United States Department of Agriculture

NRCS

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

Weekly Report - Snowpack / Drought Monitor Update **Date: 10 January 2013**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Note: New 1981-2010 SNOTEL Normals are now being used and in many cases, these values are significantly different than the 1971-2000 Normals.

Temperature: SNOTEL and ACIS 7-day temperature anomaly ending 9 January shows departures below normal across most of the West with the exception over Montana (Fig. 1a). ACIS 7-day average temperature anomalies show the greatest positive temperature departures over west-central Montana (>+15°F). The greatest negative departures occurred over western Utah (<-25°F!!). (Fig. 1b).

Precipitation: ACIS 7-day average precipitation amounts for the period ending yesterday shows dry everywhere except over northwestern Washington (Fig. 2a). In terms of percent of normal, high percentages were found scattered across the northernmost West, central California, and extreme southeast New Mexico (Fig. 2b). SNOTEL month to date precipitation percent of normal for the first third of January shows insignificant moisture totals across most of the West. Very dry conditions are expected across the West next week as high pressure builds (Fig. 2c). For the 2013 Water-Year that began on 1 October 2012, statistics continue to favor the Northern Tier States and the Northern Sierra with surpluses. Significant deficits dominate over eastern Wyoming and all of Colorado and New Mexico. Update Reports by SNOTEL site can be acquired by clicking here. (Fig. 2d).

Snow: Snow depths for the week revealed that increases occurred over the Pacific Northwest and northernmost Rockies (Fig. 3a). As for snow water-equivalent, the largest deficits continue over much of New Mexico, all of Colorado, eastern Wyoming, and the northeastern Great Basin. Significant surpluses exist over the Northern Cascades, Sierra, mountain of Arizona, and Snake River Basin. However, since last week, many basins with surpluses continue to lower their SWE by significant percentages. For example, the Northern Sierra has had a decrease in SWE between 30 and 40 percent. A continuation of this decline is expected over the next 10 days as high pressure dominates the West. The upside of this situation is that temperatures will remain well below average. Currently winter storm warnings are posted for the Interior West and much of Montana. For expected snowfall amounts, click here. A useful basin by basin assessment of SWE to date can be viewed by state by clicking here and here (Fig. 3b).

Weather Summary: This U.S. Drought Monitor week saw minor modifications as the conterminous U.S. experienced relatively tranquil weather conditions. Some modest amounts of precipitation fell over the central Gulf Coast states, California, and the Pacific Northwest while some lesser amounts were observed over portions of the Southeast and Mid-Atlantic states. Overall, temperatures across much of the conterminous U.S. were well below normal except for portions of the Southeast, Mid-Atlantic, Northern Great Plains, and the Upper Great Lakes region where temperatures were above average. The northern Great Basin, Intermountain West, and central Rocky Mountains experienced well-below-normal temperatures during the last week, and numerous records were broken. In Alaska, temperatures were well above normal

during the last week while the Hawaiian Islands experienced generally cooler-than-normal conditions.

The West: During the last seven-day period, the West was generally dry with only some light rainfall over portions of central California. Current snowpack conditions show significant deficits in snow water content over the mountains of Colorado, New Mexico, northeastern Nevada, eastern Oregon, eastern Wyoming, and sections of northern Montana. Conversely, notable surpluses exist over the Cascades, Sierras, Sawtooths, Uintas, and the mountains of Arizona. Short-term precipitation accumulations since October 1 led to categorical improvements in areas of the Great Basin and eastern Sierra Nevada along the California-Nevada border. The two areas of Extreme Drought (D3) in the Great Basin saw reductions to Severe Drought (D2) due to the net effect of short-term precipitation accumulations. Temperatures over the West have been well below normal with the exception of large portions of Montana and northwestern Wyoming. During the past week, the Great Basin, Intermountain West, southern Idaho, southeastern Oregon, and western Colorado experienced well-below-normal temperatures with minimums ranging from -10° F to -30° F. **Author:** David Simeral, Western Regional Climate Center

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

Drought Impacts Definitions

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

Soil Moisture

Soil moisture (Fig. 5), 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/.

Soil Climate Analysis Network (SCAN)

Figure 6 provides supplemental data on soil conditions (moisture and temperatures at various depths from 2 inches to 80 inches. For more information about SCAN see (brochure).

