



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

Weekly Report - Snowpack / Drought Monitor Update **Date:** **24 December, 2008**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent percent to date continues to show low values across the West with some improvement over Oregon and the Southwest since last week. Portland is experience its greatest December snowfall on record (currently >15.5" and counting) and is already the 4th snowiest winter. Still the majority of water basins are below the long term average for this time of year (Fig 1).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were considerable below normal during the past week across the Pacific Northwest and Northern Rockies with the warmest departures over the Southwest and Central Rockies (Fig. 2). Specifically, the greatest positive temperature departures occurred over parts of New Mexico (>+5F) and the greatest negative departures occurred over Montana (<-25F) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 23 December shows significant amounts of precipitation scattered across a large region of the West. Smaller amounts fell over portions of the Great Basin, east New Mexico, and the north Central Rockies and Front Range (Fig. 3). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values changing little since last week except for significant increases over Arizona and New Mexico (Fig. 3a). For precipitation totals, departures, and percent of normal for several time periods. See: <http://www.water.gov/> and <http://cig.mesonet.org/~derek/public/droughtmonitoring/>.

WESTERN DROUGHT STATUS

The West: Significant precipitation fell on a large proportion of the dry area covering much of the United States from the Rockies westward. Totals ranged from 2 to locally 8 inches across western Oregon, northwestern and southwestern California, the Sierra Nevada, central Arizona, and a few small areas in northwestern Arizona, southwestern and north-central Utah, western Colorado, central and southeastern Idaho, and western Wyoming. Amounts below 0.25 inch were restricted to central Washington, parts of southeastern Oregon and southwestern Idaho, all but northwestern most Montana, most of Wyoming, northwestern Colorado, western and northeastern Utah, most of Nevada, part of the California valleys and the northern desert region, northeastern Arizona, and northwestern New Mexico. The abundant precipitation led to improvements in the assessed drought severity across north-central and far northeastern California (D3 to D2), southern California to the east and south of Los Angeles (D2 to D1), east-central sections of the California desert (D1 to D0), and a small part of central Idaho (D1 to D0). In addition, D0 conditions were removed from southwestern Washington, all but the southern tier of western Oregon, and west-central Arizona. However, despite the wet week, precipitation totals for the calendar year remained under half of normal across most of Nevada, adjacent sections of northeastern California and southern Oregon, central Washington and adjacent northern Oregon, and scattered smaller areas. **Author:** [Richard Tinker, Climate Prediction Center, NOAA](#)

A comprehensive narrative describing drought conditions for the nation can be found at the end of this document.

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve maintain and improve our natural resources and environment

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Weekly Snowpack and Drought Monitor Update Report

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).

OBSERVED FIRE DANGER CLASS

The National Interagency Coordination Center provides a variety of products that describe the current wildfire status for the U.S. - http://activefiremaps.fs.fed.us/lq_fire2.php. The latest Observed Fire Danger Class is shown in Figs. 6 shows the current active wildfires across the West - <http://geomac.usgs.gov/>.

U.S. HISTORICAL STREAMFLOW

This map, (Fig. 7) 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.

http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map.

