



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

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**Weekly Report - Snowpack / Drought Monitor Update**      **Date:**    **January 25, 2007**

## **SNOTEL SNOWPACK AND PRECIPITATION SUMMARY**

**Snowpack:** During the 2007 Water Year, all but the Cascades and Front Range of the Central and Southern Rockies have below normal snow water-equivalent (Fig. 1). The deficits are much below normal over the Sierra Mountains near Lake Tahoe (Fig. 1a). During the past week, snowfall accumulation was down across much of the West except for some modest increases over parts of the Northern Rockies, Wind River and Big Horn Mountains in Wyoming, and over the high county of Arizona and New Mexico (Fig. 1b).

**Temperature:** During the past seven days, generally, temperatures were within +/- 5°F of normal with some colder spots over western Wyoming to northern Utah (Fig. 2).

**Precipitation:** During this report period, precipitation (rain and snow) was practically non-existent over the Great Basin and into southern Oregon and Idaho, and all of California (Fig. 3). Above normal amounts were confined to the southern half of Arizona and New Mexico. This can also be confirmed by radar estimates in Fig. 3a. Since October 2006, precipitation is above normal over the Central and Northern Cascades and eastern Colorado. Serious deficits are occurring over California and Arizona. Much of the West is beginning to see a gradual decrease in seasonal precipitation totals as high pressure begins to establish itself (Fig. 3b).

Continued worsening of drought levels are occurring over California (Fig. 4 & 4a). Soil moisture conditions continue to deteriorate over California and Arizona (Fig. 5) as the fire threat increases over southern California (Fig. 6). Stream flows over this region are also reflecting drying conditions (Fig. 7).

## **WESTERN DROUGHT STATUS**

**The Southwest and Rocky Mountains:** Although temperatures slowly moderated from last week's long-lasting, devastating freeze in California, they still averaged 4 to 8°F below normal. Once again, precipitation was nearly absent throughout the Southwest and Great Basin, continuing the disappointing wet season (since October 1) in this region, and realistically leaving only 2 more months when decent precipitation could occur. Water year-to-date Sierra Nevada basin average precipitation was only 51-62% of normal, and Jan. 23 basin average snow water content (SWC) stood at 37-50%, according to the NRCS. This season follows a poor and spotty 2006 summer monsoon, and a dry 2005-06 wet season. If it wasn't for the near- to record wet 2004-05 winter season in the Southwest, conditions would be even worse. Fortunately in California, major state averaged reservoirs stood at 70% of capacity, or 119% of normal, as of Dec. 31. Rain-fed pastures, ranges, and wildlife, however, are in poor to dismal shape, with wildfire danger remaining high, especially in southern California. With 12-month precipitation less than 70% of normal in the southern half of California, western Nevada, and western Arizona, and under 50% in the desert Southwest, D0-D2(A) was expanded northward to reflect the growing precipitation deficits. Meanwhile in southwestern Montana, another week with little

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or no precipitation dropped SWC to record low levels, expanding severe and developing extreme drought into the Shields river basin that includes the Bridger and Crazy Mountains.

In contrast, eastern portions of the Southwest benefited from mid- and late-week systems that dropped badly needed precipitation (liquid equivalents of 0.5 to 1.7 inches) on eastern Arizona and southern New Mexico. With plenty of cold air, much of the precipitation fell as welcome snow in the higher elevations, greatly increasing the water year-to-date basin average SWC. For example, Jan. 16 basin average SWC stood at 42-54% of normal in central Arizona, and 42-69% of normal in western New Mexico. One week later, those numbers increased to 63-78% and 81-124%, respectively. With conditions better in New Mexico thanks to its record wet summer monsoon, D0 was erased in southwestern and southeastern sections. In Arizona, extreme southeastern sections showed improvement (D0 removed) as it was the only area of the state to receive ample 2006 summer monsoon rainfall, while D3 was removed in northeastern Arizona. In the latter area, although it has the longest continuing run of deficits (going back 3 years), the last two snow storms have, at the very least, brought moderate improvement (Fig. 4).

***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 (Fig. 4). Detailed drought maps and statistics for the West and Wyoming are shown in Fig. 4a.

### **SOIL MOISTURE**

Soil moisture (Fig. 5) is estimated by a one-layer hydrological model ([Huang et al., 1996](#), [van den Dool et al., 2003](#)). The model takes observed precipitation and temperature and calculates soil moisture, evaporation and runoff. The potential evaporation is estimated from observed temperature. Reference: <http://www.cpc.ncep.noaa.gov/soilmst/img/curr.w.rank.daily.gif>.

### **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://www.nifc.gov/information.html>. The latest Observed Fire Danger Class is shown in Fig. 6.

### **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. Subregions 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](http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map).

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### 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/ DANIEL MEYER  
Acting Director, Conservation Engineering Division

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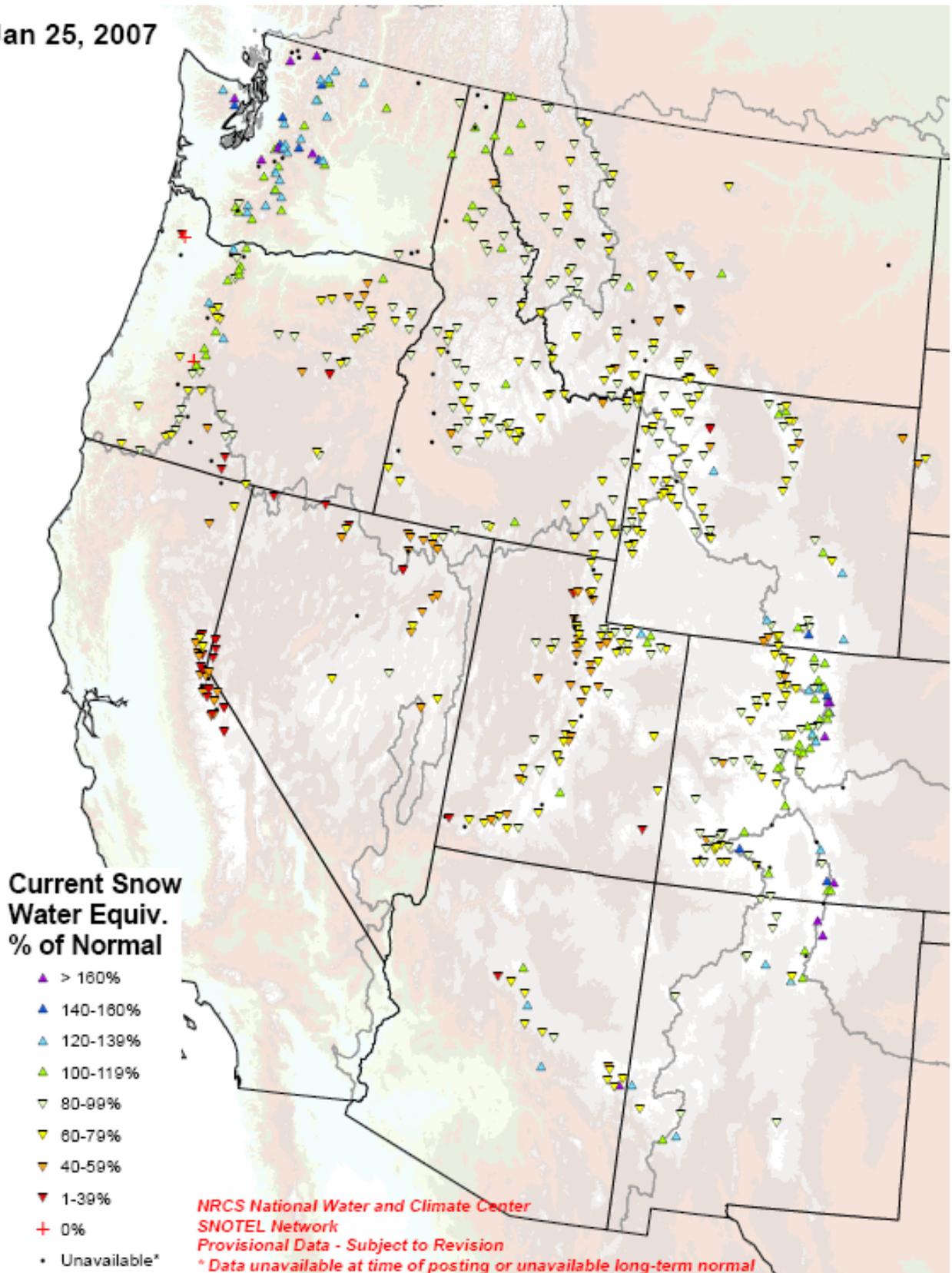