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.

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://www.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. Reports from 2007 are available on-line while ones from 2001-2006 can be acquired upon request.

This report uses data and products provided by the Interagency Drought Monitor Consortium members and the National Interagency Fire Center.

/s/
Micheal L. Golden
Deputy Chief, Soil Survey and Resource Assessment

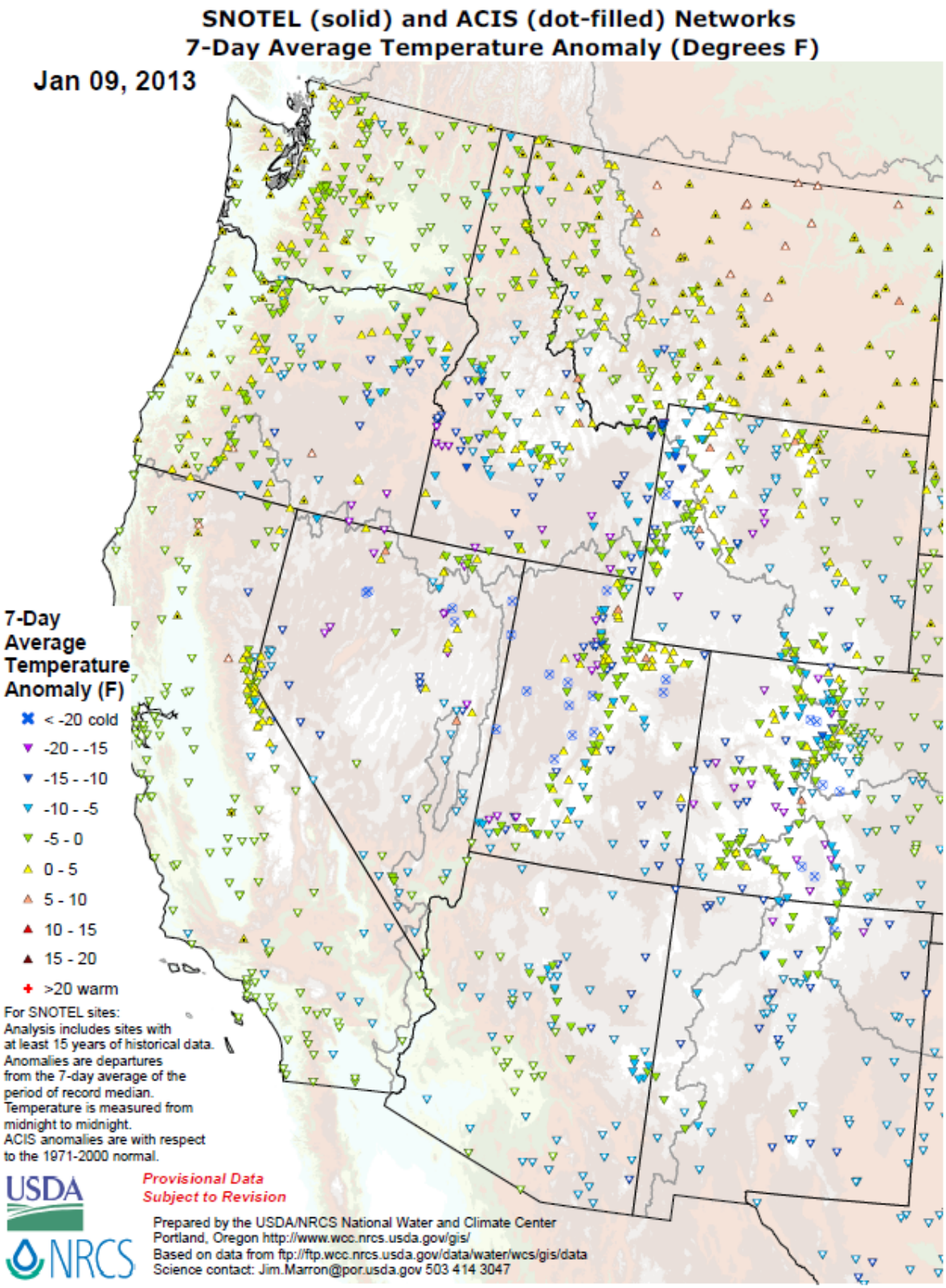


Fig. 1a: SNOTEL and ACIS 7-day temperature anomaly ending 9 January shows departures below normal across most of the West with the exception over Montana.

