



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

Weekly Report - Snowpack / Drought Monitor Update Date: 7 January 2010

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: SNOTEL Snow-Water Equivalent percent of normal values for 7 January 2009 shows amounts well below normal over much of the West. The only significant exceptions exist over southwest and southeast Utah and over the high country of Arizona and parts of New Mexico (Fig. 1). Arizona, New Mexico, and southern Utah have the highest SWE values in the West despite below normal precipitation since the start of the Water-Year.

Temperature: SNOTEL and ACIS-day station average weekly temperature experienced abnormally warmer conditions over the Cascades, Sierra, and Northern Rockies and somewhat cooler conditions over the Eastern Slope of the Rockies (Fig.2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over south-central Oregon (>+3F) and the greatest negative departure occurred over the Uinta Mountains of Utah (<-15F) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 6 January shows the bulk of the heaviest precipitation fell over the Coastal Pacific NW (Fig. 3). In terms of percent of normal, a large area from east-central California to eastern Colorado and over the Northern Tier States into the Northern High Plains experienced high weekly percentages. Most of southern Arizona, New Mexico and Wyoming experienced much lower 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 most of the West at or below normal values during the week despite above normal snow water equivalent over much of the Southwest. Conditions have deteriorated everywhere except for holding steady of the northern-most Northern Tier States (Fig. 3b).

WESTERN DROUGHT STATUS

The West: The most active weather patterns are being seen across the Pacific Northwest and into western Idaho. This has been welcomed given the extremely dry month of December (most regions in the Pacific NW were generally less than 50% of normal in the precipitation department). Even in the coastal areas where the precipitation has been the heaviest (2-5 inches), this hasn't led to surpluses on the Water Year (since October 1). In fact, many of these inland areas are still at D0 or D1 (moderate drought) in southwestern Oregon from Medford over to the Klamath Falls region and along the coastal reaches of northwestern California. The heavier precipitation (3-5 inches) that fell in northern California in and around the Shasta-Trinity Forest region has led to a slight reduction in the northwestern area of severe drought (D2) that still remains there. Generally speaking, low stream flow levels and high snowline elevations are still a concern on the water supply side of things.

To the east, an expansion of D0 is noted in western Wyoming, extreme northeastern Utah, eastern/southeastern Idaho and western/southwestern Montana. Many of the basins' snow water equivalent (SWE) totals for this time of year are running at 60-75% of normal, according to USDA-NRCS. An expansion of D1 is also found this week in southwestern

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Montana, northeastern Idaho and northwestern Wyoming in the Yellowstone region. In addition, a new area of D1 has emerged to the north in the Bitterroot Range along the Montana and Idaho borders. Southern Montana saw D0 connect with the areas to both the east and west. Water year totals have been more generous in extreme eastern Montana along the North Dakota border, leading to a reduction of D0 there.

The Southwest remains unchanged this week after another dry week. Author: Mark Svoboda, National Drought Mitigation 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.

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/cqibin/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/ NOLLER HERBERT
Director, Conservation Engineering Division

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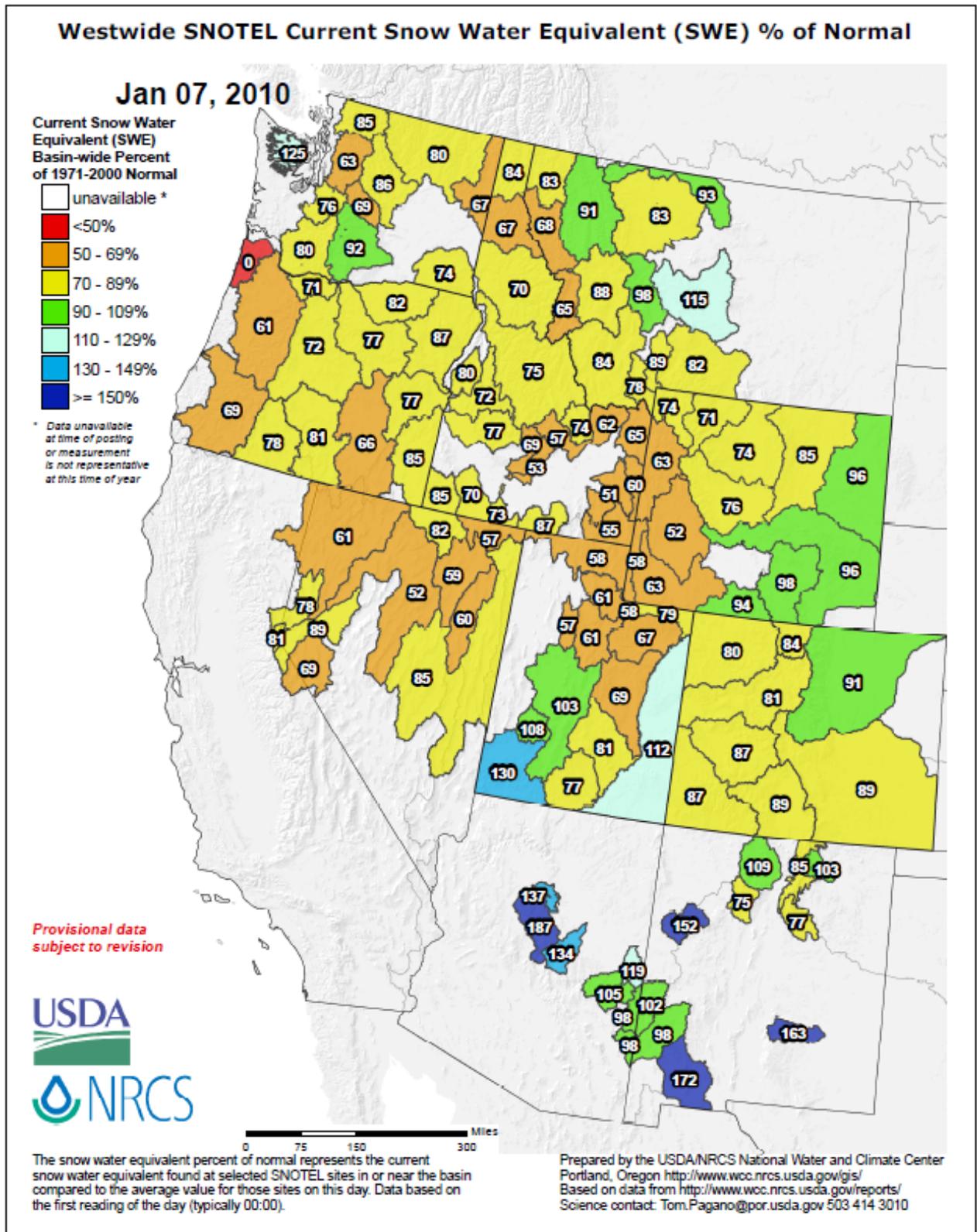


