



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

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## Weekly Report - Snowpack / Drought Monitor Update Date: 4 March 2010

### SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 4 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 reveal increases greater than a foot over parts of the Sierra. Depths decreases up to a foot occurred over the Western Slope of the Colorado Rockies, Arizona Mountains, and parts of the Wasatch in Utah (fig. 1a).

**Temperature:** ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of the Montana Rockies (>+12°F) and the greatest negative departure occurred over parts of the Uinta to the northern New Mexico Rockies (<-12°F) (Fig. 2).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 3 March shows the bulk of the heaviest precipitation fell over the north California and south Oregon coastlines. Areas with significant deficits occurred over the Northern Rockies (Fig. 3). In terms of percent of normal, well above normal amounts were scattered across California, central Washington, much of Arizona, and the Southern High Plains. The Northern Rockies and Northern High Plains 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 (Fig. 3b).

### WESTERN DROUGHT STATUS

**The Southwest:** Most locations across the southwestern quarter of the country recorded less than 0.5 inch of precipitation, although most of the dry areas in California and parts of the higher elevations in Arizona reported one to several inches. Record snowpack for early March in the higher elevations of Arizona and surplus precipitation on the whole for the past 6 months led to the removal of D0 conditions there, and some improvements to former D1 conditions in southern parts of the state were also introduced. In other parts of the area, no change was made in the Drought Monitor depiction last week.

**The Northern Rockies and Northwest:** Most interior locations reported less than 0.5 inch of precipitation, though some of the highest elevations recorded a bit more. Meanwhile, one to several inches fell on areas from the Cascades westward. Continued near- to above-normal precipitation in central Washington prompted some improvements on the western sides of the D1 and D2 areas, but many areas farther east and southeast remained in the grip of moderate to severe drought. Since the start of the water year on October 1, 2009, precipitation has totaled 4 to 8 inches below normal in much of western Washington and Oregon, and through most of the Idaho Panhandle and part of adjacent Montana. As of early March, snowpack was at or near record low level at many locations from northeastern Utah northward along and near the Idaho border with Montana and Wyoming. Furthermore, numerous sites in Idaho reported the driest or second-driest November – February period in 20 to 45 years of record. No deteriorations were

## Weekly Snowpack and Drought Monitor Update Report

introduced in northern parts of the Rockies and Intermountain West this week, but many areas may decline in the near future if more precipitation is not forthcoming. 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, 4a, and 4b).

### **SOIL MOISTURE**

Soil moisture (Figs. 5a and 5b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria). 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/cgi-bin/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**

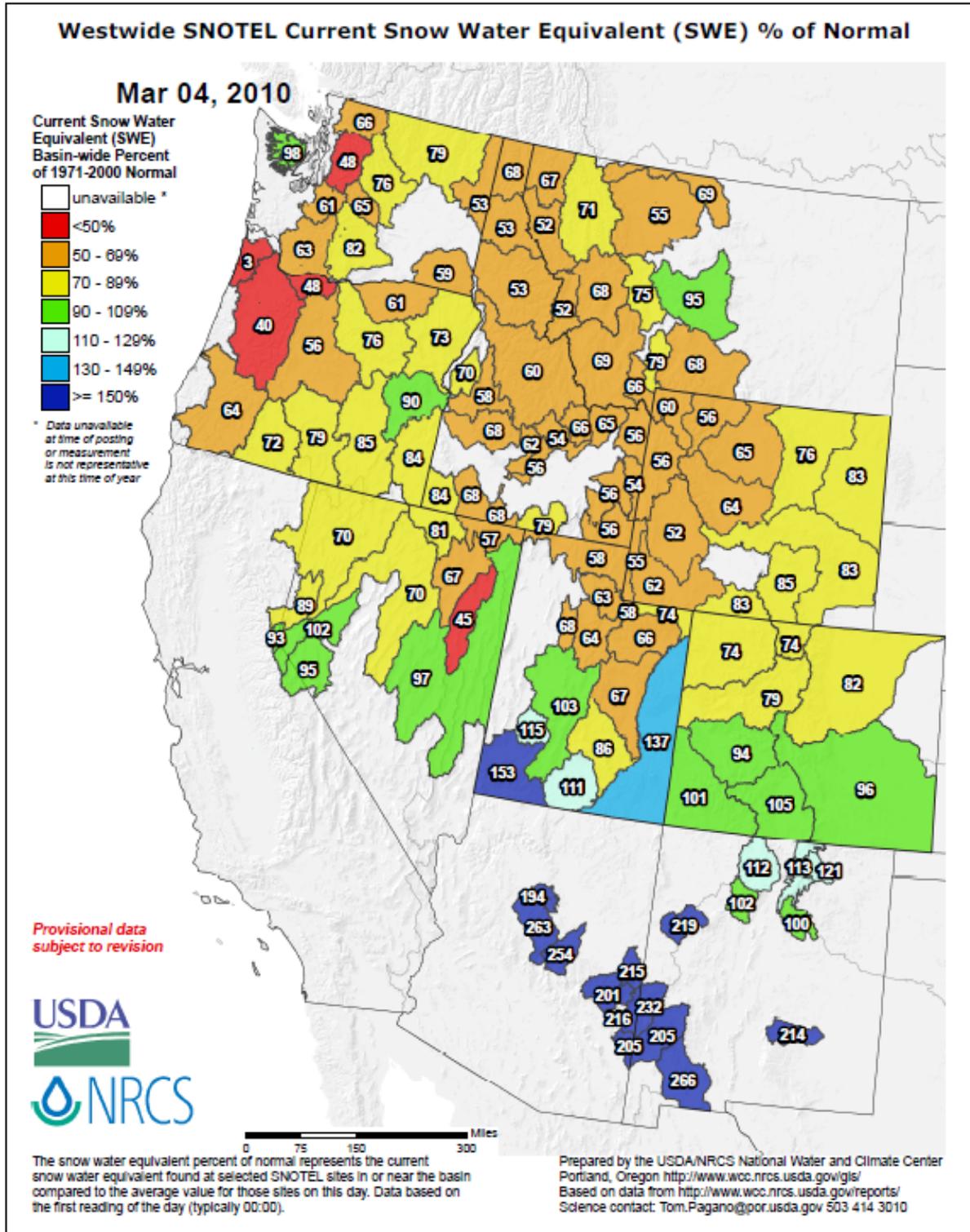
## Weekly Snowpack and Drought Monitor Update Report