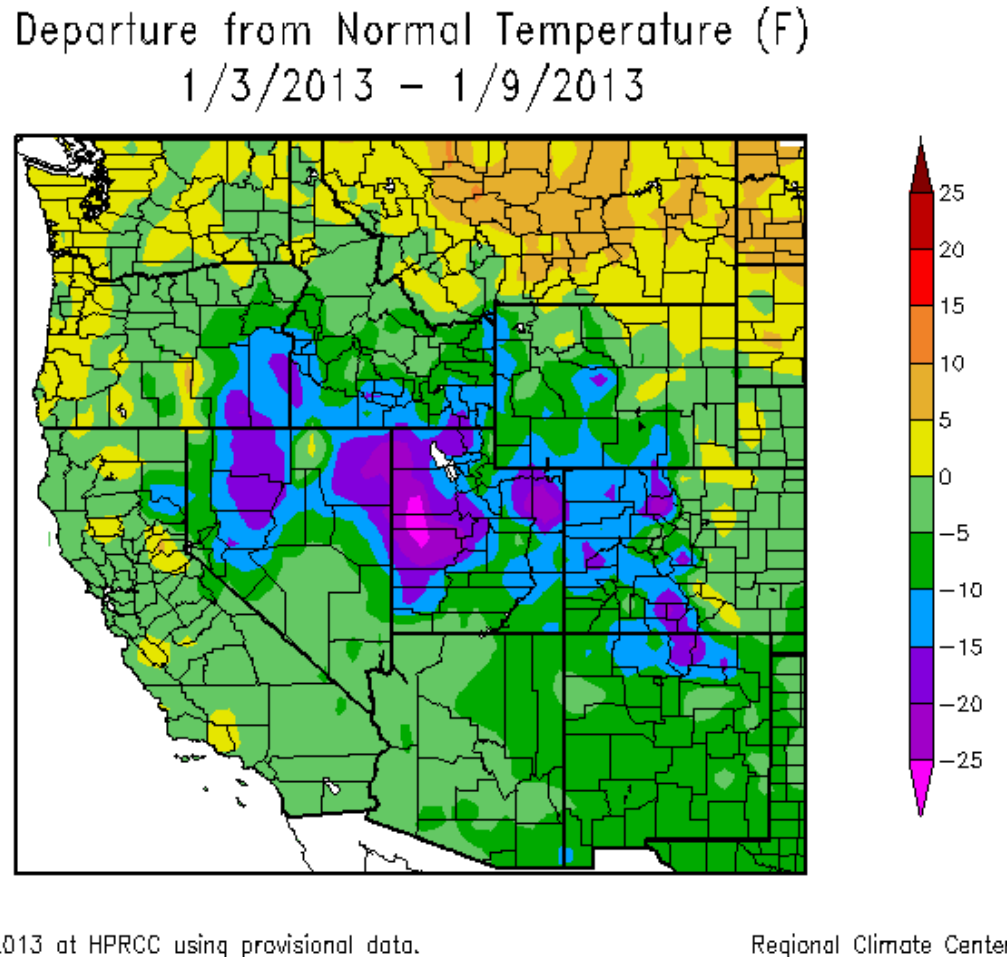
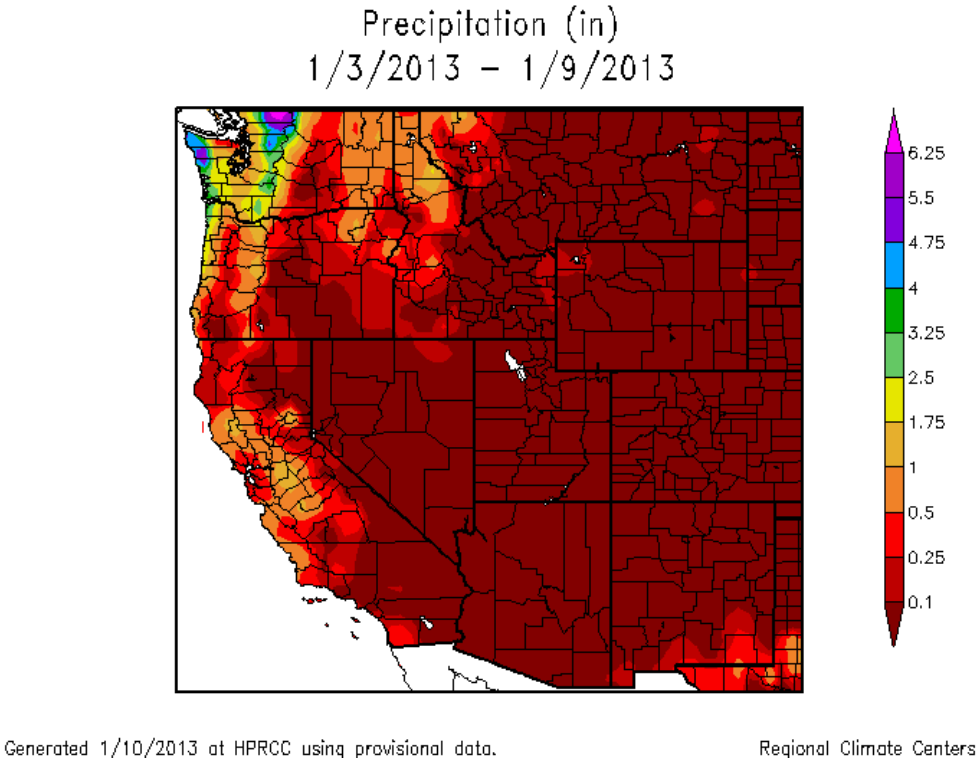