Fig. 1: Snow Water-Equivalent as a percent of normal for Water Year 2007.

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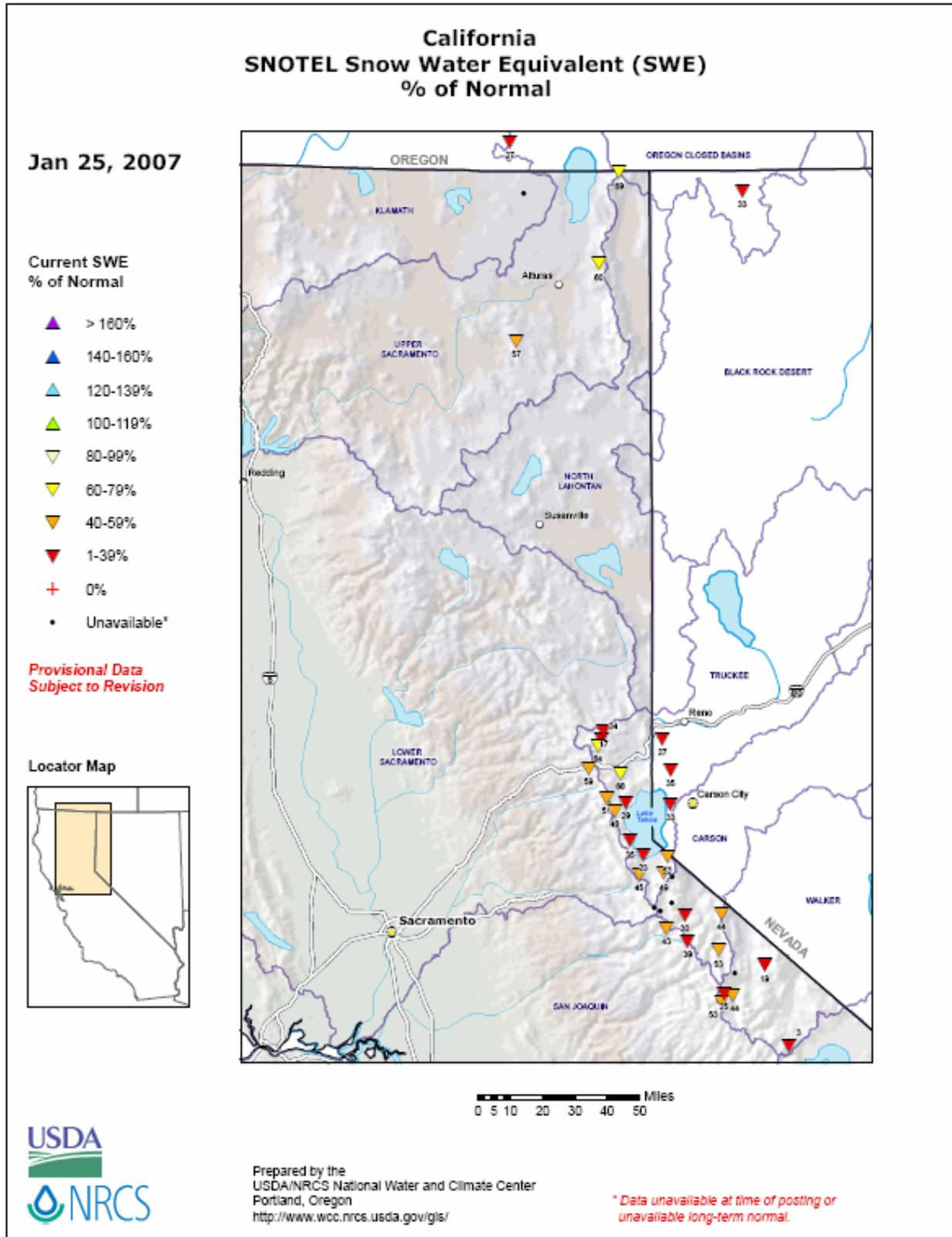
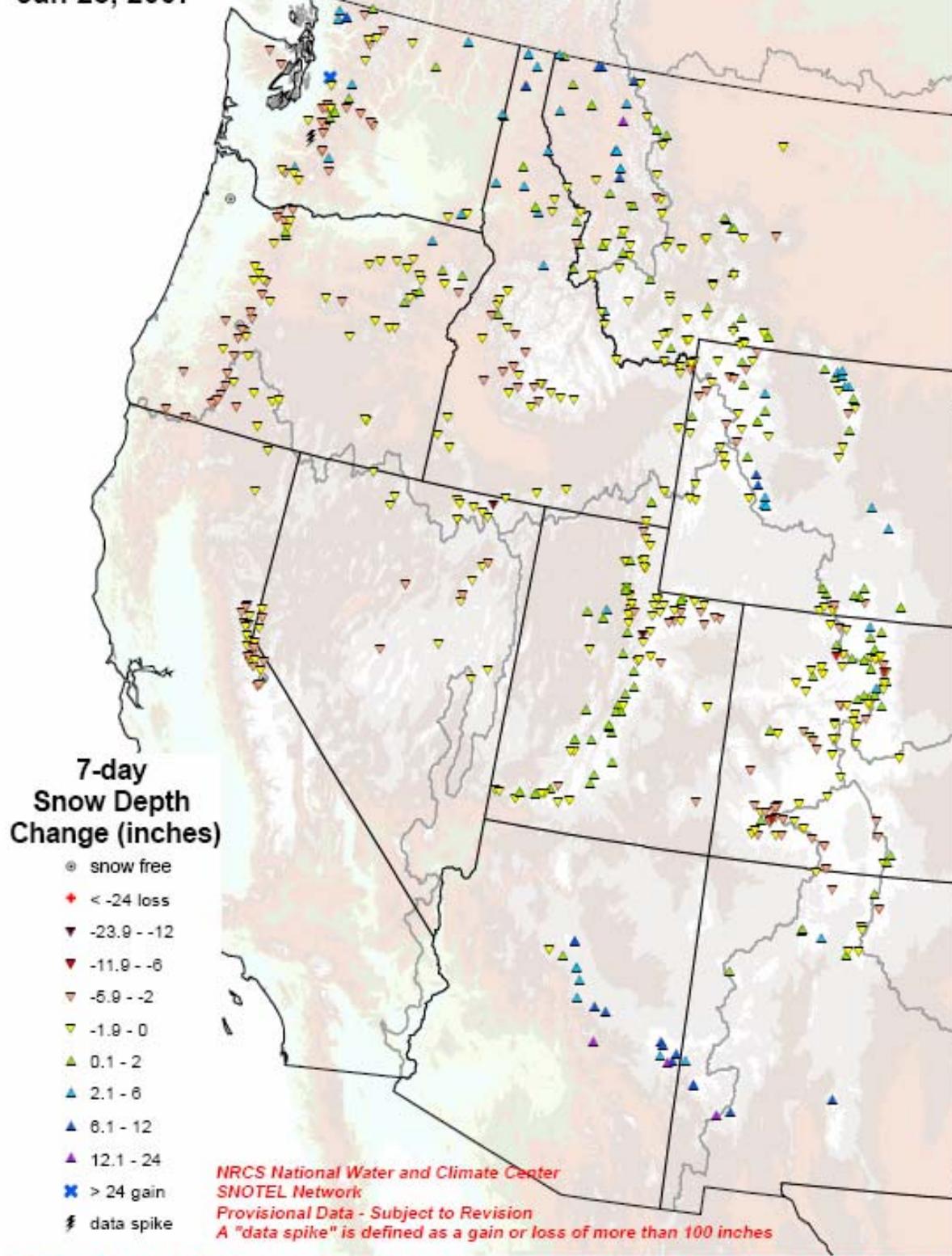