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/>

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

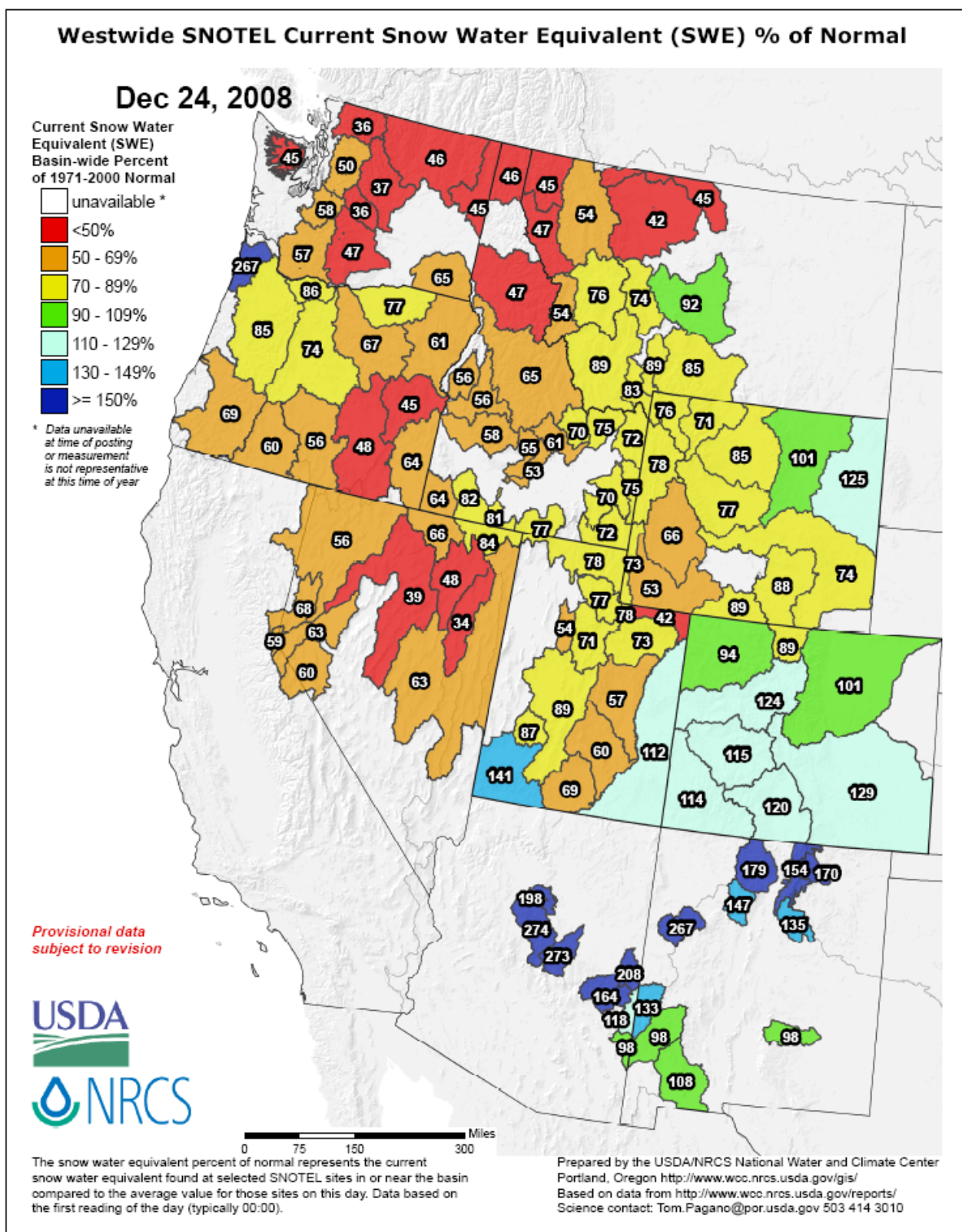


Fig. 1. Snow-water equivalent percent to date continues to show low values across the West with some improvement over Oregon and the Southwest since last