



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

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**Weekly Report - Snowpack / Drought Monitor Update**

**Date: 9 December 2010**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snow:** SNOTEL Snow-Water Equivalent percent of normal values for 9 December 2010 shows conditions are still below normal over the Washington Cascades, Idaho Panhandle, and the southern half of the Southwestern States (Fig 1). SNOTEL 7-day snow depth changes show considerably less accumulation across the Cascades, eastern ranges in Oregon and Washington, the Panhandle of Idaho, and the Wasatch in Utah. Increases were observed in the Colorado and Wyoming Rockies and Central Idaho Ranges (Fig. 1a).

**Temperature:** SNOTEL 7-day average temperature departure from normal map shows temperatures coolest over the Northern Rockies and Cascades, and warmest over the southern ranges of the West (Fig 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures was over southwest Wyoming ( $>+15^{\circ}\text{F}$ ) and the greatest negative departures occurred over north-central Montana ( $<-12^{\circ}\text{F}$ ) (Fig. 2a).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 8 December shows the bulk of the heaviest precipitation confined to Northwest Coast of Washington and northern California (Fig. 3). In terms of percent of normal, the precipitation pattern is very similar to the previous 7-days. A very wet week dominated parts of Idaho, Montana, eastern Oregon and California-southern Nevada (Fig. 3a). For the 2011 Water-Year that began on 1 October 2010, precipitation has been much greater than the long term average over much of the central interior West. Exceptions exist over eastern Arizona and all of New Mexico as would be expected during La Niña. A few river basins over Washington, Montana, Wyoming, and Colorado are also running behind in moisture (Fig. 3b).

**Central and Northern Rockies and the Intermountain West:** Although moderate to heavy precipitation fell on the central and northwestern Rockies, most areas of dryness and drought in this region missed significant precipitation, leaving conditions unchanged there. However, a re-assessment of conditions resulted in small areas where abnormal dryness was eliminated, specifically in central Colorado and in the northern Reaches of areas near the Colorado/Utah border.

**California and Southern Oregon:** Moderate precipitation totaling 1 to locally 4 inches led to some dryness and drought retraction in northeastern California and southern Oregon. Farther south, a small area of interior western California southwest of the San Joaquin Valley has recorded consistently below-normal precipitation over the course of the last 6 months. Although much of that period typically receives little precipitation during this period, seasonally increasing Normals and slowly growing precipitation shortfalls led to the introduction of abnormal dryness there.

**The Southern Rockies:** Light precipitation fell on isolated locations last week, with most locations reporting none. In a few areas, modest precipitation deficits date back approximately 6 months, but extremely dry conditions over the past 90 days led to a sharp

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increase in 3-month precipitation shortfalls. As a result, abnormal dryness was introduced throughout Arizona and through most areas outside central and east-central New Mexico.

Author: Rich Tinker, NOAA/NWS/NCEP/CPC

***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>.

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### 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/ JEFF GOEBEL  
Acting Director, Resource Inventory Division