Fig. 1a. Current SNOTEL SWE percent of normal for Water Year 2007 over northern California.  
[ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/ca\\_swepctnormal.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/ca_swepctnormal.pdf).

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Automated snow depth measurements are known to occasionally read spuriously large during precipitation events. Snow depth is also difficult to accurately measure at near-snow free conditions; data should be used with caution.

Fig. 1b. SNOTEL 7-day snow depth change.

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**7-day Avg  
Temperature  
Anomaly (F)**

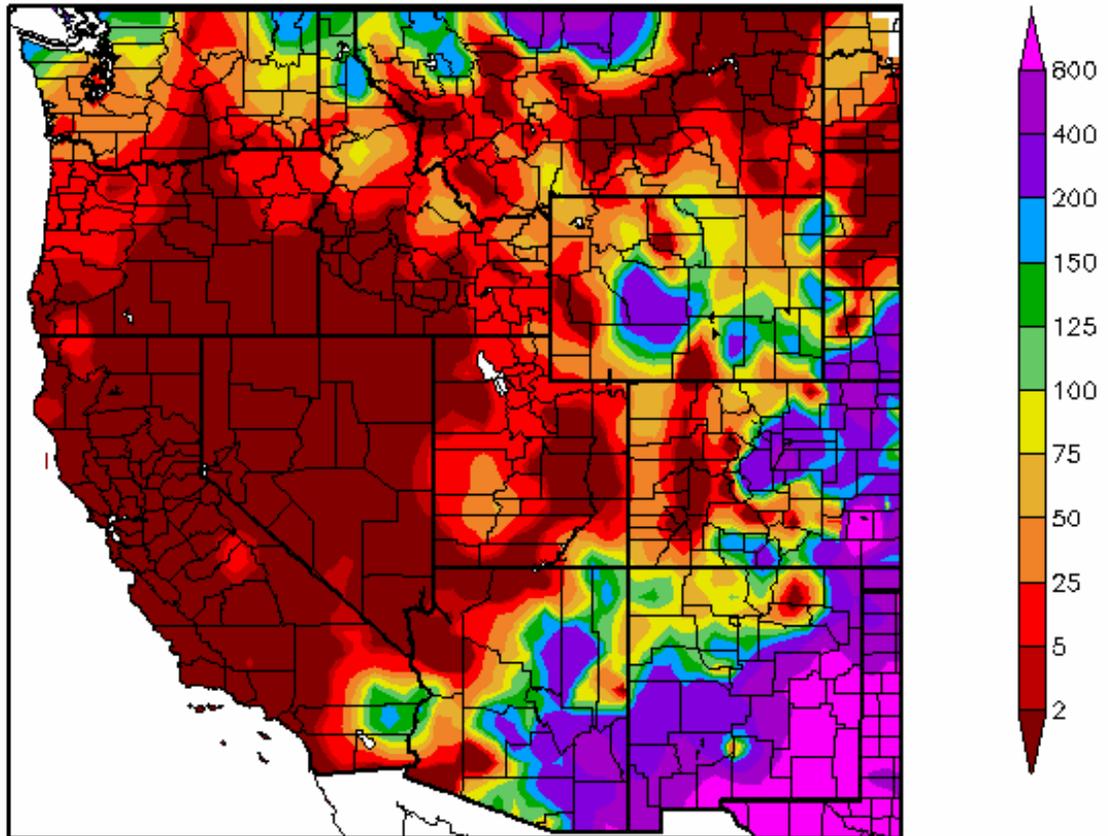
- ✖ < -20 cold
- ▼ -20 - -15
- ▼ -15 - -10
- ▼ -10 - -5
- ▼ -5 - 0
- ▲ 0 - 5
- ▲ 5 - 10
- ▲ 10 - 15
- ▲ 15 - 20
- ◆ >20 warm

*NRCS National Water and Climate Center  
SNOTEL Network (Sites with 15 or more years of record)  
Anomaly with respect to 7 day average period of record median  
Provisional Data - Subject to Revision*

**Fig. 2: SNOTEL 7-day average temperature anomaly.**

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Percent of Normal Precipitation (%)  
1/18/2007 - 1/24/2007

