



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

Weekly Report - Snowpack / Drought Monitor Update **Date:** **26 February, 2009**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent percent to date shows values dropping more than 10 percent over Arizona while the remainder of the West saw little change since last week. Deficits persist over the Northern Tier States while surpluses exist from eastern Nevada to Arizona and from northern New Mexico to northeast Wyoming (exception over the North Platte Drainage in Wyoming) (Fig 1). Unofficial forecast changes for the past 7 days for selected SNOTEL sites shows that forecast values have lowered over New Mexico and southwest Utah and are up over the Central Colorado Rockies (Fig. 1a). This past week's snow depth changes show increases over the Cascades and Northern Rockies and decreases over the Sierra, Great Basin, Utah Ranges, and Arizona Mountains (Fig. 1b).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were above normal across most of the West during the past week (Fig. 2). Specifically, the greatest positive temperature departures occurred over western Montana (>+9F) and the greatest negative departures occurred over eastern Montana (<-9F) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 25 February shows a very wet week from Northern California to northeast Washington, over eastern Utah and over scattered regions of Wyoming and Colorado. Much drier conditions prevailed over the remainder of the Rockies, Great Basin, and Southwest (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 remaining pretty much unchanged this week (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: Heavy precipitation again fell on the northern half of California, except in the northeastern most portions of the state. Between 5 and 10 inches fell on the southern Cascades and northern Sierra Nevada, and at a few locations along the western coastline, with 1 to 5 inches reported in the rest of the Sierra Nevada, the western coastline from the Monterey area northward, and the central tier of the state from the Sacramento area northward. The 2008-2009 water year, which began in October, got off to a dry start, but the past 4 weeks brought a series of wet storms through this region that dropped in aggregate over 20 inches of precipitation on parts of the southern Cascades and northern Sierra Nevada, and at least a few inches on the rest of the region. Two large reservoirs, Shasta (near Redding) and Oroville (near Chico), were approaching historically low storage levels in late January, but since then, the quantity of water stored in both reservoirs has increased by more than 22 percent. Streamflows in the region have risen to near or above normal levels, and immediate surface moisture concerns have been assuaged. On the other hand, the heavy precipitation this past month is competing with precipitation shortfalls that have been accumulating for more than 2 years. Furthermore, this heavy precipitation fell on climatologically wet areas during the wettest time of year, so departures from normal, even in the relative short term, have not been as dramatically impacted as one might think.

Weekly Snowpack and Drought Monitor Update Report

Precipitation totals through almost the entire region are still slightly below normal since late December, and most locations remain at least 4 inches behind the amounts typically recorded from the start of the water year through late February. As a result, the drought depiction didn't change dramatically this week, with former D2 to D3 areas improving by one category from the southern Cascades southward and southeastward into the northern Sierra Nevada and the northern reaches of the Sacramento area. It should be noted as an aside that regardless of how much precipitation falls during the next week; additional changes are possible across the state as further assessments are made of the complex, intertwined impacts and issues involved.

Much drier conditions were observed in other parts of the West, keeping dryness and drought unchanged in most areas. Exceptions included east-central Nevada, where a well-above-normal snowpack led to a contraction of D2 conditions, and south-central Idaho, where snowpack water content under 80 percent of normal and gradually increasing long-term precipitation deficits prompted a northward expansion of D1 conditions. 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.

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.

Weekly Snowpack and Drought Monitor Update Report

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/>

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

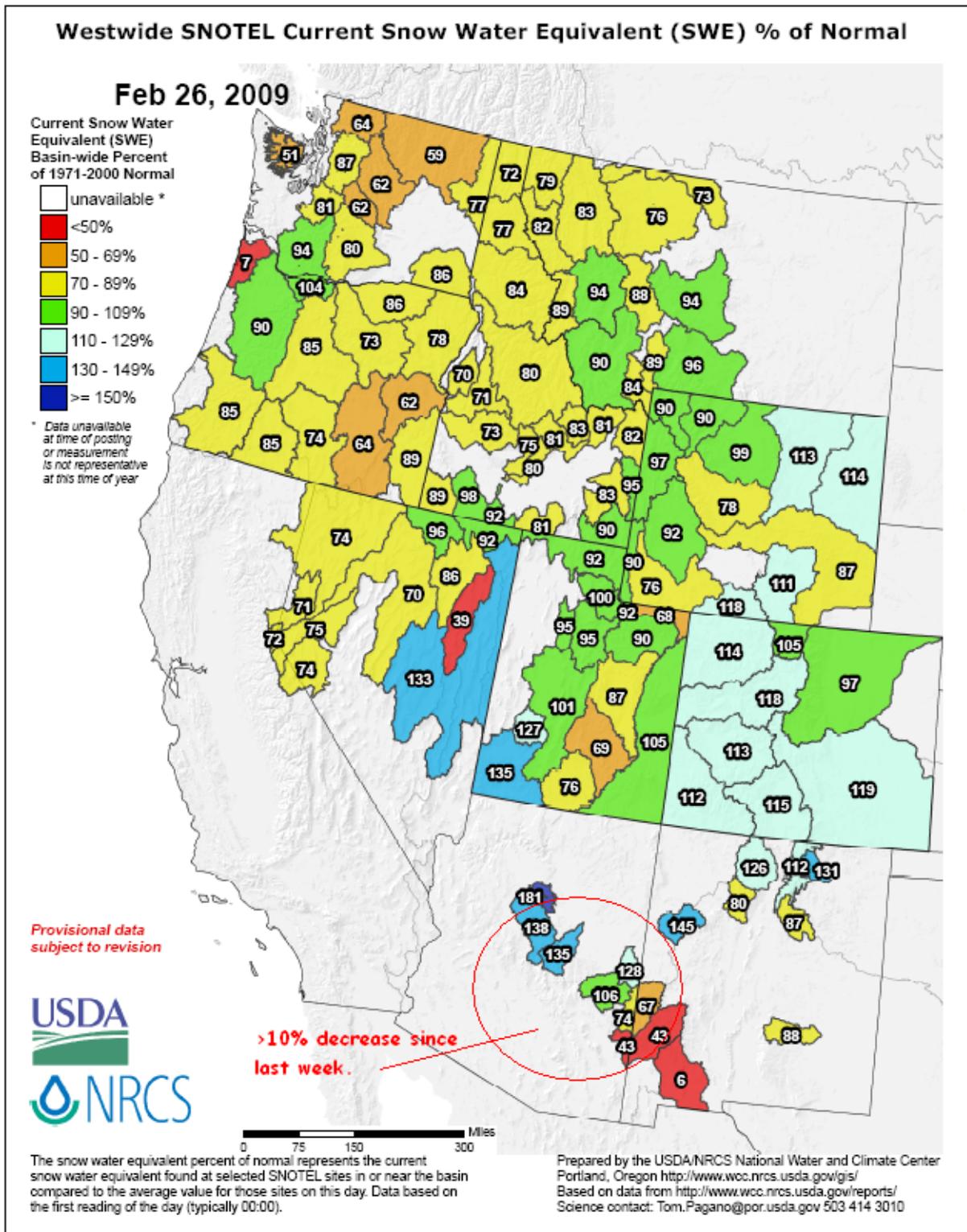


Fig. 1. Snow-water equivalent percent to date shows values dropping more than 10 percent over Arizona while the remainder of the West saw little change since last week. Deficits persist over the Northern Tier States while surpluses exist from eastern Nevada to Arizona and from northern New Mexico to northeast Wyoming (exception over the North Platte Drainage in Wyoming).
Ref: http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf

Weekly Snowpack and Drought Monitor Update Report

7-Day Guidance Forecast Change as Percent of 1971-2000 Normal

Feb 26, 2009

For guidance only

7-Day Guidance
Forecast Change
(% normal)

- ✕ > 20% gain
- ▲ 16 - 20%
- ▲ 11 - 15%
- ▲ 6 - 10%
- ▲ 1 - 5%
- ⊖ no change
- ▼ -5 - -1%
- ▼ -10 - -8%
- ▼ -15 - -11%
- ▼ -20 - -16%
- ✚ > 20% loss
- ⊖ Unavailable*

* Forecast unavailable due to insufficient realtime data or low forecast skill

Provisional Data
Subject to Revision

Miles
0 50 100 200



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

This is a completely automated objective product based on SNOTEL data. This product is not meant to replace or supersede the official forecasts produced in coordination with the National Weather Service.

Fig. 1a: Selected preliminary daily water supply forecast changes since last week show that forecast values have lowered over New Mexico and southwest Utah and are up over the Central Colorado Rockies.

Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/daily_forecast/maps/west_dailyfcst_7daych.pdf

SNOTEL 7-Day Snow Depth Change (Inches)

Feb 26, 2009

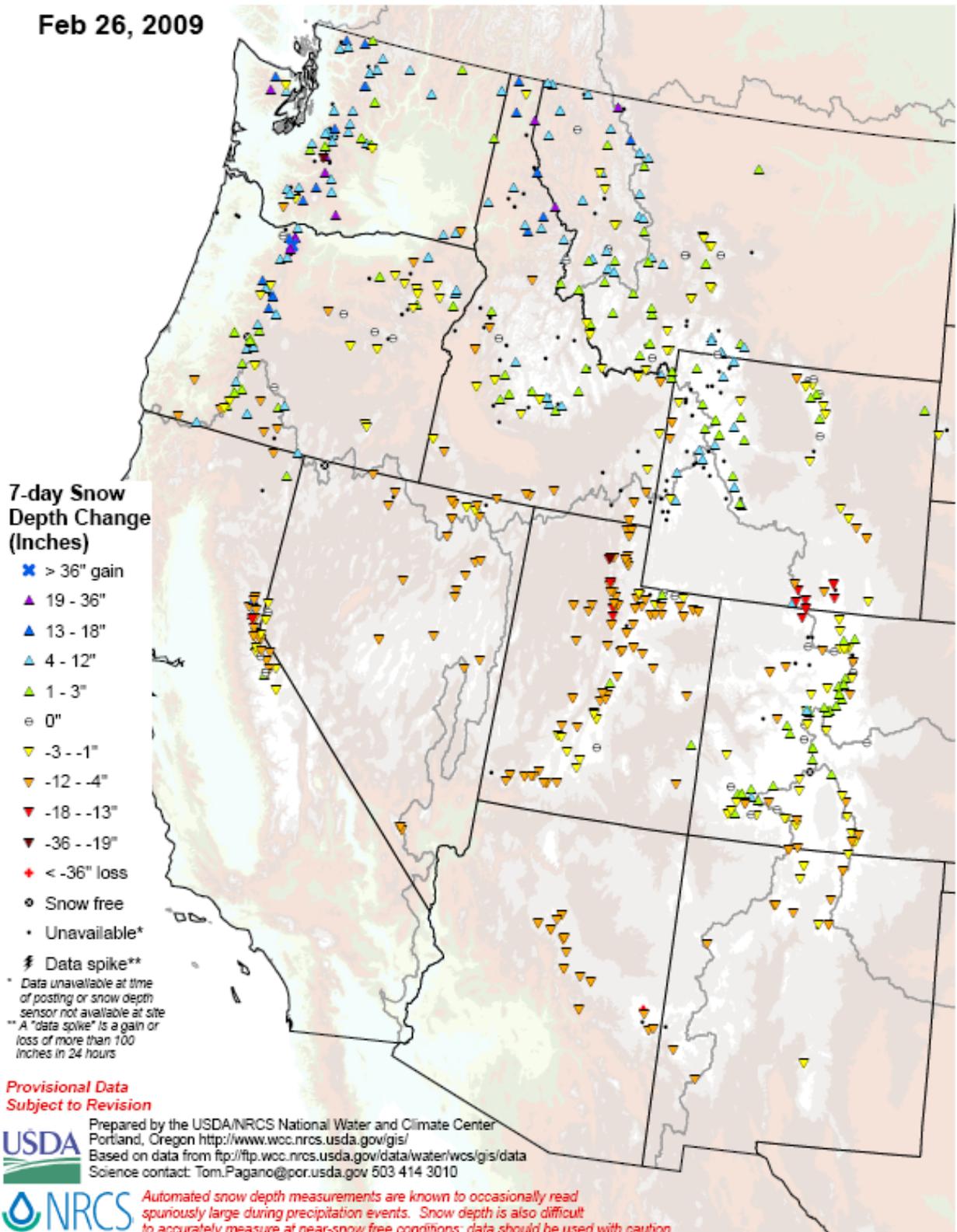


Fig. 1b: This past week's snow depth changes show increases over the Cascades and Northern Rockies and decreases over the Sierra, Great Basin, Utah Ranges, and Arizona Mountains.

