



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

Weekly Report - Snowpack / Drought Monitor Update Date: 17 December 2009

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: SNOTEL Snow-Water Equivalent percent of normal values for 17 December 2009 shows amounts have increased significantly over Utah and to lesser amounts over the Interior West during the past week (Fig. 1). SNOTEL snow depths change over the past week shows a marked increase scattered across the West with the exception of Arizona and New Mexico where snow pack saw a decrease (Fig. 1a).

Temperature: SNOTEL and ACIS-day station average weekly temperature continue to run below normal especially over the Northern Tier States (Fig.2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over the Central Coastal Mountains of California and southwestern New Mexico (**>+5F**) and the greatest negative departure occurred over northeastern Montana (**<-20F**) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 16 December shows the bulk of the heaviest precipitation fell over central California (Fig. 3). In terms of percent of normal, a large area from southern California to northern Montana experienced exceptionally high weekly percentages. Most of Arizona, New Mexico and the Wyoming and Montana Rockies experienced much lesser percentages (Fig. 3a). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows a vast improvement over the Great Basin and southern Utah during the week (Fig. 3b).

WESTERN DROUGHT STATUS

The West: A series of storms this Drought Monitor period brought rain and snow to many areas in the West, particularly the Sierras and the Rockies. Precipitation along the southern coast of California led to reduction in moderate drought (D1) from Monterey down to Los Angeles. This storm also reduced severe drought (D2) in interior southern California. Conversely, the area of severe drought (D2) in northern California and northwest Nevada increased as did the abnormal dryness along the northwest California and southwest Oregon coast, as this area largely missed the beneficial precipitation. Southern Nevada saw improvement in severe drought (D2) as did western Arizona. Extreme drought (D3) was also reduced slightly in central Arizona. Small expansions of abnormal dryness (D0) expanded in the north-central mountains of Colorado and in southern and western Montana. Author: Michael Brewer, National Climatic Data Center, NOAA

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

Weekly Snowpack and Drought Monitor Update Report

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.

