



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

Weekly Report - Snowpack / Drought Monitor Update **Date: 20 November, 2008**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent percent to date continues to show a decline across the West since last week. The high values over the Arizona-New Mexico region are subject to early season statistical anomalies that have little relationship to the longer term seasonal averages (Fig 1).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were well above normal during the past week in most locales across the West (Fig. 2). Specifically, the greatest positive temperature departures occurred over the central Washington, northeastern California, and the Montana Rockies ($>+12^{\circ}\text{F}$) and the greatest negative departures occurred over southern New Mexico ($<-1^{\circ}\text{F}$) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 19 November shows significant amounts falling (mostly as rain) occurring over the Northern Rockies, Colorado, and northern Idaho. Mostly dry conditions prevailed over the remainder of the West (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 below normal totals across much of Central, northern most Rockies, and Southwest. Above normal amounts are noted over the Great Basin, Snake River Drainage, Northern Cascades, and the Northern Sierra (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: Flooding subsided west of the Cascades, where November 1-18 rainfall totals included 14.43 inches (166% of normal) in Quillayute, Washington, and 9.94 inches (165%) in Astoria, Oregon. Although significant precipitation ended after November 12, enough moisture spilled across the Cascades to result in a reduction in the coverage of abnormal dryness (D0) in northeastern Oregon and adjoining areas. Across the interior Northwest, rain resulted in a slight improvement in winter wheat condition. Between November 9 and 16, the U.S. Department of Agriculture reported that the percentage of Oregon's winter wheat rated in very poor to poor condition changed from 29 to 24%. During the same period, Washington's wheat rated very poor to poor changed from 32 to 30%. Farther south, however, short-term dryness intensified in the Four Corners region. As a result, D0 was introduced in parts of southeastern Utah, southwestern Colorado, northwestern New Mexico, and northeastern Arizona. California's drought depiction was not changed, although conditions remained ripe for additional wildfire activity across southern areas. Mid-November wildfires near Los Angeles charred more than 40,000 acres of vegetation and damaged or destroyed nearly 1,000 structures. On November 14-15, consecutive daily-record highs were reported in California locations such as Burbank (91 and 90 degrees F), Santa Ana (94 degrees F both days), and El Cajon (94 and 96 degrees F). In addition, winds howled across California, with gusts reaching 75 mph (on November 13) on Whitaker Peak and 78 mph (on November 15) at Camp Nine. The latter gust occurred near the site of the Sayre fire, which was one of three major incidents (along with the Freeway complex and the Tea fire) to affect the hills near Los Angeles. The Freeway complex was the largest of the fires, with acreage approaching

Weekly Snowpack and Drought Monitor Update Report

30,000 acres by November 18, while the Sayre fire was the most destructive, with more than 600 structures consumed by flames. Author: Brad Rippey, U.S. Department of Agriculture

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).

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/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/>