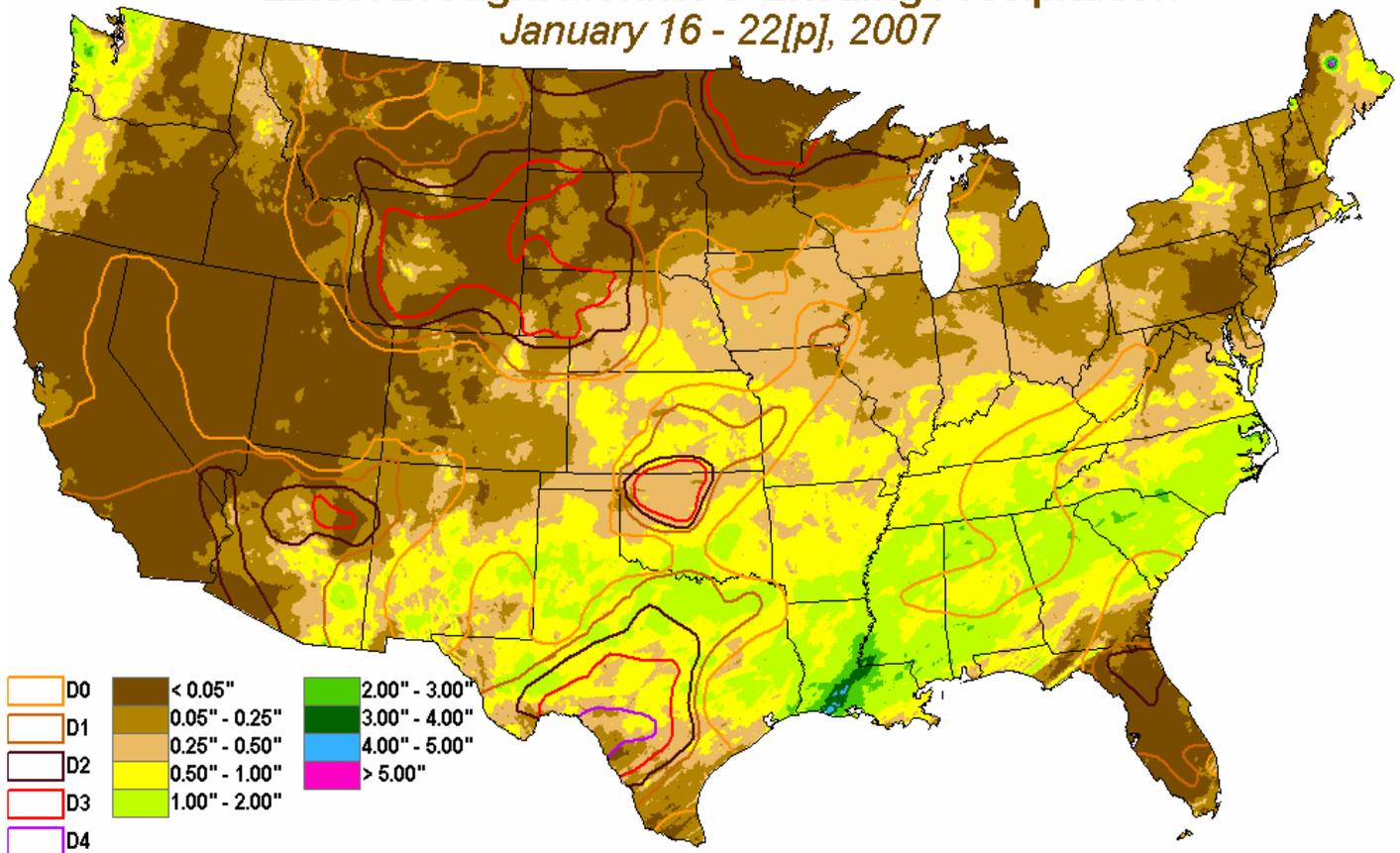


Generated 1/25/2007 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 3. ACIS percent of normal precipitation for the past week over the Western US.**

**Latest Drought Monitor & Ensuing Precipitation**  
*January 16 - 22[p], 2007*



**Fig. 3a. National radar precipitation estimate for the past week. Note: estimates over the mountain areas of the West are less reliable. Drought Monitor intensities are shown as contour lines.**

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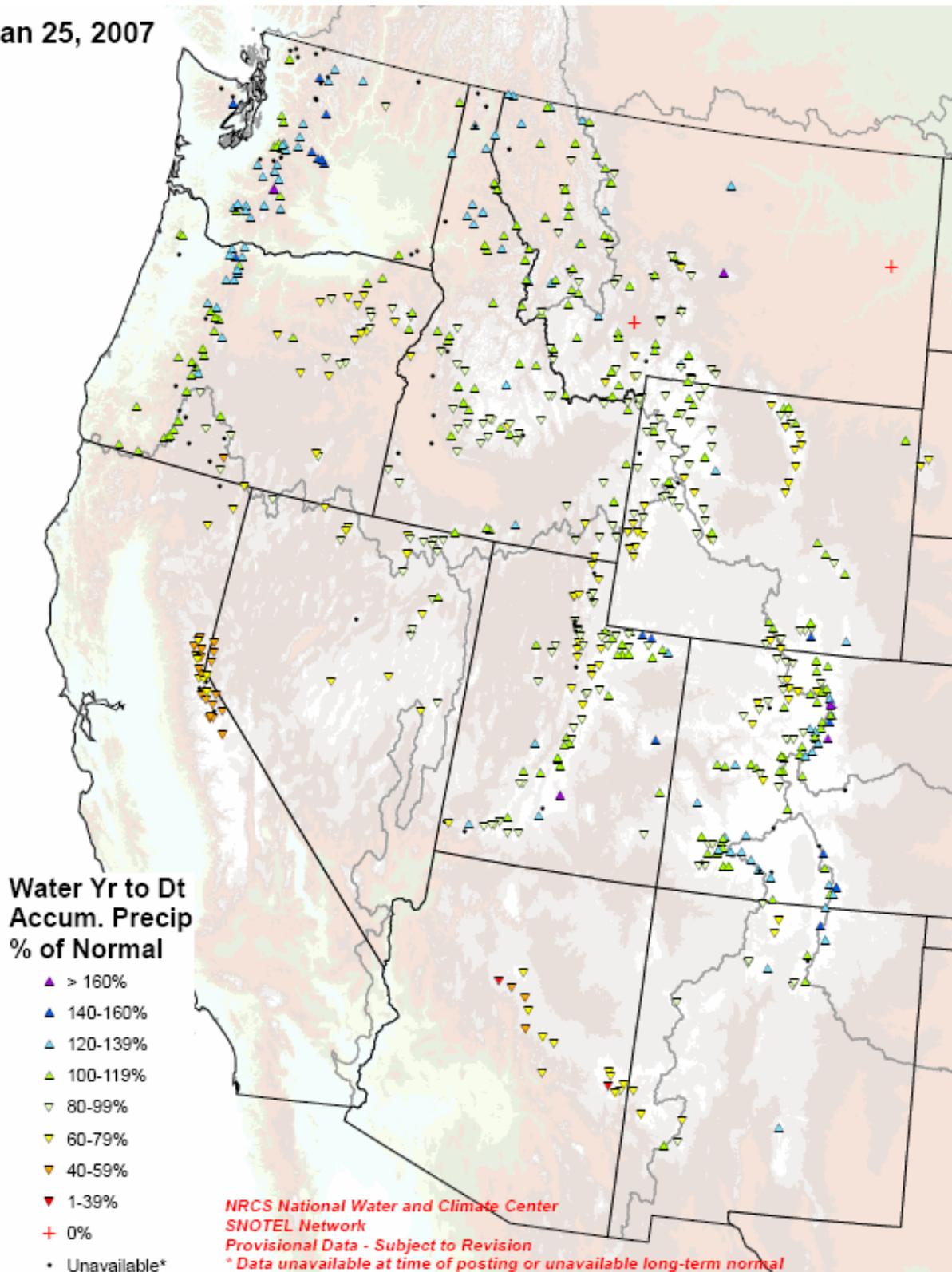


Fig. 3b. SNOTEL station water year (since October 1) precipitation as a percent of normal.