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

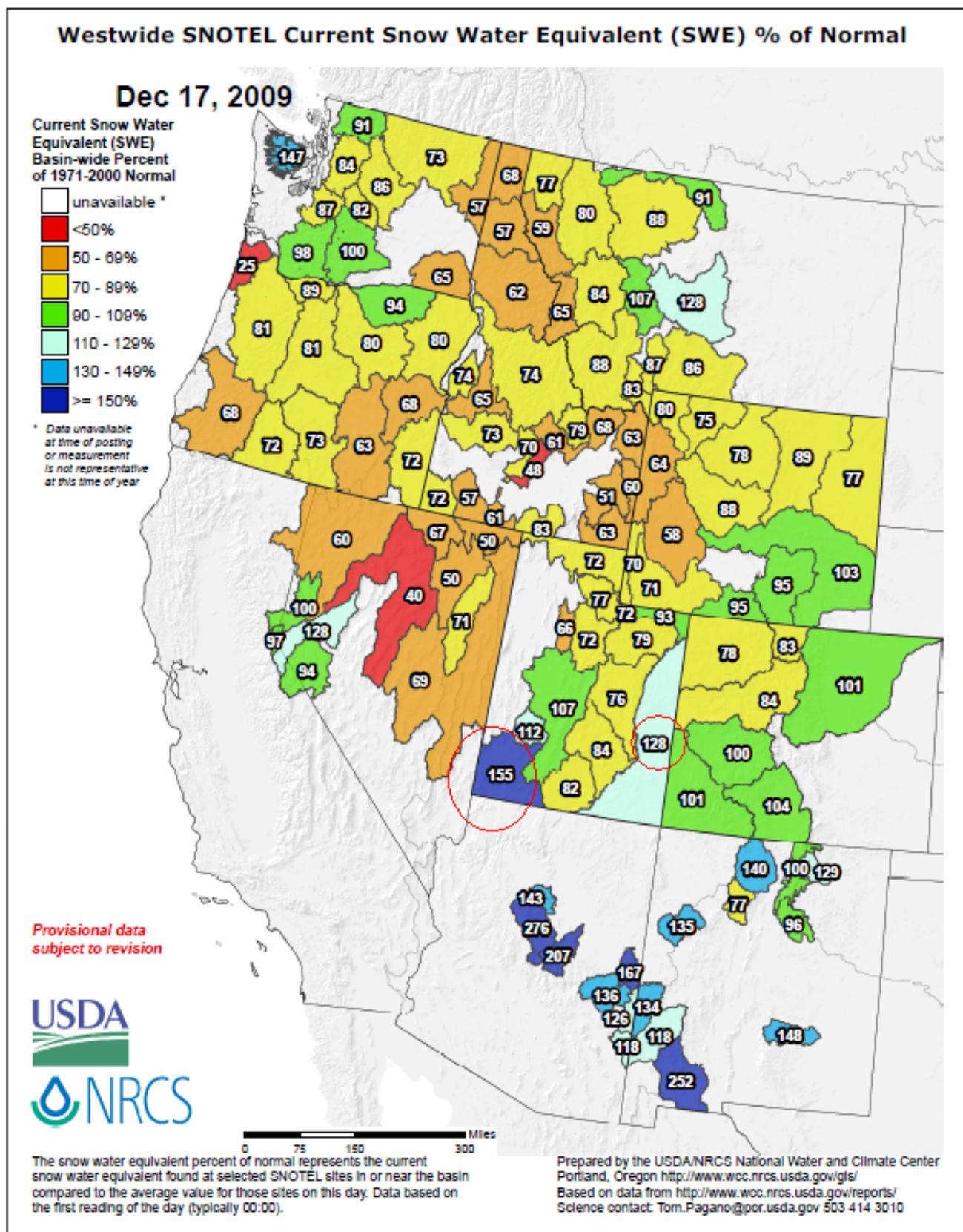


Fig 1. SNOTEL Snow-Water Equivalent percent of normal values for 17 December 2009 shows amounts have increased significantly over Utah (circled basins) and to lesser amounts over the Interior West during the past week.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf

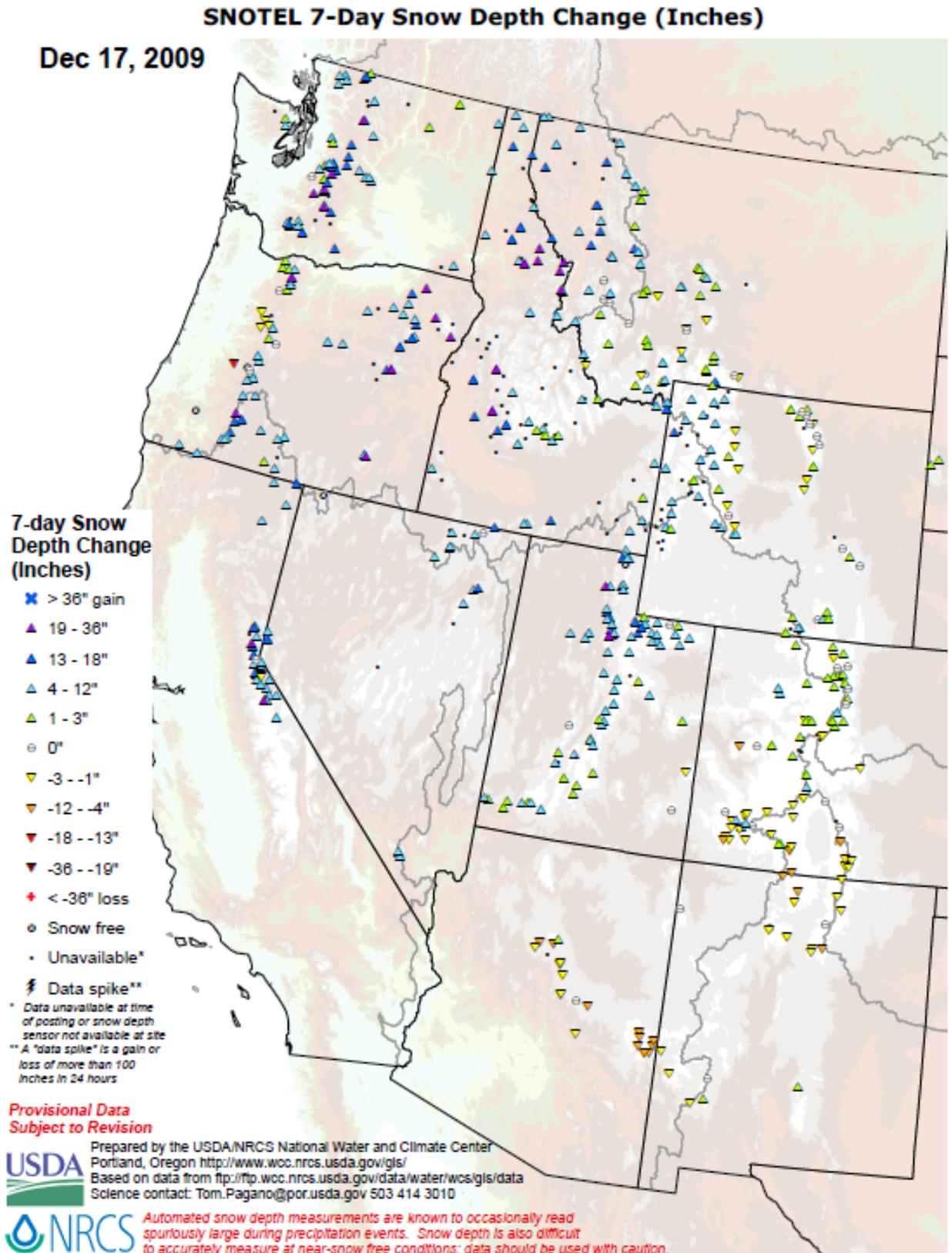


Fig 1a. SNOTEL snow depths change over the past week shows a marked increase scattered across the West with the exception of Arizona and New Mexico where snow pack saw a decrease.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf

Weekly Snowpack and Drought Monitor Update Report

SNOTEL (solid) and ACIS (dot-filled) Networks 7-Day Average Temperature Anomaly (Degrees F)