week. Still the majority of water basins are below the long term average for this time of year.

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

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

Dec 24, 2008

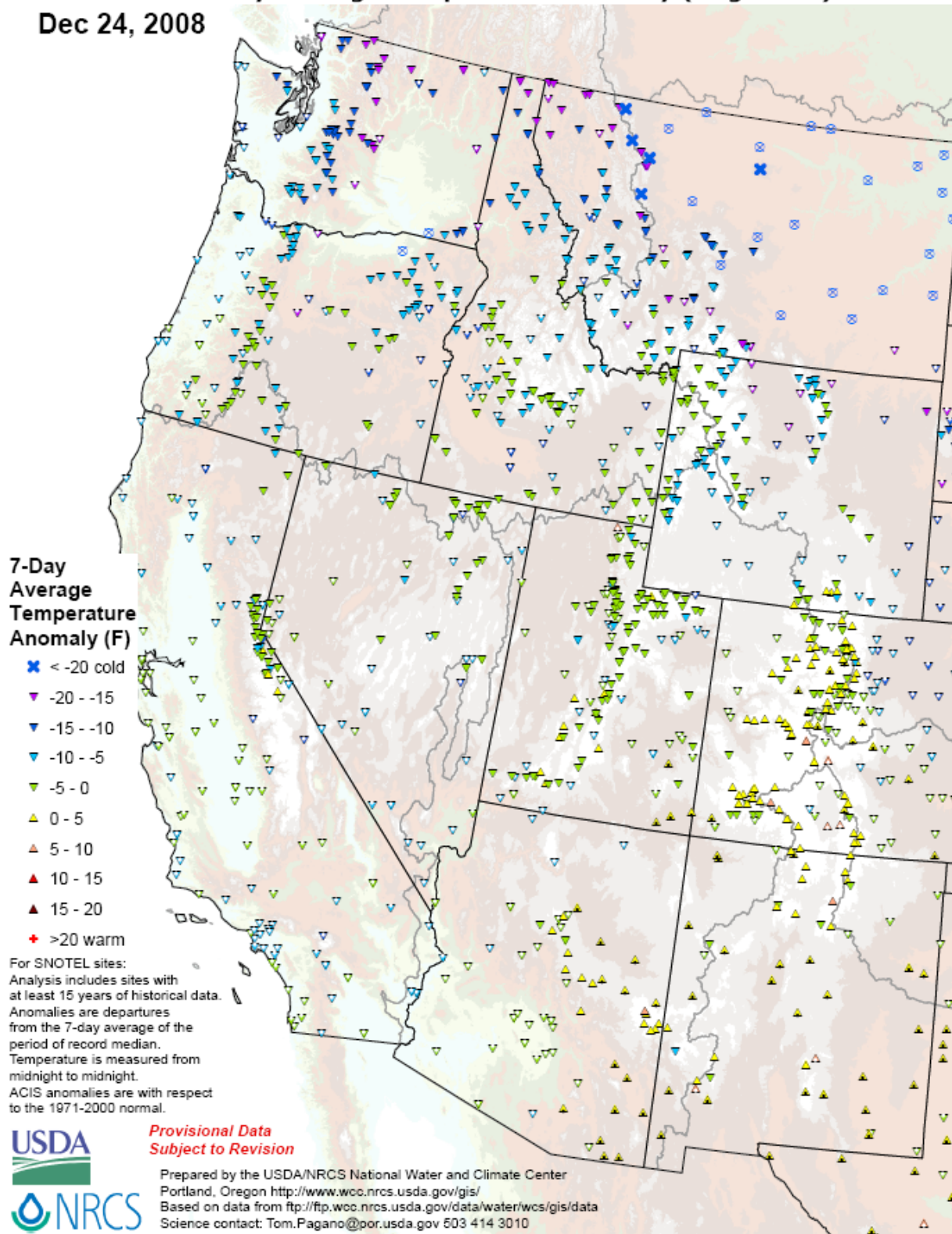
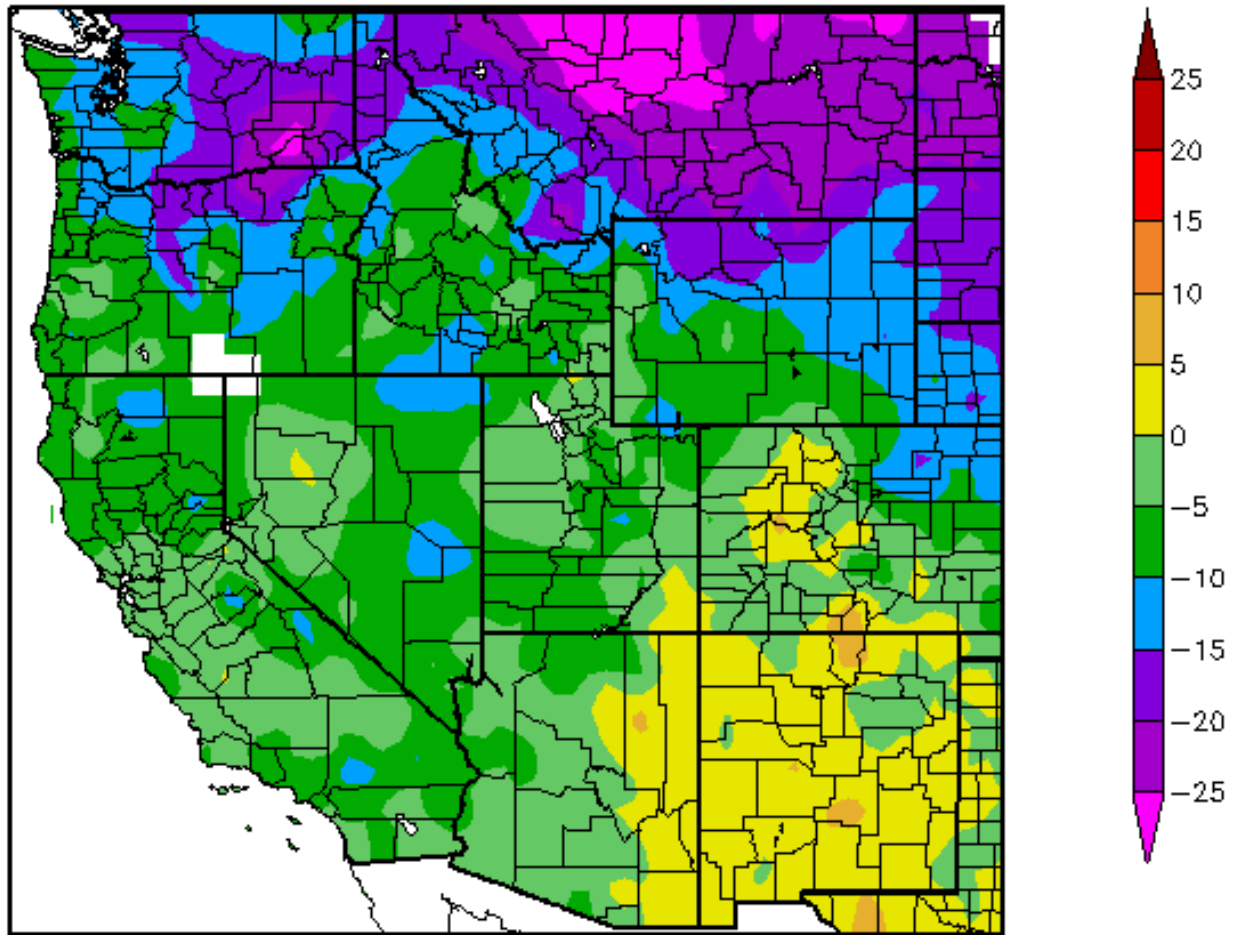