Fig 1. SNOTEL Snow-Water Equivalent percent of normal values for 7 January 2009 shows amounts well below normal over much of the West. The only significant exceptions exist over southwest and southeast Utah and over the high country of Arizona and parts of New Mexico.

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

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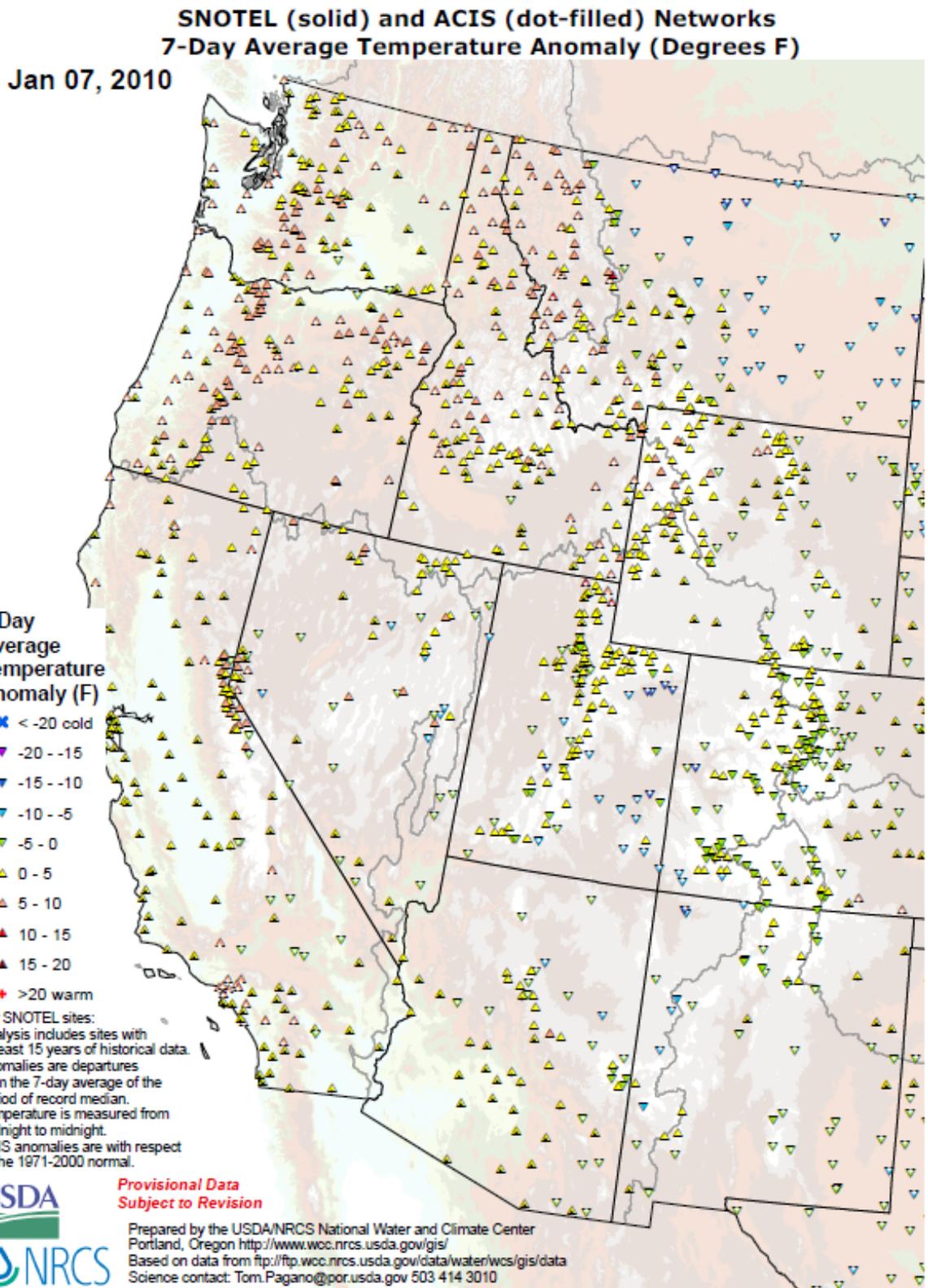
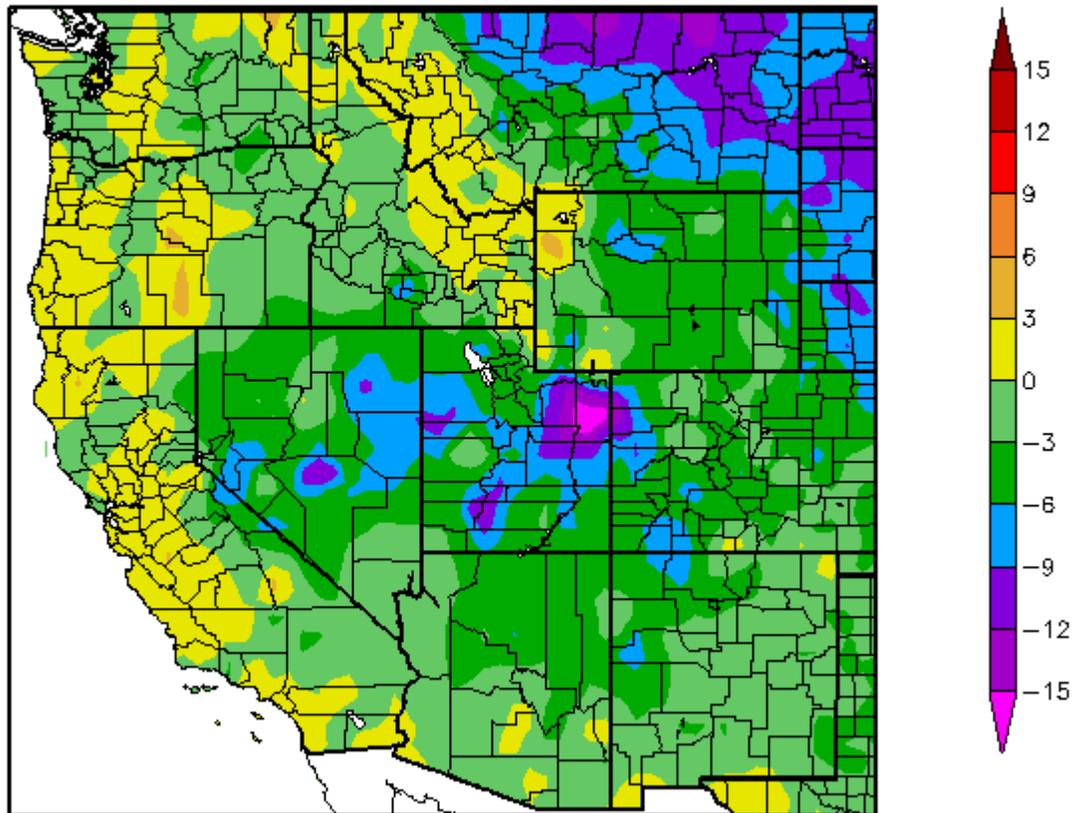


Fig. 2. SNOTEL and ACIS-day station average weekly temperature experienced abnormally warmer conditions over the Cascades, Sierra, and Northern Rockies and somewhat cooler conditions over the Eastern Slope of the Rockies.

Ref: <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)
12/8/2009 – 1/6/2010



Generated 1/7/2010 at HPRCC using provisional data.