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)

Feb 26, 2009

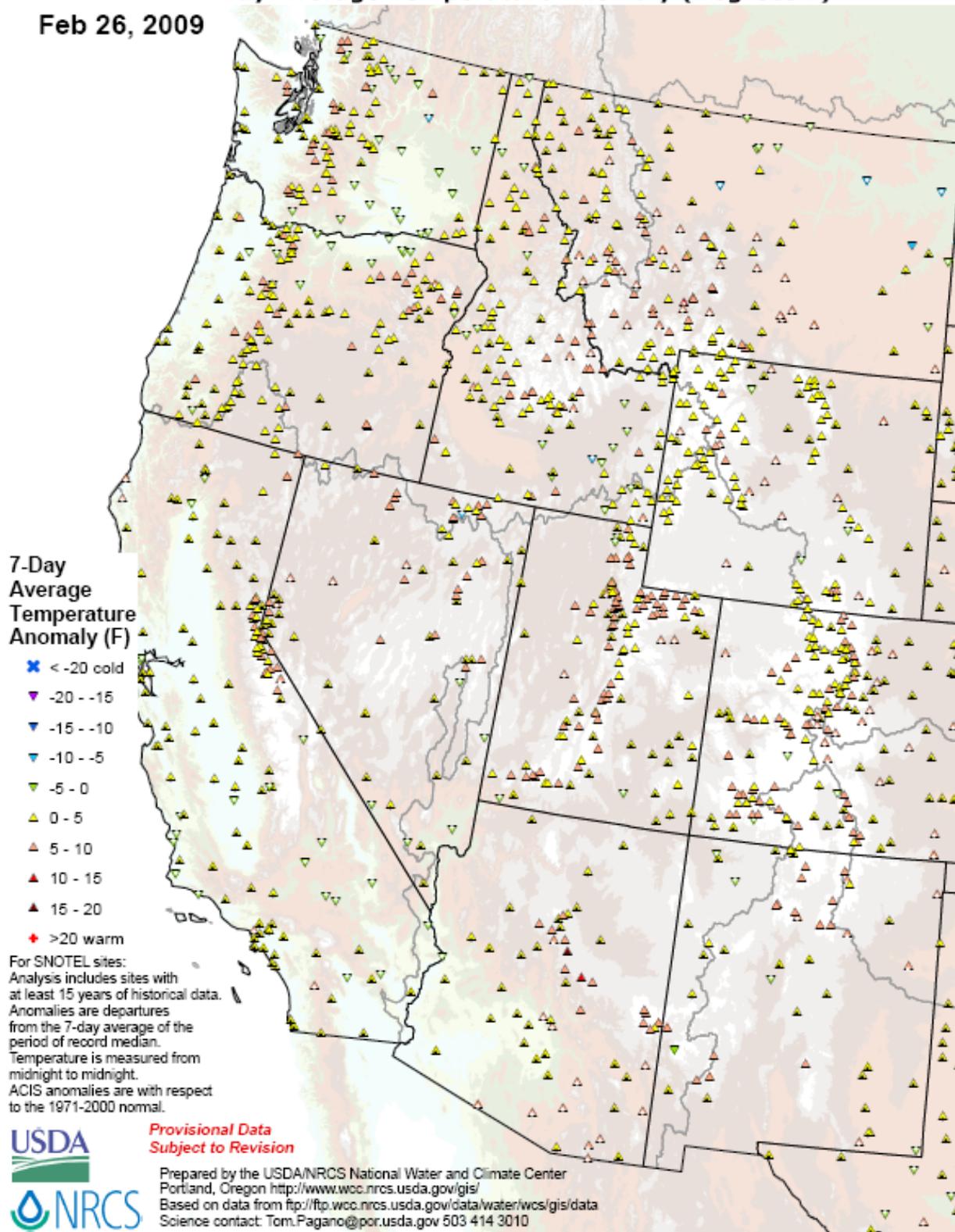
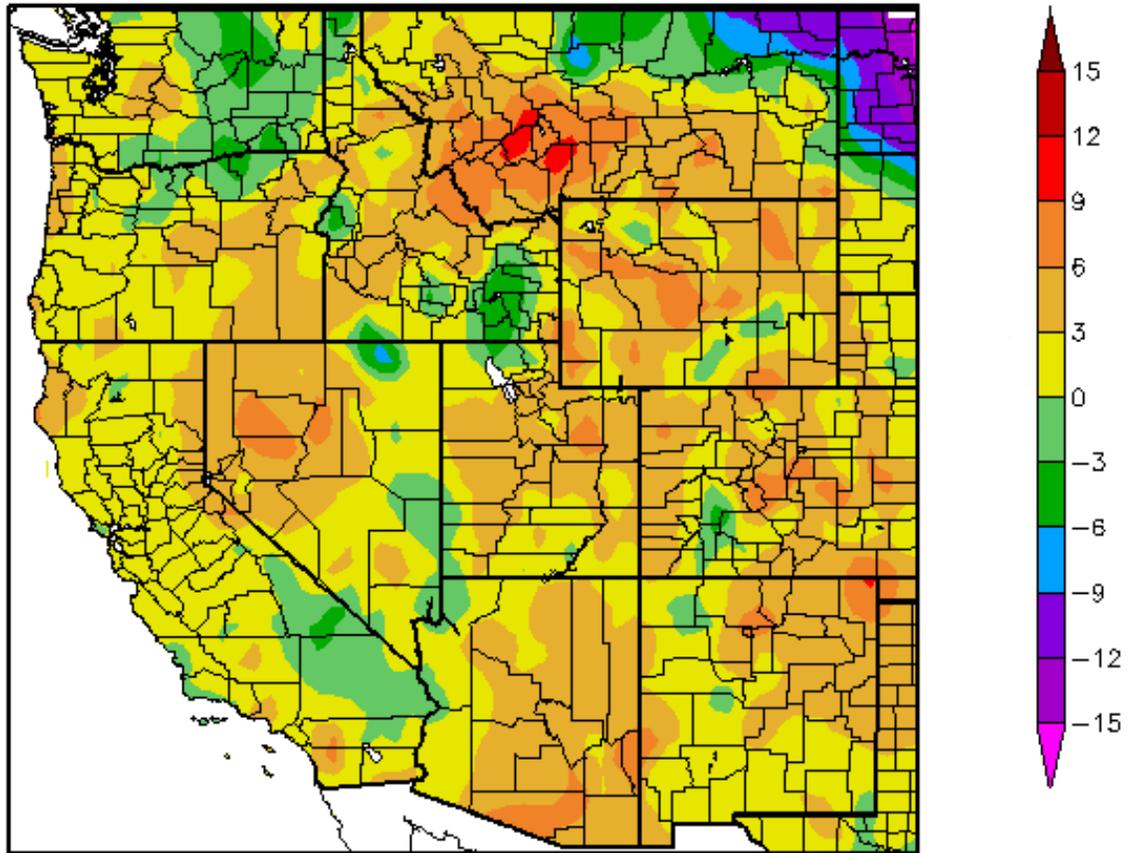


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were above normal across most of the West during the past week.

