



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

Weekly Report - Snowpack / Drought Monitor Update

Date: 6 January 2011

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: SNOTEL Snow-Water Equivalent percent of normal values for 6 January 2011 shows abundant snowpack over Nevada and Utah. The only regions experience some deficits are the northern portions of the Pacific Northwest and southwestern and northeastern New Mexico (Fig. 1). The SNOTEL Snow-Water Equivalent record values as of this morning shows several sites at record high values in Utah, Lake Tahoe region, and western Colorado (Fig. 1a). SNOTEL 7-day snow depth changes show considerably gains in accumulation across much of the eastern slope of the Rockies but down significantly elsewhere across the West (Fig. 1b).

Temperature: SNOTEL 7-day average temperature departure from normal map shows temperatures were much below normal over the West (Fig 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over the southern San Joaquin Valley in California and Central Great Basin in Nevada ($>+2^{\circ}\text{F}$) and the greatest negative departures occurred over portions of eastern Oregon, western Utah, and the Uinta Mountains ($<-20^{\circ}\text{F}$).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 5 January shows the bulk of the heaviest precipitation confined to the Olympic Mountains in Washington and east-central California (Fig. 3). In terms of percent of normal, the precipitation pattern was extremely wet from southern California and the Southwest then northward to the Northwest High Plains (Fig. 3a). For the 2011 Water-Year that began on 1 October 2010, precipitation matches the overall SWE pattern in Figure 1 above. Greatest deficits are found over the extreme southern reaches of the Southwest (Fig. 3b).

Weekly Summary: Heavy precipitation (2 inches or more) was reported across much of California, western Oregon, and the higher terrain of Idaho during the past week, boosting snowpack levels. The Pacific jet stream and attendant storms meandered farther south than is typical for a La Nina winter, as evidenced by one to two inch amounts of precipitation which fell over coastal portions of southern California, and 2-4 inch amounts measured over central Arizona. Alaska remained mostly dry and frigid, except for south-central portions of the state and the Panhandle where at least 2 inches of precipitation fell. More heavy showers fell on the western Hawaiian Islands and southern portions of the Big Island.

Southwest: A Pacific storm system brought more rain and snow to the region, with 2 or more inches of precipitation measured over central portions of Arizona. January 4th SNOTEL basin-average Snow Water Content (SWC) in central Arizona stood between 100 to 200 percent of normal. Up to an inch of rain fell over the lower elevations of southern Arizona. D0 was trimmed back out of Gila County and much of Maricopa County, with a narrow transition zone between D-nothing and D1 drought, which is supported by WYTD precipitation totals. The western half of New Mexico received anywhere up to 2 inches of precipitation during the past week, and SNOTEL SWC in the mountainous north is roughly half that of central Arizona. In Nevada's northern Nye County, WYTD precipitation is running about 200 percent of normal, this area typically being very dry. Based on this, the D0 depiction was eliminated. In California, heavy

Weekly Snowpack and Drought Monitor Update Report

precipitation (2 inches or more) fell during the past 7 days over much of the western and eastern thirds of the state, extending about as far south as Los Angeles. Even farther south near the Pacific Coast, 1-2 inch precipitation amounts were fairly common.

Intermountain West and north-central Rockies: Light to moderate precipitation (up to an inch) was measured over much of the northern half of the Intermountain region, as well as over the northern and central Rockies. Relatively concentrated areas of 2-inch plus precipitation were reported over northeastern Oregon, western and northern Idaho, and north-central Utah. SNOTEL basin-average SWC (January 4th) is near 100 percent over a large portion of this region, with values between 125 and 150 percent over Oregon, and 150 to 200 percent over northern Utah. In Wyoming, the statewide SWC is near 120 percent, about 50 percent higher than last year at this time. In addition to this, recent low and high-country precipitation (e.g., up to an inch during the past week) warrants the removal of the small D1 area in western Wyoming, though D0 is being retained at this time pending further evaluation by local experts. Author: Anthony Artusa, NOAA/NWS/NCEP/CPC

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

DROUGHT IMPACTS DEFINITIONS (<http://drought.unl.edu/dm/classify.htm>)

The possible impacts associated with **D4 (H, A)** drought include widespread crop/pasture losses and shortages of water in reservoirs, streams, and wells creating water emergencies. The possible impacts associated with **D3 (H, A)** drought include major crop/pasture losses and widespread water shortages or restrictions. Possible impacts from **D2 (H, A)** drought are focused on water shortages common and water restrictions imposed and crop or pasture losses likely. The possible impacts associated with **D1 (H, A)** drought are focused on water shortages developing in streams, reservoirs, or wells, and some damage to crops and pastures (Figs. 4 and 4a).

SOIL MOISTURE

Soil moisture (Figs. 5a and 5b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria). Another good resource can be found at: <http://www.emc.ncep.noaa.gov/mmb/nldas/drought/>.

U.S. HISTORICAL STREAMFLOW

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

This map, (Fig. 6) shows the 7-day average streamflow conditions in hydrologic units of the United States and Puerto Rico for the day of year. The colors represent 7-day average streamflow percentiles based on historical streamflow for the day of the year. Thus, the map shows conditions adjusted for this time of the year. Only stations having at least 30 years of record are used. Sub-regions shaded gray indicate that insufficient data were available to compute a reliable 7-day average streamflow value. During winter months, this situation frequently arises due to ice effects. The data used to produce this map are provisional and have not been reviewed or edited. They may be subject to significant change.

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/> and <http://drought.gov>.

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/ JEFF GOEBEL
Acting Director, Resource Inventory Division