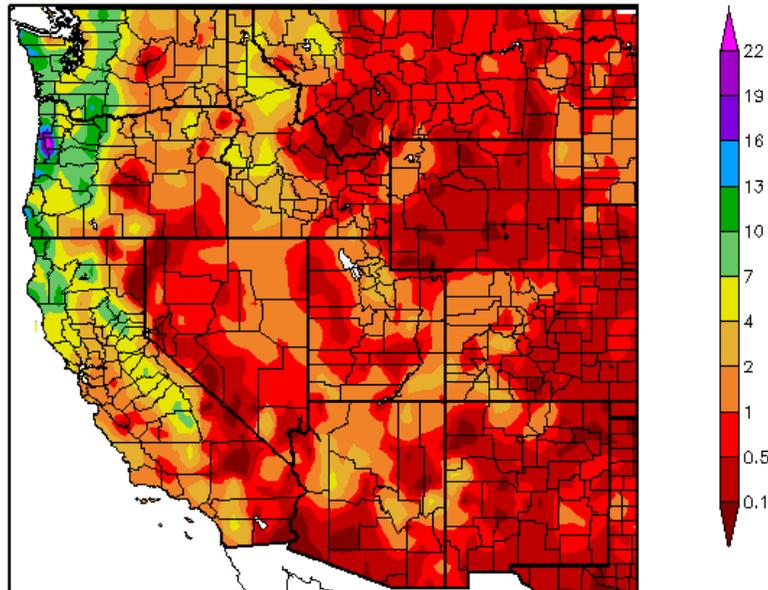
NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over south-central Oregon (>+3F) and the greatest negative departure occurred over the Uinta Mountains of Utah (<-15F).

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

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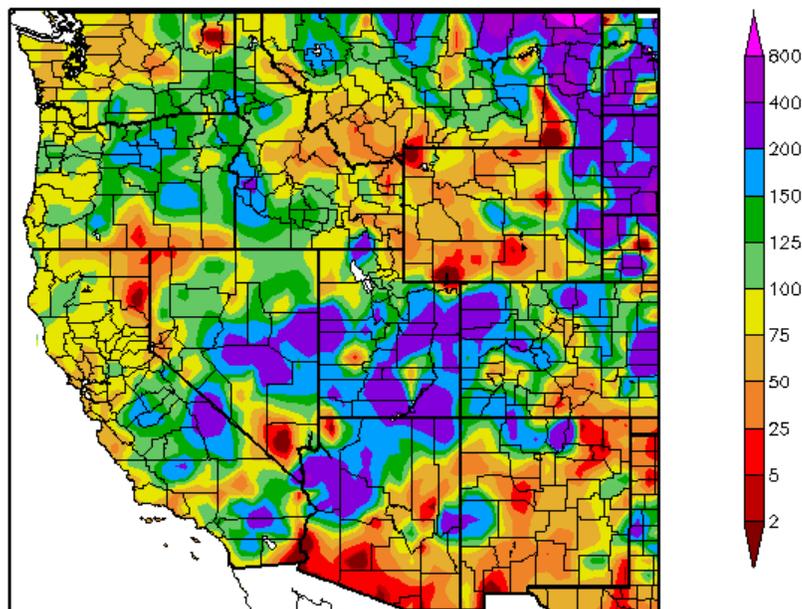
Precipitation (in)
12/8/2009 - 1/6/2010



Generated 1/7/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
12/8/2009 - 1/6/2010



Generated 1/7/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a. ACIS 7-day average precipitation amounts for the period ending 6 January shows the bulk of the heaviest precipitation fell over the Coastal Pacific NW. In terms of percent of normal, a large area from east-central California to eastern Colorado and over the Northern Tier States into the Northern High Plains experienced high weekly percentages. Most of southern Arizona, New Mexico and Wyoming experienced much lower percentages. Ref: <http://www.hprcc.unl.edu/maps/current/>

