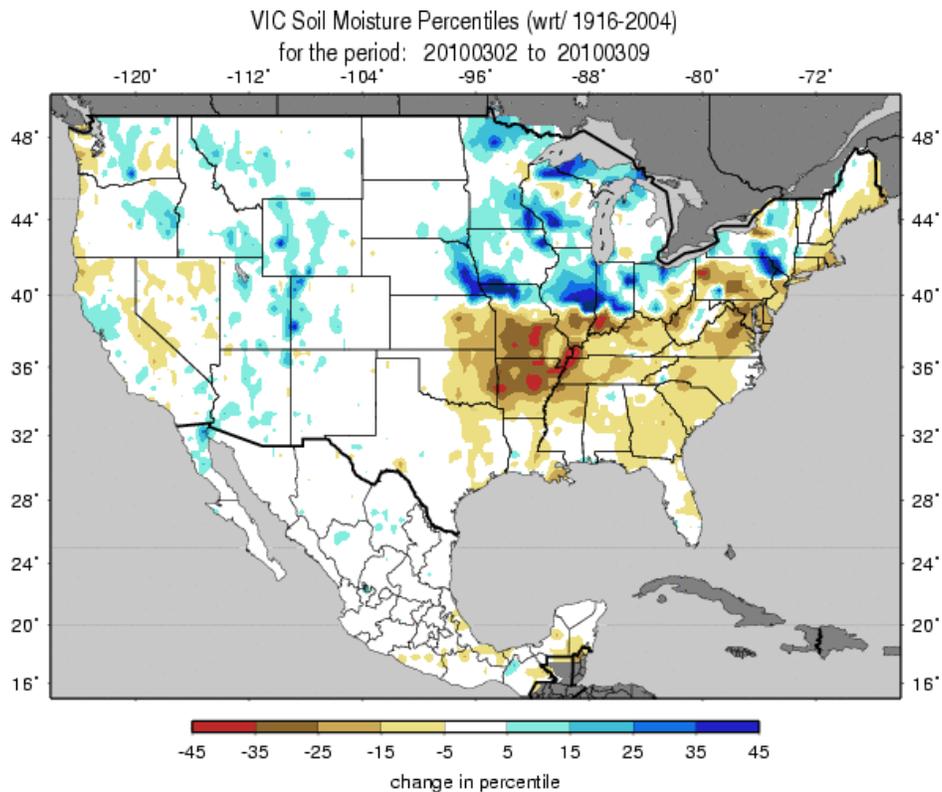
Ref: [http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm)

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**Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 9 March. Values are down over the Great Basin and Oregon and especially over the Tennessee River Valley.**

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)