# Weekly Snowpack and Drought Monitor Update Report

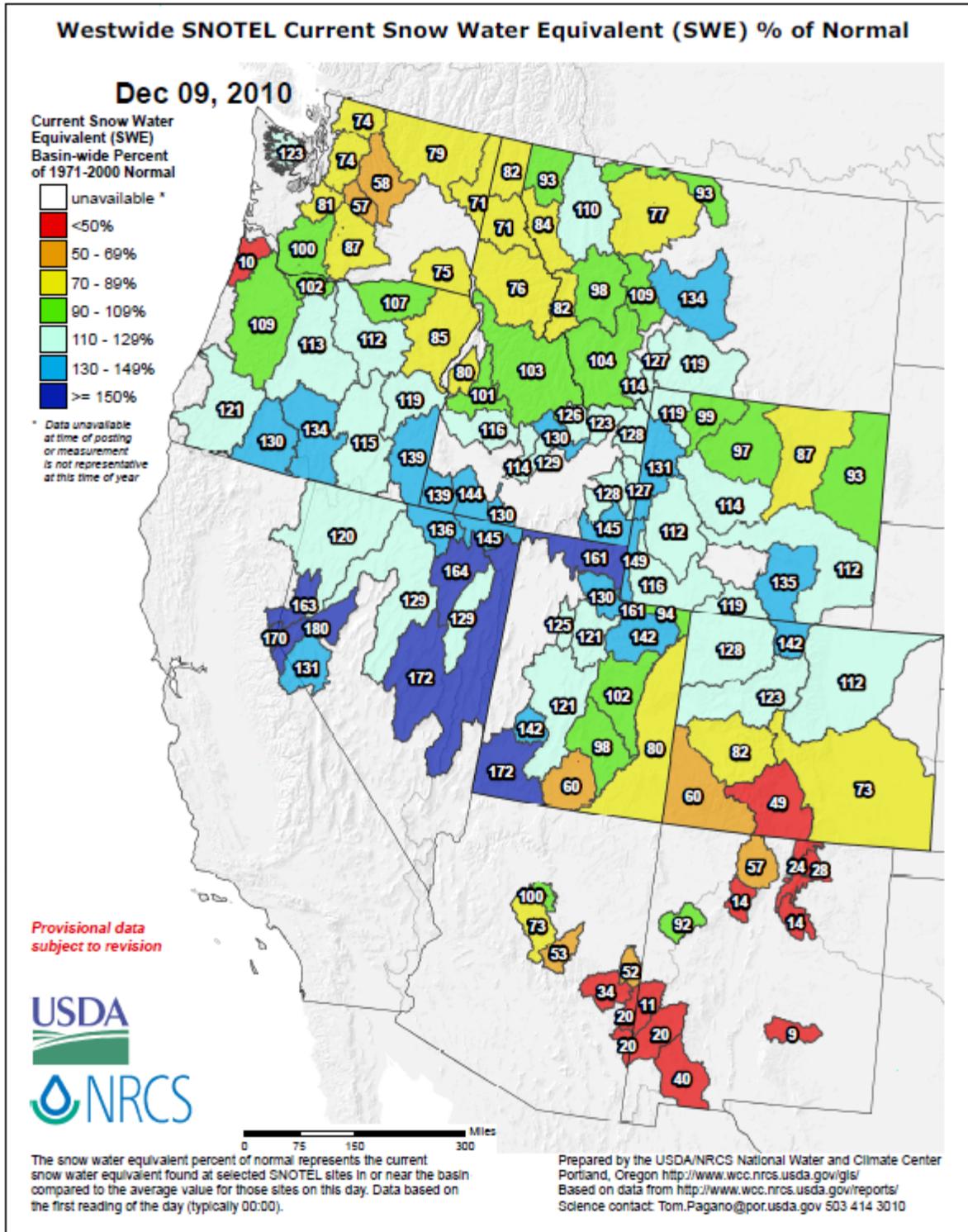


Fig 1. SNOTEL Snow-Water Equivalent percent of normal values for 9 December 2010 shows conditions are still below normal over the Washington Cascades, Idaho Panhandle, and the southern half of the Southwestern States.

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)

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

Dec 09, 2010

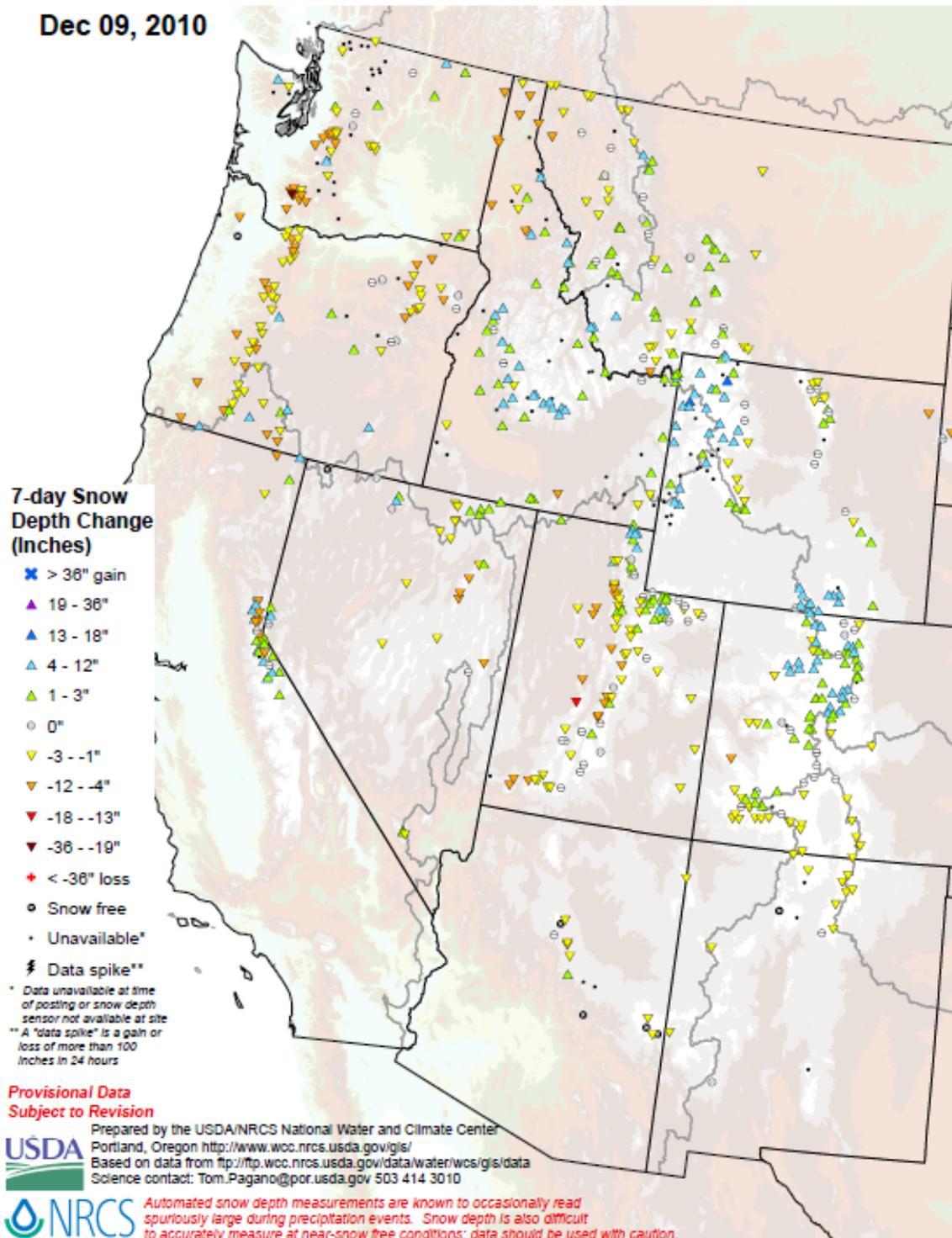


Fig 1a. SNOTEL 7-day snow depth changes show considerably less accumulation across the Cascades, eastern ranges in Oregon and Washington, the Panhandle of Idaho, and the Wasatch in Utah. Increases were observed in the Colorado and Wyoming Rockies and Central Idaho Ranges.