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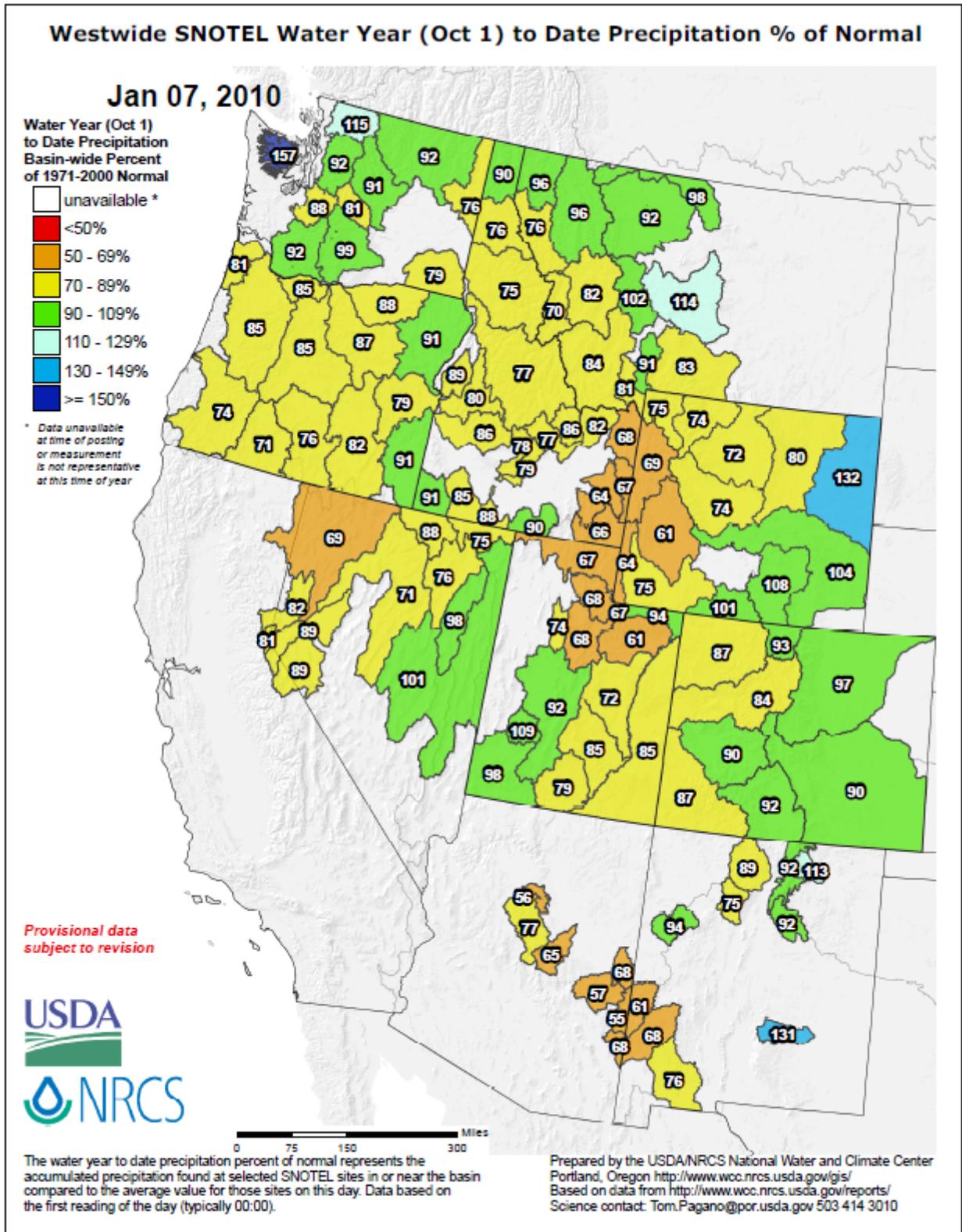


Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2010 Water Year that began on October 1, 2009 shows most of the West at or below normal values during the week despite above normal snow water equivalent over much of the Southwest. Conditions have deteriorated everywhere except for holding steady of the northern-most Northern Tier States.