Weekly Snowpack and Drought Monitor Update Report

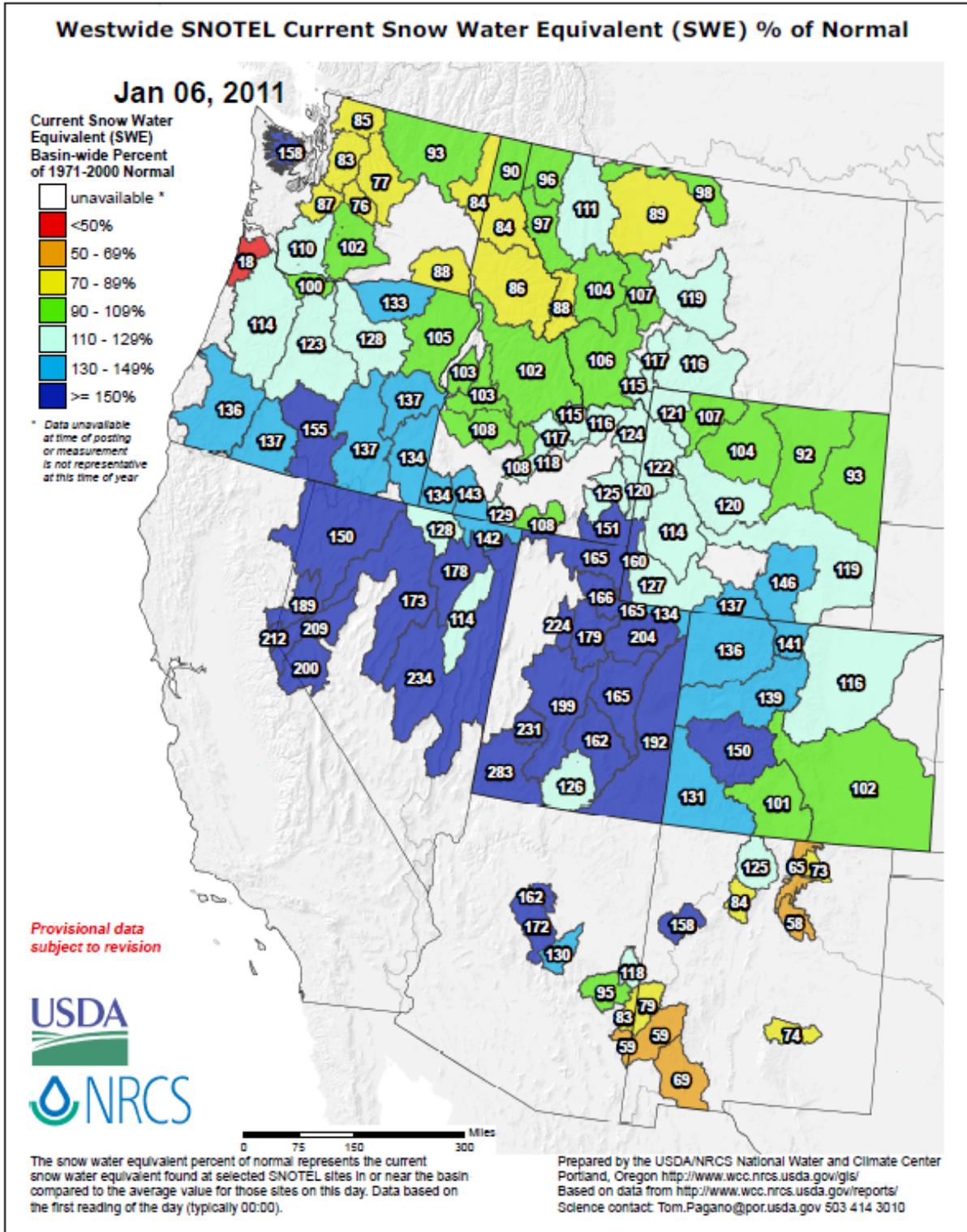


Fig. 1: SNOTEL Snow-Water Equivalent percent of normal values for 6 January 2011 shows abundant snowpack over Nevada and Utah. The only regions experience some deficits are the northern portions of the Pacific Northwest and southwestern and northeastern New Mexico. Ref: http://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_swepctnormal_update.pdf

Weekly Snowpack and Drought Monitor Update Report

SNOTEL Current Snow Water Equivalent (SWE) Records

Jan 06, 2011

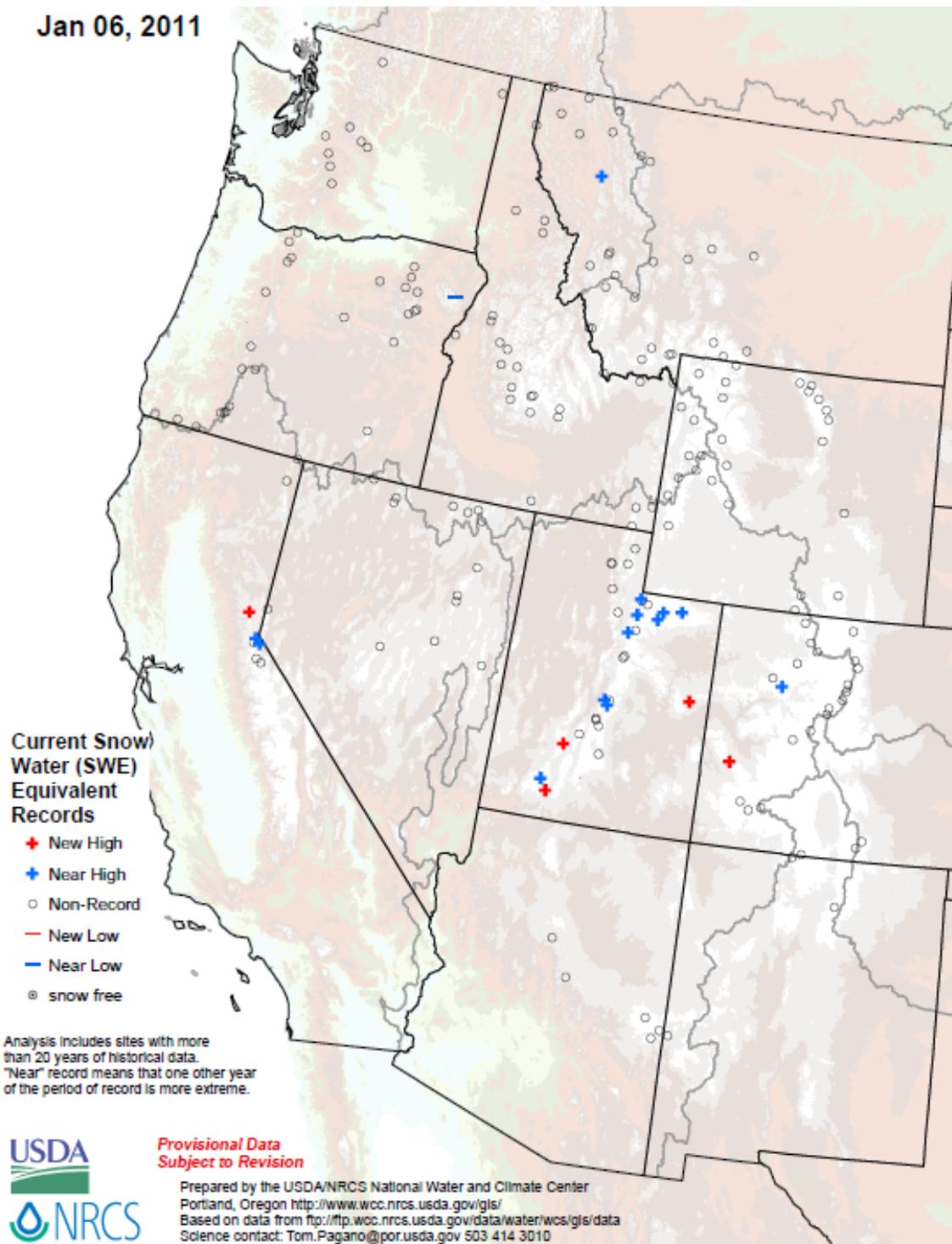


Fig. 1a: SNOTEL Snow-Water Equivalent records as of this morning shows several sites at record high values in Utah, Lake Tahoe region, and western Colorado.