# U.S. Drought Monitor

January 23, 2007  
Valid 7 a.m. EST

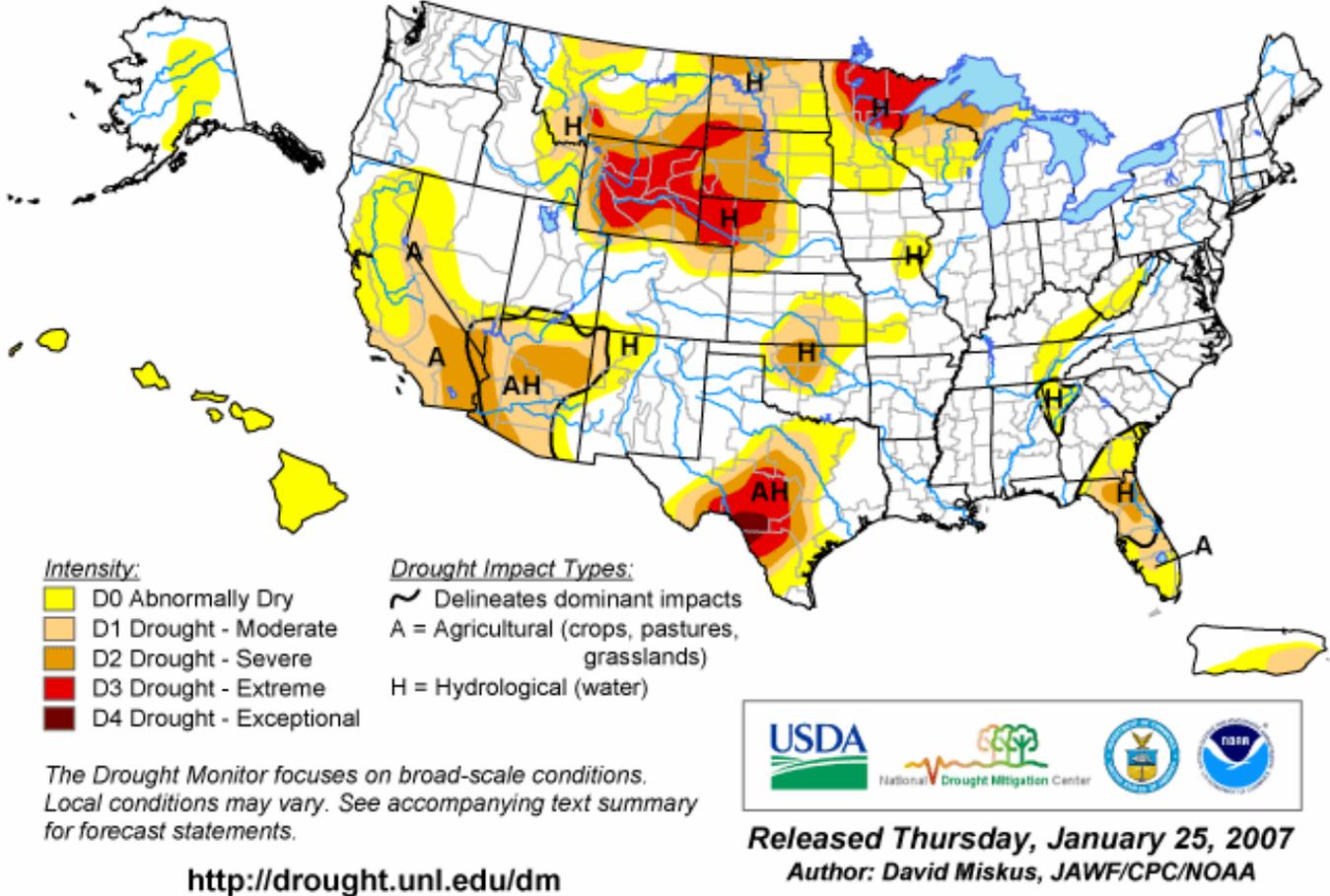
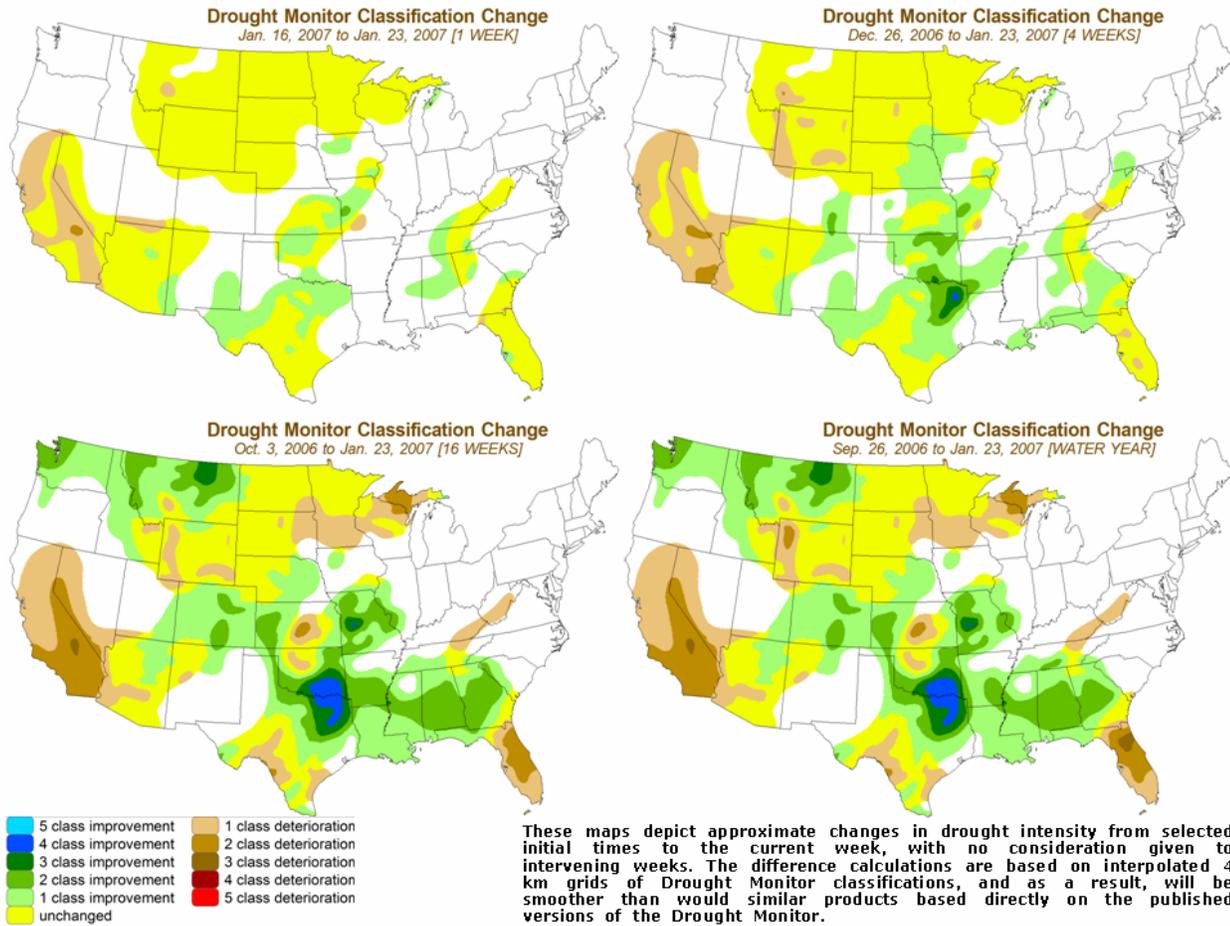