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

U.S. Drought Monitor

January 5, 2010
Valid 7 a.m. EST

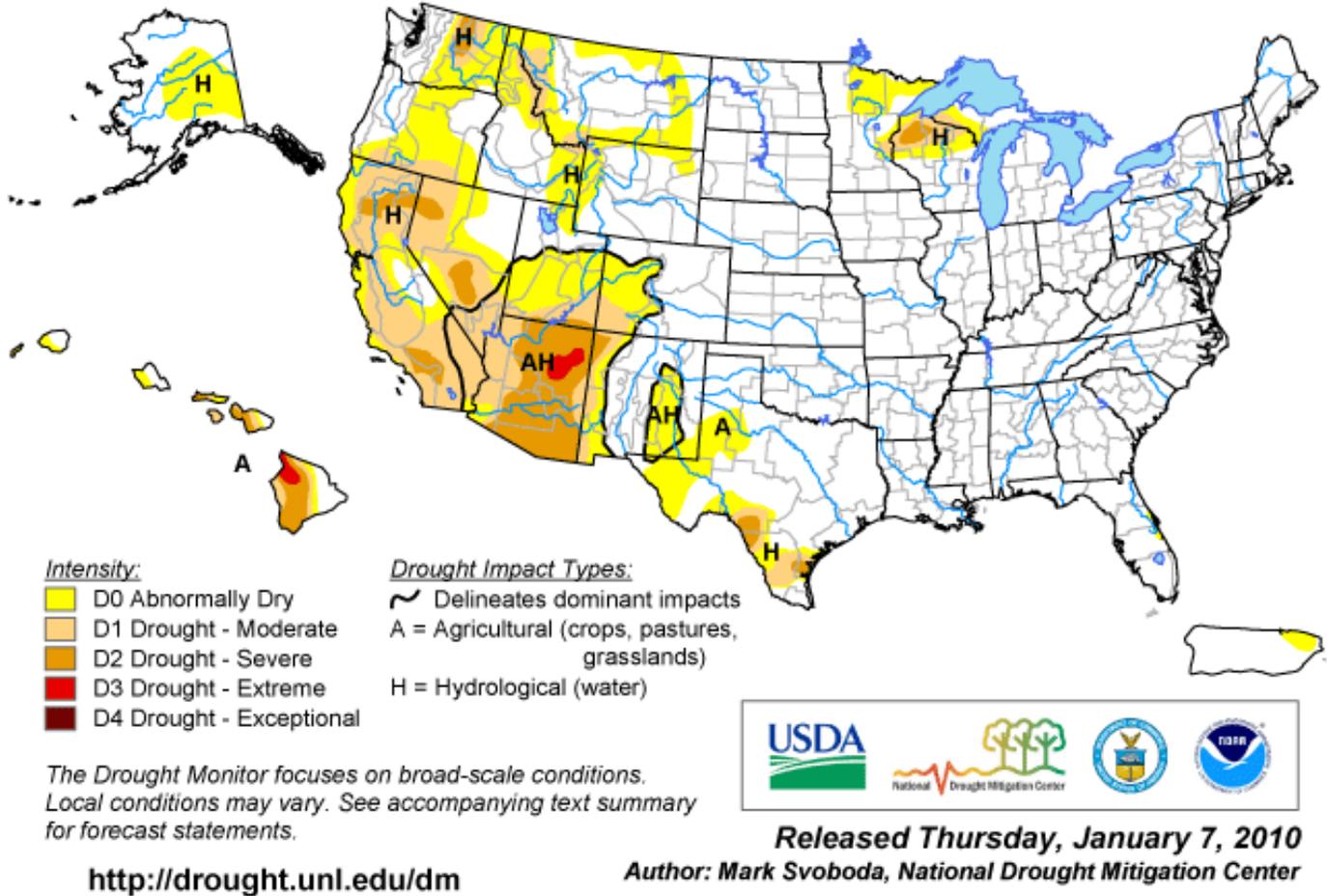


Fig. 4. Current Drought Monitor weekly summary.

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

U.S. Drought Monitor

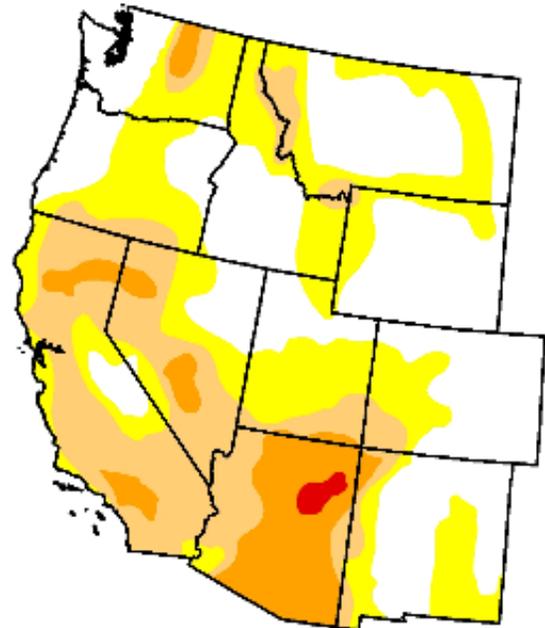
West

January 5, 2010

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	40.1	59.9	30.6	9.9	0.5	0.0
Last Week (12/29/2009 map)	40.8	59.2	28.4	9.9	0.5	0.0