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 4 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

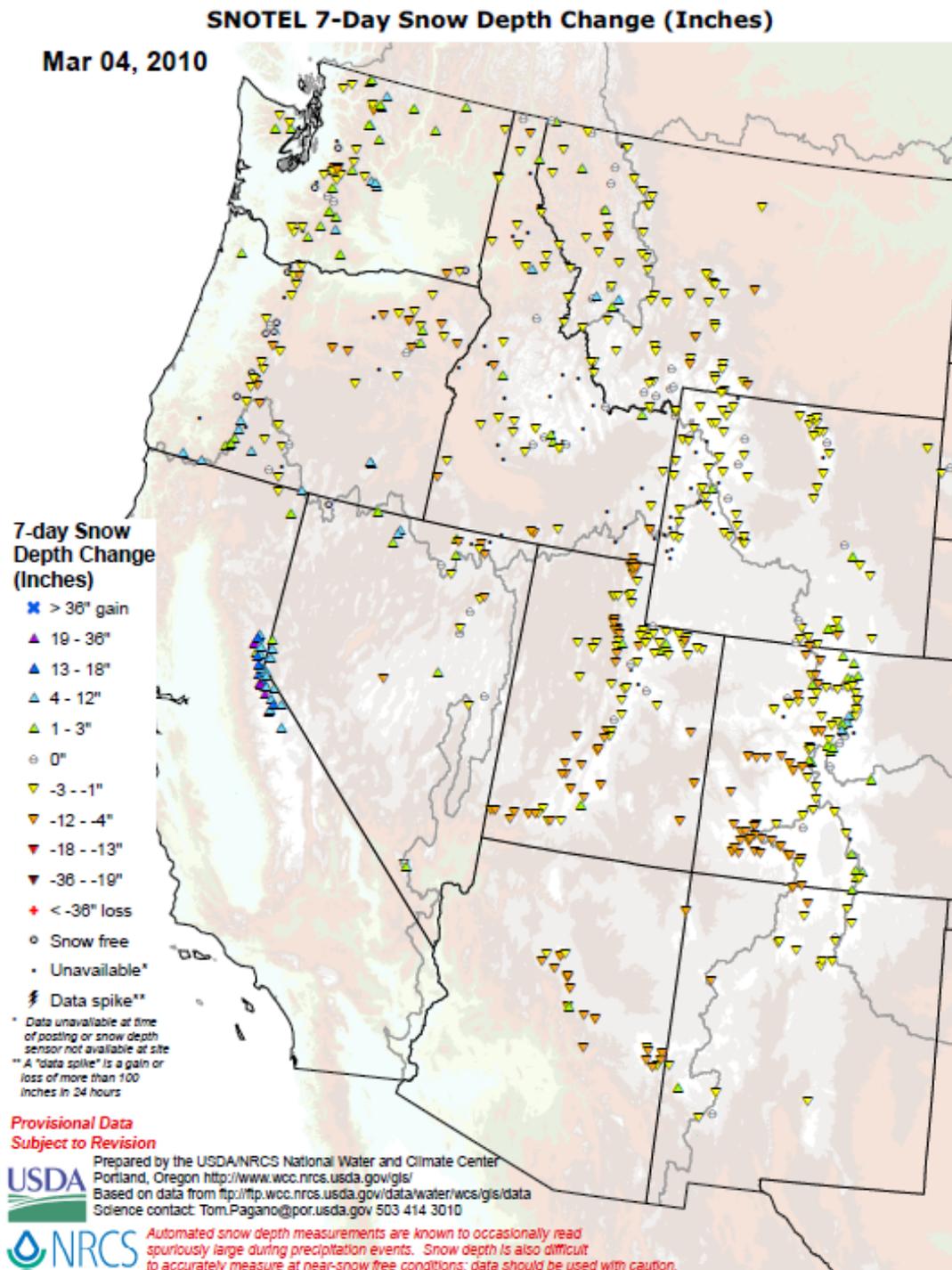
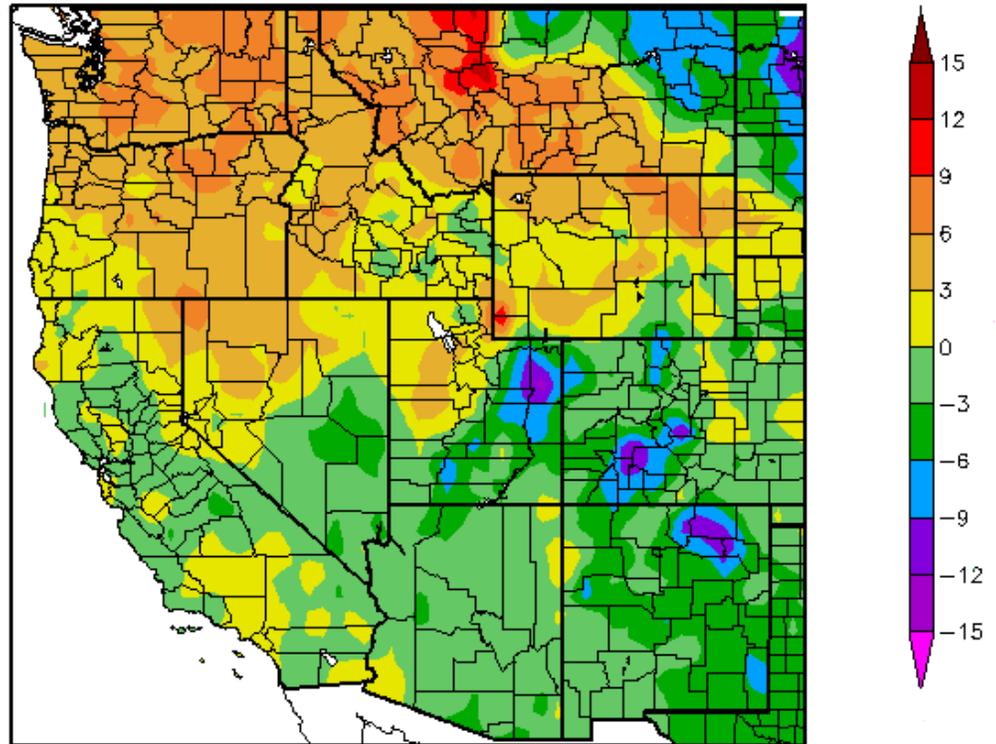