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were considerable below normal during the past week across the Pacific Northwest and Northern Rockies with the warmest departures over the Southwest and Central Rockies.

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

Departure from Normal Temperature (F) 12/17/2008 – 12/23/2008



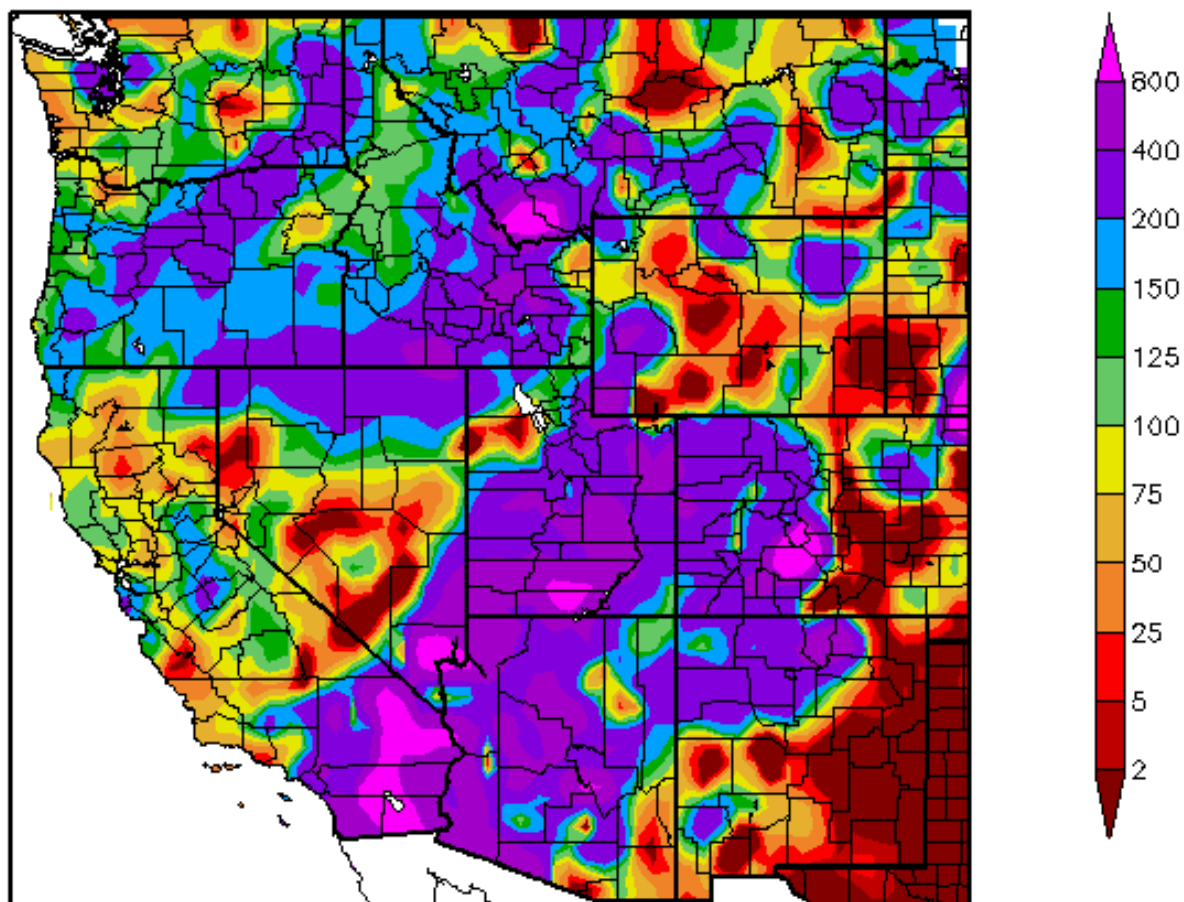
Generated 12/24/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies: Greatest positive temperature departures occurred over parts of New Mexico (>+5F) and greatest negative departures occurred over Montana (<-25F).