Dec 17, 2009

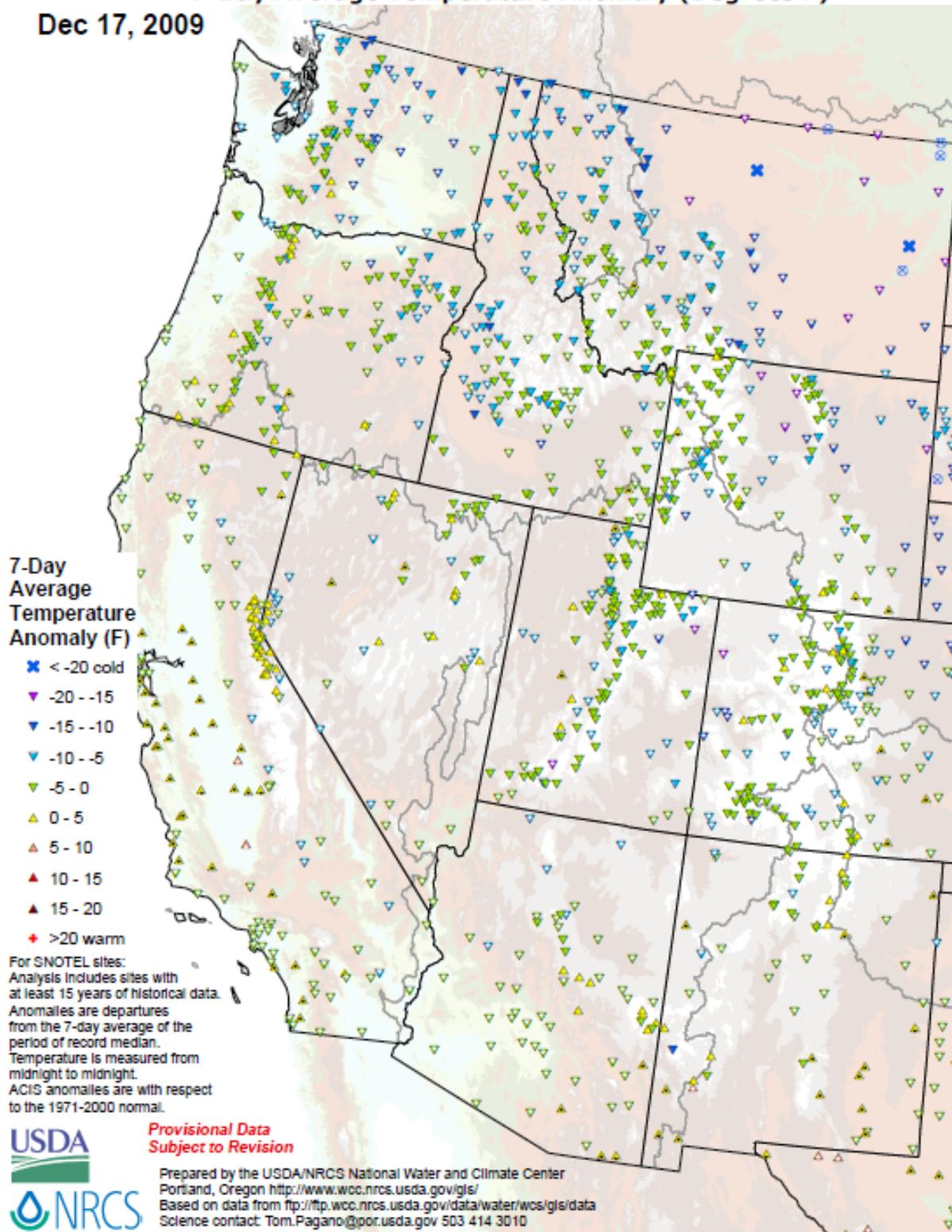
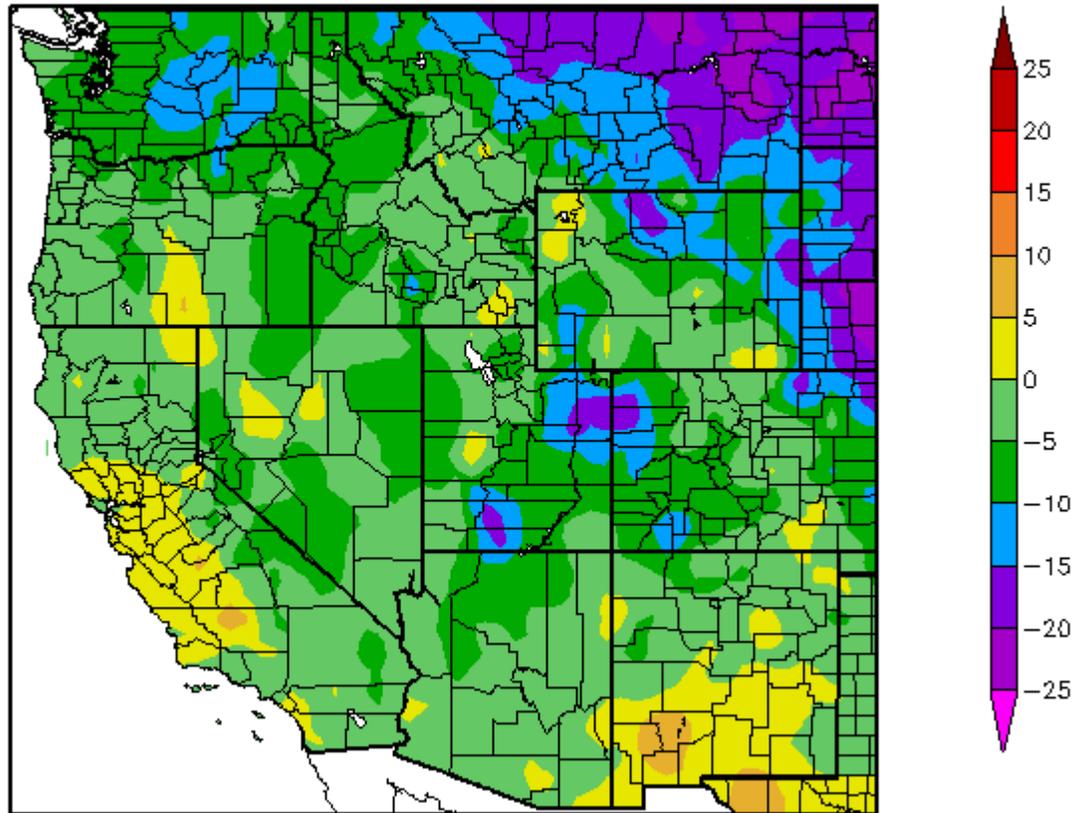