Weekly Snowpack and Drought Monitor Update Report

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

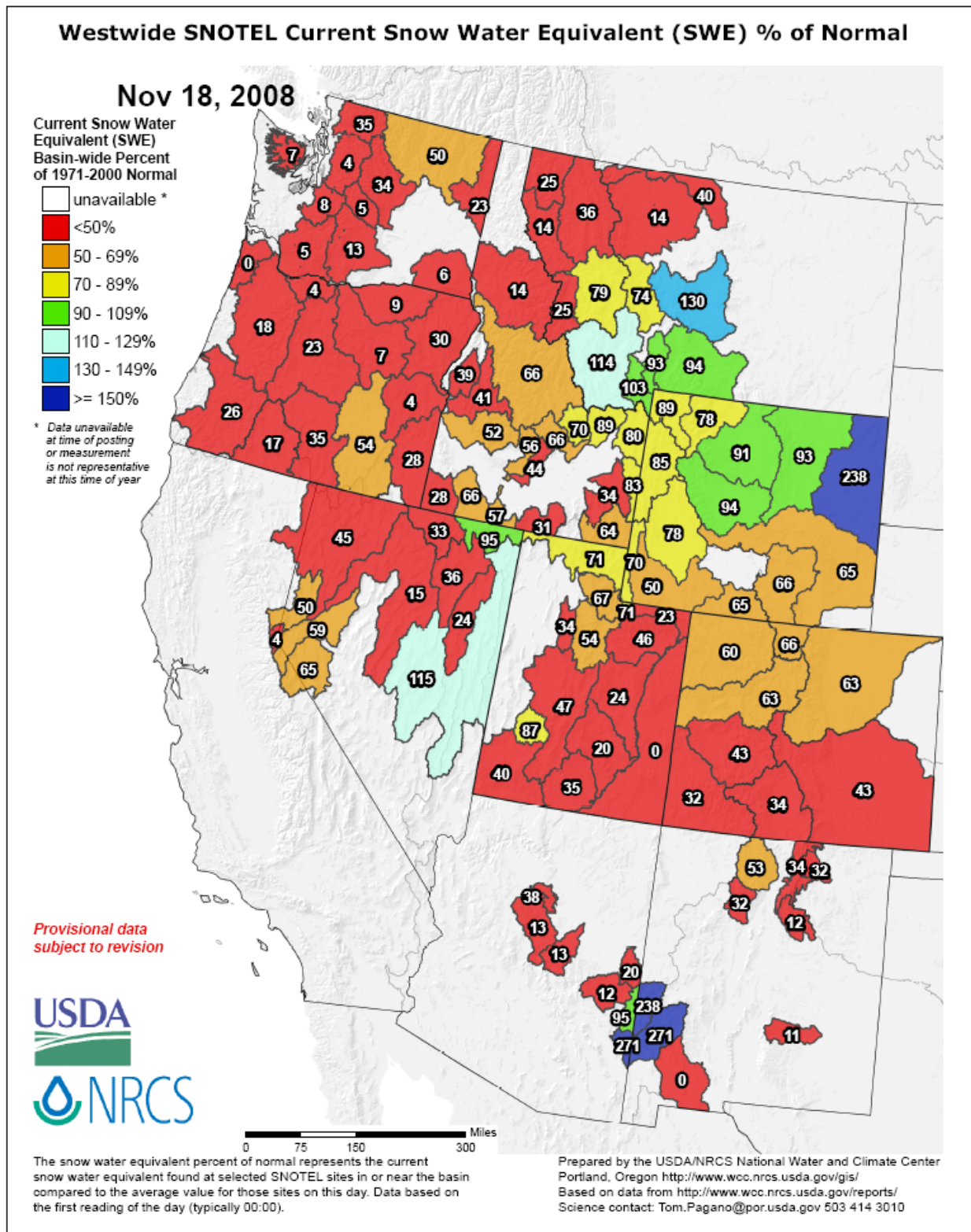


Fig. 1. Snow-water equivalent percent to date continues to show a decline across the West since last week. The high values over the Arizona-New Mexico region are subject to early season statistical anomalies that have little relationship to the longer term seasonal averages.

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

Weekly Snowpack and Drought Monitor Update Report

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

Nov 18, 2008

7-Day Average Temperature Anomaly (F)

- ✕ < -20 cold
- ▼ -20 - -15
- ▼ -15 - -10
- ▼ -10 - -5
- ▼ -5 - 0
- ▲ 0 - 5
- ▲ 5 - 10
- ▲ 10 - 15
- ▲ 15 - 20
- ✚ >20 warm

For SNOTEL sites:
Analysis includes sites with
at least 15 years of historical data.
Anomalies are departures
from the 7-day average of the
period of record median.
Temperature is measured from
midnight to midnight.
ACIS anomalies are with respect
to the 1971-2000 normal.



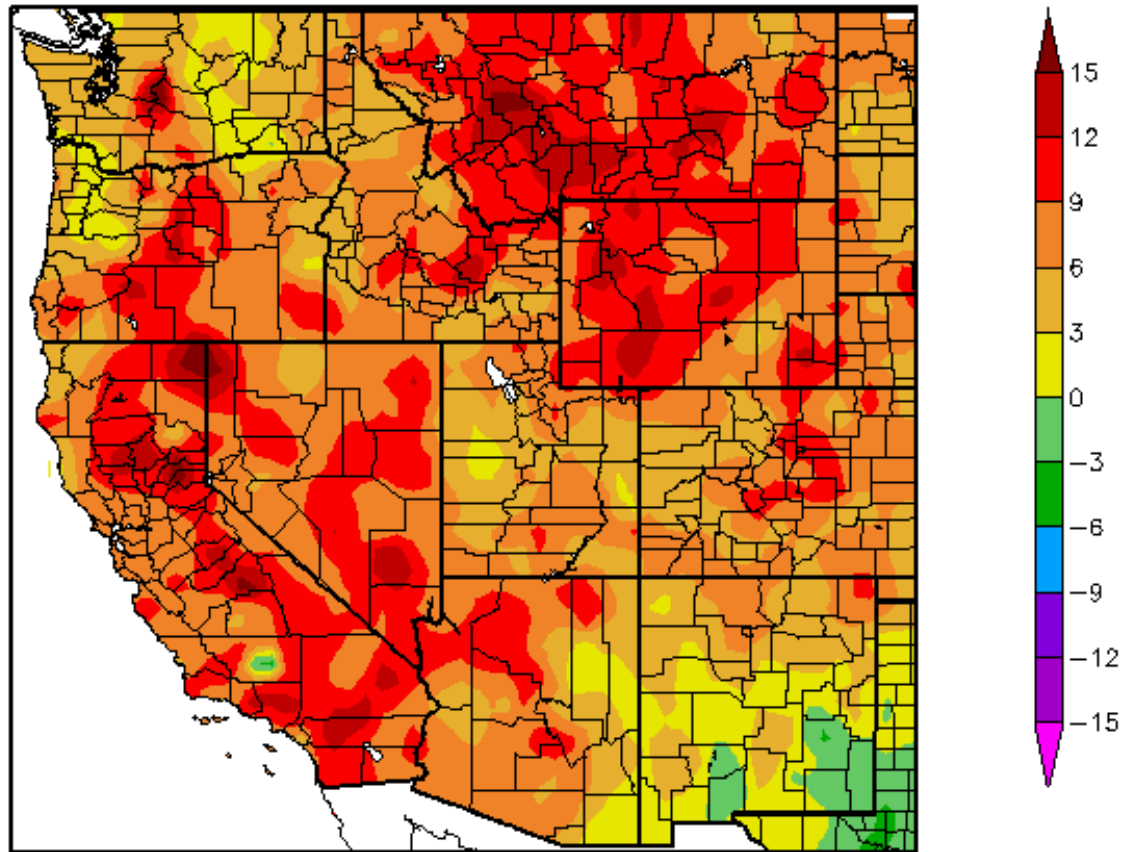
*Provisional Data
Subject to Revision*

Prepared by the USDA/NRCS National Water and Climate Center
Portland, Oregon <http://www.wcc.nrcs.usda.gov/gis/>
Based on data from <ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/data>
Science contact: Tom.Pagano@por.usda.gov 503 414 3010

Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were well above normal during the past week in most locales across the West.