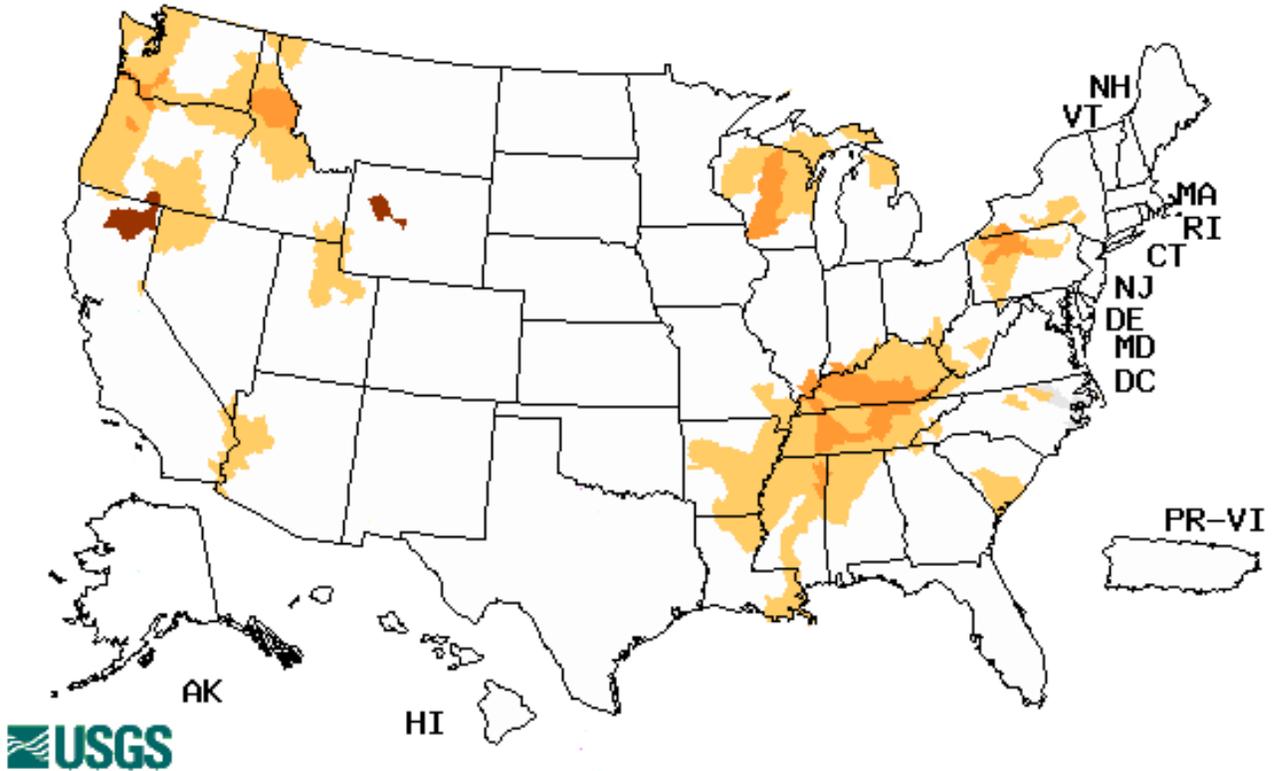


**Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for the week shows a much moister conditions over the Upper Mid-West and drier conditions over much of the southeast quarter of the Nation. Ref:**

[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)

# Weekly Snowpack and Drought Monitor Update Report

Wednesday, March 10, 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. Most of the highlighted areas are a bit worse off this week than last week.

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- March 9, 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/>.*

During the past 7 days, dryness generally increased between the Appalachians and the Mississippi River and across the northwestern quadrant of the country, but decreased through the southwestern one-quarter of the contiguous 48 states. On Hawaii, windward locations improved but dryness and drought persisted or intensified elsewhere.

**East of the Mississippi River:** Between the Mississippi River and the Appalachians, only a few tenths of an inch of precipitation fell, if any. This allowed dryness and drought across Minnesota and the western Great Lakes region to persist. Farther east and south, growing short-term precipitation deficits led to D0 introductions across much of the northern half of Michigan as well as through much of the southern half of Kentucky, Tennessee, northern Alabama, and adjacent Mississippi. Since early December 2009, precipitation in most of northern and central Michigan totaled 2 to 4 inches below normal, with some reports of 4 to 6 inches below normal in northwestern Lower Michigan. Farther south, the new D0 area coincides with areas that received 4 to 8 inches below normal precipitation during this period, and streamflows at many sites in the area were among the lowest 5 to 20 percent of values observed at this time of year.

**Texas:** The areas of abnormal dryness in southern and western Texas persisted, with little precipitation reported in these regions during the past 7 days.

**The West:** Weekly precipitation totals of 0.6 to 3.0 inches were fairly common in several areas, most notably in parts of the Sierra Nevada and western California that are no longer experiencing significant abnormal dryness. However, similar amounts fell on numerous locations from southeastern Nevada through southeastern Arizona, part of the dry area in the central California valleys, and portions of southern Oregon, and the western slopes of the Washington Cascades, along with scattered to isolated locations through the rest of the Rockies, Intermountain West, and interior Pacific Northwest coastal plains.