Fig. 2. SNOTEL and ACIS-day station average weekly temperature continue to run below normal especially over the Northern Tier States. Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)
12/10/2009 – 12/16/2009



Generated 12/17/2009 at HPRCC using provisional data.

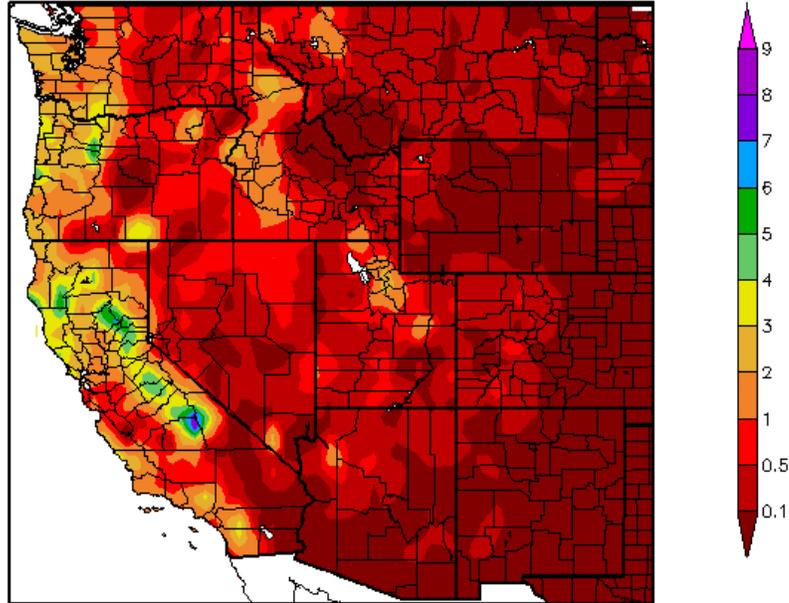
NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over the Central Coastal Mountains of California and southwestern New Mexico (>+5F) and the greatest negative departure occurred over northeastern Montana (<-20F).

Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDdept

Weekly Snowpack and Drought Monitor Update Report

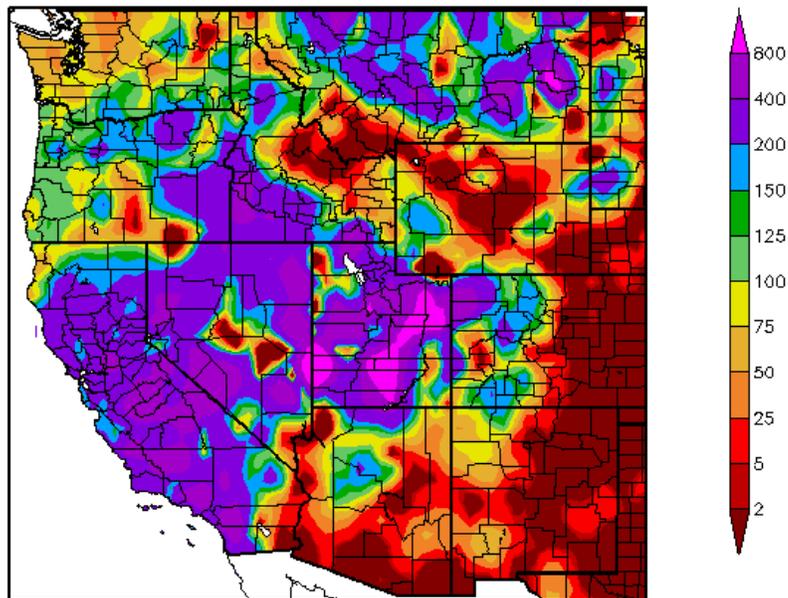
Precipitation (in)
12/10/2009 - 12/16/2009



Generated 12/17/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
12/10/2009 - 12/16/2009



Generated 12/17/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a. ACIS 7-day average precipitation amounts for the period ending 16 December shows the bulk of the heaviest precipitation fell over central California. In terms of percent of normal, a large area from southern California to northern Montana experienced exceptionally high weekly percentages. Most of Arizona, New Mexico and the Wyoming and Montana Rockies experienced much lesser percentages. Ref: <http://www.hprcc.unl.edu/maps/current/>.