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

Departure from Normal Temperature (F)
2/19/2009 – 2/25/2009

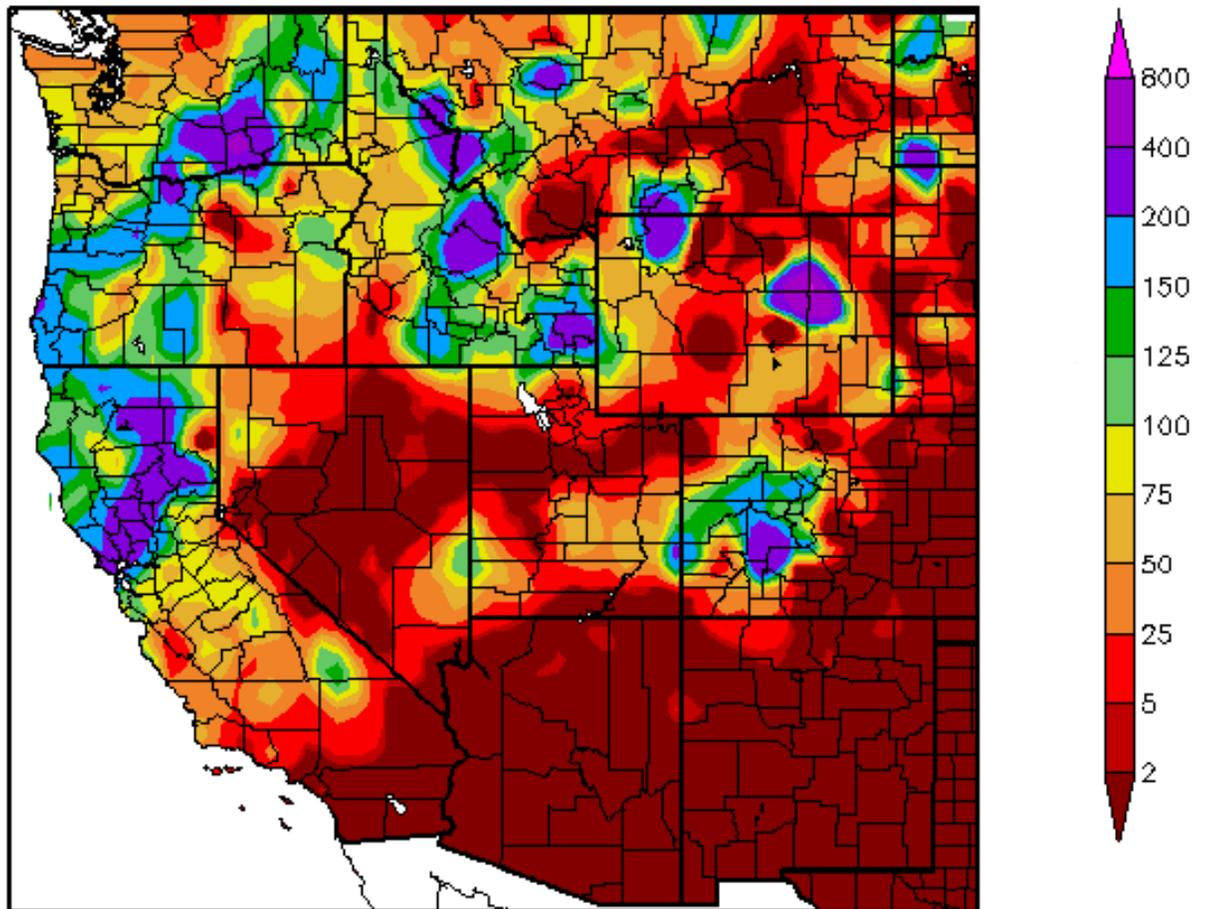


Generated 2/26/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies: Greatest positive temperature departures occurred over western Montana (>+9F) and the greatest negative departures occurred over eastern Montana (<-9F). Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDept

Percent of Normal Precipitation (%)
2/19/2009 – 2/25/2009



Generated 2/26/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 25 February shows a very wet week from Northern California to northeast Washington and over eastern Utah and scattered regions of Wyoming and Colorado. Much drier conditions prevailed over the remainder of the Rockies, Great Basin, and Southwest.