Fig. 1a. SNOTEL 7-day snow depth change reveal increases greater than a foot over parts of the Sierra. Depths decreases up to a foot occurred over the Western Slope of the Colorado Rockies, Arizona Mountains, and parts of the Wasatch in Utah.

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)  
2/25/2010 – 3/3/2010



Generated 3/4/2010 at HPRCC using provisional data.

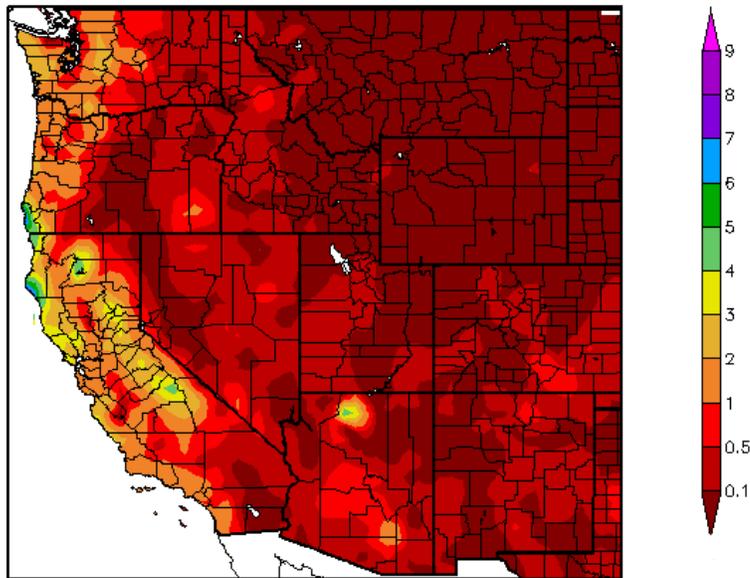
NOAA Regional Climate Centers

**Fig. 2. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of the Montana Rockies (>+12°F) and the greatest negative departure occurred over parts of the Uinta to northern New Mexico Rockies (<-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

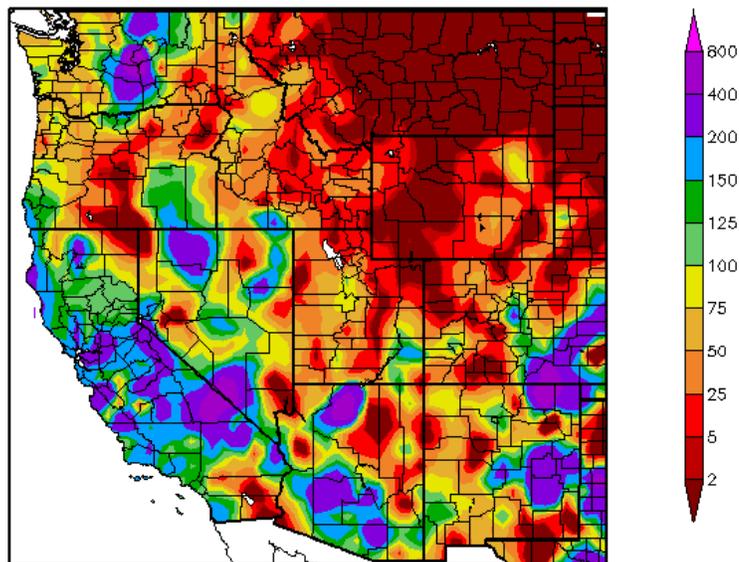
Precipitation (in)  
2/25/2010 - 3/3/2010