Ref: <http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavq7dAnomalyAcis.pdf>

Departure from Normal Temperature (F)
11/13/2008 – 11/19/2008



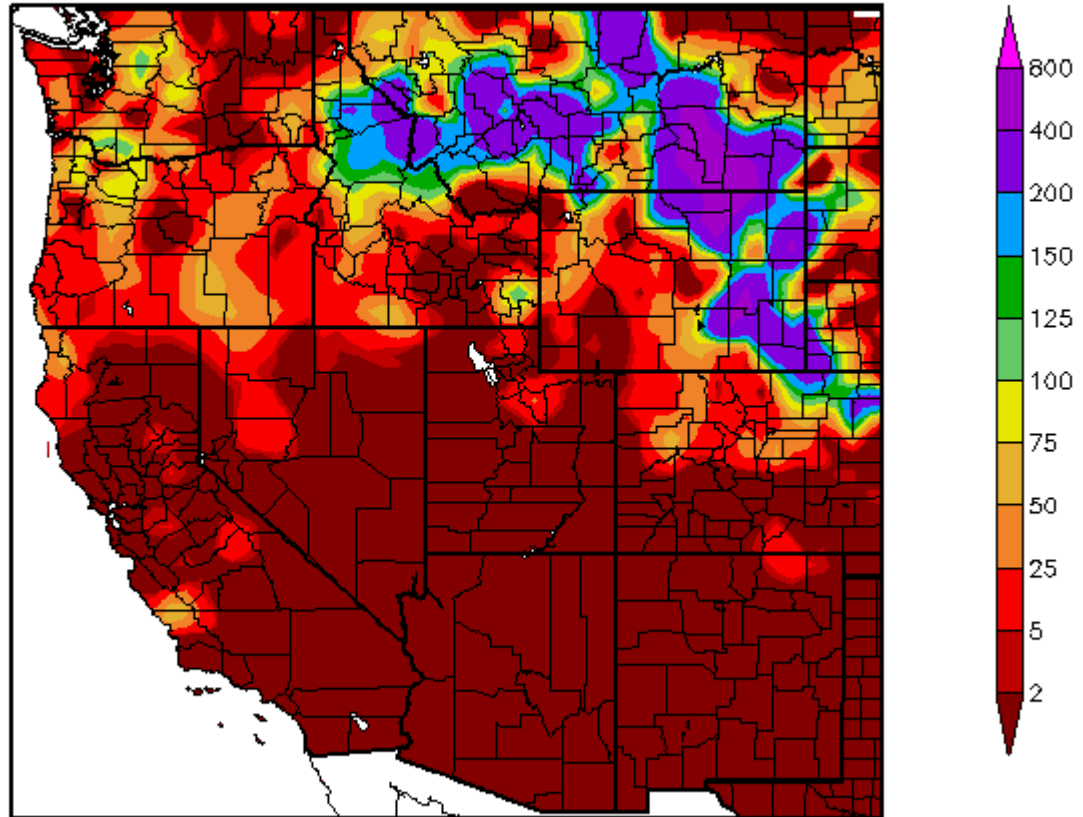
Generated 11/20/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies: Greatest positive temperature departures occurred over the central Washington, northeastern California, and the Montana Rockies (>+12F) and greatest negative departures occurred over southern New Mexico (<-1F).

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

Percent of Normal Precipitation (%)
11/13/2008 – 11/19/2008



Generated 11/20/2008 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 19 November shows significant amounts falling (mostly as rain) occurring over the Northern Rockies, Colorado, and northern Idaho. Mostly dry conditions prevailed over the remainder of the West.