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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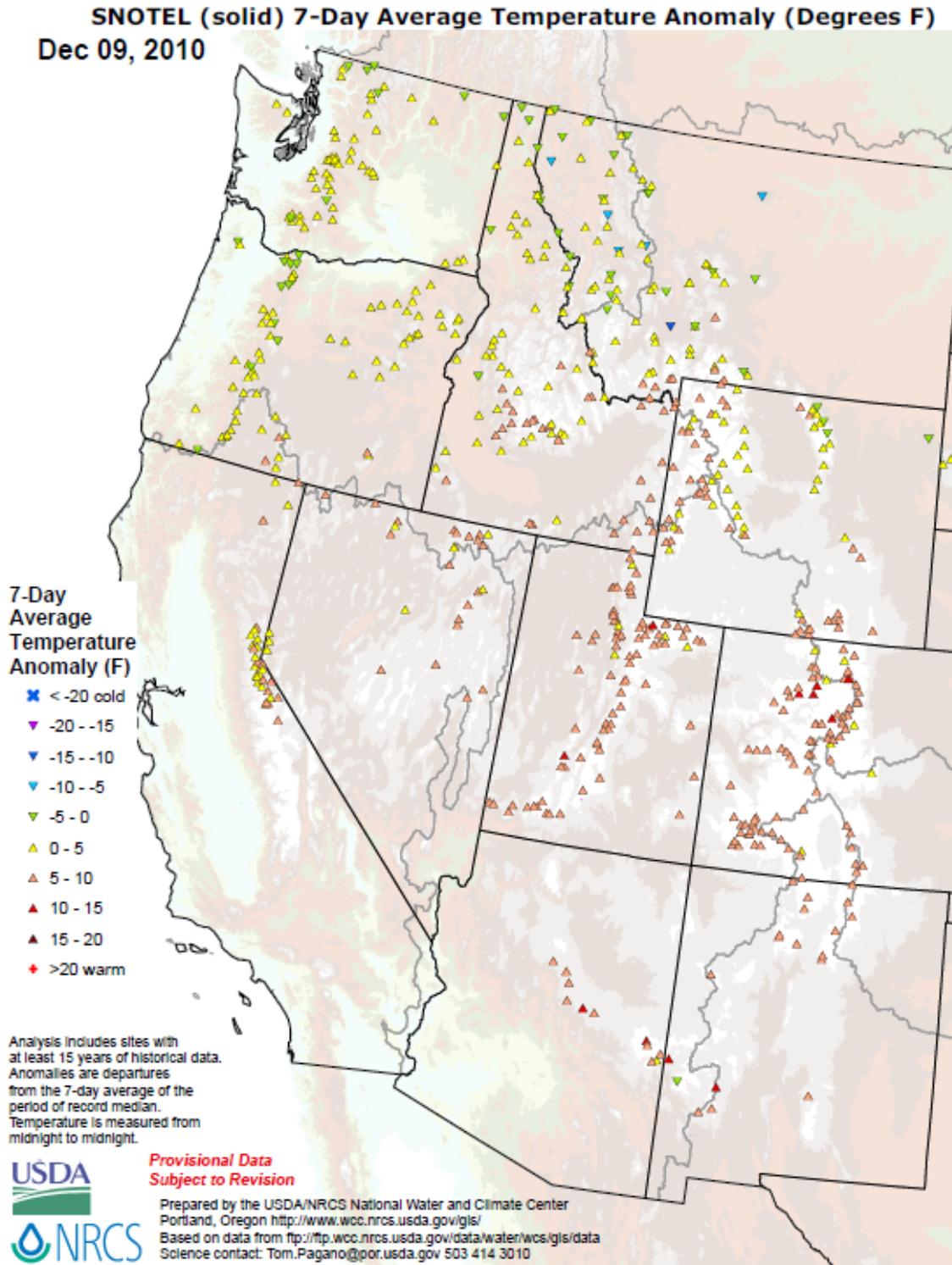
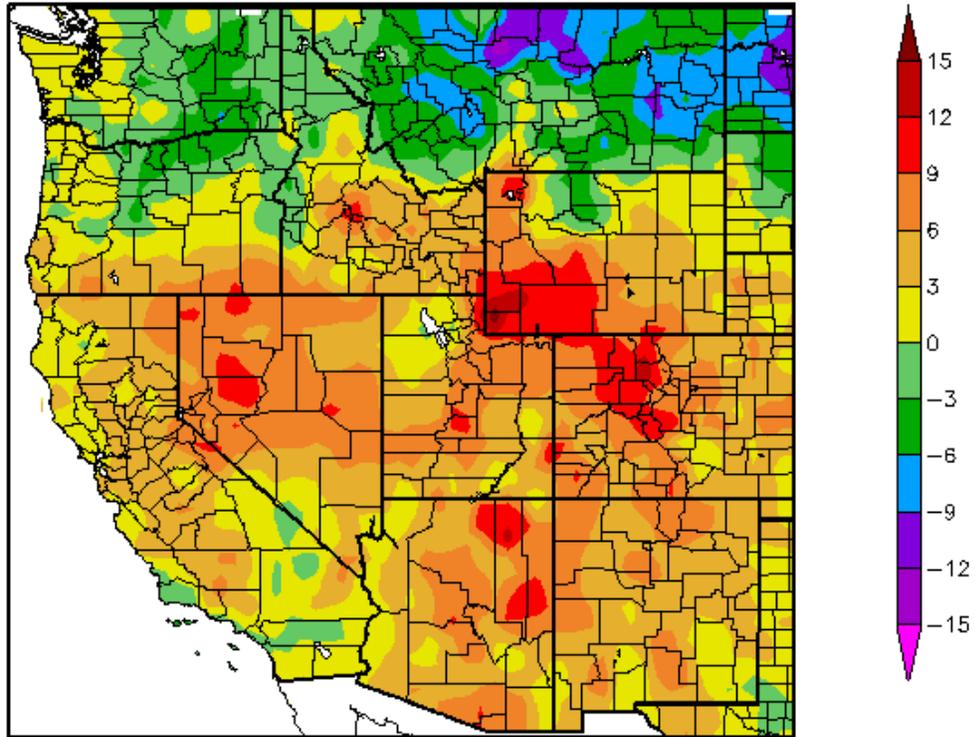


Fig. 2: SNOTEL 7-day average temperature departure from normal map shows temperatures coolest over the Northern Rockies and Cascades, and warmest over the southern ranges of the West.