3 Months Ago (10/13/2009 map)	41.8	58.2	26.5	13.1	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 (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	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>



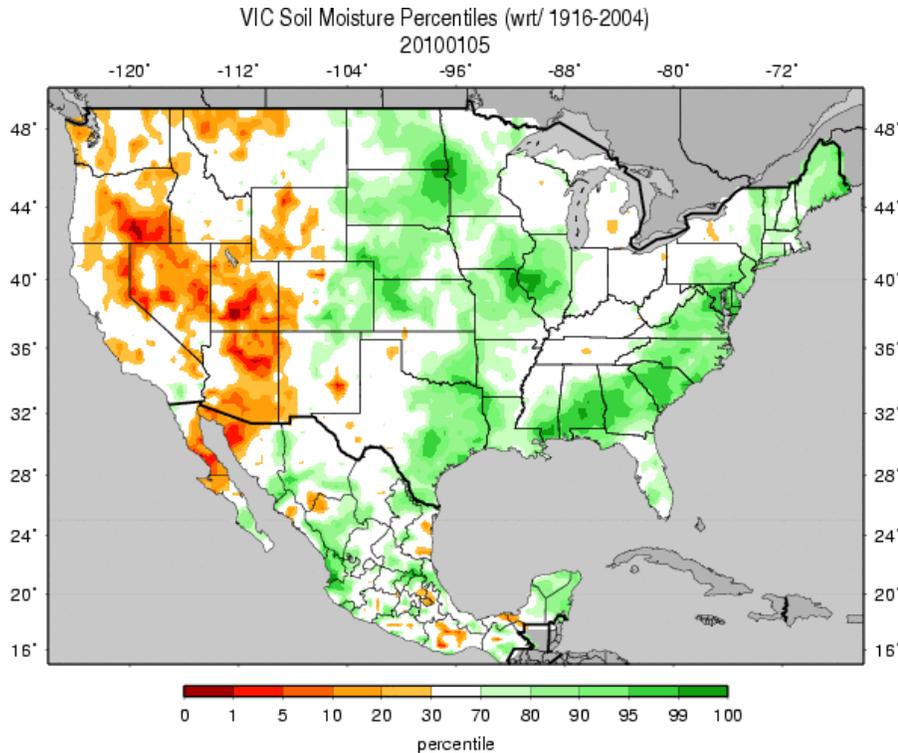
Released Thursday, January 7, 2010

Author: Mark Svoboda, National Drought Mitigation Center

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Regionally there was no change since last week. Note Extreme drought in Arizona.