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

Weekly Snowpack and Drought Monitor Update Report

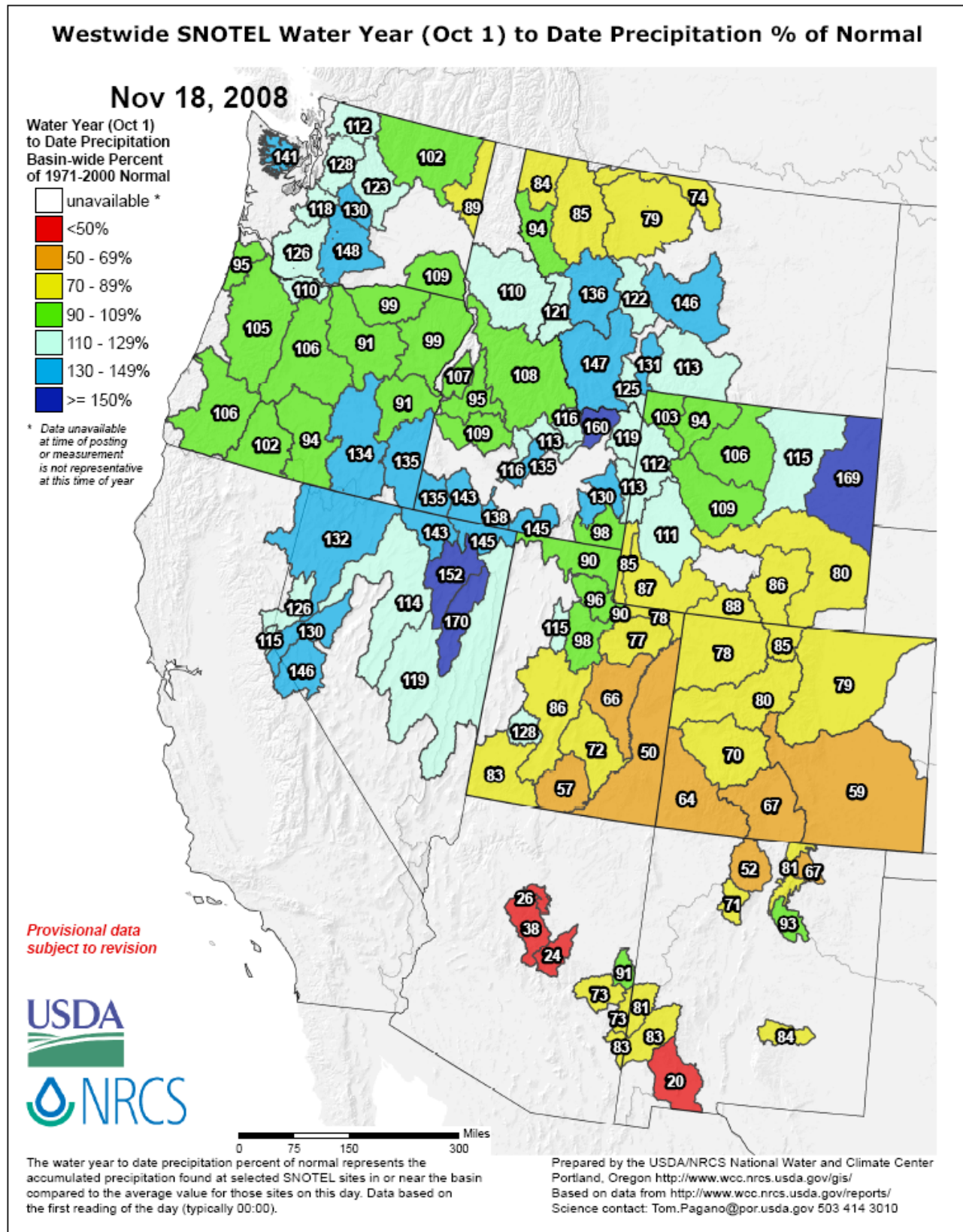
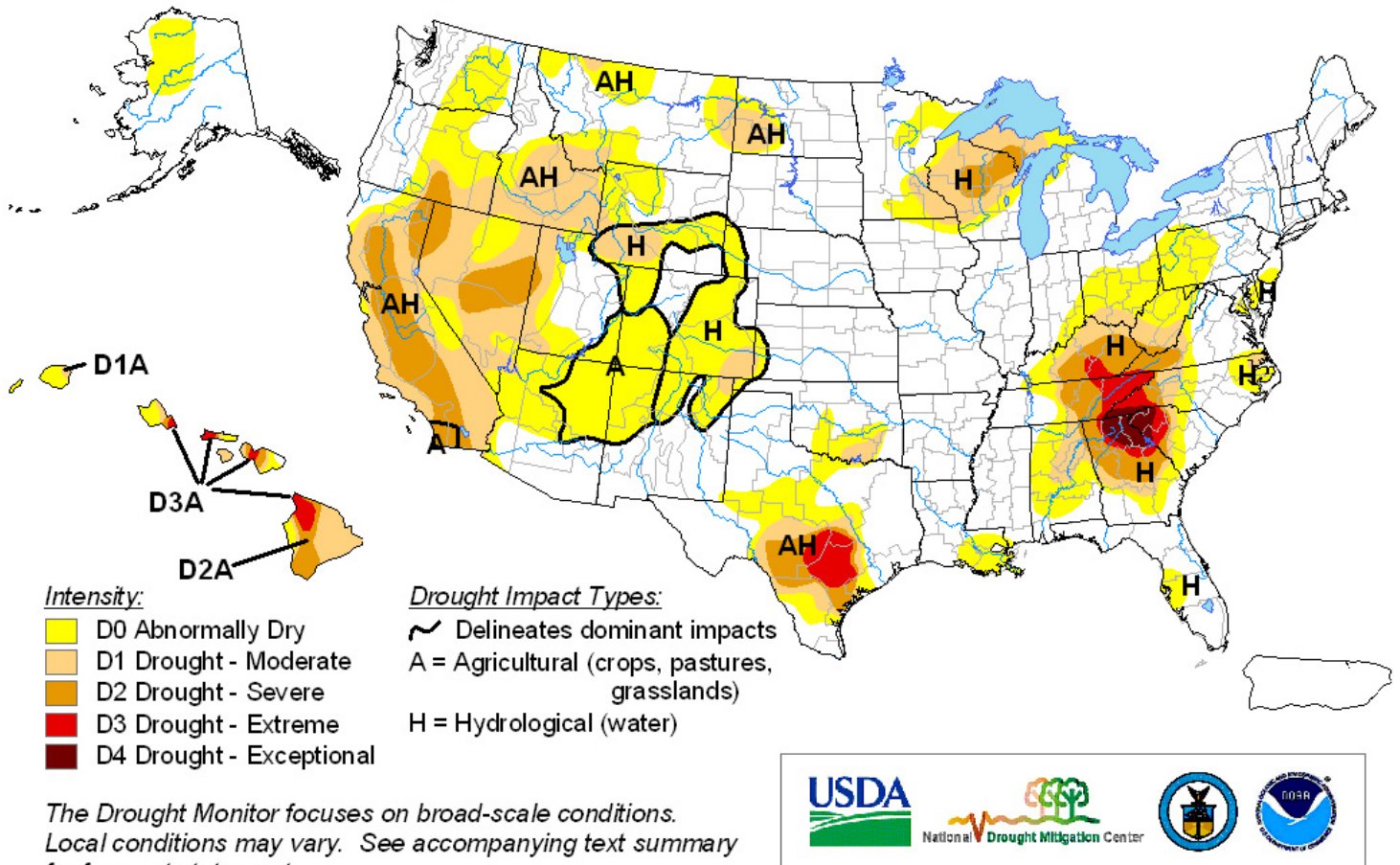


Fig 3a. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows below normal totals across much of Central, northern most Rockies, and Southwest. Above normal amounts are noted over the Great Basin, Snake River Drainage, Northern Cascades, and the Northern Sierra.