Generated 3/4/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)  
2/25/2010 - 3/3/2010



Generated 3/4/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. and 3a. ACIS 7-day average precipitation amounts for the period ending 3 March shows the bulk of the heaviest precipitation fell over north coastal California and south coastal Oregon. Areas with significant deficits occurred over the Northern Rockies. In terms of percent of normal, well above normal amounts were scattered across the California, central Washington, much of Arizona, and the Southern High Plains. 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

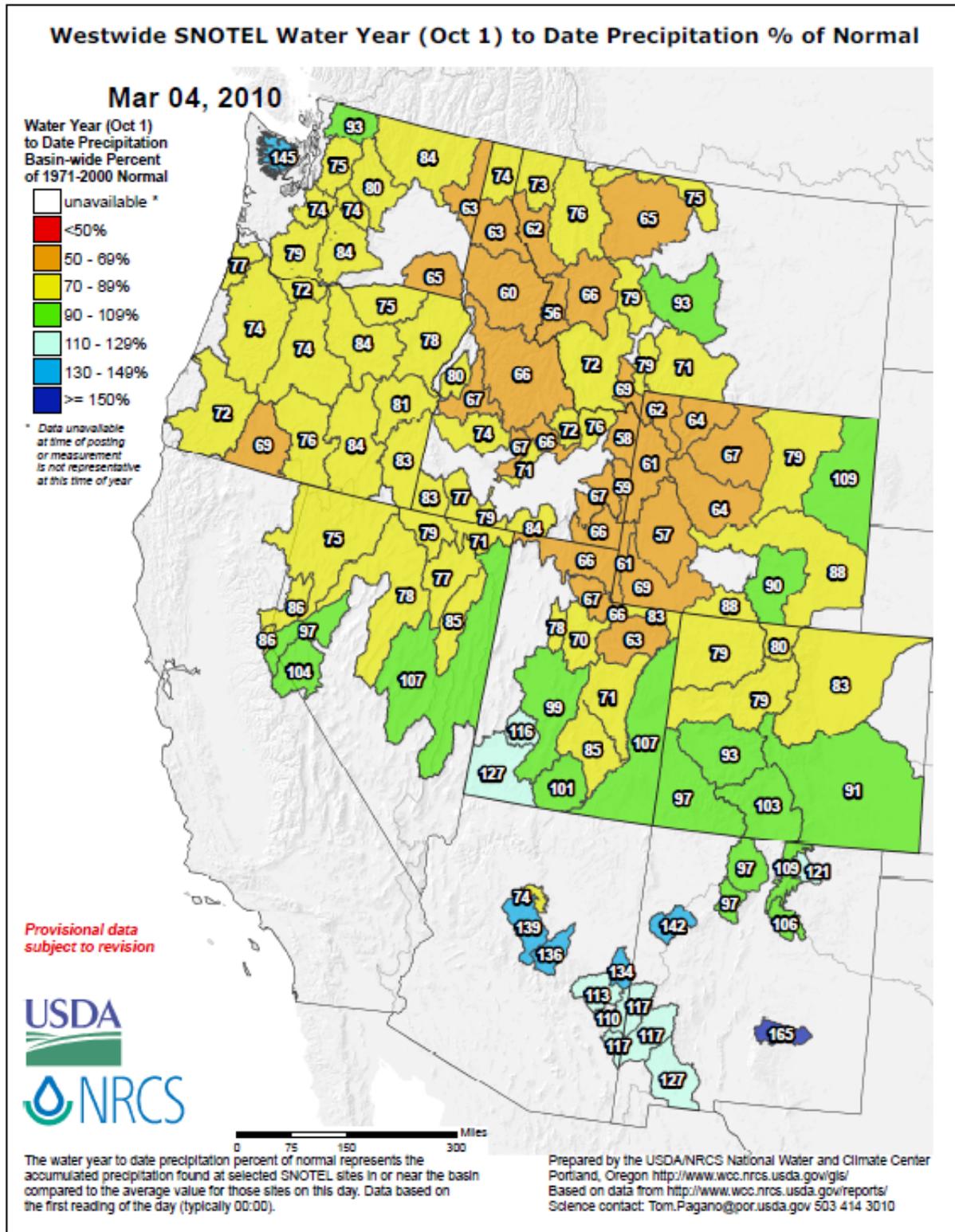
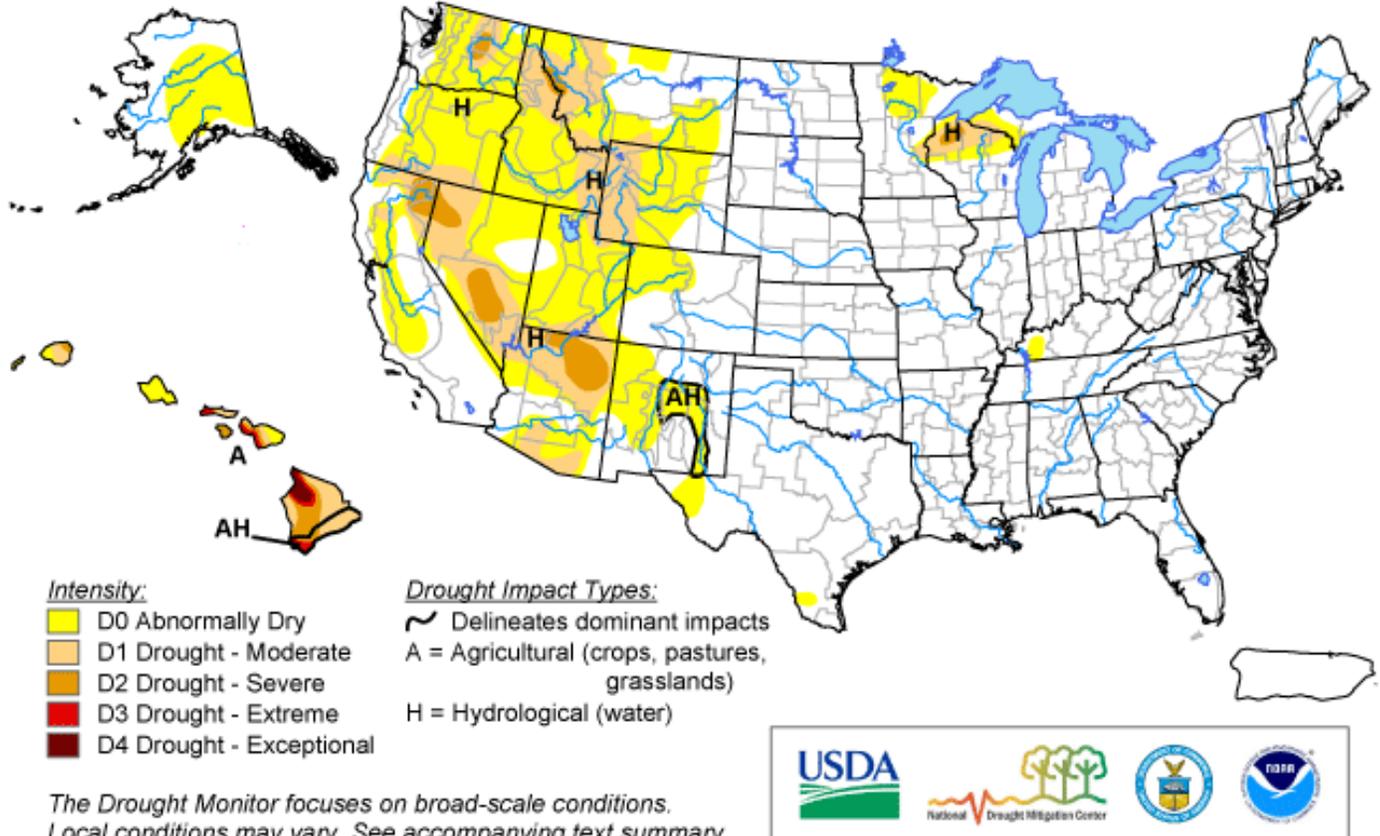