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

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Departure from Normal Temperature (F)  
12/2/2010 – 12/8/2010



Generated 12/9/2010 at HPRCC using provisional data.

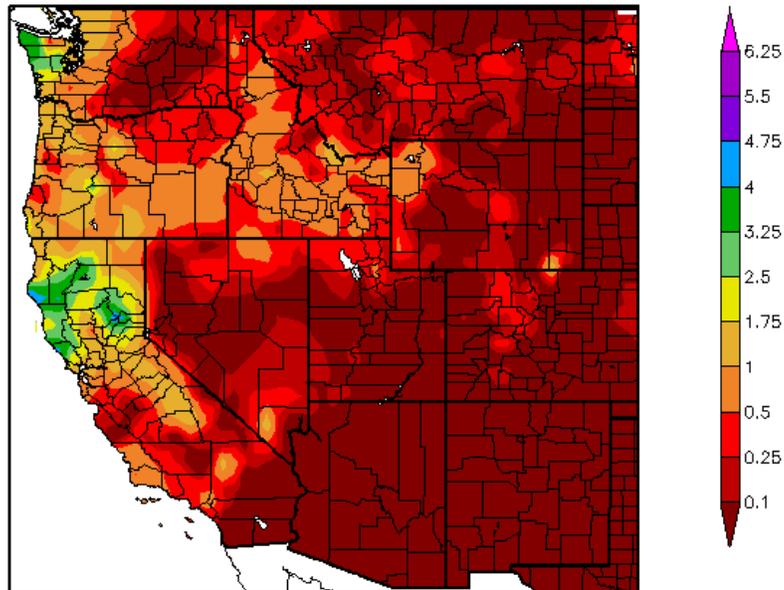
Regional Climate Centers

**Fig. 2a: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures was over southwest Wyoming (>+15°F) and the greatest negative departures occurred over north-central Montana (<-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

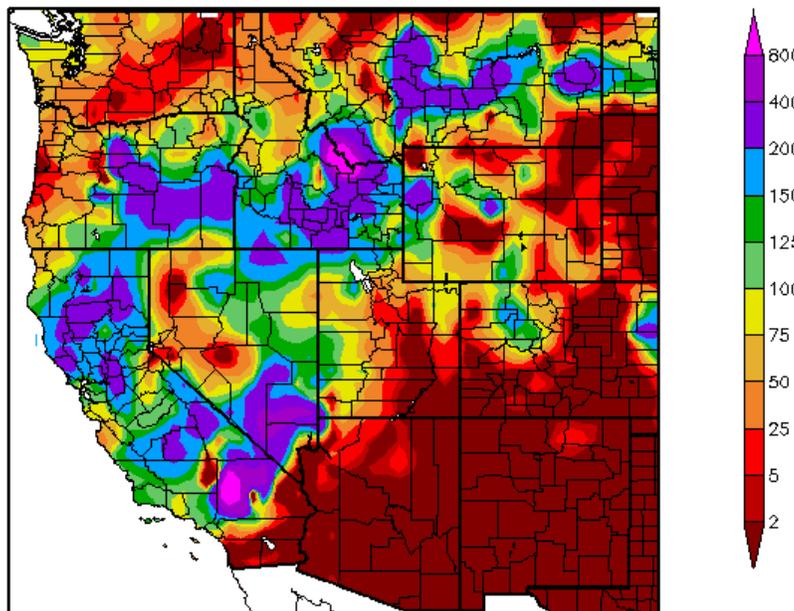
Precipitation (in)  
12/2/2010 - 12/8/2010



Generated 12/9/2010 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%)  
12/2/2010 - 12/8/2010



Generated 12/9/2010 at HPRCC using provisional data.

Regional Climate Centers

**Fig. 3 and 3a:** ACIS 7-day average precipitation amounts for the period ending 8 December shows the bulk of the heaviest precipitation confined to Northwest Coast of Washington and northern California (Fig. 3). In terms of percent of normal, the precipitation pattern is very similar to the previous 7-days. A very wet week dominated parts of Idaho, Montana, eastern Oregon and California-southern Nevada (Fig. 3a). Ref: <http://www.hprcc.unl.edu/maps/current/>