Weekly Snowpack and Drought Monitor Update Report

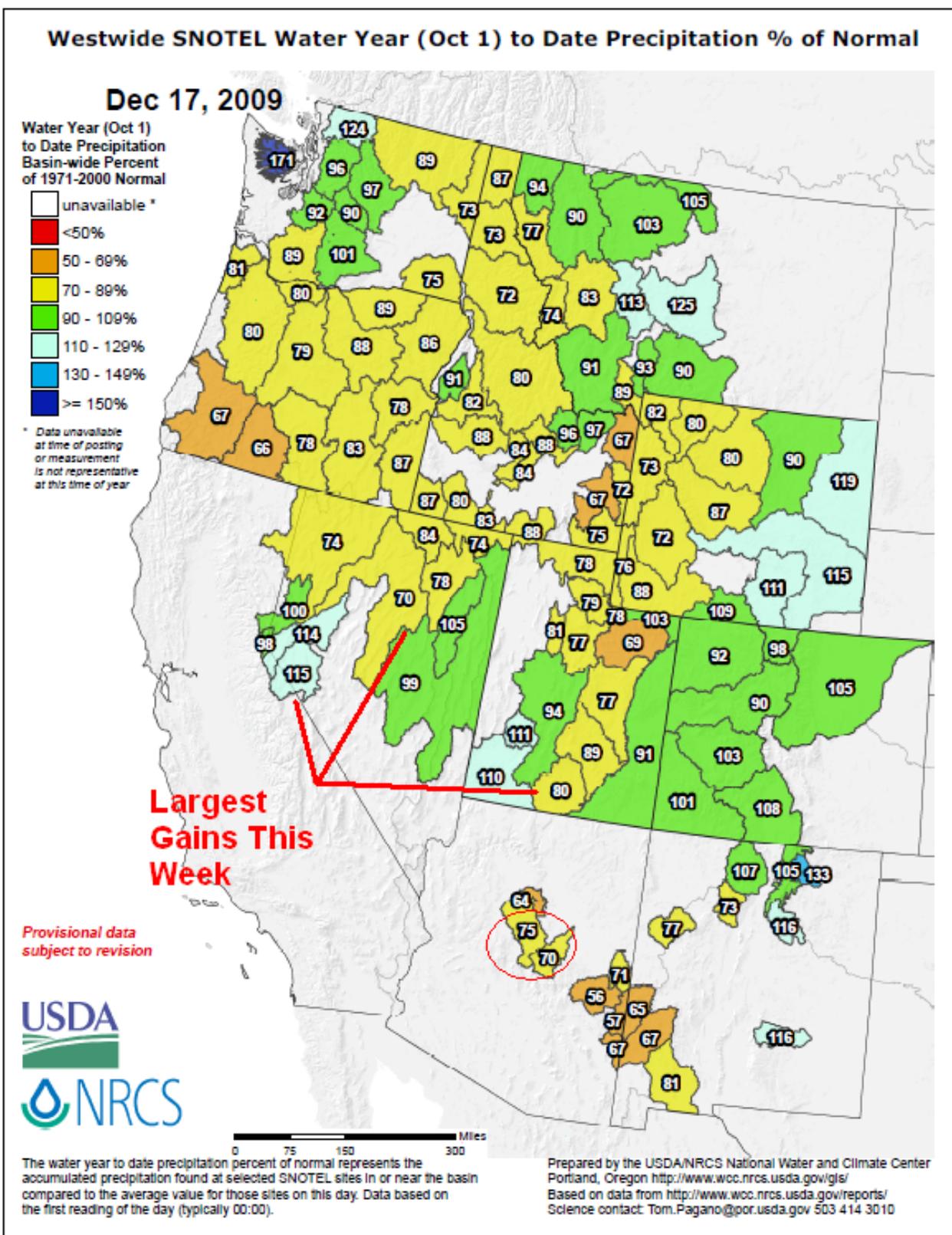
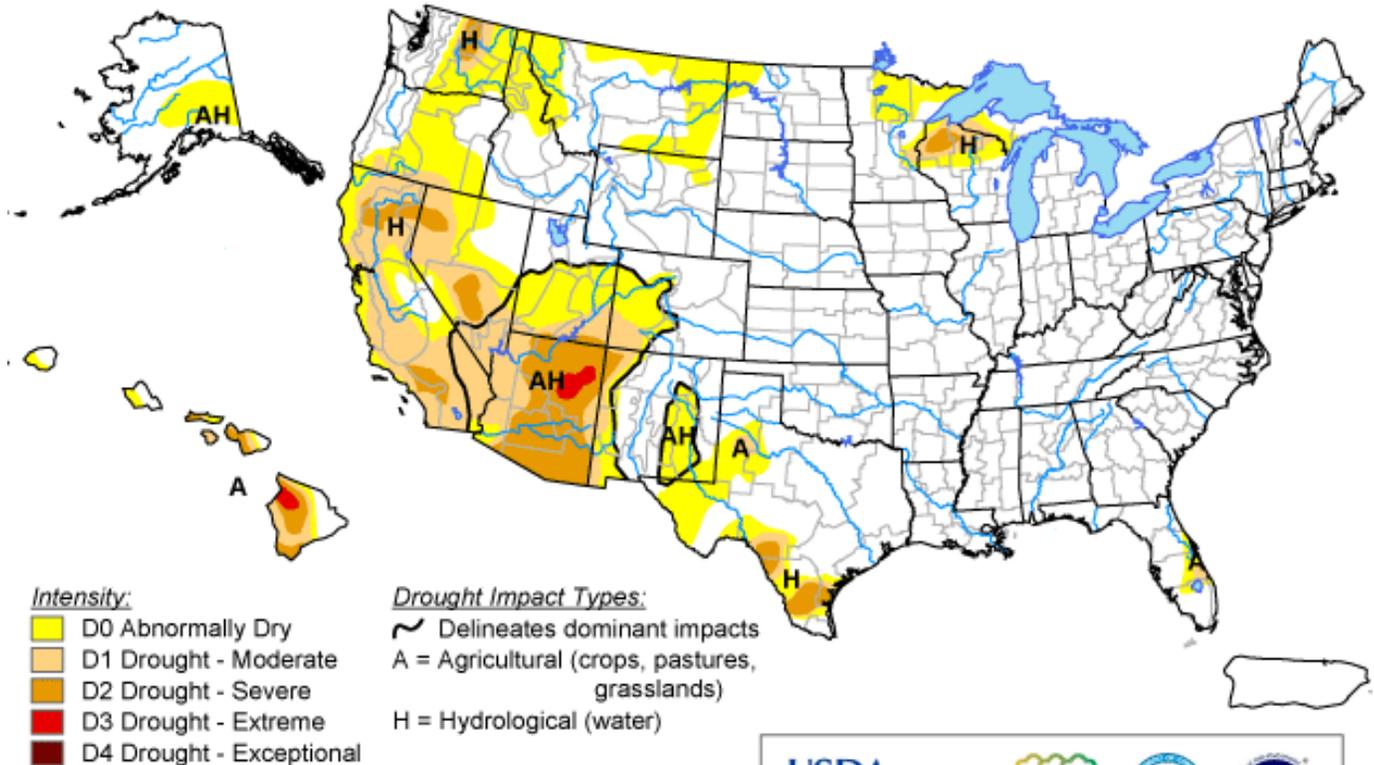


Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows a vast improvement over the Great Basin and southern Utah during the week.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/wytdprecpcnormal_update.pdf

U.S. Drought Monitor

December 15, 2009
Valid 7 a.m. EST



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

Released Thursday, December 17, 2009

Author: Michael Brewer/Liz Love-Brotak, NOAA/NESDIS/NCDC

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

Fig. 4. Current Drought Monitor weekly summary.

Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

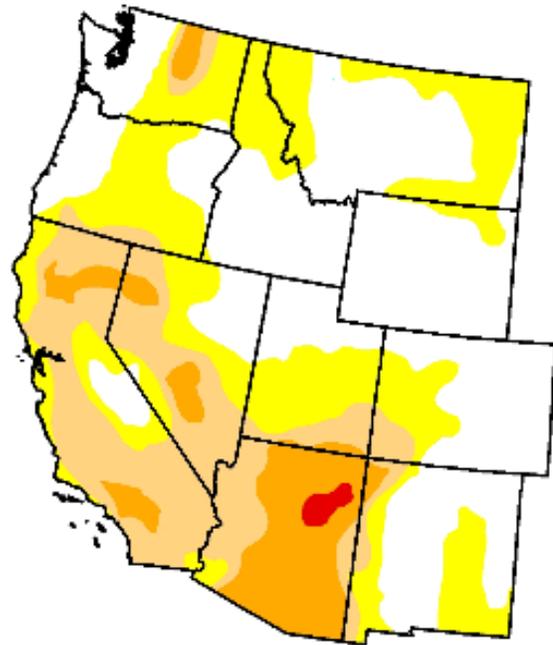
U.S. Drought Monitor

West

December 15, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	43.0	57.0	28.4	9.9	0.5	0.0
Last Week (12/08/2009 map)	44.4	55.6	28.7	11.6	0.5	0.0
3 Months Ago (09/22/2009 map)	52.8	47.2	22.4	7.5	0.0	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	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 (12/16/2008 map)	27.5	72.5	31.0	10.0	0.8	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>