Fig. 4. Current Drought Monitor – Source: National Drought Mitigation Center (NDMC)

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**Fig. 4a. Drought Monitor map changes for various periods for this Water Year.**

### Calculated Soil Moisture Ranking Percentile JAN 24, 2007

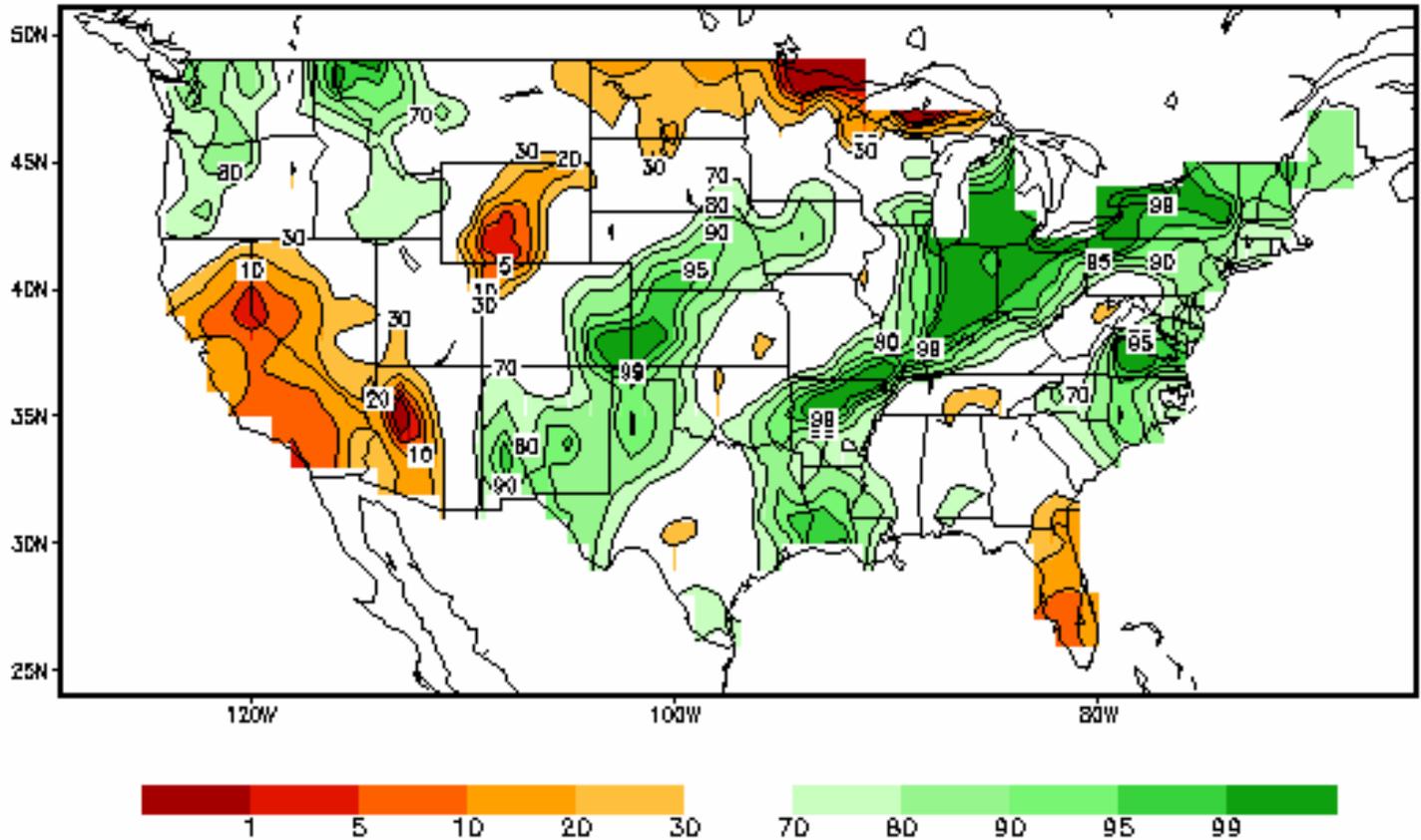


Fig. 5: Soil Moisture Ranking Percentile based on 1932-2000 climatology. **Caution:** Soils tend to freeze this time of year resulting in potentially erroneous sensor readings. Source NOAA-CPC