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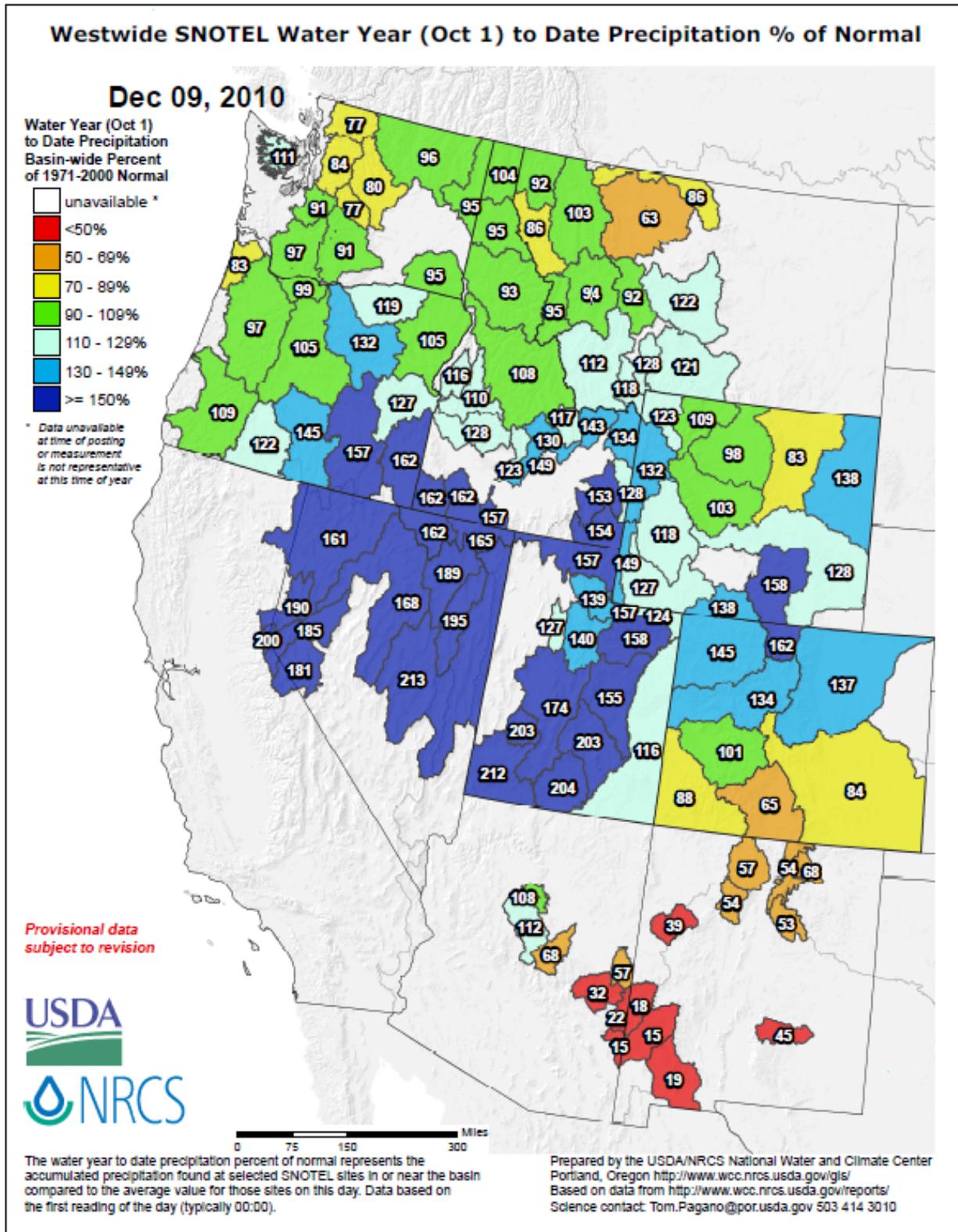


Fig 3b: For the 2011 Water-Year that began on 1 October 2010, precipitation has been much greater than the long term average over much of the central interior West. Exceptions exist over eastern Arizona and all of New Mexico as would be expected during La Niña. A few river basins over Washington, Montana, Wyoming, and Colorado are also running behind in moisture. Ref: [http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecptnormal\\_update.pdf](http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecptnormal_update.pdf)