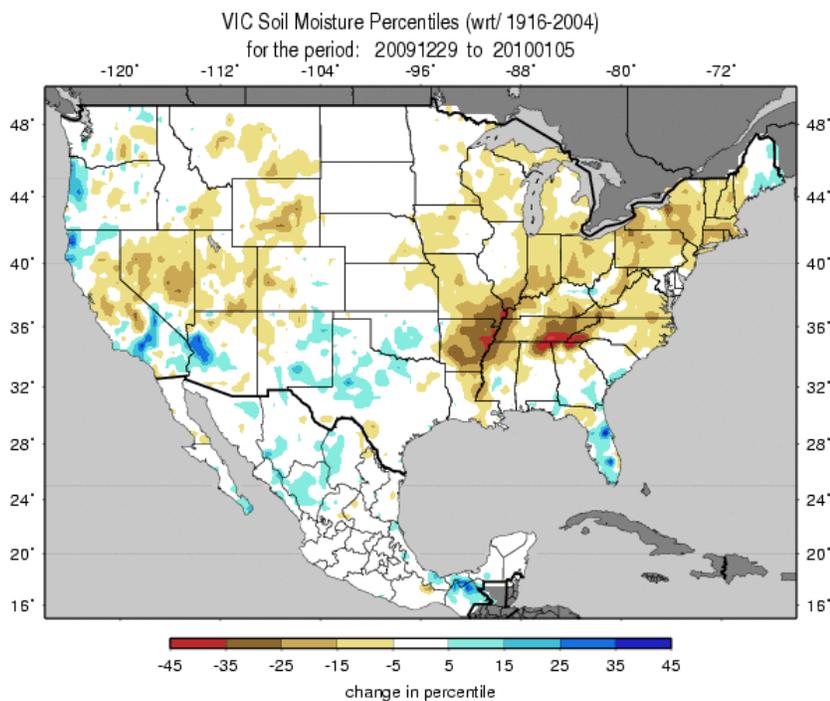
Ref: http://www.drought.unl.edu/dm/DM_west.htm

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Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 5 January. No change over the past two weeks.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif

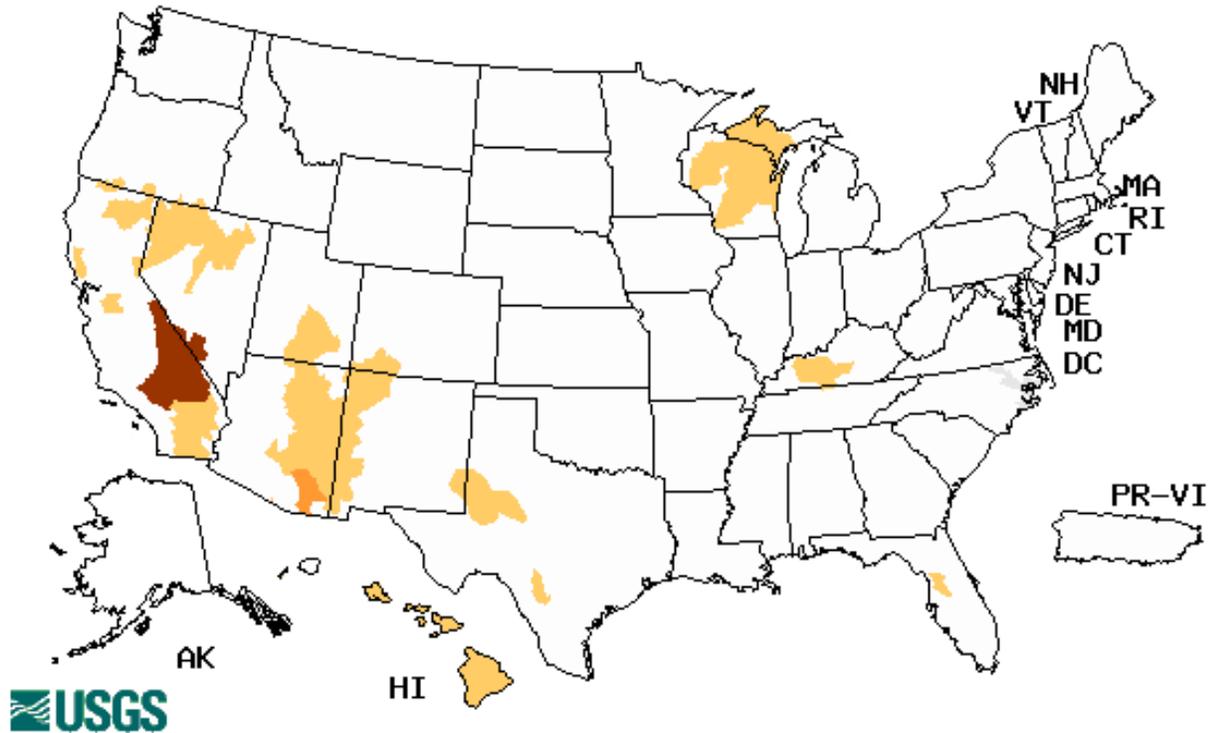


Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for the week. Note extreme dryness over the Lower Mississippi and Tennessee Valleys.

http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif

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Wednesday, January 06, 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. Conditions continue to be severe over southern California, Note, many streams are frozen and thus the flows become more unreliable during the winter.