Fig. 1b: ACIS 7-day average temperature anomalies show the greatest positive temperature departures over west-central Montana (>+15°F). The greatest negative departures occurred over western Utah (<-25°F!).



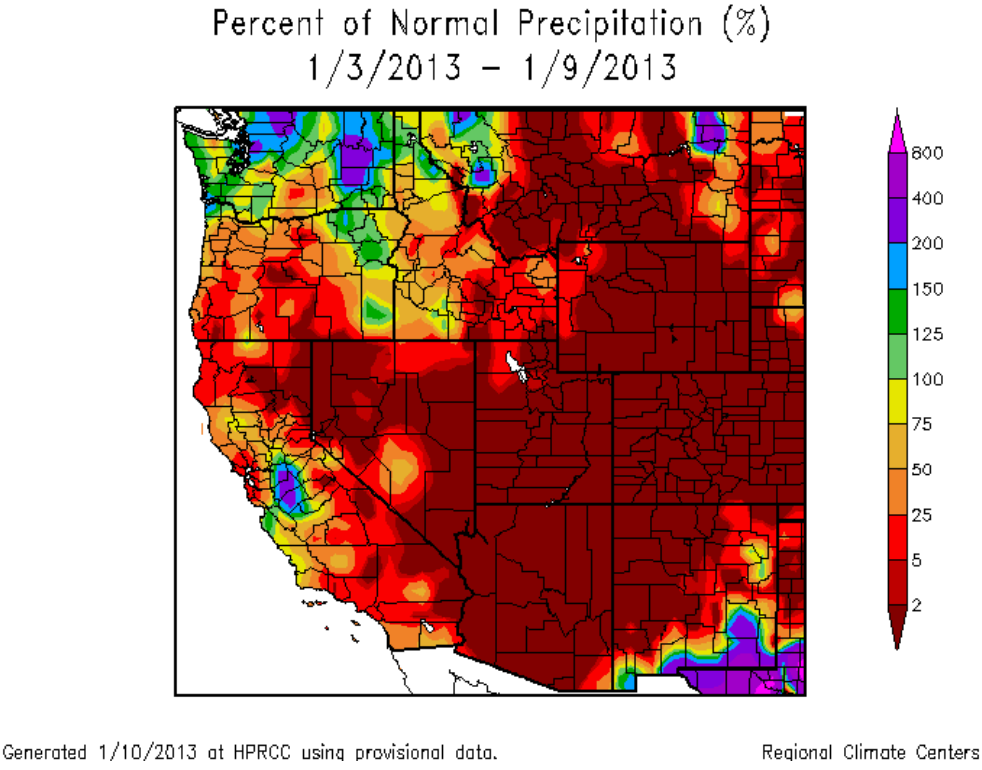


Fig. 2a and 2b: ACIS 7-day average precipitation amounts for the period ending yesterday shows dry everywhere except over northwestern Washington (Fig. 2a). In terms of percent of normal, high percentages were found scattered across the northernmost West, central California, and extreme southeast New Mexico (Fig. 2b).