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

U.S. Drought Monitor

November 18, 2008
Valid 8 a.m. EST



Released Thursday, November 20, 2008

Author: Brad Rippey, U.S. Department of Agriculture

Fig. 4. Current Drought Monitor weekly summary.

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

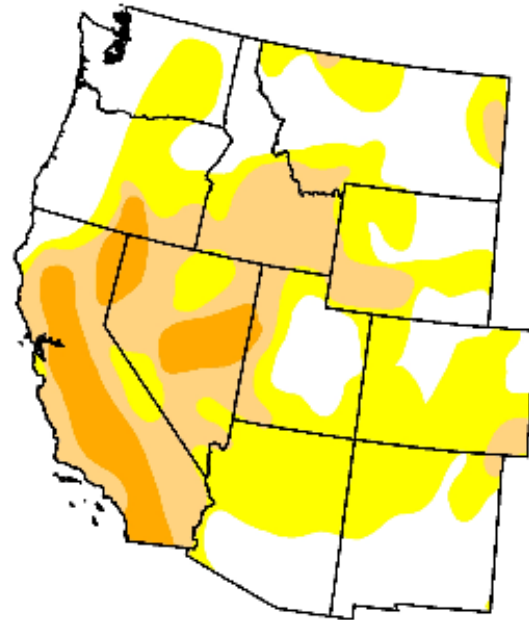
U.S. Drought Monitor

West

November 18, 2008

Valid 7 a.m. EST

| | Drought Conditions (Percent Area) | | | | | |
|---|-----------------------------------|-------|-------|-------|-------|-----|
| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
| Current | 36.0 | 64.0 | 29.3 | 8.6 | 0.0 | 0.0 |
| Last Week (11/11/2008 map) | 41.9 | 58.1 | 28.4 | 8.7 | 0.0 | 0.0 |
| 3 Months Ago (08/26/2008 map) | 34.7 | 65.3 | 29.9 | 9.9 | 0.2 | 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 (11/20/2007 map) | 25.4 | 74.6 | 56.6 | 38.1 | 7.9 | 0.0 |

Intensity:

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, November 20, 2008
Author: Brad Rippey, U.S. Department of Agriculture

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Note some deterioration (D1-D4) since last week. Ref: http://www.drought.unl.edu/dm/DM_west.htm

U.S. Drought Monitor

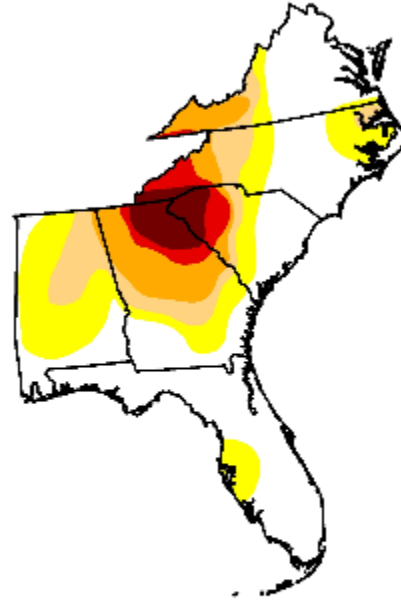
Southeast

November 18, 2008
Valid 7 a.m. EST

| | Drought Conditions (Percent Area) | | | | | |
|---|-----------------------------------|-------|-------|-------|-------|------|
| | None | D0-D4 | D1-D4 | D2-D4 | D3-D4 | D4 |
| Current | 49.5 | 50.5 | 28.9 | 18.4 | 8.5 | 4.6 |
| Last Week (11/11/2008 map) | 47.3 | 52.7 | 32.3 | 19.1 | 8.8 | 4.6 |
| 3 Months Ago (08/26/2008 map) | 34.3 | 65.7 | 45.3 | 26.7 | 10.9 | 1.5 |
| Start of Calendar Year (01/01/2008 map) | 9.6 | 90.4 | 74.3 | 58.5 | 41.0 | 22.0 |
| Start of Water Year (10/07/2008 map) | 35.2 | 64.8 | 41.8 | 20.8 | 9.4 | 1.9 |
| One Year Ago (11/20/2007 map) | 11.3 | 88.7 | 75.6 | 55.4 | 41.7 | 27.2 |