Fig 3b. For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits.  
Ref: [http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecpcnormal\\_update.pdf](http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf)

# U.S. Drought Monitor

March 2, 2010  
Valid 7 a.m. EST



Released Thursday, March 4, 2010  
Author: Rich Tinker, NOAA/NWS/NCEP/CPC

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>

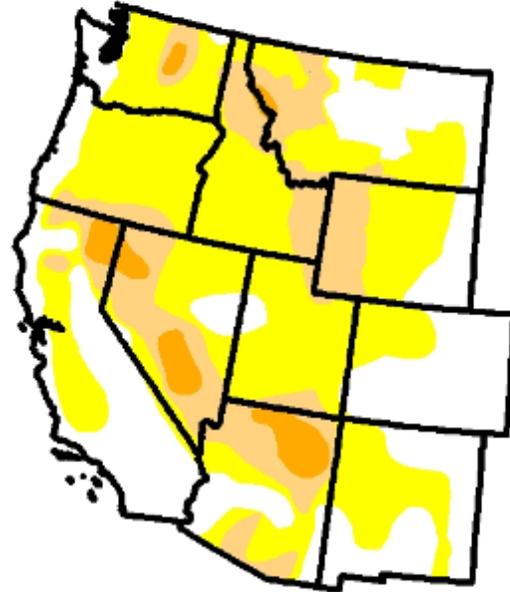
# U.S. Drought Monitor

## West

March 2, 2010  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	34.9	65.1	21.1	3.8	0.0	0.0
Last Week (02/23/2010 map)	34.1	65.9	21.6	3.9	0.0	0.0
3 Months Ago (12/08/2009 map)	44.4	55.6	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 (03/03/2009 map)	35.1	64.9	28.0	8.0	0.6	0.0