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

Percent of Normal Precipitation (%)
12/17/2008 – 12/23/2008



Generated 12/24/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 23 December shows significant amounts of precipitation scattered across a large region of the West. Smaller amounts fell over portions of the Great Basin, east New Mexico, and the north Central Rockies and Front Range.

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

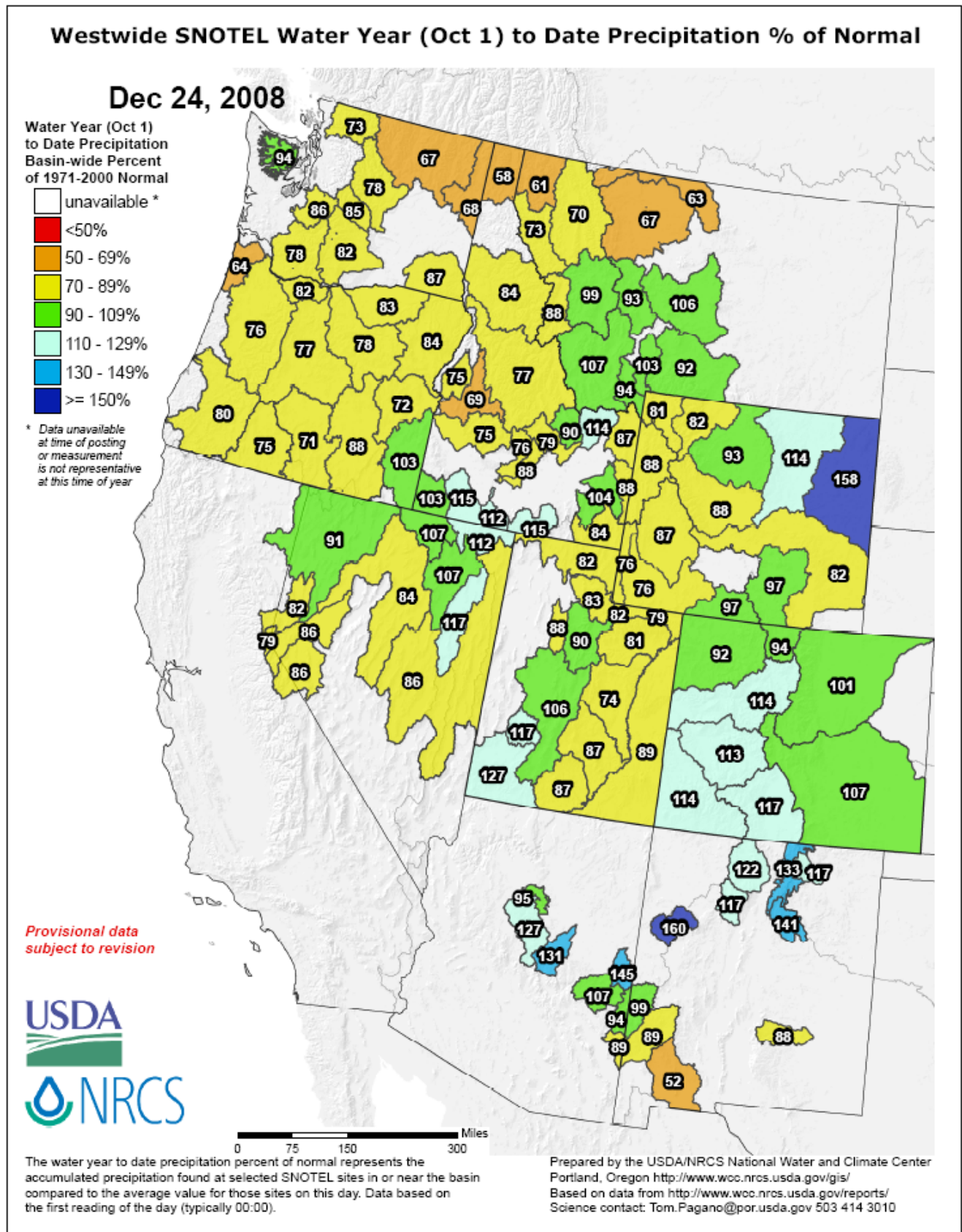


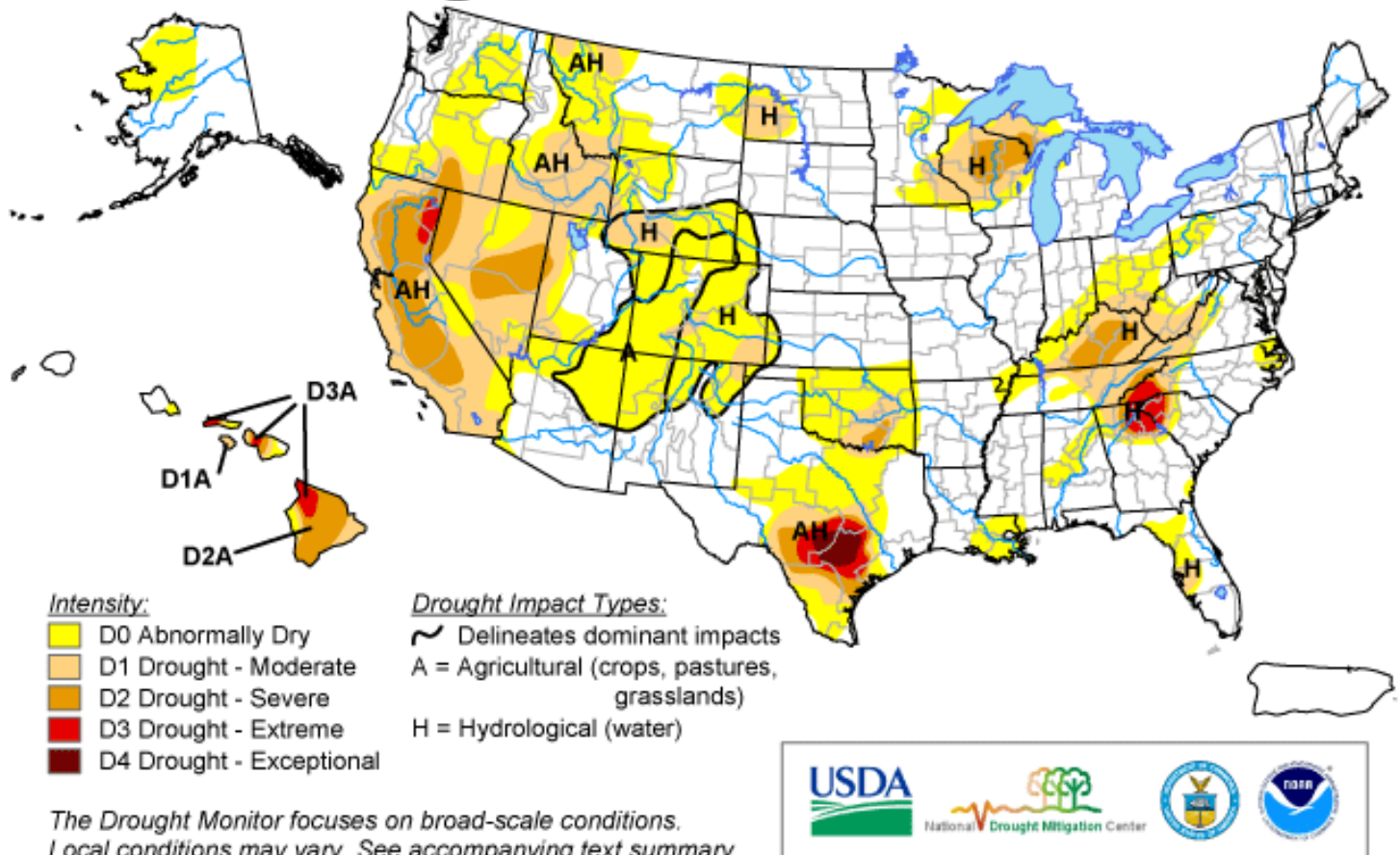
Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values changing little since last week except for significant increases over Arizona and New Mexico.

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

U.S. Drought Monitor

December 23, 2008

Valid 8 a.m. EST



Released Wednesday, December 24, 2008
Author: Rich Tinker, Climate Prediction Center, NOAA

<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

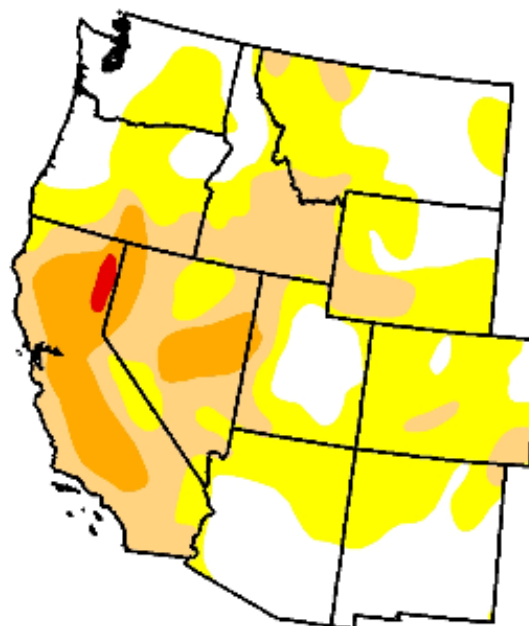
West

December 23, 2008
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	31.5	68.5	30.1	9.0	0.4	0.0
Last Week (12/16/2008 map)	27.5	72.5	31.0	10.0	0.8	0.0
3 Months Ago (09/30/2008 map)	40.5	59.5	29.2	10.4	0.4	0.0
Start of Calendar Year (01/01/2008 map)	26.3	73.7	54.7	33.1	2.7	0.0
Start of Water Year (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (12/25/2007 map)	26.3	73.7	54.7	33.1	2.7	0.0

Intensity:

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



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 Wednesday, December 24, 2008

Author: Rich Tinker, CPC/NOAA

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. In western Oregon and southwestern Washington abnormally dry conditions (D0) has been removed.