Ref: <http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideSWErecord.pdf>

Weekly Snowpack and Drought Monitor Update Report

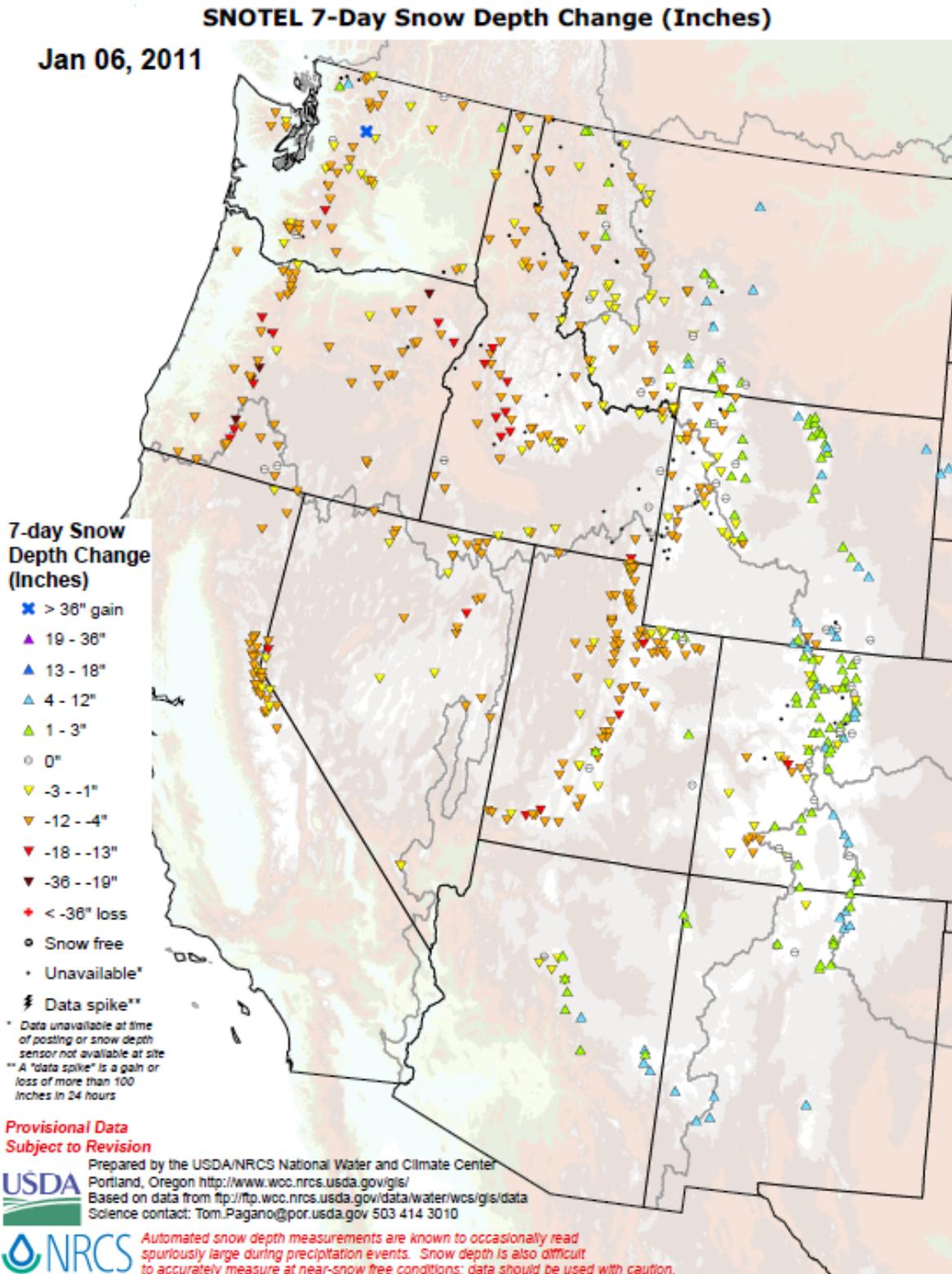


Fig. 1b: SNOTEL 7-day snow depth changes show considerably gains in accumulation across much of the eastern slope of the Rockies but down significantly elsewhere across the West.