*Intensity:*

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements



Released Thursday, March 4, 2010  
Author: R. Tinker, CPC/NOAA

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

**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>

## Drought Monitor Classification Changes for Selected Time Periods

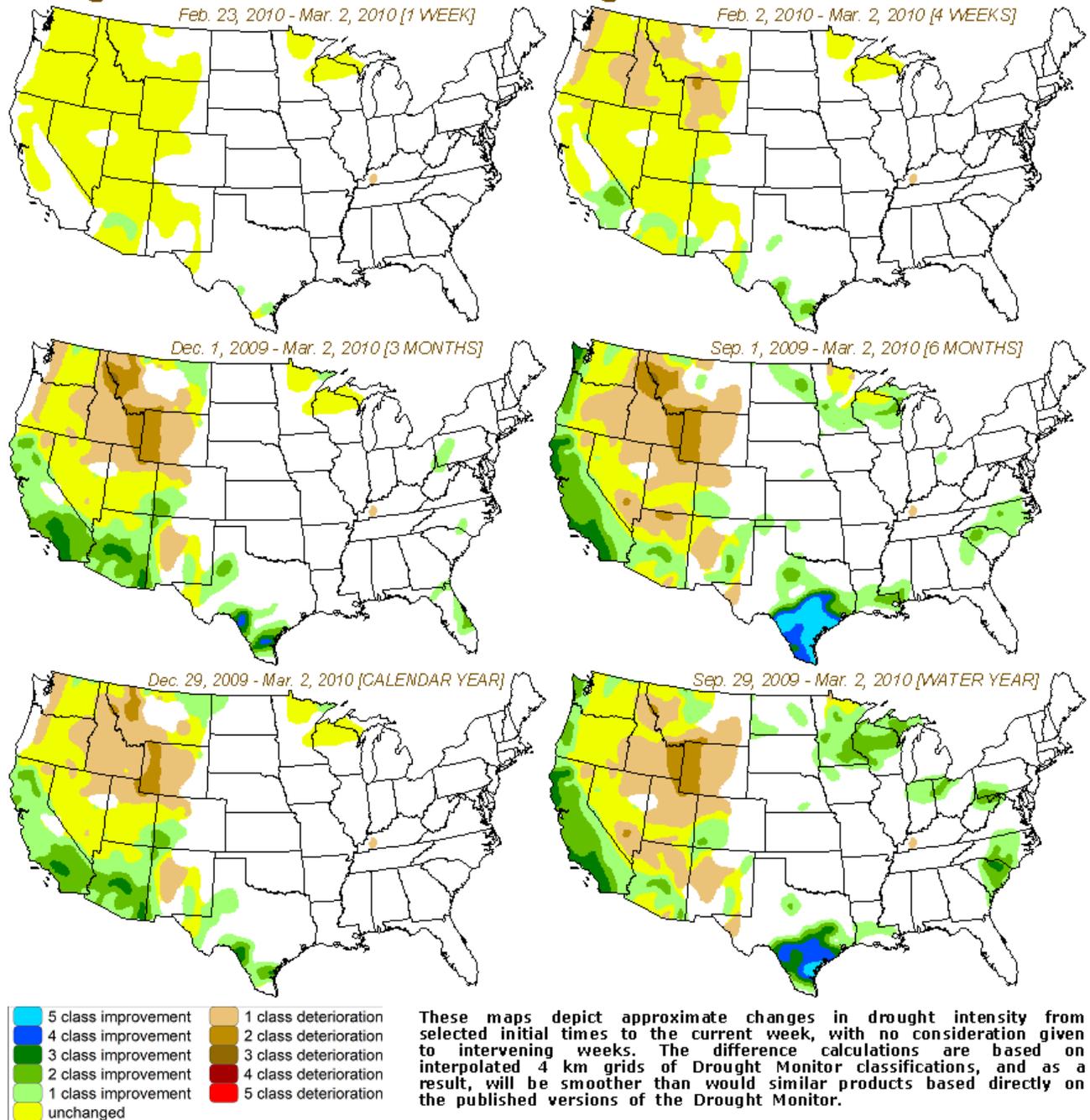
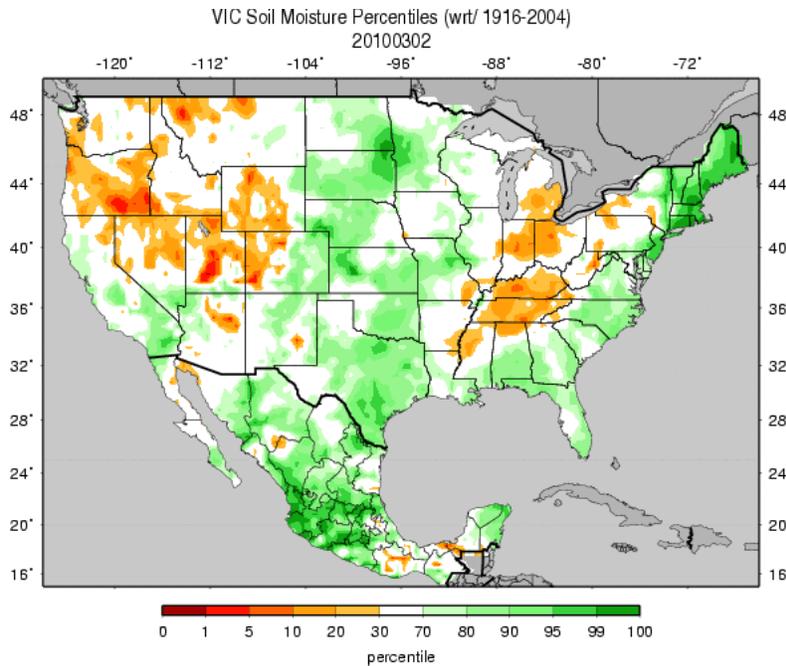


Fig. 4b. Drought Monitor classification changes for selected time periods show little change since last week.