# U.S. Drought Monitor

December 7, 2010  
Valid 7 a.m. EST

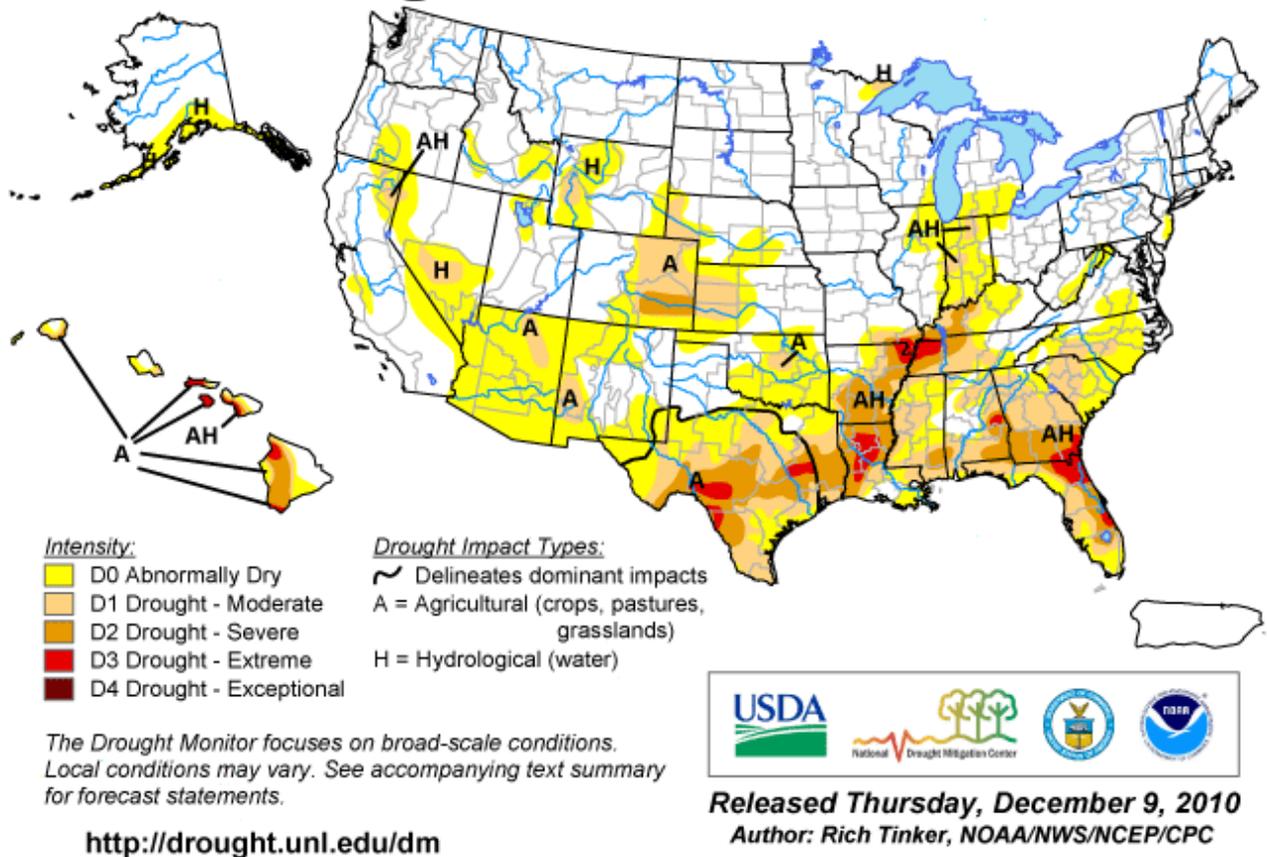


Fig. 4: Current Drought Monitor weekly summary. The severest D3 levels of drought dominate Hawaii, the Lower Mississippi and Tennessee River Valleys, northern Florida and now Texas.  
Ref: <http://www.drought.unl.edu/dm/monitor.html>

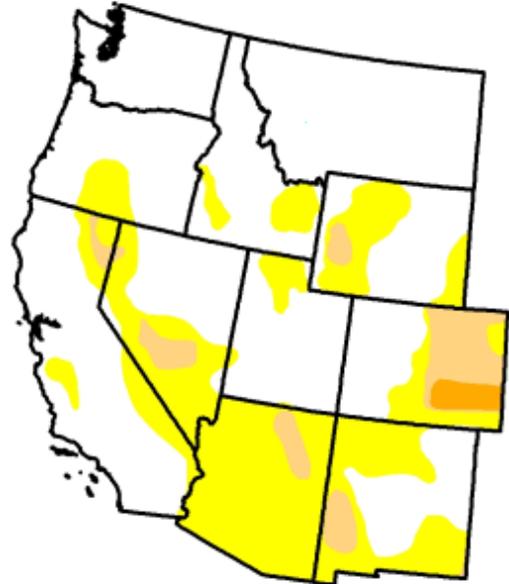
# U.S. Drought Monitor

## West

December 7, 2010  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	64.9	35.1	6.4	0.9	0.0	0.0
Last Week (11/30/2010 map)	72.8	27.2	5.8	0.9	0.0	0.0
3 Months Ago (09/14/2010 map)	72.8	27.2	6.9	0.6	0.0	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 (10/05/2010 map)	62.5	37.5	8.4	0.6	0.0	0.0
One Year Ago (12/09/2009 map)	44.4	55.6	28.7	11.6	0.5	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>