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>



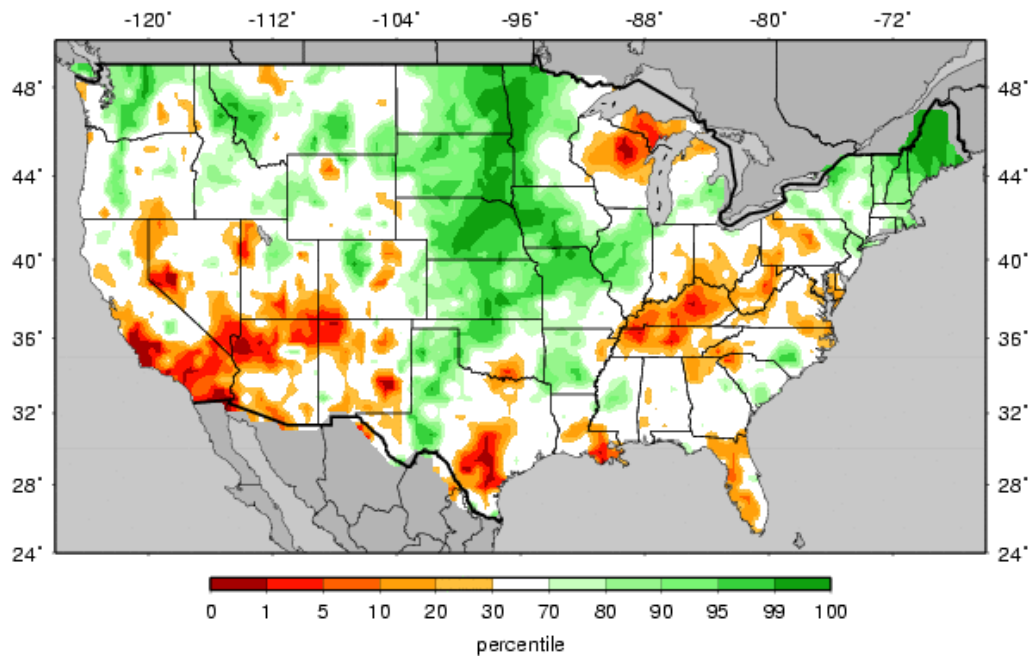
Released Thursday, November 20, 2008
Author: Brad Rippey, U.S. Department of Agriculture

Fig. 4b: Drought Monitor for the Southeast shows some improvement (D1-D4) since last week. The D4 area is the worst drought level currently in the US.

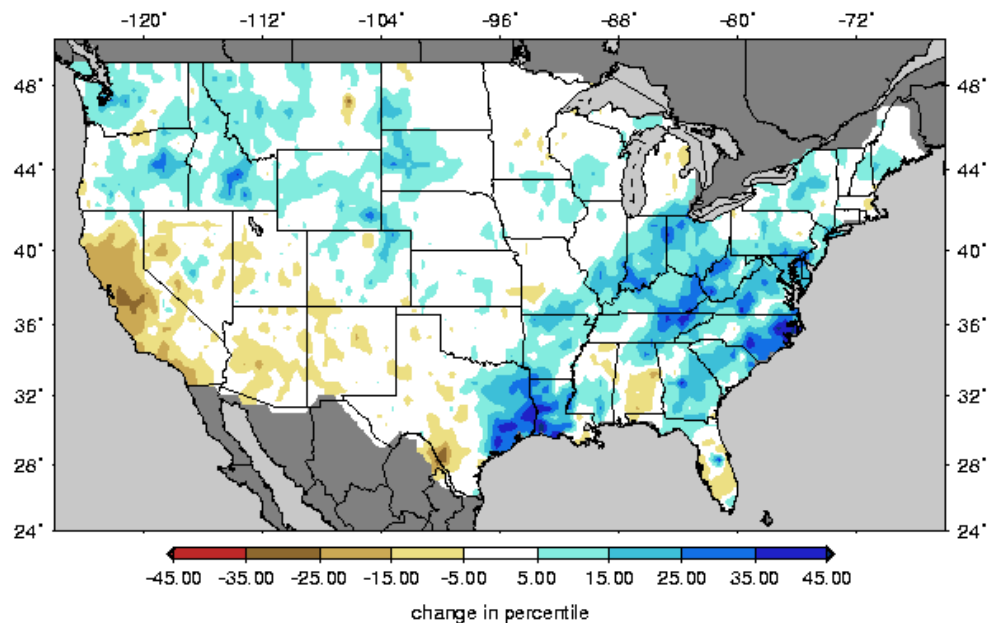
Ref: http://www.drought.unl.edu/dm/DM_southeast.htm

Weekly Snowpack and Drought Monitor Update Report

MULTIMODEL Soil Moisture Percentiles (wrt/ 1920-2003)
20081118



Change in Soil Moisture Percentiles (wrt/ 1915-2003)
for the week 20081111 to 20081118



Figs. 5a & 5b: Soil Moisture Ranking and change in percentile based on 1915-2003 climatology for this past week. Significant changes since last week include: improvement over much of the eastern third of the nation and drying over central California (Fig. 5a and 5b). However, Wisconsin-northern Michigan and Kentucky-Tennessee are still considerably dry.

Ref: http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.multimodel.sm_qnt.gif
http://www.hydro.washington.edu/forecast/monitor/curr/CONUS.vic.sm_qnt.1wk.gif