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

U.S. Drought Monitor

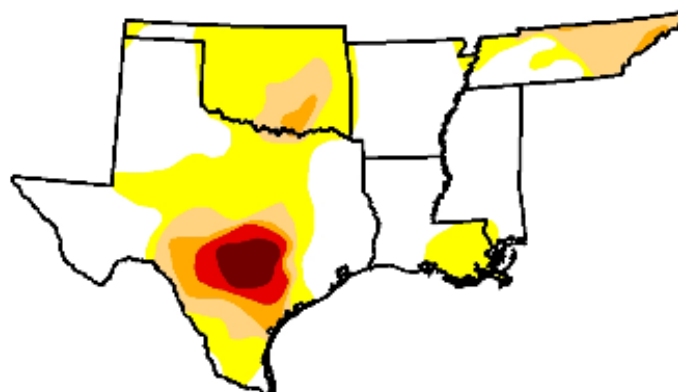
South

December 23, 2008

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	51.8	48.2	19.5	8.6	4.6	2.1
Last Week (12/16/2008 map)	58.5	41.5	19.5	8.9	4.6	2.1
3 Months Ago (09/30/2008 map)	73.1	27.0	17.2	10.0	2.9	0.0
Start of Calendar Year (01/01/2008 map)	57.5	42.5	12.9	4.3	3.8	1.6
Start of Water Year (10/07/2008 map)	73.3	26.7	17.3	10.7	2.9	0.0
One Year Ago (12/25/2007 map)	63.8	36.2	9.0	4.3	3.8	1.7

Intensity:

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

The Drought Monitor focuses on broad-scale conditions.
Local conditions may vary. See accompanying text summary
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<http://drought.unl.edu/dm>



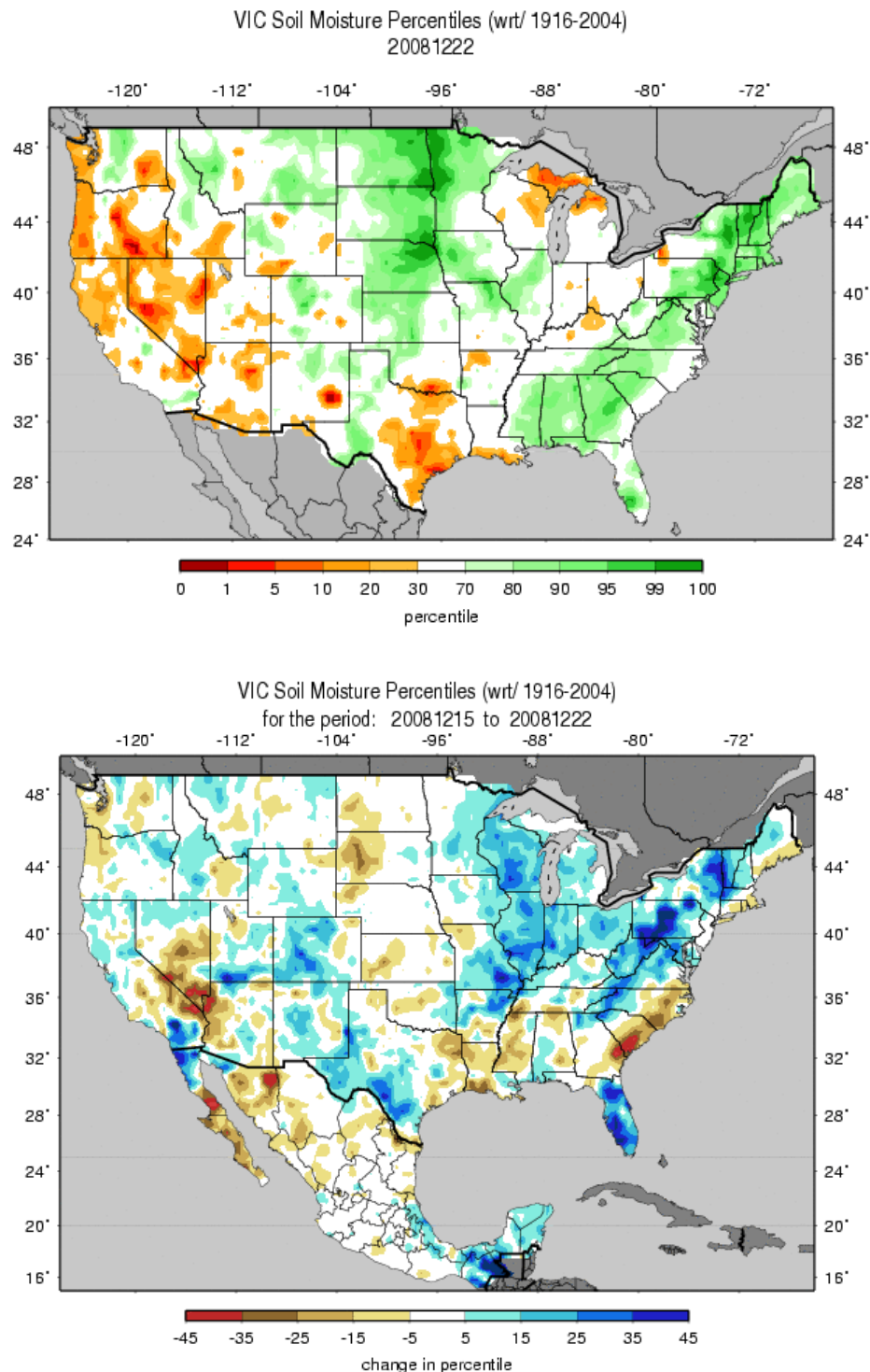
Released Wednesday, December 24, 2008

Author: Rich Tinker, CPC/NOAA

Fig. 4b: Texas now stands alone as the only state with D4 drought condition. Note expansion of D0 since last week.

Ref: http://www.drought.unl.edu/dm/DM_southeast.htm and http://www.drought.unl.edu/dm/DM_south.htm.

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Figs. 5a & 5b: Soil Moisture Ranking and change in percentile based on 1915-2003 climatology for this past week. Near saturation exists over the Northern Plain while excessive dryness dominates the central-southern Texas, the Upper Peninsula of Michigan, the Great Basin, and Oregon as of 22 December (Fig. 5a). Increased soil moisture occurred over the Northeast, Florida, and the Mid-West while drier conditions developed over South Carolina and southern Nevada this week (Fig. 5b).