Ref: http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf

Weekly Snowpack and Drought Monitor Update Report

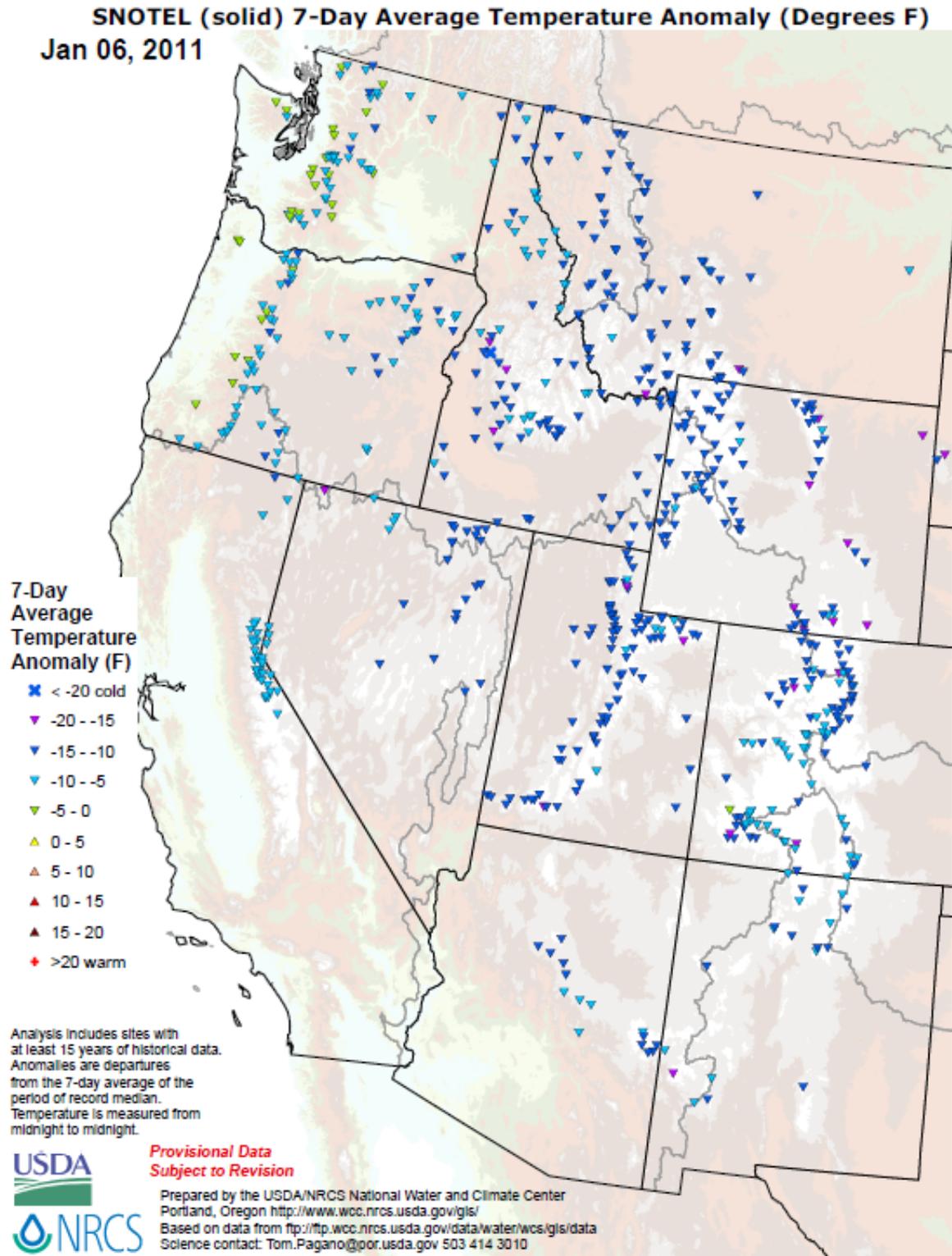
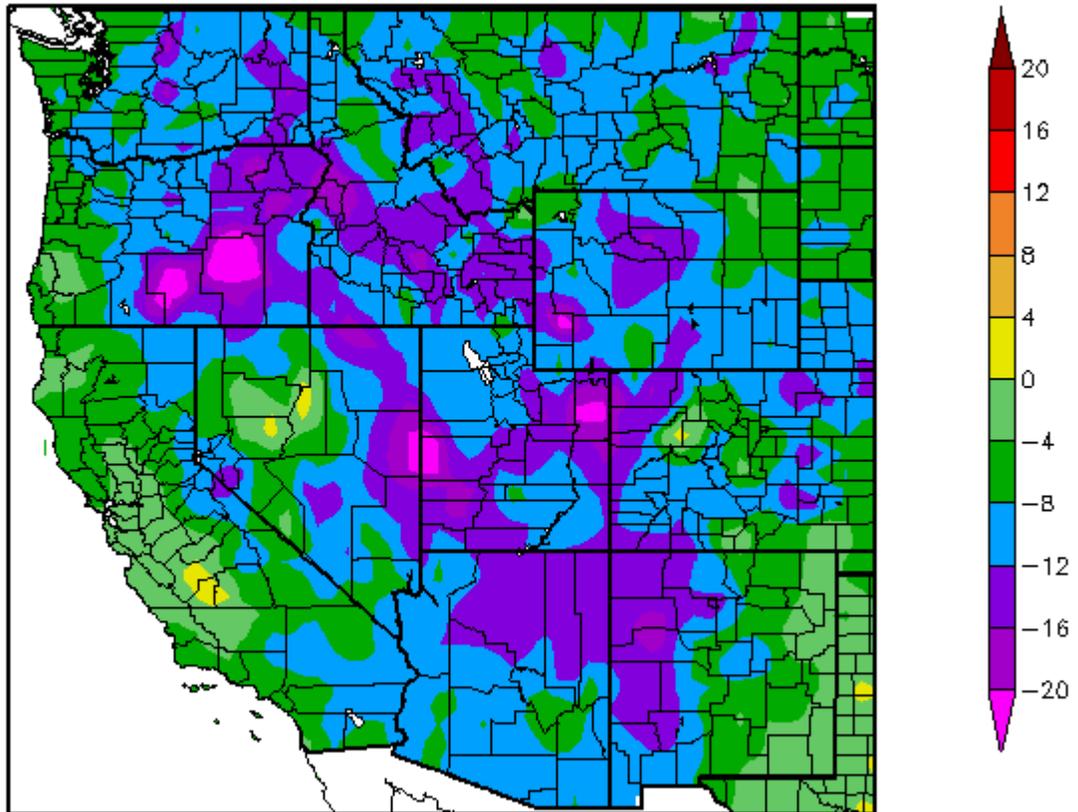


Fig. 2: SNOTEL 7-day average temperature departure from normal map shows temperatures were much below normal over the West.

Ref: <http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf>

Departure from Normal Temperature (F)
12/30/2010 - 1/5/2011



Generated 1/6/2011 at HPRCC using provisional data.

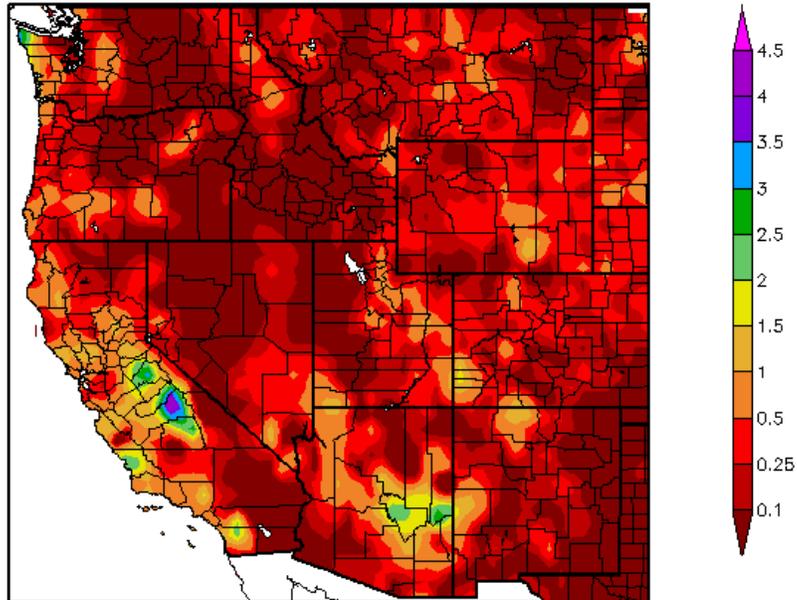
Regional Climate Centers

Fig. 2a: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over the southern San Joaquin Valley in California and Central Great Basin in Nevada (>+2°F) and the greatest negative departures occurred over portions of eastern Oregon, western Utah, and the Uinta Mountains (<-20°F).

Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d

Weekly Snowpack and Drought Monitor Update Report

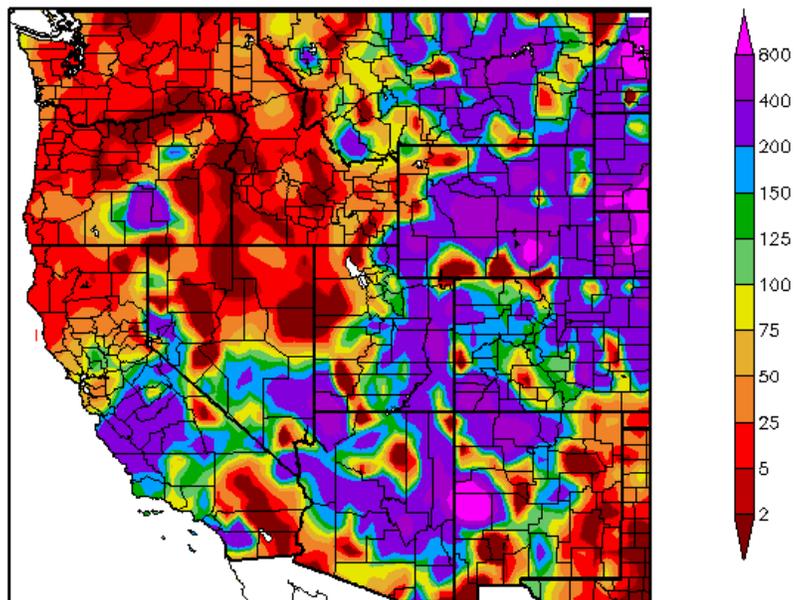
Precipitation (in)
12/30/2010 - 1/5/2011



Generated 1/6/2011 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%)
12/30/2010 - 1/5/2011



Generated 1/6/2011 at HPRCC using provisional data.

Regional Climate Centers

Fig. 3 and 3a: ACIS 7-day average precipitation amounts for the period ending 5 January shows the bulk of the heaviest precipitation confined to the Olympic Mountains in Washington and east-central California (Fig. 3). In terms of percent of normal, the precipitation pattern was extremely wet from southern California and the Southwest then northward to the Northwest High Plains (Fig. 3a). Ref: <http://www.hprcc.unl.edu/maps/current/>

Weekly Snowpack and Drought Monitor Update Report

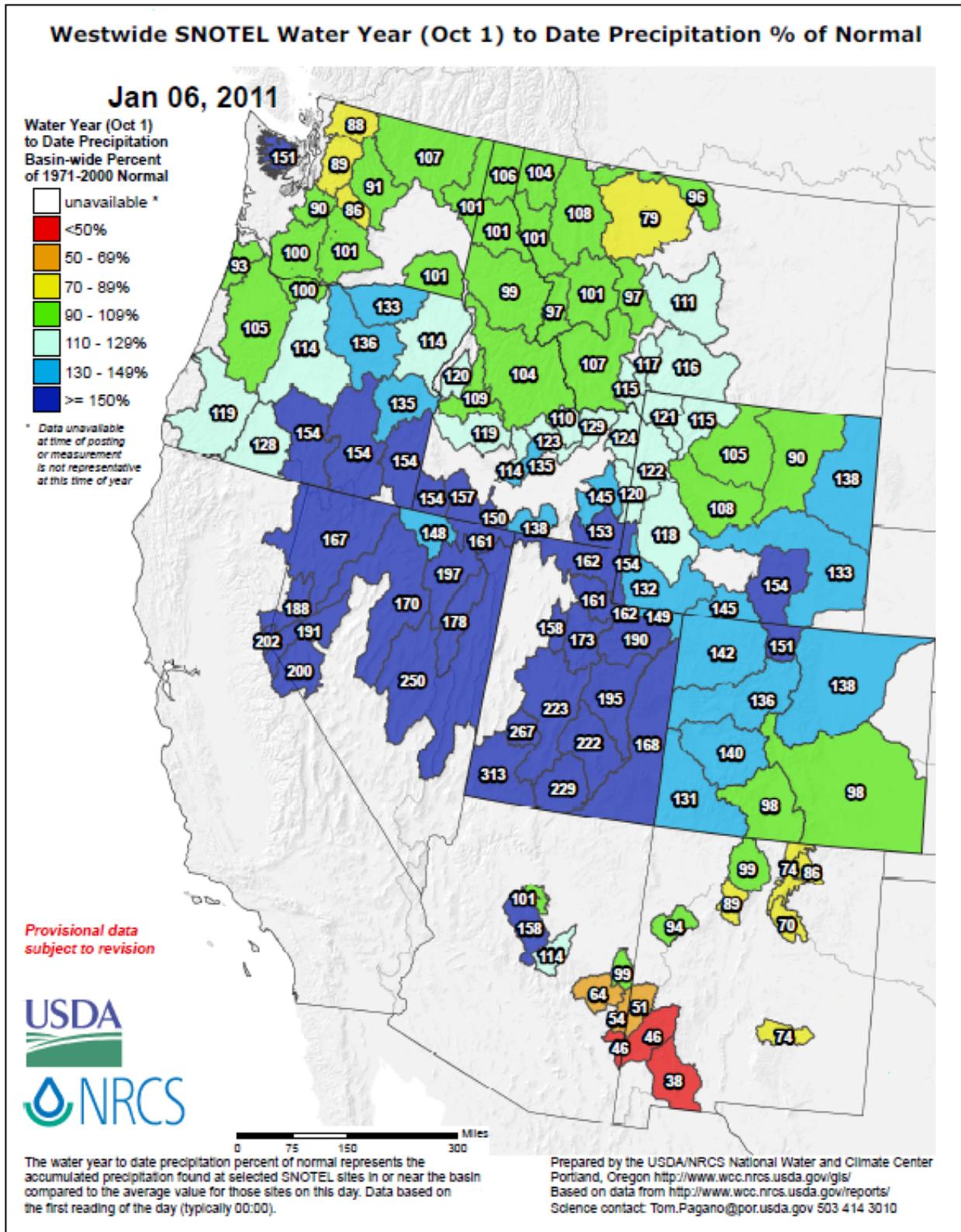


Fig 3b: For the 2011 Water-Year that began on 1 October 2010, precipitation matches the overall SWE pattern in Figure 1 above. Greatest deficits are found over the extreme southern reaches of the Southwest.