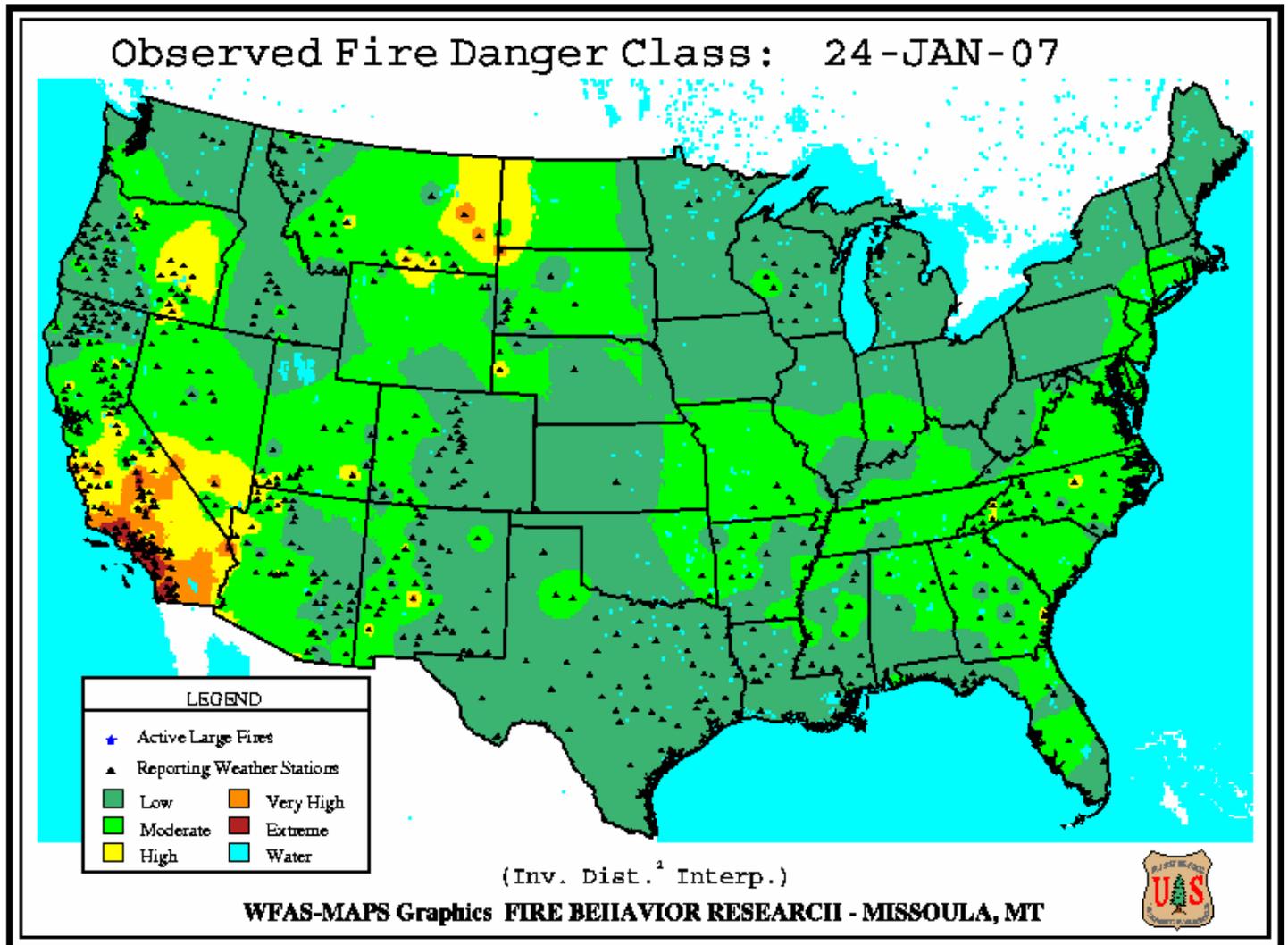
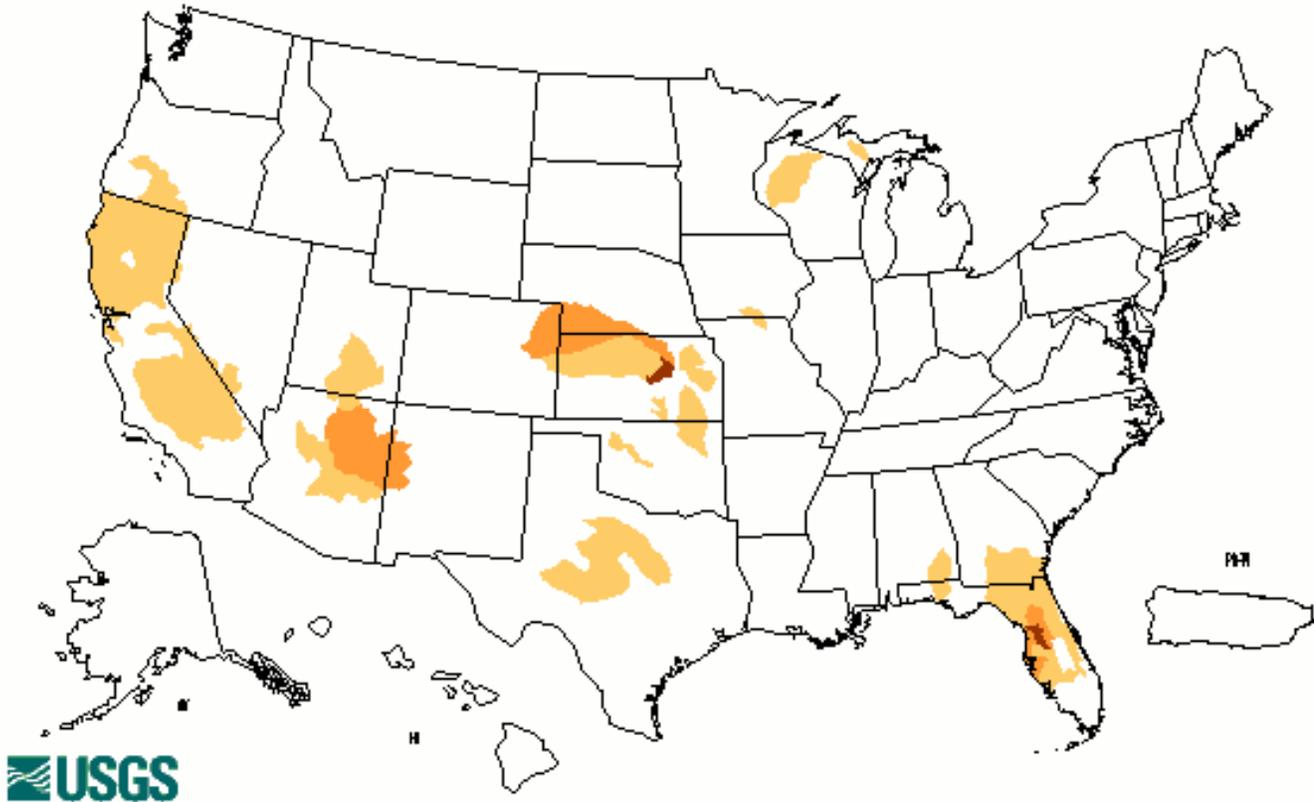


Fig. 6. Observed Fire Danger Class. Note continued increase risk of fire over southern California. Source: Forest Service *Fire Behavior Research - Missoula, MT*

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Wednesday, January 24, 2007



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 stream flow for the day of the year. **Caution:** Flows tend to freeze this time of year resulting in potentially erroneous gauge readings. Source: USGS

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### National Drought Summary -- January 23, 2007

*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/>.

Frigid conditions, with temperatures averaging more than 6°F below normal, enveloped much of the Far West, central and southern Rockies, and southern Plains. Locally, weekly departures exceeded -15°F in the Great Basin and central Rockies, and readings slowly moderated in California from last week's devastating freeze. Meanwhile, above-normal readings returned to the northern Rockies, northern Plains, and upper Midwest, and continued in Florida. A persistent fetch of subtropical moisture stretching from the central Baja northeastward across the Southeast was a focal point for light to moderate precipitation, including light snow in the central Plains, middle Mississippi and upper Ohio Valleys, and mid-Atlantic. Mostly dry weather prevailed in much of the West, across the northern tier of states, southern sections of Texas and Florida, and Hawaii.

**The Midwest and Plains:** In the lower Midwest, additional precipitation, mainly in the form of light snow (2-6 inches), blanketed much of the Corn Belt, with slightly greater totals (4-10 inches) farther west in the central Great Plains. Since mid-December, frequent precipitation (>150% of normal precipitation) has produced short-term surpluses in the western Corn Belt and lower Missouri Valley, improving conditions. D0(H), however, remained in a few areas (southwest and northeast Missouri, southeast Iowa) where long-term deficits remained and recent precipitation was not as great. In addition, drought conditions persisted in the upper Midwest and northern Plains, with little or no precipitation, moderating temperatures (weekly departures +4 to +8°F), and an increasing shallow snow pack.