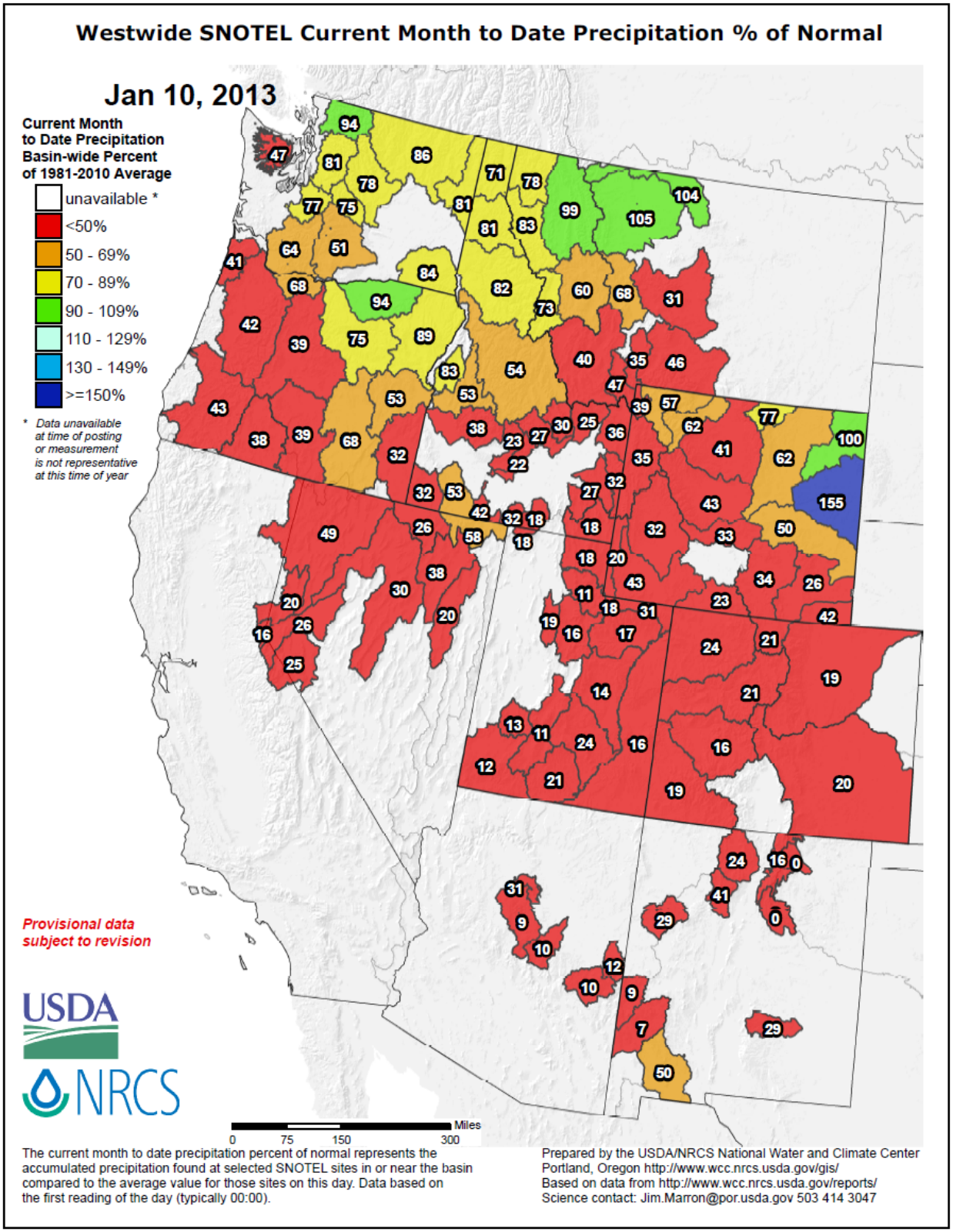


Fig. 2c: SNOTEL month to date precipitation percent of normal for the first third of January shows insignificant moisture across most of the West. Very dry conditions are expected across the West next week.