This precipitation, in conjunction with a series of relatively wet weeks, led to the elimination of D0AH in central and southeastern New Mexico, and some reduction in northwestern parts of the state as well. Farther west, D1 and D2 conditions across southern Nevada and Arizona were reduced due to the recent precipitation and a re-assessment of conditions. Moderate drought was eliminated across southern and northwestern Arizona where significant moisture surpluses have been established over the last 90 days and 12-month totals were within 4 inches of normal. Meanwhile, essentially the middle of the severe drought region in northeast Arizona and the southern reaches of the region in southern Nevada were removed. In the remaining areas of severe drought across Arizona, 24-month precipitation amounts were still only 50 to 70 percent of normal, and 36-month totals ranged from 60 to 80 percent of normal.

## Weekly Snowpack and Drought Monitor Update Report

Other areas of improvement in the western half of the country included part of north-central Colorado east of the continental divide, where abnormal dryness was trimmed, and north-central Washington, where little rain fell last week but where year-to-date precipitation amounts were significantly above normal. The moderate to severe drought in this region improved one category, to range from abnormally dry to moderate drought.

The wet week led to the removal of abnormal dryness in part of the central California Valleys, but for the remainder of the contiguous United States from the Rockies westward, dryness and drought either persisted or intensified relative to last week. Abnormally dry conditions were extended westward in Oregon and Washington as 90-day precipitation amounts declined toward 75 percent of normal. Meanwhile, moderate to severe drought expanded in northeastern and north-central California, southern Oregon, and northwestern Nevada where precipitation has consistently come up short of normal since early in the water year, and where some locations are experiencing their fourth consecutive drier than normal year so far. Conditions in the Klamath Basin have become particularly severe of late, prompting the Governor of Oregon to announce plans to sign a state drought declaration for the region in the near future.

Finally, precipitation and snowpack have been below average for a while across Idaho, Montana, and western Wyoming, and have declined to seriously low levels recently. As a result, D1 and D2 conditions expanded significantly across these regions and adjacent eastern Washington and Oregon. In the western half of Wyoming, snowpack water content was generally below 70 percent of average for the date, and surface water supply indices (SWSI's) were among the lowest 5 to 20 percent of expected values for this time of year. In areas of western Wyoming and adjacent Utah where snowpack water content was below 55 percent of normal for the date, D2 was introduced. Farther north, significant D1 and D2 expansion took place across central and northern Idaho and, to a lesser extent, western Wyoming as seasonal precipitation totals and snowpack water content continued to decline relative to average conditions for early March. During the last 60 days, less than half of normal precipitation fell on northwestern Montana and essentially the northern half of Idaho.

**Hawaii and Alaska:** The worst drought in the nation continues impacting the state of Hawaii. Fortunately, heavy precipitation on many windward locations and a few other scattered areas led to improvements across eastern sections of Molokai, Maui, and Hawaii Island. In contrast, reports of increasing agricultural impacts led to D2 and D3 expansion on the western half of the Big Island. The last 90 days brought 1.5 to 3.0 inches of rain to Lihue, Kauai; Honolulu, Oahu; and Kahului, Maui. These amounts were about 6 to 9 inches below normal.

In Alaska, little or no precipitation fell across much of the state, with greater amounts along the far southern tier, as usual. As a result, abnormal dryness was unchanged from last week.

**Looking Ahead:** Moderate to isolated heavy precipitation is anticipated during March 10 – 15, 2010 for northern California, interior western sections of Washington and Oregon, parts of the northern Intermountain West, central New Mexico, the Big Bend of Texas, the new dry area in the interior Southeast, central and northern Michigan, and northern Wisconsin. Light precipitation should fall on most other current areas of dryness and drought, with little or none expected in southern Texas, the desert Southwest, southern California, western Nevada, Wyoming, and north-central Montana. For the ensuing 5 days (March 16 – 20, 2010), the odds favor wetter than normal conditions in southern Texas, and closer to normal precipitation in Washington, northwestern Oregon, and the southern Big Bend of Texas. All other current areas of dryness and drought should receive below-normal precipitation, including much of Alaska.

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**Author:** [Rich Tinker, NOAA/NWS/NCEP/Climate Prediction 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 March 10, 2010