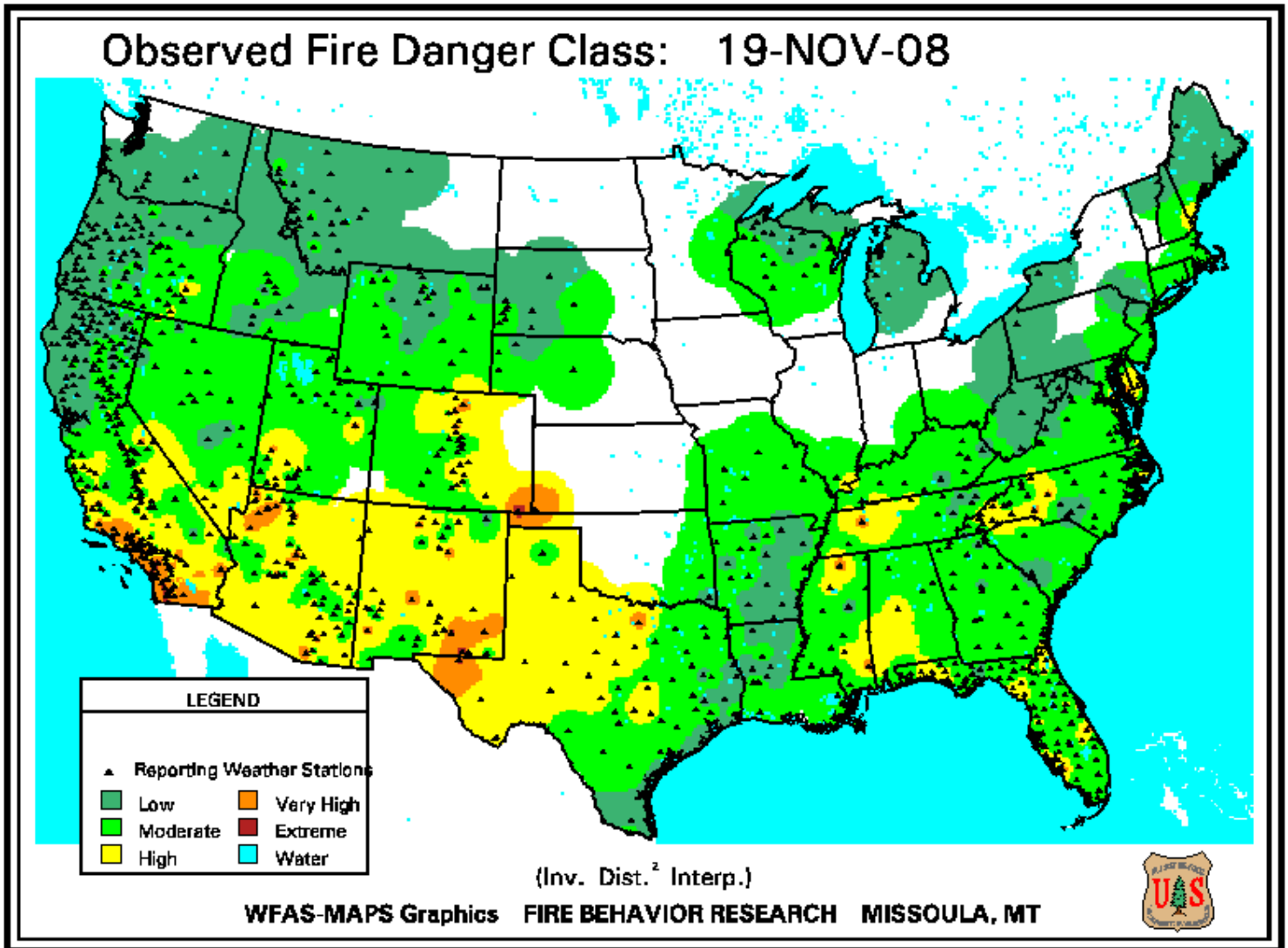
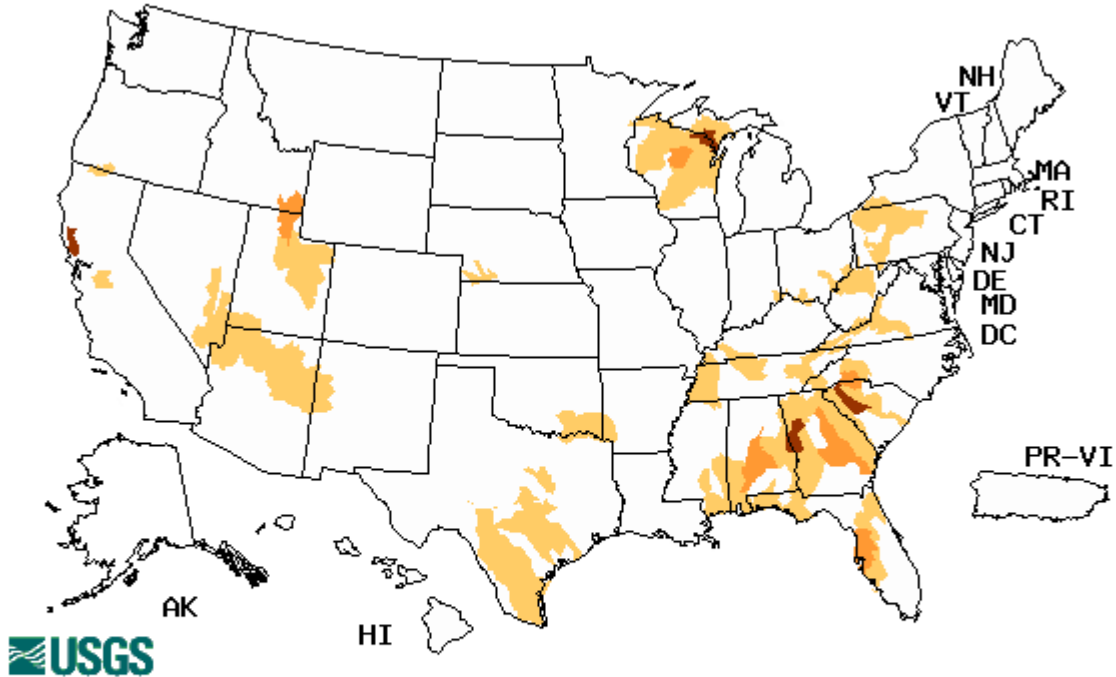


Fig. 6. Observed Fire Danger Class. Note most of the Southwest US has worsened since last week. Very high fire conditions dominate coastal southern California. These conditions are a result of a very strong Santa Anna this past week (<http://blogs.usatoday.com/weather/2008/11/santa-ana-winds.html>). Source: Forest Service Fire Behavior Research – Missoula, MT. Ref: http://www.fs.fed.us/land/wfas/fd_class.gif

Weekly Snowpack and Drought Monitor Update Report

Wednesday, November 19, 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 persistent low flows over parts the Southeastern States (contracting), and over the Upper Peninsula of Michigan. . Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary – November 18, 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/>.