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

U.S. Drought Monitor

January 4, 2011
Valid 7 a.m. EST

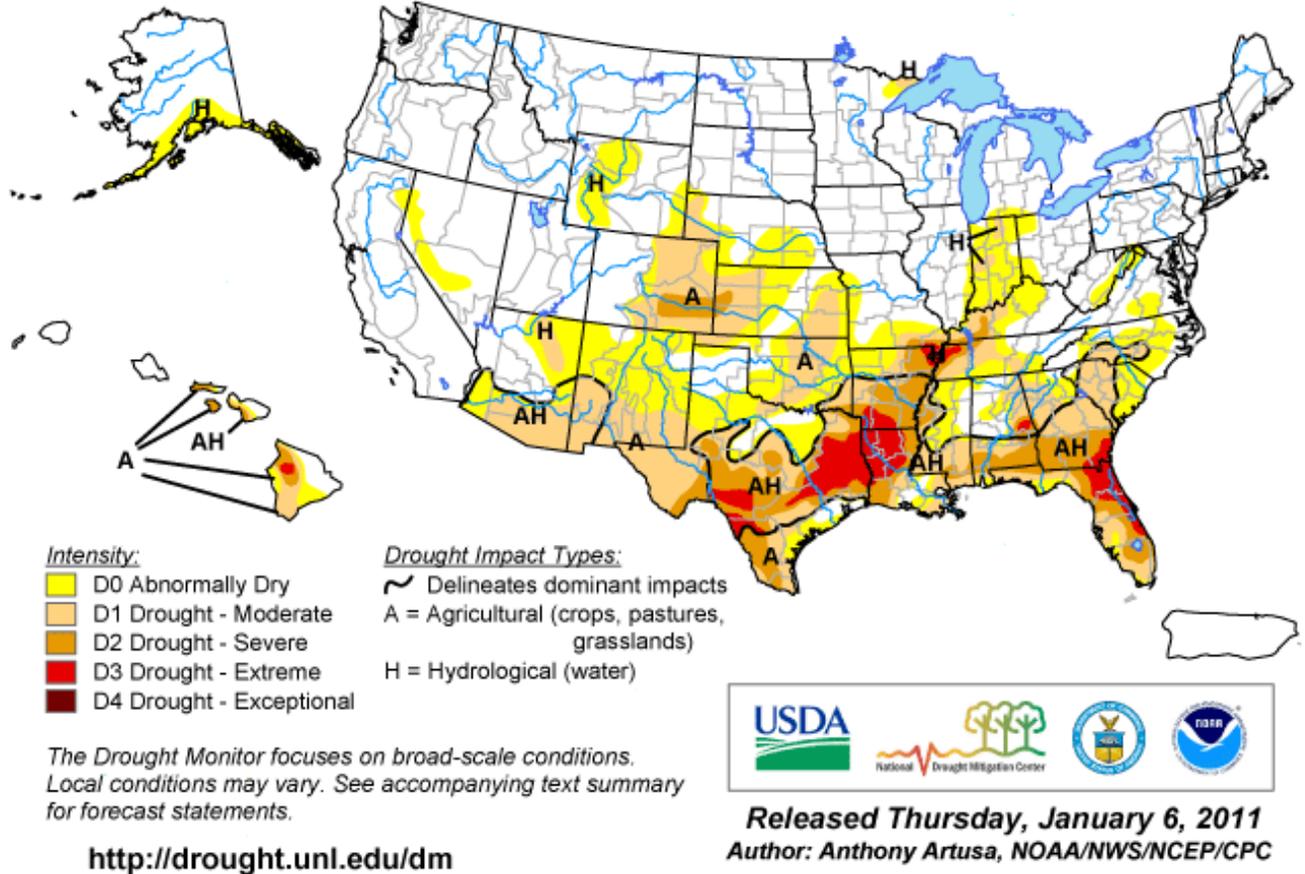
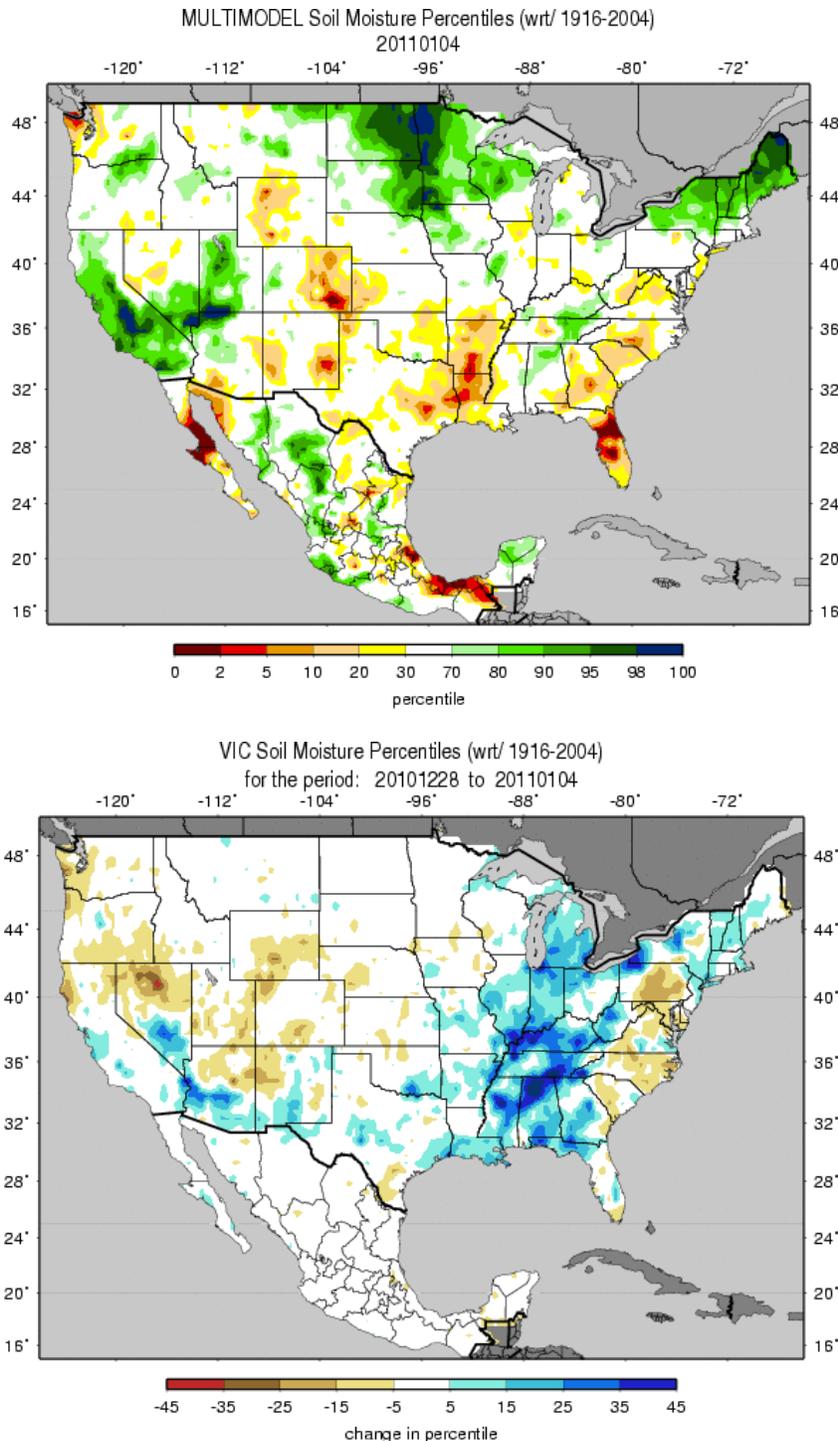


Fig. 4: Current Drought Monitor weekly summary. The severest D3 levels of drought dominate Hawaii, and is scattered across Texas to Florida. The region map for the West is unavailable this week.
Ref: <http://www.drought.unl.edu/dm/monitor.html>

Weekly Snowpack and Drought Monitor Update Report



Figs. 5a and 5b: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 4 January (Fig. 5a) hasn't changed much in the past two weeks. Wetter conditions dominate New England, California-southern Nevada, and the Northeast Plains and drier conditions dominate much of the Southern Tier States and eastern Colorado. During the past week, much wetter conditions developed over parts of the eastern third of the country and parts of Arizona (Fig. 5b).