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

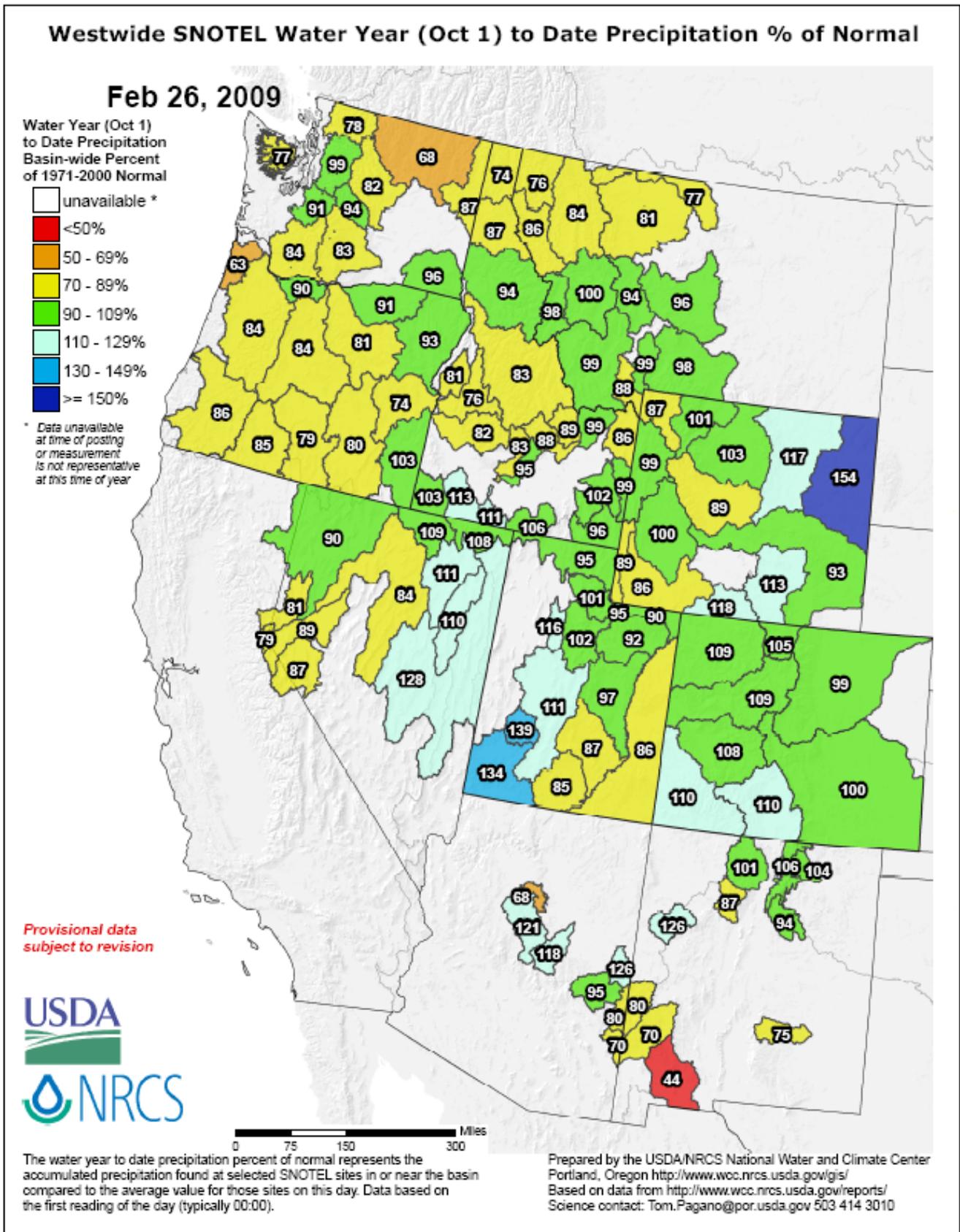


Fig 3b. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values remaining pretty much unchanged this week.

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

U.S. Drought Monitor

February 24, 2009
Valid 8 a.m. EST

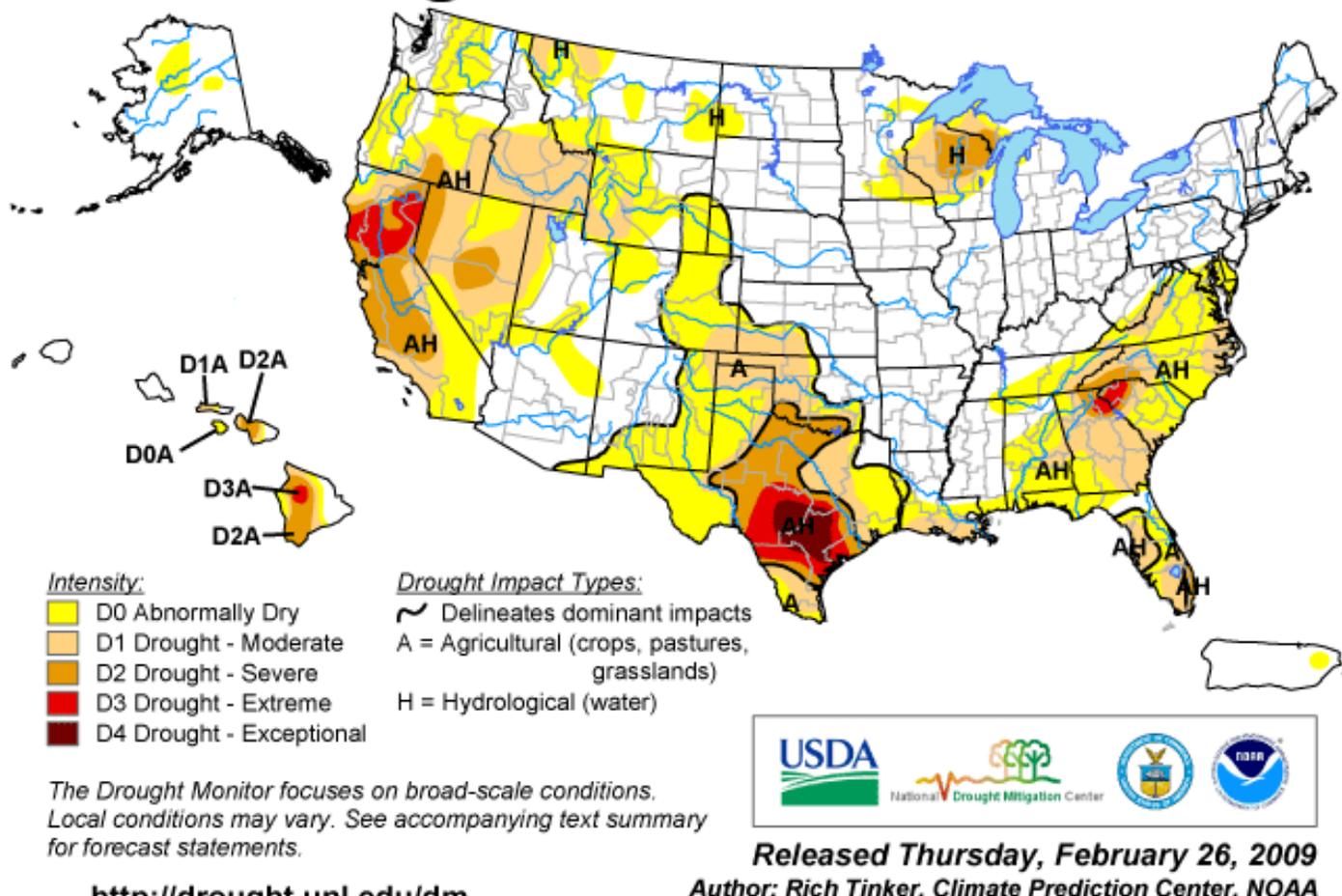


Fig. 4. Current Drought Monitor weekly summary.

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

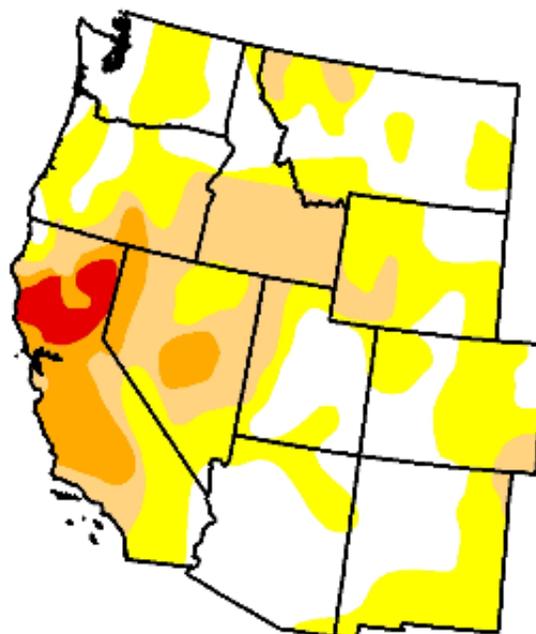
U.S. Drought Monitor

West

February 24, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	37.2	62.8	26.5	9.0	2.0	0.0
Last Week (02/17/2009 map)	37.6	62.4	24.4	10.1	2.2	0.0
3 Months Ago (12/02/2008 map)	32.8	67.2	29.6	8.6	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 (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (02/26/2008 map)	37.8	62.2	37.0	16.6	0.0	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, February 26, 2009
Author: Rich Tinker, CPC/NOAA