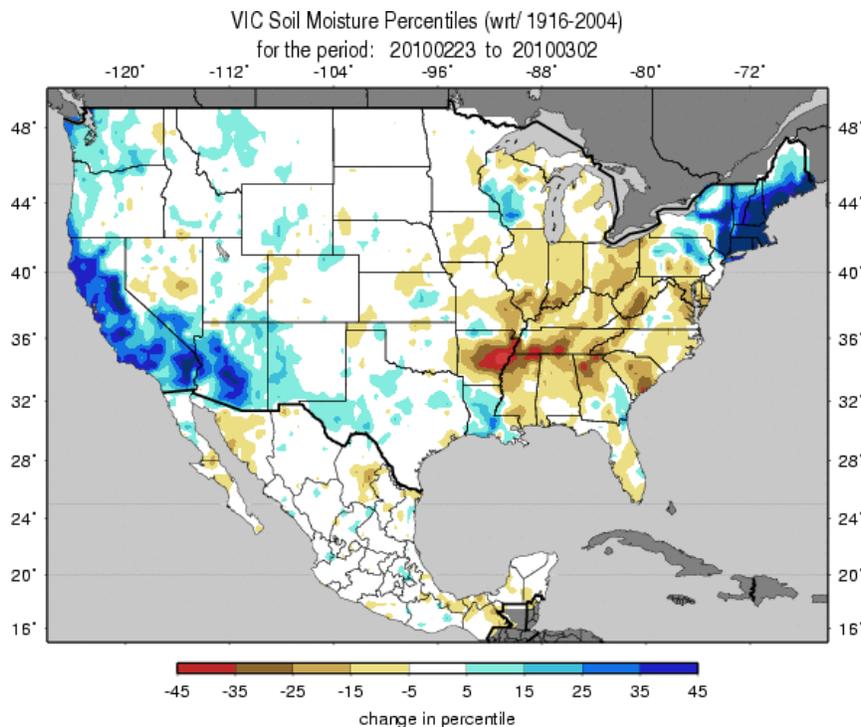
Ref: <http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/dm-change-4maps.png>

## Weekly Snowpack and Drought Monitor Update Report



**Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 2 March. A weakening El Niño pattern of drier over the Northern Tier States and moister over the Southern Tier States persists.**

Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_gnt.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_gnt.gif)