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

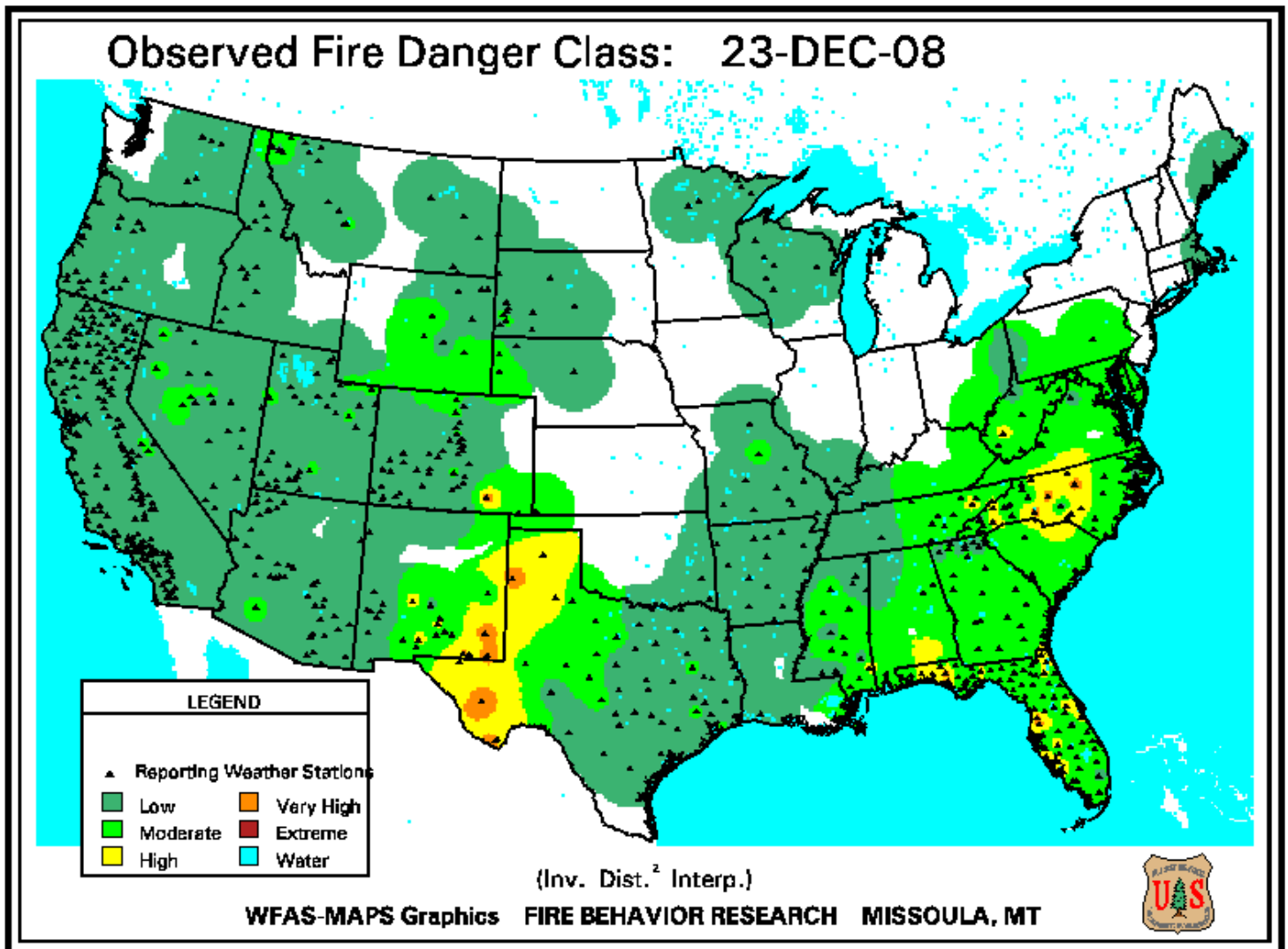
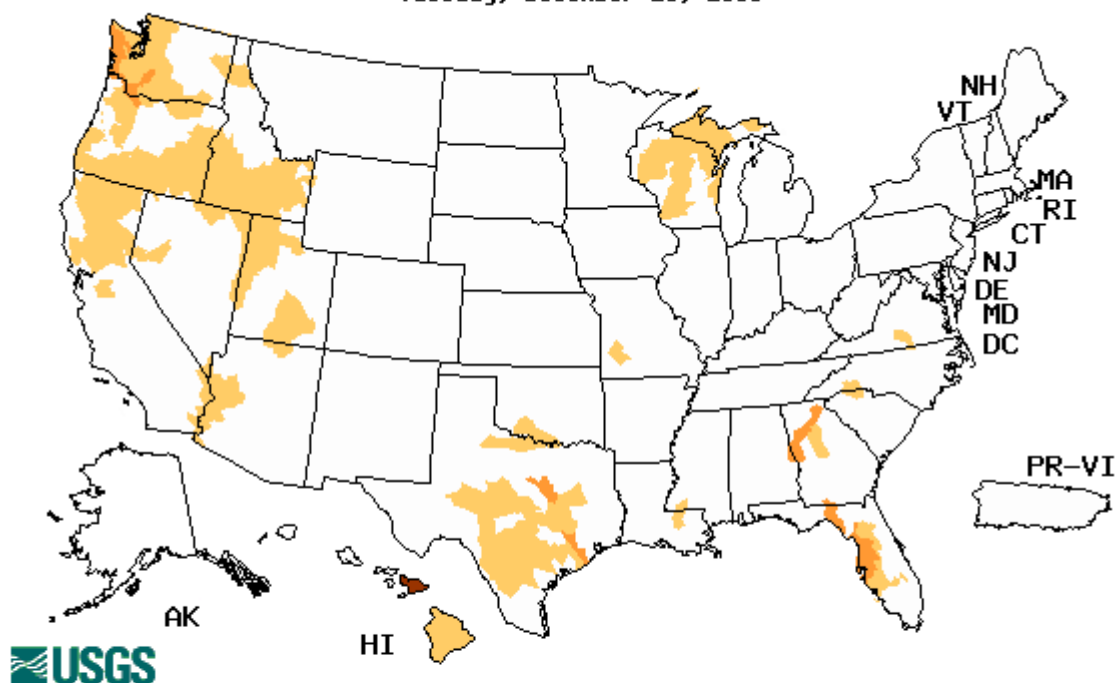


Fig. 6. Observed Fire Danger Class. Continued increase in fire threat exits over western and northern Texas and North Carolina. Source: Forest Service Fire Behavior Research – Missoula, MT.
Ref: http://www.fs.fed.us/land/wfas/fd_class.gif

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Tuesday, December 23, 2008



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. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Note some improvement over western Oregon since last week.