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Note little change in drought conditions since last week. Daily update for California can be viewed at: <http://cdec.water.ca.gov/cgi-progs/reports/DROUGHTSUM>
Ref: http://www.drought.unl.edu/dm/DM_west.htm

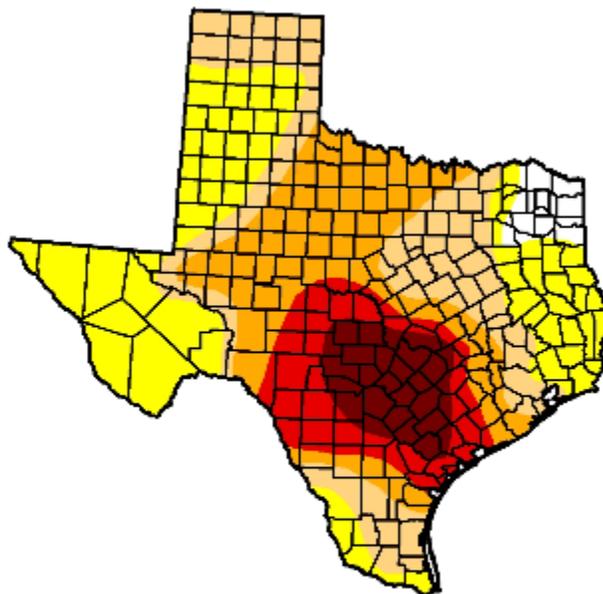
U.S. Drought Monitor

Texas

February 24, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	3.2	96.8	65.5	43.1	19.9	8.6
Last Week (02/17/2009 map)	4.1	95.9	61.8	43.1	19.9	8.6
3 Months Ago (12/02/2008 map)	53.0	47.0	24.5	14.2	7.5	1.2
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0
One Year Ago (02/26/2008 map)	29.0	71.0	44.2	19.3	2.0	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

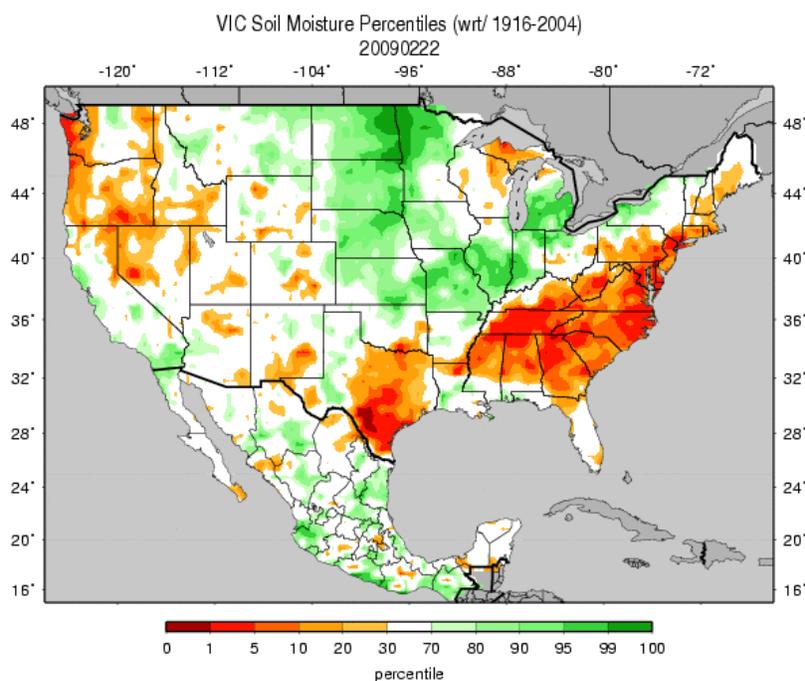
<http://drought.unl.edu/dm>



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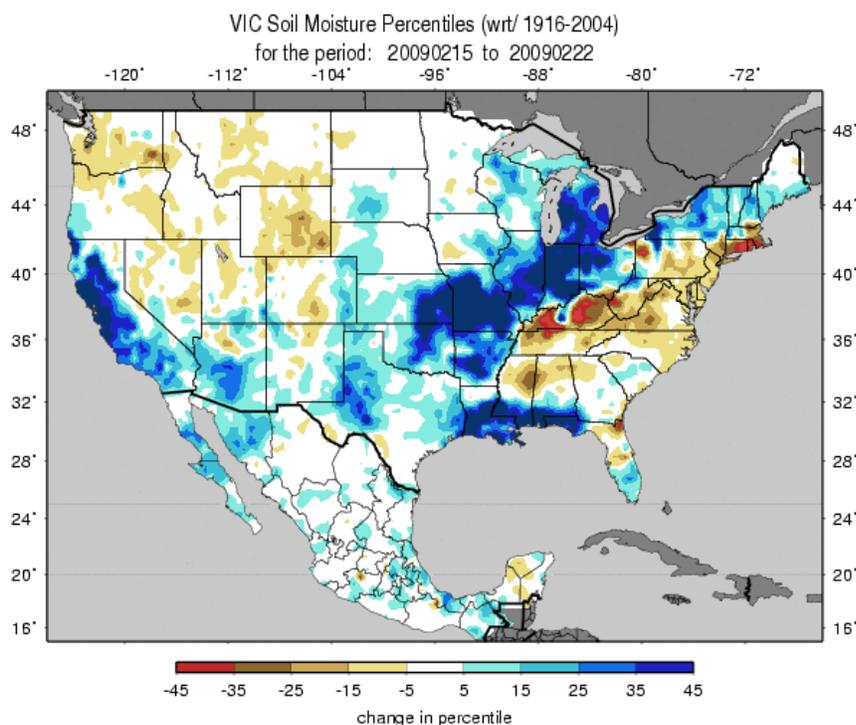
Fig. 4b: Texas is the only state with D4 drought condition in the US. Note little change since last week. Ref: http://www.drought.unl.edu/dm/DM_southeast.htm

Weekly Snowpack and Drought Monitor Update Report



Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology for this past week. Near saturation exists over the Northern Plain while excessive dryness dominates much of the South, Mid-Atlantic, and the Upper Peninsula of Michigan. No significant change since last week.