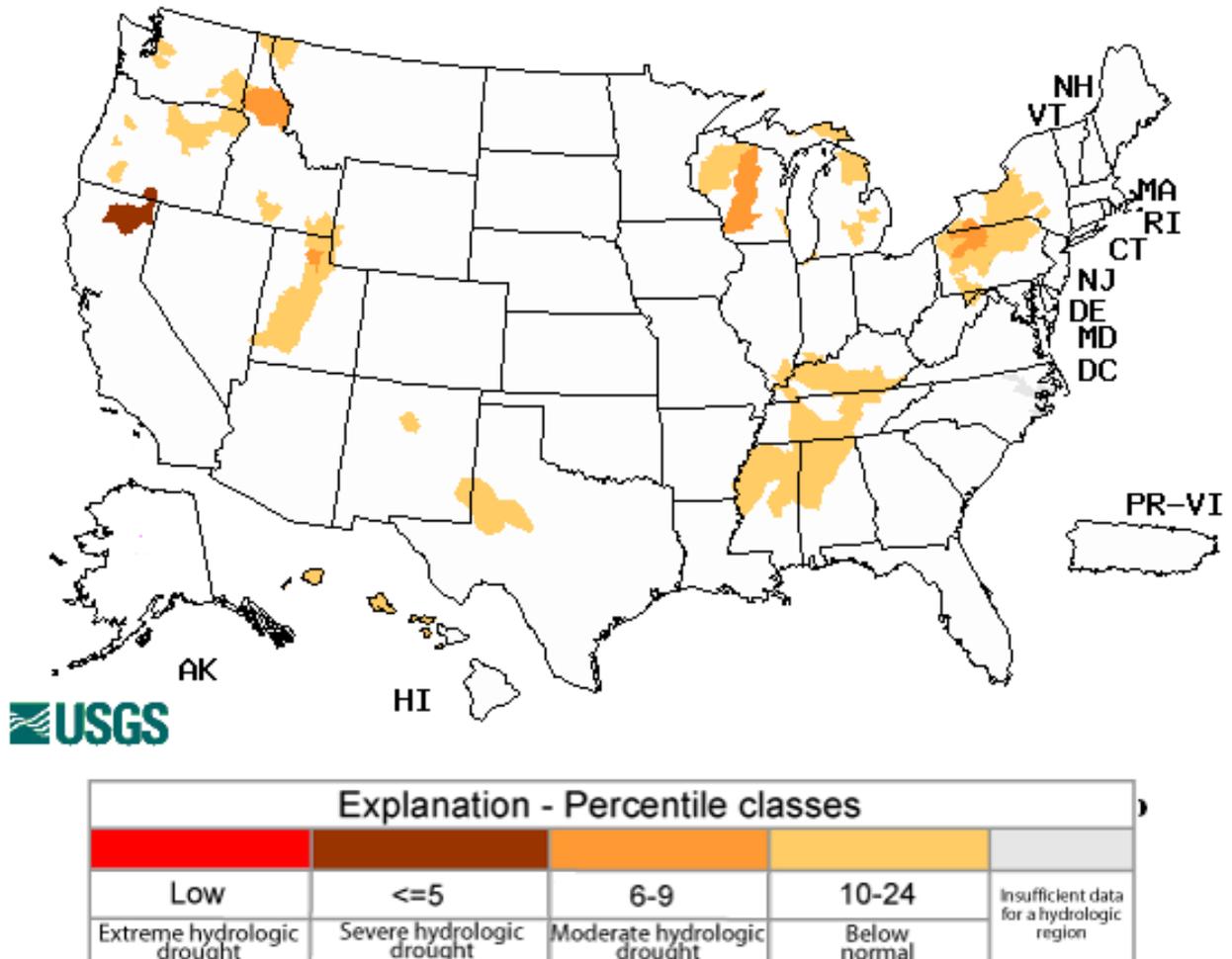


**Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for the week shows a much wetter West Coast, Arizona, and New England. A drier week over the Lower Mississippi River Valleys and Mid-West is noted.**

[http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_gnt.1wk.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_gnt.1wk.gif)

# Weekly Snowpack and Drought Monitor Update Report

Wednesday, March 03, 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 northernmost California, northern Idaho, and central Wisconsin.

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- March 2, 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/>.

**The Southwest:** Most locations across the southwestern quarter of the country recorded less than 0.5 inch of precipitation, although most of the dry areas in California and parts of the higher elevations in Arizona reported one to several inches. Record snowpack for early March in the higher elevations of Arizona and surplus precipitation on the whole for the past 6 months led to the removal of D0 conditions there, and some improvements to former D1 conditions in southern parts of the state were also introduced. In other parts of the area, no change was made in the Drought Monitor depiction last week.

**The Northern Rockies and Northwest:** Most interior locations reported less than 0.5 inch of precipitation, though some of the highest elevations recorded a bit more. Meanwhile, one to several inches fell on areas from the Cascades westward. Continued near- to above-normal precipitation in central Washington prompted some improvements on the western sides of the D1 and D2 areas, but many areas farther east and southeast remained in the grip of moderate to severe drought. Since the start of the water year on October 1, 2009, precipitation has totaled 4 to 8 inches below normal in much of western Washington and Oregon, and through most of the Idaho Panhandle and part of adjacent Montana. As of early March, snowpack was at or near record low level at many locations from northeastern Utah northward along and near the Idaho border with Montana and Wyoming. Furthermore, numerous sites in Idaho reported the driest or second-driest November – February period in 20 to 45 years of record. No deteriorations were introduced in northern parts of the Rockies and Intermountain West this week, but many areas may decline in the near future if more precipitation is not forthcoming.

**Texas:** The abnormally dry areas in Texas reported only a few tenths of an inch of rain this past week, but with precipitation totals in most of these areas near- to above-normal for the past 90 to 180 days, most of the D0 conditions in southern Texas were removed this week, save for a small area in far southwest Texas which has not fared as well over the past 3 to 6 months. Farther northwest, D0 conditions persisted in part of western Texas.

**The Upper Mid-West:** No changes were made in this region. Most areas reported at least a few tenths of an inch of precipitation last week, with totals exceeding an inch reported on parts of the northern Upper Peninsula of Michigan. Over the course of the past 2 years, northern Wisconsin accumulated precipitation totals 12 to 20 inches below normal.

**Hawaii, Alaska, and Micronesia:** The worst drought in the nation continues impacting the state of Hawaii. Water supplies for ranchers in northwest sections of the Big Island have been unprecedentedly poor, and growing precipitation deficits led to the introduction of D4 in this area. This marks the first time since the inception of the Drought Monitor that such poor conditions have been assessed for any part of the state. Since the start of the calendar year,

## Weekly Snowpack and Drought Monitor Update Report

Lihue (on Kauai), Honolulu (Oahu), and Kahului (Maui) have reported 1.38 to 2.00 inches of rain, compared to normal amounts of 5.23 to 8.07 inches for the period. Hilo, on the Big Island, received only 2.65 inches for this period, compared to a normal total of 19.39 inches.

In Alaska, little or no precipitation fell across much of the state. Reports from near the southern shore, adjacent islands, and along the panhandle indicate precipitation amounts ranged from 1.4 to 5.1 inches. The frozen ground and dormant vegetation provide minimal demand for ground water, so the depiction was maintained from last week.

Although the region is not assessed by the Drought Monitor, it should be noted that drought has developed recently through most of Micronesia, including Guam, where February precipitation totals of around 0.5 inch were only about 15 percent of normal.

**Looking Ahead:** The next 5 days (March 4 – 8, 2010) looks relatively dry for most parts of the contiguous 48 states currently affected by dryness and drought. Generally 0.25 to locally 1.50 inches of precipitation is forecast from California eastward through Nevada, central and northern Arizona, Utah, southern Idaho, Wyoming, and Colorado, with the larger amounts expected in the coastal and Sierra Nevada regions of California and scattered higher elevations in the central Rockies. Elsewhere, only a few tenths of an inch is expected, if anything, including the dry areas in the Upper Midwest and the lower Ohio Valley. For the ensuing 5 days, the odds favor above-normal precipitation in the southwestern two-thirds of Alaska, the West Coast from central California northward through western Oregon, the Upper Midwest, and the lower Ohio Valley. In contrast, subnormal amounts appear more likely from central and southern Arizona eastward through the Big Bend region of Texas, and across Montana and most of the Idaho Panhandle.

**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 3, 2010