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

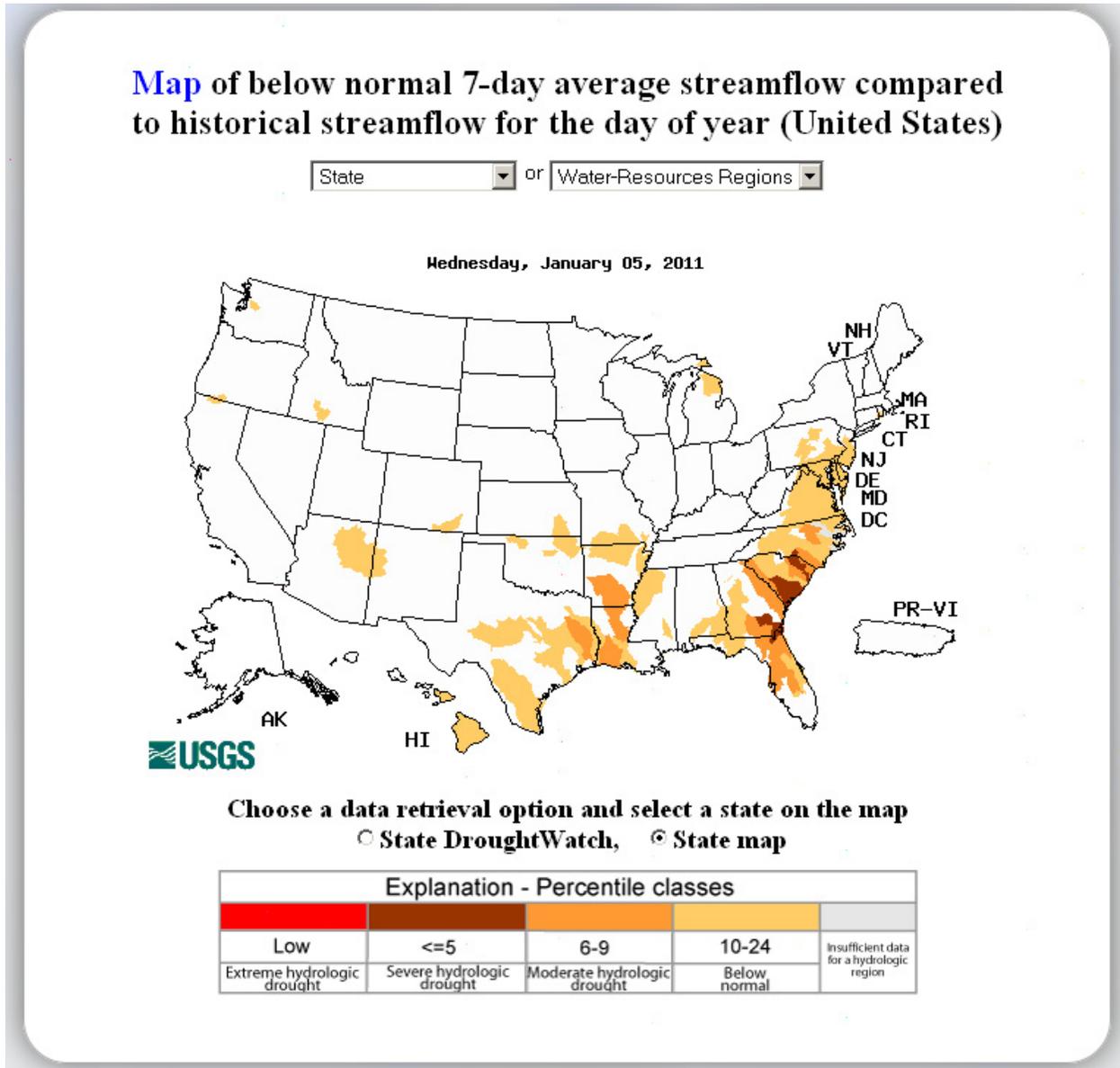


Fig. 6: Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Clearly, portions of the Southern and Southeastern Tier States are reflecting La Niña conditions of dryness. Note: northern site gauges will become less accurate as rivers and streams freeze. Ref: <http://waterwatch.usgs.gov/?m=dryw&r>

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary -- January 4, 2011

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/>.

Weekly Summary: Heavy precipitation (2 inches or more) was reported across much of California, western Oregon, and the higher terrain of Idaho during the past week, boosting snowpack levels. The Pacific jet stream and attendant storms meandered farther south than is typical for a La Nina winter, as evidenced by one to two inch amounts of precipitation which fell over coastal portions of southern California, and 2-4 inch amounts measured over central Arizona. These storms were heralded several days later by an increase in low-level Gulf moisture across the western and central Gulf States, which resulted in significant coverage of heavy rain (2 inches or more). The Florida peninsula missed out on the beneficial rains of the past week. Across the Northeast, increasing dryness has been noted, though right after Christmas coastal areas received as much as 1-2 feet of snow. Above-normal temperatures enveloped the east-central states and the Northeast, while below-normal temperatures were reported across most of the West and the southern Atlantic states. Alaska remained mostly dry and frigid, except for south-central portions of the state and the Panhandle where at least 2 inches of precipitation fell. More heavy showers fell on the western Hawaiian Islands and southern portions of the Big Island.