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 this past week. Note improvement over the California, Arizona and the Central US and major worsening over the Kentucky and southern New England.

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

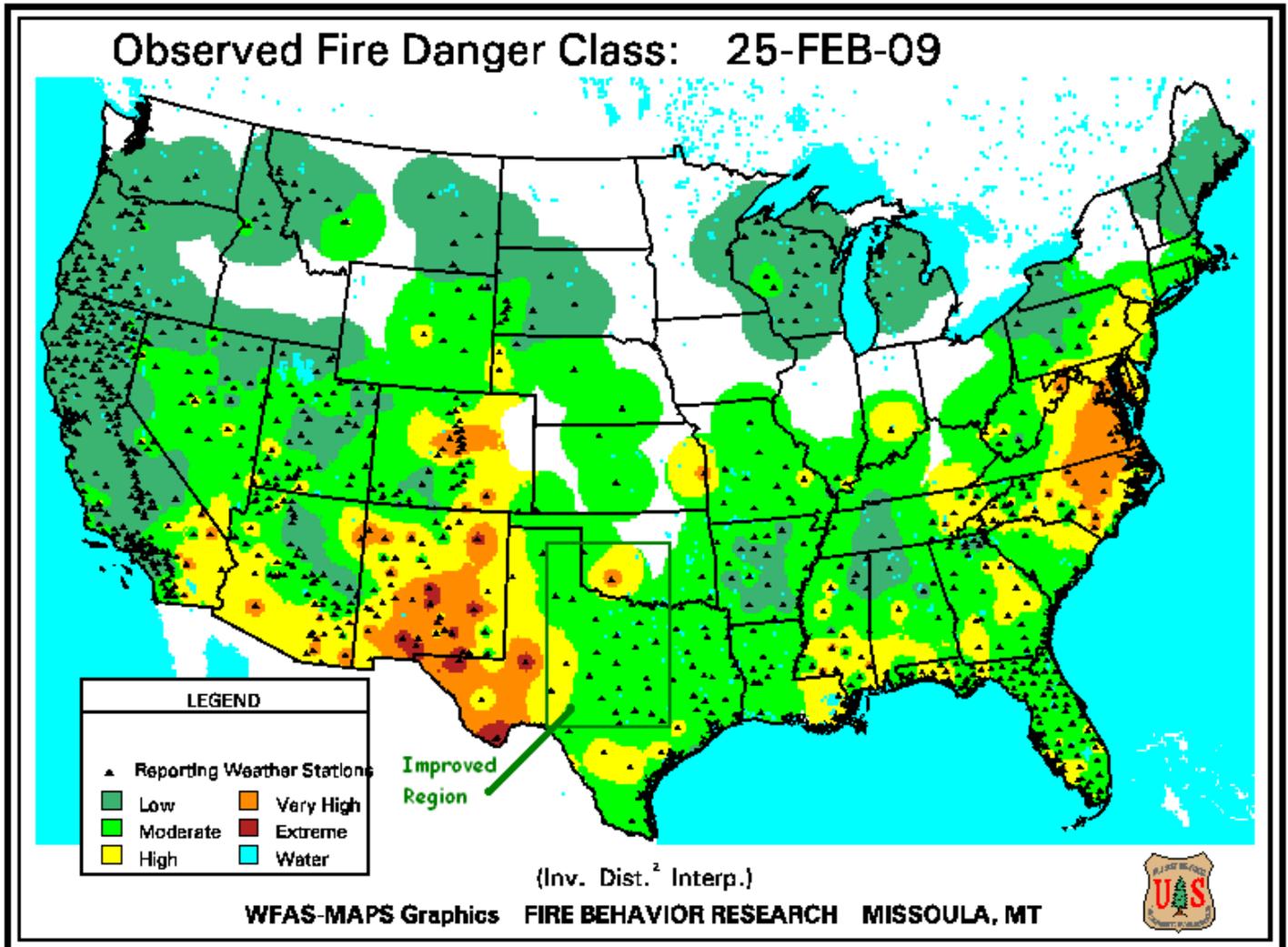
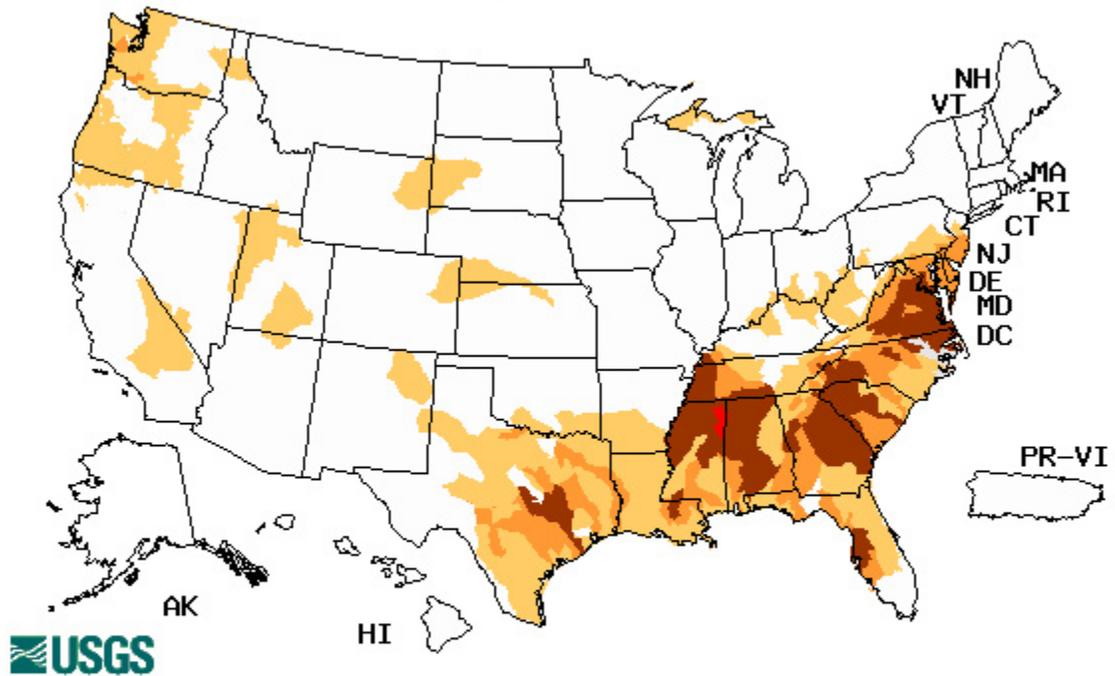


Fig. 6. Observed Fire Danger Class. Conditions have improved considerably over Texas and over parts of Florida since last week. Source: Forest Service Fire Behavior Research – Missoula, MT.
Ref: http://www.fs.fed.us/land/wfas/fd_class.gif

Weekly Snowpack and Drought Monitor Update Report

Wednesday, February 25, 2009



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. Conditions continue to be very poor from Texas to the Mid-Atlantic States during the past week. Elsewhere, over the Northern States, cold temperatures have probably frozen rivers and thus do not necessarily reflect accurate flows. Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary – February 24, 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/>.