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

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National Drought Summary -- January 5, 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 Southeast: It was a pretty quiet week for the Southeast. The only abnormally dry (D0) area found along the east-central coast of Florida was reduced a bit on the northern edge, where 2-3 inches of rain fell last week.

The Great Lakes Region: The only moderate precipitation recorded in this region fell across the western Upper Peninsula of Michigan, which was outside (for the most part) of the drought region depicted in northern Wisconsin. Consequently, the drought depiction remains as is this week across both Minnesota and Wisconsin.

The Plains: Cold and dry was the story across most of the Plains from North Dakota to Texas and most points in between. The only change to the map this week is found in a slight improvement in extreme northwest North Dakota, where the favorable recent storm trend has led to the removal of lingering D0 there and in eastern Montana. Little precipitation was found across southern and western Texas, leaving the map unchanged this week.

The West: The most active weather patterns are being seen across the Pacific Northwest and into western Idaho. This has been welcomed given the extremely dry month of December (most regions in the Pacific NW were generally less than 50% of normal in the precipitation department). Even in the coastal areas where the precipitation has been the heaviest (2-5 inches), this hasn't led to surpluses on the Water Year (since October 1). In fact, many of these inland areas are still at D0 or D1 (moderate drought) in southwestern Oregon from Medford over to the Klamath Falls region and along the coastal reaches of northwestern California. The heavier precipitation (3-5 inches) that fell in northern California in and around the Shasta-Trinity Forest region has led to a slight reduction in the northwestern area of severe drought (D2) that still remains there. Generally speaking, low stream flow levels and high snowline elevations are still a concern on the water supply side of things.

To the east, an expansion of D0 is noted in western Wyoming, extreme northeastern Utah, eastern/southeastern Idaho and western/southwestern Montana. Many of the basins' snow water equivalent (SWE) totals for this time of year are running at 60-75% of normal, according to USDA-NRCS. An expansion of D1 is also found this week in southwestern Montana, northeastern Idaho and northwestern Wyoming in the Yellowstone region. In addition, a new area of D1 has emerged to the north in the Bitterroot Range along the Montana and Idaho borders. Southern Montana saw D0 connect with the areas to both the east and west. Water year totals have been more generous in extreme eastern Montana along the North Dakota border, leading to a reduction of D0 there.

The Southwest remains unchanged this week after another dry week.

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Hawaii, Alaska and Puerto Rico: Another dry week was reported across many parts of Hawaii, which is seeing stream flows well below normal across many parts of the islands. Changes of note this week include a slight expansion of severe (D2) and extreme (D3) drought on the eastern and southern sides of the Big Island. Pasture conditions there are really beginning to feel the toll.

After some slight expansion of the D0 last week in Alaska, the status quo holds this week even though it was another generally dry week, even in the coastal regions. The snow water equivalent values continue to fall, which could lead to further degradation if the dry pattern persists.

Some good rains fell across the northern half of Puerto Rico last week. No changes to the D0 are warranted until the pattern continues and stream flow values rebound.

Looking Ahead: During the next 5 days (January 7-12, 2010), the weather will remain very cold over much of the country with readings falling 10-20 degrees below normal from the Rockies east to the Atlantic. Parts of the West including Arizona, Nevada, California, western Oregon and north-central Montana can expect to escape the chill and see above-normal temperatures. The best bet for precipitation is found along the West Coast from northern California up to Washington. The upper Midwest and parts of the Ohio Valley and Gulf Coast may see moderate totals as well. Much of the West looks to be pretty dry over the next 5 days or so.

The 6-10 day forecast (January 12-16) is beginning to nicely reflect a traditional El Niño pattern and calls for better odds of above-normal temperatures in southeast Alaska, the west coast (from California up to Washington) and the northern tier states from Washington east to the Great Lakes region. Cooler temperatures are likely along the Gulf Coast from Texas to Florida and up the east coast from the Carolinas to New England. As for precipitation during this time period, much of Alaska and northern California may see above-normal totals. The Rockies from Colorado up to central Montana are likely to see below-normal precipitation. The other area of dryness forecasted is in the Northeast. Two areas of possible above-normal precipitation are found in the Gulf Coast states along with the Carolinas and the Upper Midwest, including Minnesota and Wisconsin.

Author: [Mark Svoboda, National Drought Mitigation 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 January 6, 2010