Southeast and mid-Atlantic: Both regions have been experiencing significant precipitation deficits for at least the past 90 days. Four to eight inch departures have mounted from the Carolinas to Florida and southeastern Alabama, while departures of 4 inches or less have accumulated during the past 3 months over the mid-Atlantic region. USGS stream flow levels generally remained in the lowest quartiles, with many sites still near or at record low levels. During the past week, heavy rain (2 inches or more) fell in two broad bands across the Southeast. The first stretched northeastward from the upper Texas coast through much of Louisiana, Mississippi, northern Alabama, and the southern Appalachians. The other extended from southeastern Oklahoma through much of central Arkansas. One-category improvements to the drought depiction were made in southwestern and south-central Louisiana, northwestern and central Arkansas, and much of Mississippi, with very modest adjustments made in northeastern and southern Alabama. No rain fell across central and southern Florida, resulting in one-category degradation for some areas. In central Florida, this included southern Lake County and eastern portions of both Seminole and Orange Counties, while in southern Florida this included Palm Beach, northwestern Broward, and some of Miami-Dade County. May through December 2010 rainfall deficits across east-central Florida ran 15-20 inches below normal. Orlando and Daytona Beach were ranked second lowest for this time period, while Melbourne and Vero Beach have experienced the driest such period on record. In the Florida Panhandle area, fairly widespread 1-3 inch rains occurred during the past week which helped short-term dryness, but longer-term deficits remained, so no alterations were made to this region. Finally, a slight eastward expansion of the D1 drought conditions in South Carolina was attributed to the overall lack of significant rainfall and very low stream flows.

Weekly Snowpack and Drought Monitor Update Report

Ohio and Tennessee Valleys: Moderate precipitation (0.5 to 1.0 inch) fell over much of the region, enough to offset further degradation. During the past month, stream flows have improved to normal conditions over most of the area. The short-term objective blend indicates recent drying across northeastern Indiana and extreme northwestern Ohio, but most other climate divisions fall within the near-normal category. In northeastern Illinois, low soil moisture and low stream flows several months ago has been largely rectified with near- to above-normal precipitation within the past month. Therefore, the small area of D0 in northeastern Illinois was removed.

Central and Southern Plains: As noted above in the Southeast and mid-Atlantic portion of the narrative, the areas where 2 or more inches of precipitation fell during the past 7 days were confined to southeastern Oklahoma and the upper Texas coast. In southeastern Oklahoma, a general 1-category improvement was made in areas that received between 2 and 4 inches of precipitation in the past 30 days. The southern tier of counties (Bryant, Choctaw and southern McCurtain) are still below-normal for the past 30 days and have potential water supply issues. Based on feedback from local experts, drought degradation (from D1 to D2) is depicted for southern McCurtain and southern Choctaw counties. In Texas, a number of modifications were made. One-category improvements were made along the upper Texas coast where significant rain fell this past week. Improvements were also made to north-central portions of the state based on the updated Texas SPI Blends and precipitation which fell a week ago. In eastern Texas, the area of extreme drought (D3) was expanded to include about a dozen nearby counties, based on rapidly deteriorating 6-month SPI blends. In south-central Texas, rainfall from October to December 2010 was noticeably below normal, with Austin and San Antonio reporting their fifth driest October-December period on record. Del Rio experienced its second driest October to December period, tied with 1950.

Southwest: A Pacific storm system brought more rain and snow to the region, with 2 or more inches of precipitation measured over central portions of Arizona. January 4th SNOTEL basin-average Snow Water Content (SWC) in central Arizona stood between 100 to 200 percent of normal. Up to an inch of rain fell over the lower elevations of southern Arizona. D0 was trimmed back out of Gila County and much of Maricopa County, with a narrow transition zone between D-nothing and D1 drought, which is supported by WYTD precipitation totals. The western half of New Mexico received anywhere up to 2 inches of precipitation during the past week, and SNOTEL SWC in the mountainous north is roughly half that of central Arizona. In Nevada's northern Nye County, WYTD precipitation is running about 200 percent of normal, this area typically being very dry. Based on this, the D0 depiction was eliminated. In California, heavy precipitation (2 inches or more) fell during the past 7 days over much of the western and eastern thirds of the state, extending about as far south as Los Angeles. Even farther south near the Pacific Coast, 1-2 inch precipitation amounts were fairly common.

Intermountain West and north-central Rockies: Light to moderate precipitation (up to an inch) was measured over much of the northern half of the Intermountain region, as well as over the northern and central Rockies. Relatively concentrated areas of 2-inch plus precipitation were reported over northeastern Oregon, western and northern Idaho, and north-central Utah. SNOTEL basin-average SWC (January 4th) is near 100 percent over a large portion of this region, with values between 125 and 150 percent over Oregon, and 150 to 200 percent over northern Utah. In Wyoming, the statewide SWC is near 120 percent, about 50 percent higher than last year at this time. In addition to this, recent low and high-country precipitation (e.g., up to an inch during the past week) warrants the removal of the small D1 area in western Wyoming, though D0 is being retained at this time pending further evaluation by local experts.

Weekly Snowpack and Drought Monitor Update Report

Alaska and Hawaii: In Alaska, cold and dry conditions experienced in December continued into early January, along with mounting precipitation deficits. This is especially the case along the southern and southeastern coasts where normal autumn and winter precipitation totals are large. In south-central Alaska, western portions of both the Kenai Peninsula and the Mat-su Valley reported less than 0.2 inches of precipitation, while some spots on the eastern Kenai Peninsula measured anywhere from 1-5 inches. During the past 30 days, accumulated deficits reached 3.6 inches at Juneau, and 7.0 inches at Sitka. No changes were made in the Alaskan drought depiction.

In Hawaii, rainfall data and impact reports from the USDA/FSA justify improvement over the southern portion of the Big Island. Several spots recorded at least 4 inches of rain during the past week, resulting in the elimination of D2 drought conditions. Western slopes of the Big Island continue to be dry, and extreme fire risk is an issue.

Looking Ahead: The weather for January 6-10, 2011, will feature storms across the Pacific Northwest, the Northeast, and the Gulf Coast region. One to two inches of precipitation is expected to fall across the Gulf Coast region, which will substantially help with short term relief, though 0.5 inches or less is forecast for central and southern Florida. By far the heaviest precipitation totals (5 inches) are predicted for western Washington State which is not in need of drought relief. For temperatures, an outbreak of very cold air is forecast for much of the country.

For the ensuing 5 days (January 11-15, 2011), subnormal temperatures are predicted for most of the Nation, except for New England, the Southwest, and most of Alaska, where near to above normal temperatures are forecast. Above median precipitation is expected across the interior Northwest, the northern Rockies, and the northern Great Plains. Below median precipitation is forecast for most of Alaska, the Southwest, the southern Plains, the northern and middle Atlantic coast, and the upper Great Lakes region.

Author: [Anthony Artusa, NOAA/NWS/NCEP/CPC](#)

Dryness Categories

D0 ... Abnormally Dry ... used for areas showing dryness but not yet in drought, or for areas recovering from drought.

Drought Intensity Categories

D1 ... Moderate Drought

D2 ... Severe Drought

D3 ... Extreme Drought

D4 ... Exceptional Drought

Drought or Dryness Types

A ... Agricultural

H ... Hydrological

Updated January 6, 2011