Beneficial precipitation again fell on central and northern California, particularly in the higher elevations, abetting continued albeit slow relief from dryness and drought dating back well over 2 years. Farther east, moderate to heavy rainfall was spotty at best, resulting in only isolated, localized improvement and several areas of deterioration.

The East: Moderate to locally heavy precipitation fell on many locations from the northernmost tier of Florida northward through the Carolinas, with light amounts reported in most other areas of dryness and drought to the south and east of the Ohio River. The primary exception was the southern half of Florida, where only a few locations recorded measurable precipitation.

For most of the region, dryness and drought intensities remained unchanged; however, declining streamflows and slowly increasing precipitation deficits led to the introduction of moderate drought through most of Georgia, and farther south, moderate drought was expanded into parts of southwestern and east-central Florida, with a sliver of severe drought introduced along the southeastern coastline in the Miami and Palm Beach areas. Although winter is a dry time of year for the southern half of Florida, this past winter has been one of the driest on record at many locations, pushing soil moisture, lake levels, fire danger, and other reflections of surface moisture to critically low levels. Hydrologic concerns, which tend to respond to precipitation on longer time scales and typically arise during the wetter time of year (late spring through late autumn), are less critical at this juncture, but could decline quickly should dry weather persist through the next few months.

The Great Lakes Region: Light to moderate precipitation fell on most of the areas affected by dryness and drought, keeping drought classifications unchanged. Precipitation this past winter has been unremarkable to somewhat low, but a respectable snowpack has accumulated in most areas, which should provide at least some surface moisture recharge during spring snowmelt.

The Plains and Mississippi River Delta: It was a dry week for areas to the north and west of central Texas, and only isolated sites reported over 0.5 inch farther south and east, including the southern tier of Louisiana. The drought depiction for most of this region remained unchanged, with a couple of exceptions. First, D0AH was introduced across southwestern Louisiana and adjacent Texas, where moisture deficits have been growing slowly of late. Second, moderate agricultural drought was introduced across the northern Texas Panhandle, northwestern Oklahoma, and southwestern Kansas. Winter is a dry time of year for the region, and hydrologic concerns at this point are minimal. However, this winter has been considerably drier than normal following some heavy late-autumn precipitation, and winter wheat has suffered as a result.

The West: Heavy precipitation again fell on the northern half of California, except in the northeastern most portions of the state. Between 5 and 10 inches fell on the southern Cascades and northern Sierra Nevada, and at a few locations along the western coastline, with 1 to 5 inches reported in the rest of the Sierra Nevada, the western coastline from the Monterey area

Weekly Snowpack and Drought Monitor Update Report

northward, and the central tier of the state from the Sacramento area northward. The 2008-2009 water year, which began in October, got off to a dry start, but the past 4 weeks brought a series of wet storms through this region that dropped in aggregate over 20 inches of precipitation on parts of the southern Cascades and northern Sierra Nevada, and at least a few inches on the rest of the region. Two large reservoirs, Shasta (near Redding) and Oroville (near Chico), were approaching historically low storage levels in late January, but since then, the quantity of water stored in both reservoirs has increased by more than 22 percent. Streamflows in the region have risen to near or above normal levels, and immediate surface moisture concerns have been assuaged. On the other hand, the heavy precipitation this past month is competing with precipitation shortfalls that have been accumulating for more than 2 years. Furthermore, this heavy precipitation fell on climatologically wet areas during the wettest time of year, so departures from normal, even in the relative short term, have not been as dramatically impacted as one might think. Precipitation totals through almost the entire region are still slightly below normal since late December, and most locations remain at least 4 inches behind the amounts typically recorded from the start of the water year through late February. As a result, the drought depiction didn't change dramatically this week, with former D2 to D3 areas improving by one category from the southern Cascades southward and southeastward into the northern Sierra Nevada and the northern reaches of the Sacramento area. It should be noted as an aside that regardless of how much precipitation falls during the next week; additional changes are possible across the state as further assessments are made of the complex, intertwined impacts and issues involved.

Much drier conditions were observed in other parts of the West, keeping dryness and drought unchanged in most areas. Exceptions included east-central Nevada, where a well-above-normal snowpack led to a contraction of D2 conditions, and south-central Idaho, where snowpack water content under 80 percent of normal and gradually increasing long-term precipitation deficits prompted a northward expansion of D1 conditions.

Hawaii, Alaska and Puerto Rico: It was an uneventful week across Hawaii, with scattered moderate to heavy rainfall reported, but reports of easing impacts, particularly from the agricultural sector, led to improvements across western Molokai (to D1) and limited improvements in parts of the Big Island.

In Alaska and Puerto Rico, abnormal dryness persisted.

Looking Ahead: Additional moderate to heavy precipitation is anticipated across central and northern California during February 26 – March 2, 2009. Except for the climatologically drier sections of northeastern California, more than 1 inch is forecast area-wide, with totals reaching as high as 4 inches in the higher elevations and the northwestern sections of the state. In addition, moderate to locally heavy precipitation is expected in northern sections of the Intermountain West and Rockies, with totals topping out around 1.5 inches in parts of central and northern Idaho. Unfortunately, significant precipitation is forecast to evade other areas of dryness and drought west of the Mississippi River. Farther east, at least light to moderate precipitation is expected in existing areas of dryness and drought, with inconsequential totals limited to the southern half of Florida. Generally 1 to 3 inches are forecast from central sections of Alabama and Georgia northward through the Carolinas and mid-Atlantic region.

For the ensuing 5 days (March 3 – 7, 2009), the odds favor drier than normal weather from the southernmost Rockies and the southern half of the High Plains eastward through Texas, the lower Mississippi Valley, and the Southeast. Subnormal amounts are also anticipated in the abnormally dry areas in Alaska. In contrast, surplus precipitation seems more likely in the Great Lakes region, the northern Intermountain West, the Great Basin, and the West Coast states.

Author: Richard Tinker, Climate Prediction Center, NOAA

Weekly Snowpack and Drought Monitor Update Report

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: 26 February 2009