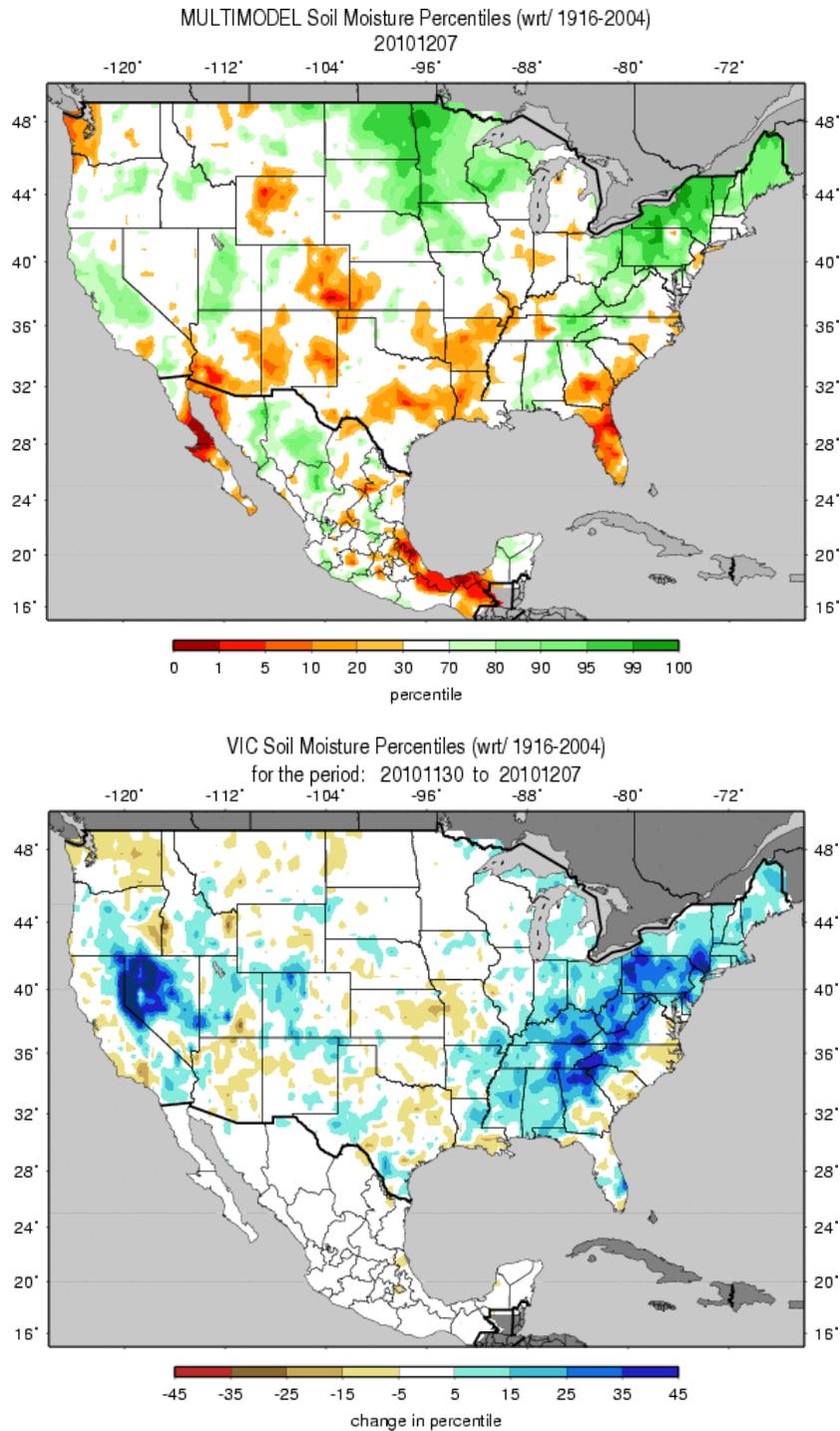


Released Thursday, December 9, 2010  
Author: R. Tinker, CPC/NOAA

**Fig. 4a: Drought Monitor for the Western States with statistics over various time periods. Regionally there was significant deterioration in D0 intensity during the past week.**

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

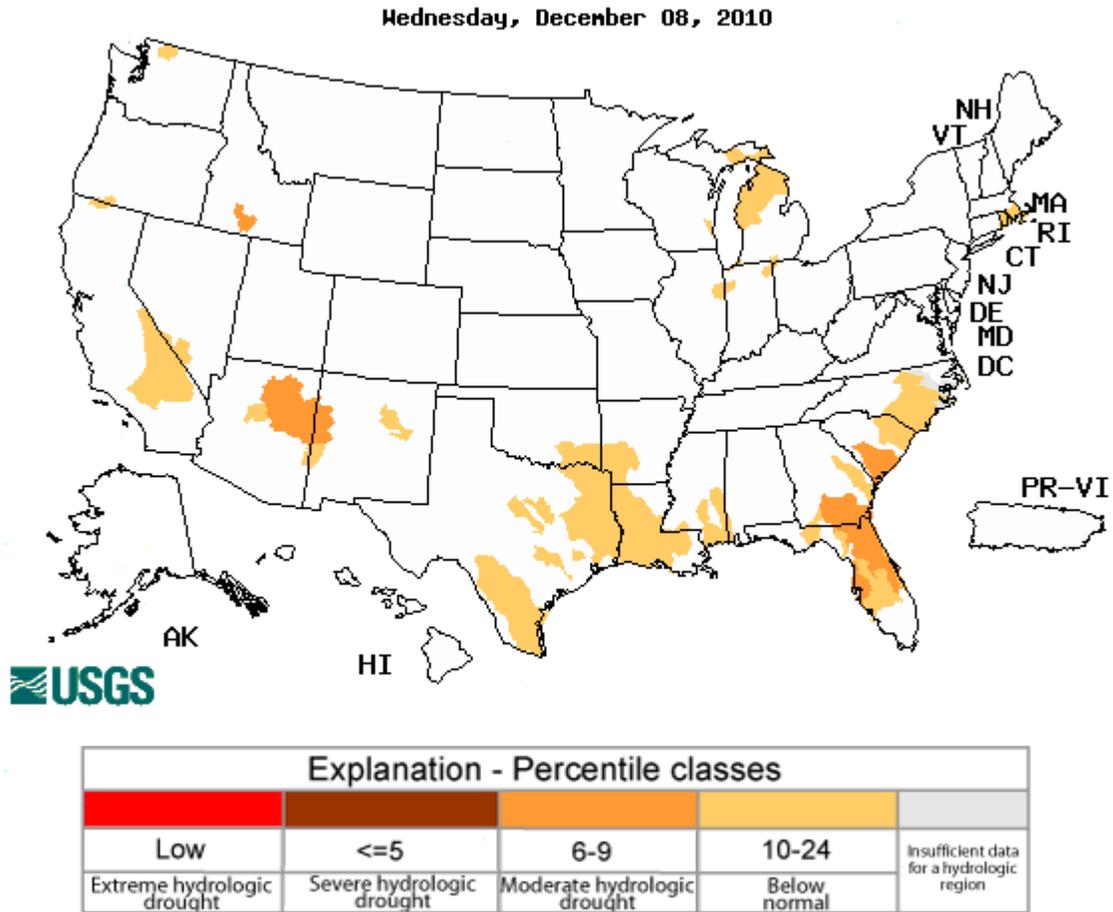
## Weekly Snowpack and Drought Monitor Update Report



**Figs. 5a and 5b: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 7 December (Fig. 5a). Wetter conditions dominate the Northern Tier States eastward from the Dakotas and drier conditions dominate coastal Washington and much of the Southern Tier States. During the past week, much wetter conditions developed over the Great Basin and Appalachians (Fig. 5b).**

Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.multimodel.sm\\_qnt.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.multimodel.sm_qnt.gif)  
[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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**Fig. 6:** Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Clearly, the Southern Tier States are starting to reflect La Niña conditions of dryness. As winter approaches, northern site gauges will become less accurate as rivers and streams freeze. Ref: <http://waterwatch.usgs.gov/?m=dryw&r>

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### National Drought Summary -- December 7, 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/>.*

**Atlantic Seaboard:** Precipitation totals were below normal east of the Appalachians in the dry areas from southern New Jersey southward and southwestward through southern Georgia and the Florida Panhandle, where only parts of New Jersey received over an inch of precipitation. Increasing moisture deficits led to expansion of D0 toward the southern Florida coast, and D1 into parts of the central Carolinas. More widespread deterioration was introduced through much of peninsular Florida and southeast Georgia, with extreme drought expanded northward from northeast Florida into southeast Georgia.