The East and South: Widespread 1- to 2-inch rainfall totals, with locally higher amounts, fell across the East, resulting in a modest contraction of the drought area. In addition, rain during the moisture recharge season and diminishing agricultural impacts resulted in the removal of the “A” (agricultural) designation from the northern half of the Eastern drought area. As of November 16, the U.S. Department of Agriculture rated 73% of Ohio’s winter wheat in good to excellent condition, along with 81% of North Carolina’s crop. However, the southern Appalachians’ core area of extreme and exceptional drought (D3 and D4) remained virtually unchanged due to significant and persistent hydrological impacts. Heavy rain (generally 2 to 4 inches) fell across eastern North Carolina, eliminating severe drought (D2) and reducing the coverage of abnormal dryness and moderate drought (D0 and D1). The coverage of D0 was also reduced from eastern Maryland into southern New Jersey. A separate area of D0 across southern Louisiana was reduced sharply in size due to as much as 2 to 5 inches of rain in the southwestern part of the state.

The Great Lakes Region: Rain and melted snow resulted in 0.5 to 1.0 inch of liquid equivalent totals across the southeastern half of the drought area stretching from the upper Mississippi Valley to Upper Michigan. The extent of abnormal dryness (D0) and moderate to severe drought (D1 to D2) decreased very slightly across northeastern Iowa and southern and eastern Wisconsin. In addition, the designation of the drought region was changed from “AH” to “H”, reflecting the increase in topsoil moisture and lack of agricultural impacts at this time of year.

The Plains: An assessment of rain and snow from earlier storms resulted in the removal of severe drought (D2) from all of western North Dakota and easternmost Montana. That region became completely free of D2 for the first time since September 25, 2007. Elsewhere in Montana, there was an expansion of abnormal dryness (D0) and the introduction of moderate drought (D1) on the High Plains just east of the Rocky Divide across the state’s northern tier. Some D1 also crept into southwestern Montana. Meanwhile, there were no changes to the hydrological dryness and moderate drought (D0 and D1) on the central High Plains, but very heavy rain, with totals locally in excess of 5 inches, dented the eastern edge of the drought area in Texas. Nevertheless, a core area of extreme drought (D3) persisted in south-central Texas.

The West: Flooding subsided west of the Cascades, where November 1-18 rainfall totals included 14.43 inches (166% of normal) in Quillayute, Washington, and 9.94 inches (165%) in Astoria, Oregon. Although significant precipitation ended after November 12, enough moisture spilled across the Cascades to result in a reduction in the coverage of abnormal dryness (D0) in northeastern Oregon and adjoining areas. Across the interior Northwest, rain resulted in a slight improvement in winter wheat condition. Between November 9 and 16, the U.S. Department of Agriculture reported that the percentage of Oregon’s winter wheat rated in very poor to poor condition changed from 29 to 24%. During the same period, Washington’s wheat rated very poor to poor changed from 32 to 30%. Farther south, however, short-term dryness intensified in the Four Corners region. As a result, D0 was introduced in parts of southeastern Utah, southwestern Colorado, northwestern New Mexico, and northeastern Arizona. California’s drought depiction was not changed, although conditions remained ripe for additional wildfire activity across southern areas. Mid-November wildfires near Los Angeles charred more than 40,000 acres of vegetation and damaged or destroyed nearly 1,000 structures. On November 14-15, consecutive daily-record highs were reported in California locations such as Burbank (91 and 90 degrees F), Santa Ana (94

Weekly Snowpack and Drought Monitor Update Report

degrees F both days), and El Cajon (94 and 96 degrees F). In addition, winds howled across California, with gusts reaching 75 mph (on November 13) on Whitaker Peak and 78 mph (on November 15) at Camp Nine. The latter gust occurred near the site of the Sayre fire, which was one of three major incidents (along with the Freeway complex and the Tea fire) to affect the hills near Los Angeles. The Freeway complex was the largest of the fires, with acreage approaching 30,000 acres by November 18, while the Sayre fire was the most destructive, with more than 600 structures consumed by flames.

Alaska and Hawaii: Recent heavy snowfall brought an end to abnormally dry conditions (D0) along Alaska's Arctic Coast. For example, Barrow received 23.2 inches of snow last month, breaking its October 1925 record of 21.2 inches. Barrow received an additional 6.8 inches during the first half of November, ranking as its seventh-snowiest November 1-15 period on record. Meanwhile, recent showers on Kauai, Hawaii, brought enough improvement in pasture conditions to warrant the removal of severe drought (D2) from the northeastern part of the island. In addition, Kauai's extent of moderate drought (D1) was reduced. Elsewhere in Hawaii, however, the drought depiction remained unchanged.

Looking Ahead: During the next 5 days (November 20-24), dry weather will prevail nearly nationwide. Snow squalls will re-develop in areas downwind of the Great Lakes, while rain and snow showers will affect the northern Rockies and the Pacific Northwest. On November 21-22, a fast-moving storm system could produce light snow across the northern Plains and the Great Lakes region, while scattered rain showers may fall across the Mid-South. Warm weather in the West will contrast with chilly conditions across the Midwest and East.

The CPC 6- to 10-day forecast (November 25-29) calls for the likelihood of below-normal temperatures in the East, while warmer-than-normal weather will prevail across the Northwest, the Intermountain West, and the northern and central Plains. Meanwhile, below-normal precipitation across the majority of the U.S. will contrast with wetter-than-normal conditions in southern California and the Desert Southwest.

Author: Brad Rippey, U.S. Department of Agriculture

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 20 November 2008