Farther south, another round of beneficial precipitation fell on the central and southern Plains, making this the fourth (of five) wet week since mid-December. Liquid equivalents of 0.5 to 1.5 inches were common in Kansas, Oklahoma, and northern Texas, with 1.5 to 2.5 inches in southwestern Texas. Accordingly, short- to medium-term surpluses have developed across much of these three states, with topsoil moisture now mostly adequate to abundant, and a general one-category improvement was made. Long-term deficits, subsoil moisture deficiencies, and low reservoir levels, however, still existed in parts of northern Oklahoma, southern Kansas, and south-central Texas, maintaining hydrological impacts (H). For example, the Oklahoma Water Resources Board announced plans for the release of 15,000 acre-feet of water from Canton Lake to supplement supply in Oklahoma City's central Oklahoma lakes. Canton Lake, currently at about 60% capacity, should normally be at full capacity. In addition, some parts of Texas, namely from Del Rio and north of Laredo northward to San Angelo and Brownwood, missed out on the recent heavy precipitation as compared to the surrounding area, and their water year (since October 1) percent of normal precipitation stood at only 50-75% of normal. With reports of low lake levels (e.g., Lake Lometa only at 20% capacity), subnormal stream flows, and low or dry stock tanks, D2-D4 remained.

**The Southeast and Appalachians:** With a more west to east upper-air flow, this week's storm system, in conjunction with ample subtropical moisture, dropped widespread light to moderate precipitation (1-2 inches) on the Southeast, and slightly less (0.5-1 inches) on the Appalachians.

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January precipitation has been enough to alleviate abnormal dryness in most of the Appalachians and Southeast, although parts of the Appalachians and eastern Tennessee Valley still had lingering 30-, 60-, and 90-day deficits between 2 and 4 inches, and D0 remained there. In northern Georgia, Lake Lanier, the primary water source for Atlanta, was still 3 feet below the winter guidance, creating low flows (and D0(H)) in the Chattahoochee River Valley. In contrast, Florida (except the Panhandle) missed out on the widespread rainfall. Temperatures averaged more than 4°F above normal with highs in the 80s, and only 0.2 to 0.5 inches of rain was reported. USGS 7-, 14-, and 28-day stream flows remained in the lower 10th percentile in north-central areas, and the KBDI (fire danger) remained high in southern Florida. Although January normally has the least impact toward drought in Florida (rainfall, evaporation, temperatures, and water demand is usually low), it is also an ideal time for surplus rainfall to occur and diminish any lingering dryness. Unfortunately, as more time passes and the expected El Niño-induced heavy rains fail to occur, drought concerns and impacts will increase.

**The Southwest and Rocky Mountains:** Although temperatures slowly moderated from last week's long-lasting, devastating freeze in California, they still averaged 4 to 8°F below normal. Once again, precipitation was nearly absent throughout the Southwest and Great Basin, continuing the disappointing wet season (since October 1) in this region, and realistically leaving only 2 more months when decent precipitation could occur. Water year-to-date Sierra Nevada basin average precipitation was only 51-62% of normal, and Jan. 23 basin average snow water content (SWC) stood at 37-50%, according to the NRCS. This season follows a poor and spotty 2006 summer monsoon, and a dry 2005-06 wet season. If it wasn't for the near- to record wet 2004-05 winter season in the Southwest, conditions would be even worse. Fortunately in California, major state averaged reservoirs stood at 70% of capacity, or 119% of normal, as of Dec. 31. Rain-fed pastures, ranges, and wildlife, however, are in poor to dismal shape, with wildfire danger remaining high, especially in southern California. With 12-month precipitation less than 70% of normal in the southern half of California, western Nevada, and western Arizona, and under 50% in the desert Southwest, D0-D2(A) was expanded northward to reflect the growing precipitation deficits. Meanwhile in southwestern Montana, another week with little or no precipitation dropped SWC to record low levels, expanding severe and developing extreme drought into the Shields river basin that includes the Bridger and Crazy Mountains.

In contrast, eastern portions of the Southwest benefited from mid- and late-week systems that dropped badly needed precipitation (liquid equivalents of 0.5 to 1.7 inches) on eastern Arizona and southern New Mexico. With plenty of cold air, much of the precipitation fell as welcome snow in the higher elevations, greatly increasing the water year-to-date basin average SWC. For example, Jan. 16 basin average SWC stood at 42-54% of normal in central Arizona, and 42-69% of normal in western New Mexico. One week later, those numbers increased to 63-78% and 81-124%, respectively. With conditions better in New Mexico thanks to its record wet summer monsoon, D0 was erased in southwestern and southeastern sections. In Arizona, extreme southeastern sections showed improvement (D0 removed) as it was the only area of the state to receive ample 2006 summer monsoon rainfall, while D3 was removed in northeastern Arizona. In the latter area, although it has the longest continuing run of deficits (going back 3 years), the last two snow storms have, at the very least, brought moderate improvement.

**Hawaii, Puerto Rico, and Alaska:** Tranquil weather was observed across Hawaii, with only a few light showers reported on the windward side of Kauai, Maui, and the Big Island early in the period, then not much at all from the weekend on. As a result, abnormal dryness developed across eastern parts of Oahu and Maui and now covers all of Hawaii.

In Puerto Rico, shower activity was confined to the northern half of the island, with little or no

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rain falling on southern sections. For the past 30-, 60-, 90-, and 180-days, generally less than 60% of normal precipitation has been observed across southern and southeastern portions, with 90- and 180-day deficits reaching more than 8 and 12 inches, respectively, in the southeast. Accordingly, D0 was expanded to cover the <60% area, and D1 added where 3- and 6-month deficits were greatest.

Temperatures continued to moderate in Alaska, with early January's Arctic blast a thing of the past. With weekly readings 5 to 10°F above normal, significant precipitation (more than an inch) was limited to along the southern and southeastern coastal areas. With normal precipitation generally low in the winter in central interior Alaska, abnormal dryness was maintained.

**Looking ahead:** During the next 5 days (January 25-29), after a brief warm-up, several cold fronts will push southward out of Canada, dropping temperatures across the eastern two-thirds of the nation and producing lake-effect snows in the Great Lakes region. Meanwhile, two systems, including a stalled front over the Gulf of Mexico and a developing low pressure center, will trigger showers and thunderstorms along the Gulf Coast, including Florida and southern Texas, early and then later in the period. Elsewhere, seasonable readings are forecast for the western third of the U.S., with mostly dry weather prevailing across the remainder of the lower 48 states.

The NWS 6-10 day outlook (January 30-February 3) calls for subnormal precipitation in much of the West, in the middle Mississippi and Ohio Valleys, and southeastern Alaska. An El Niño-like pattern of wetter-than-normal conditions is expected across the southern tier of states, from eastern Arizona to South Carolina and Florida, and in the western half of Alaska. Unseasonably cold weather is forecast for the eastern two-thirds of the nation, with above-normal readings limited to California, Nevada, and especially Alaska.

**Author:** [David Miskus, Joint Agricultural Weather Facility, CPC/NCEP/NWS/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 January 24, 2007