**The Appalachians Westward Toward the Tennessee and Ohio Valleys:** Heavy precipitation induced widespread drought improvement, especially along the Appalachians. Most of the central and eastern sections of the region recorded 2 to locally over 5 inches, with the largest totals falling on western North Carolina and part of western Virginia. Farther west, amounts of 1 to nearly 4 inches brought less widespread improvement to areas from eastern Alabama, northern Georgia, and eastern Tennessee northeastward through western Pennsylvania. The result of these changes was the elimination of abnormally dry conditions in all areas from the southern Appalachians and eastern Tennessee northeastward through western Pennsylvania.

**Central Gulf Coast States:** Moderate precipitation locally approaching 2 inches, along with a re-assessment of the impacts from rainfall during recent weeks, led to additional improvements in eastern and northern Alabama and northern Mississippi. D3 conditions were removed from southeastern Alabama, and drought was removed from much of central and northern Alabama, along with northern Mississippi.

**Ohio, Tennessee, and Lower Mississippi Valleys:** Light to moderate precipitation brought limited improvement to the areas of dryness and drought that have existed for some time through the central Ohio Valley, but little or no precipitation resulted in some localized deterioration in central and western sections of the region.

**Southern and Central Plains:** Only isolated light precipitation fell on areas from the central Plains southward through Oklahoma and Texas. No change was made to drought designations across the central Plains, but widespread deterioration occurred through most of Texas and Oklahoma, where very little precipitation during the last few weeks, and smaller areas of precipitation deficits dating back several months, led to rapidly increasing impacts and concerns, especially surface moisture declines and its related impacts on wildfire potential and available livestock feed.

**Central and Northern Rockies and the Intermountain West:** Although moderate to heavy precipitation fell on the central and northwestern Rockies, most areas of dryness and drought in

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this region missed significant precipitation, leaving conditions unchanged there. However, a re-assessment of conditions resulted in small areas where abnormal dryness was eliminated, specifically in central Colorado and in the northern Reaches of areas near the Colorado/Utah border.

**California and Southern Oregon:** Moderate precipitation totaling 1 to locally 4 inches led to some dryness and drought retraction in northeastern California and southern Oregon. Farther south, a small area of interior western California southwest of the San Joaquin Valley has recorded consistently below-normal precipitation over the course of the last 6 months. Although much of that period typically receives little precipitation during this period, seasonally increasing Normals and slowly growing precipitation shortfalls led to the introduction of abnormal dryness there.

**The Southern Rockies:** Light precipitation fell on isolated locations last week, with most locations reporting none. In a few areas, modest precipitation deficits date back approximately 6 months, but extremely dry conditions over the past 90 days led to a sharp increase in 3-month precipitation shortfalls. As a result, abnormal dryness was introduced throughout Arizona and through most areas outside central and east-central New Mexico.

**Alaska:** Relatively light but consistent precipitation across central Alaska has reduced or eliminated deficits on time scales ranging from 1 month to a year, with the most improvement seen over recent periods. This led to the removal of D0 throughout central parts of the state. Farther south, quite a few locations reported moderate to heavy precipitation last week, but with relatively large Normals common through the regions receiving the larger amounts, deficits remained significant enough to warrant continued D0 conditions.

**Hawaii:** Another week of relatively heavy rainfall, especially in windward areas, finally seems to have brought improvement to some areas that have experienced a protracted period of dryness and drought. Exceptional drought finally released its grip on northwestern sections of the Big Island, and D0 to D3 conditions improved in parts of the southern Big Island, western Maui, eastern Oahu, and northern Kauai.

**Looking Ahead:** December 8 – 12, 2010 should provide widespread moderate precipitation (0.5 to 1.5 inches) from the Ohio/Mississippi Confluence through parts of the central Gulf Region and eastward to the Atlantic Ocean, unfortunately missing southeastern Georgia and peninsular Florida where drought conditions are more serious than in areas farther north. The largest totals should accumulate in eastern New Jersey and northern reaches of the lower Mississippi Valley. Farther west, areas from northern California northward into southern Oregon should record similar amounts, or perhaps slightly more near the California/Oregon border. Colder than normal conditions are expected from the northern High Plains and southeastern Great Plains eastward to the Atlantic Coast, with above-normal temperatures anticipated farther west.

For the ensuing 5 days (December 13 – 17, 2010), dry weather is favored from the Southwestern Deserts and central Rockies eastward through the central Plains, then southeastward to the Carolina Coastline and all points south, as well as in Alaska. In contrast, wet weather seems more likely across the north-central Plains, the Northwest, and northern California. Regarding temperatures, the odds favor cold weather east of the Mississippi River and in Alaska while above-normal temperatures appear most likely from the central and southern Plains westward to the Pacific Coast.

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**Author:** [Rich Tinker, NOAA/NWS/NCEP/CPC](#)

### **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 December 8, 2010