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

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National Drought Summary -- December 23, 2008

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/>.

Three storm systems affected the western United States during the last 7 days, dropping widespread moderate to heavy precipitation on much of the country's dry areas from the Rockies westward to the Pacific Coast. Remnants from 2 of these systems re-strengthened as they tracked through the central and eastern states, dropping moderate precipitation on parts of the dry regions in the Southeast, Ohio Valley, and upper Midwest as well. However, substantial precipitation evaded most of the Plains, Florida, Alaska, and Hawaii.

The East: Moderate to locally heavy precipitation fell on all but the west-central and southernmost sections of the dry region extending from the Ohio Valley southward into Alabama and Georgia, on central and southern portions of the dry region in the Great Lakes states and upper Midwest, and across northeastern North Carolina. The largest amounts (2 to 4 inches) were recorded across southwestern Pennsylvania and at scattered locations in eastern Tennessee and the northern reaches of Georgia and Alabama. As a result, abnormal dryness (D0) was pulled out of southwestern Pennsylvania and adjacent sections of Ohio and West Virginia, where 60-day precipitation totals climbed above normal. In addition, D3 and D4 conditions were reduced in part of northern Georgia, and both D0 and D1 conditions were trimmed back in parts of the Upper Peninsula of Michigan, where lake-effect snowfall has been abundant for the past several weeks. Meanwhile, little or no precipitation fell on the Florida Peninsula, southeastern Louisiana, and northern Wisconsin, where D0 to D1 conditions remained unchanged. These regions received less than half of normal precipitation during the last 2 months.

The Plains: It was a dry week for the already-dry areas in the Plains. Precipitation totaled between one-quarter and one-half of an inch in south-central North Dakota, but elsewhere, only scattered locations in south-central Montana, southeastern Wyoming, and the eastern sections of Colorado, Oklahoma, and Texas recorded over 0.1 inch. Dryness and drought classifications remained unchanged in most areas, although D0 expanded to cover most of Oklahoma and more of northeastern Texas, including the greater Dallas and Fort Worth metropolitan area. For the last 60 days, only 5 to 25 percent of normal precipitation fell on most of the dry region across Oklahoma and Texas, and amounts ranged from 4 to 8 inches below normal across the eastern tier of this area.

The West: Significant precipitation fell on a large proportion of the dry area covering much of the United States from the Rockies westward. Totals ranged from 2 to locally 8 inches across western Oregon, northwestern and southwestern California, the Sierra Nevada, central Arizona, and a few small areas in northwestern Arizona, southwestern and north-central Utah, western Colorado, central and southeastern Idaho, and western Wyoming. Amounts below 0.25 inch were restricted to central Washington, parts of southeastern Oregon and southwestern Idaho, all but northwestern most Montana, most of Wyoming, northwestern Colorado, western and northeastern Utah, most of Nevada, part of the California valleys and the northern desert region, northeastern Arizona, and northwestern New Mexico. The abundant precipitation led to improvements in the assessed drought severity across north-central and far northeastern California (D3 to D2), southern California to the east and south of Los Angeles (D2 to D1), east-central sections of the

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California desert (D1 to D0), and a small part of central Idaho (D1 to D0). In addition, D0 conditions were removed from southwestern Washington, all but the southern tier of western Oregon, and west-central Arizona. However, despite the wet week, precipitation totals for the calendar year remained under half of normal across most of Nevada, adjacent sections of northeastern California and southern Oregon, central Washington and adjacent northern Oregon, and scattered smaller areas.

Hawaii, Alaska and Puerto Rico: Precipitation totals were relatively low across Hawaii in the wake of last week's heavy rainfall and flooding, but former D0 to D1 conditions improved in Kauai and Oahu as drought impacts continued to ease. Little or no precipitation was again observed in northwestern Alaska, where D0 conditions persisted.

Looking Ahead: More moderate to heavy precipitation is expected across the dry area in the interior eastern United States, where 1.5 to 3.5 inches of precipitation are forecast during December 24 – 28, 2008. Moderate amounts are expected to the south and east of the Appalachians, and across southeastern Louisiana. Totals are forecast to be much lower farther east and south, with only a few tenths of an inch expected in northeastern North Carolina, and little or none along the Florida Peninsula. Moderate to heavy precipitation (0.5 to 2.0 inches) is also forecast for central and eastern sections of the dry area in and near the Great Lakes region, with lesser amounts expected in eastern Minnesota, northwestern Wisconsin, and the Upper Peninsula of Michigan. The dry areas in the Plains from Texas to North Dakota and Montana are expected to remain dry, with amounts exceeding 0.5 inch restricted to eastern Oklahoma. Farther west, more beneficial precipitation is anticipated from the Rockies westward to the Pacific Ocean, with amounts below 0.25 inch restricted to the deserts. More than an inch is expected in coastal areas and typically-wetter higher elevations, with 2 to 6 inches predicted in central Arizona, the mountains of southwestern California, the Sierra Nevada, the southern Cascades, and northwestern California. Around the cusp of the new year (December 29, 2008 through January 2, 2009), odds favor above-normal precipitation in the Great Lakes region, the northern Plains, and the western states from northwestern Colorado northward through Montana and westward to the central California coast. Meanwhile, drier than normal conditions are favored in the Southwest, the southern Rockies, the central and southern Plains, peninsular Florida, and the southern half of the D0 area in northwestern Alaska.

Author: [Richard Tinker, Climate Prediction 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 23, 2008