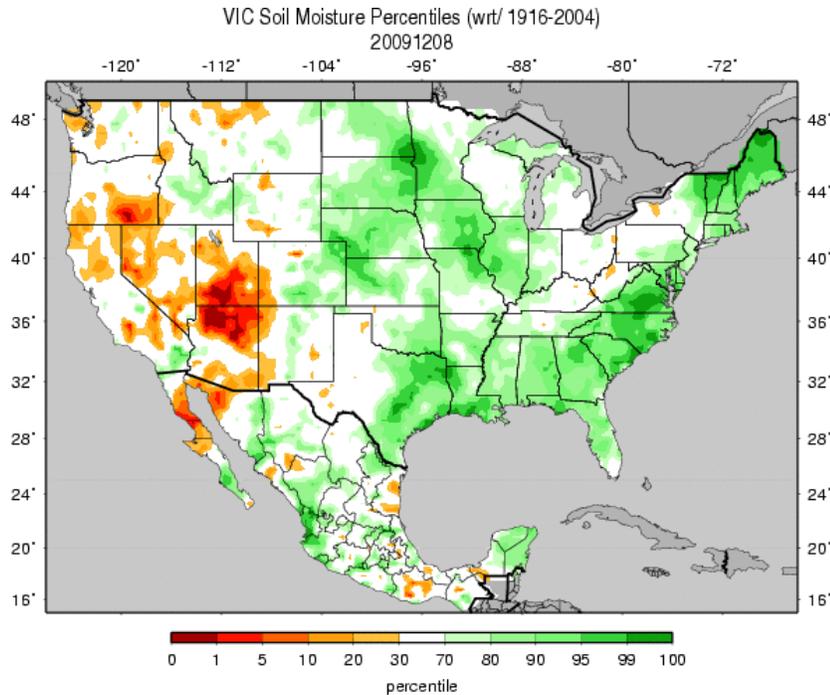


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Author: M. Brewer/L. Love-Brotak, NOAA/NESDIS/NCDC

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally, there some improvement during the past week (mostly in D2).

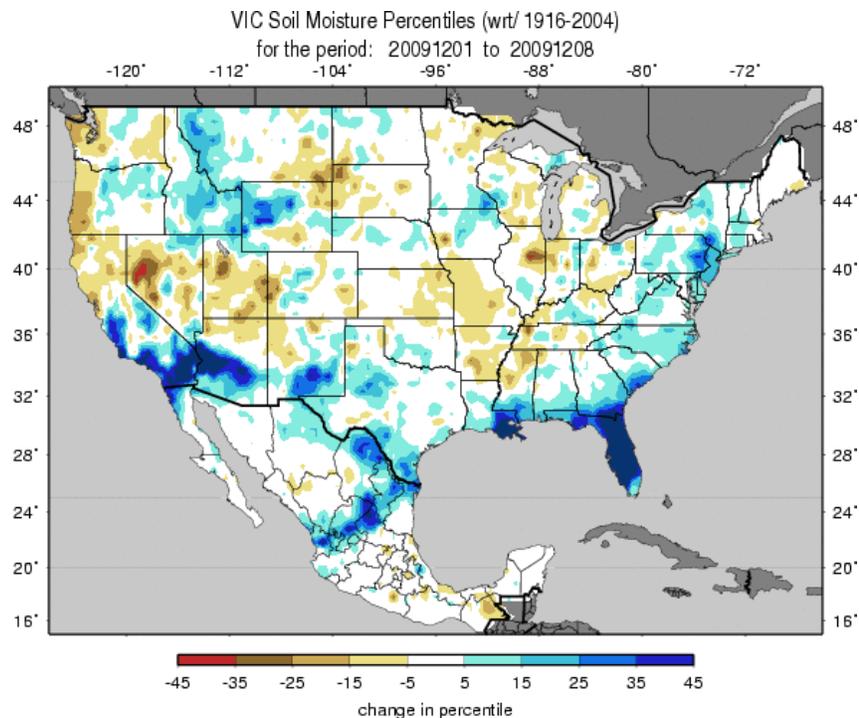
Ref: http://www.drought.unl.edu/dm/DM_west.htm

Weekly Snowpack and Drought Monitor Update Report



Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 8 December. Updates are not available.

Ref: 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 ending 8 December. Updates are not available.

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, December 16, 2009

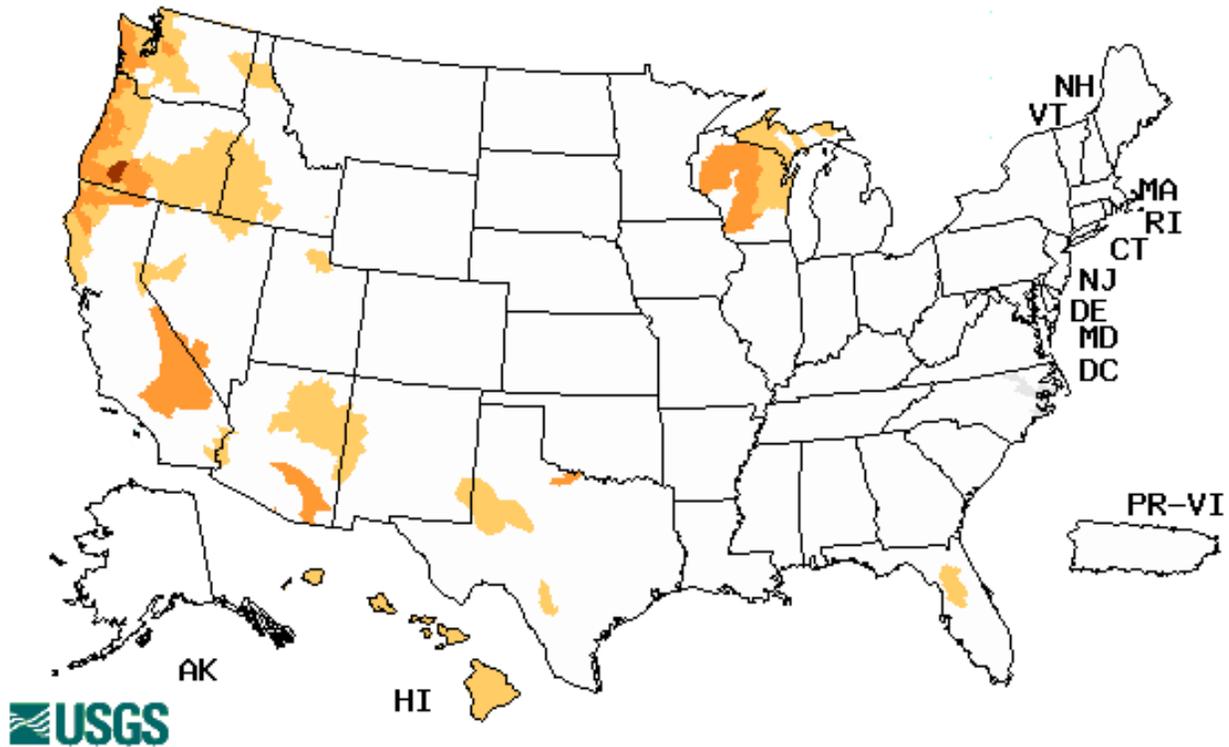


Fig. 6. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are worst over Wisconsin, southern California, and the Coastal Pacific NW region of the country. Note, streams are freezing and thus the flows become more unreliable as we enter into winter.

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

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary -- December 15, 2009

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/>.

Early in the Drought Monitor period, beneficial precipitation again fell on Texas, helping to ease drought conditions there. The same storm produced precipitation all along the East Coast and was followed by a second storm dropping precipitation along a similar path. Late this period, a storm brought beneficial rain and snow to areas of drought-stricken California and western Nevada.

The East: Two storms affected the East Coast again this week. They eliminated areas of abnormal dryness (D0) from northern Florida and the southwest Pennsylvania - West Virginia area. Lingering eastern drought and dryness is limited to south Florida.

The Great Lakes Region: Most of the drought-affected areas of the region saw little to no precipitation this week. Continued long-term deficits resulted in unchanged drought classification in this region.

The Plains and Mississippi River Delta: In Texas, the impact of recent beneficial precipitation continues. Areas of extreme drought (D3) were removed from the southern part of the state as shorter-term wetness has mitigated many of the negative impacts of the long-term drought. Areas of severe (D2) and moderate (D1) drought and abnormal dryness (D0) were also reduced near the Gulf Coast. In western Texas, moderate drought (D1) was reduced while abnormal dryness (D0) near the Mexico border expanded.

The West: A series of storms this Drought Monitor period brought rain and snow to many areas in the West, particularly the Sierras and the Rockies. Precipitation along the southern coast of California led to reduction in moderate drought (D1) from Monterey down to Los Angeles. This storm also reduced severe drought (D2) in interior southern California. Conversely, the area of severe drought (D2) in northern California and northwest Nevada increased as did the abnormal dryness along the northwest California and southwest Oregon coast, as this area largely missed the beneficial precipitation. Southern Nevada saw improvement in severe drought (D2) as did western Arizona. Extreme drought (D3) was also reduced slightly in central Arizona. Small expansions of abnormal dryness (D0) expanded in the north-central mountains of Colorado and in southern and western Montana.

Hawaii, Alaska and Puerto Rico: Drought conditions remained unchanged across the Hawaiian Islands and in Puerto Rico this week. In Alaska, the abnormal dryness expanded into the central part of the state.

Looking Ahead: Warmer than normal temperatures through much of the central part of the country early in the December 17 – December 21, 2009 period will give way to below normal temperatures from the Plains to the East Coast later in the period. Near-normal temperatures are expected to dominate the western US. Precipitation is expected along the northern West Coast, along the Gulf of Mexico coast, and from the northern Midwest to the East Coast.

Weekly Snowpack and Drought Monitor Update Report

For the ensuing 5 days (December 22 – 26, 2009), the odds favor cooler-than-normal conditions over most of the eastern US and across the states bordering the Gulf of Mexico up into the Midwest. The West, mostly from the Rockies westward and particularly in the extreme Southwest, is likely to see normal to above normal temperatures. Normal to below normal precipitation is expected from the Midwest through the Ohio Valley and into the Southeast. Above normal precipitation is expected in the Northwest, the Northeast, and along the western Gulf Coast. Odds favor near-normal temperatures and above normal precipitation for much of Alaska.

Author: [Michael Brewer, National Climatic Data Center, NOAA](#)

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 16, 2009