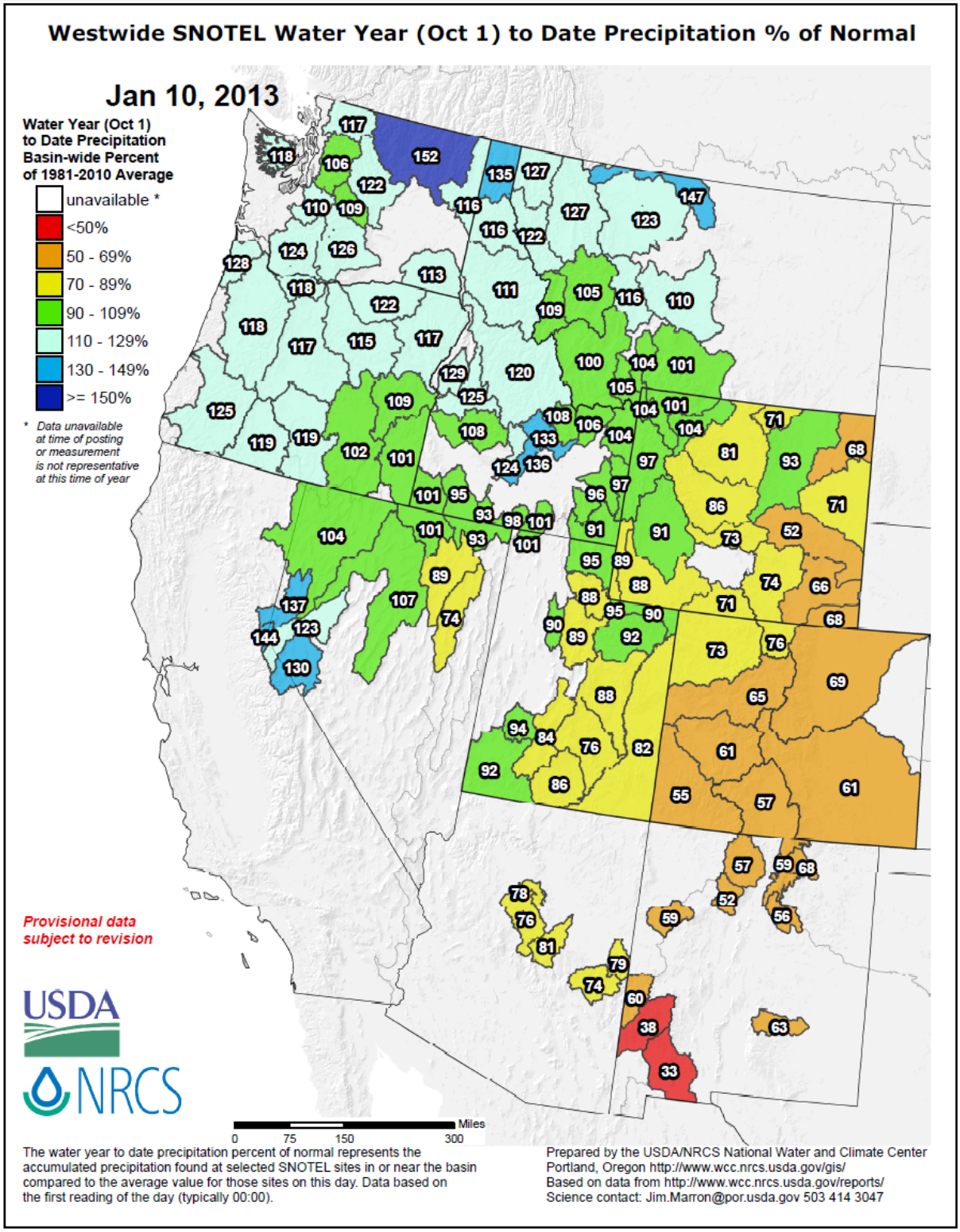


Fig. 2d: For the 2013 Water-Year that began on 1 October 2012, statistics continue to favor the Northern Tier States and the Northern Sierra with surpluses. Significant deficits dominate over eastern Wyoming and all of Colorado and New Mexico. Update Reports by SNOTEL site can be acquired by clicking here.

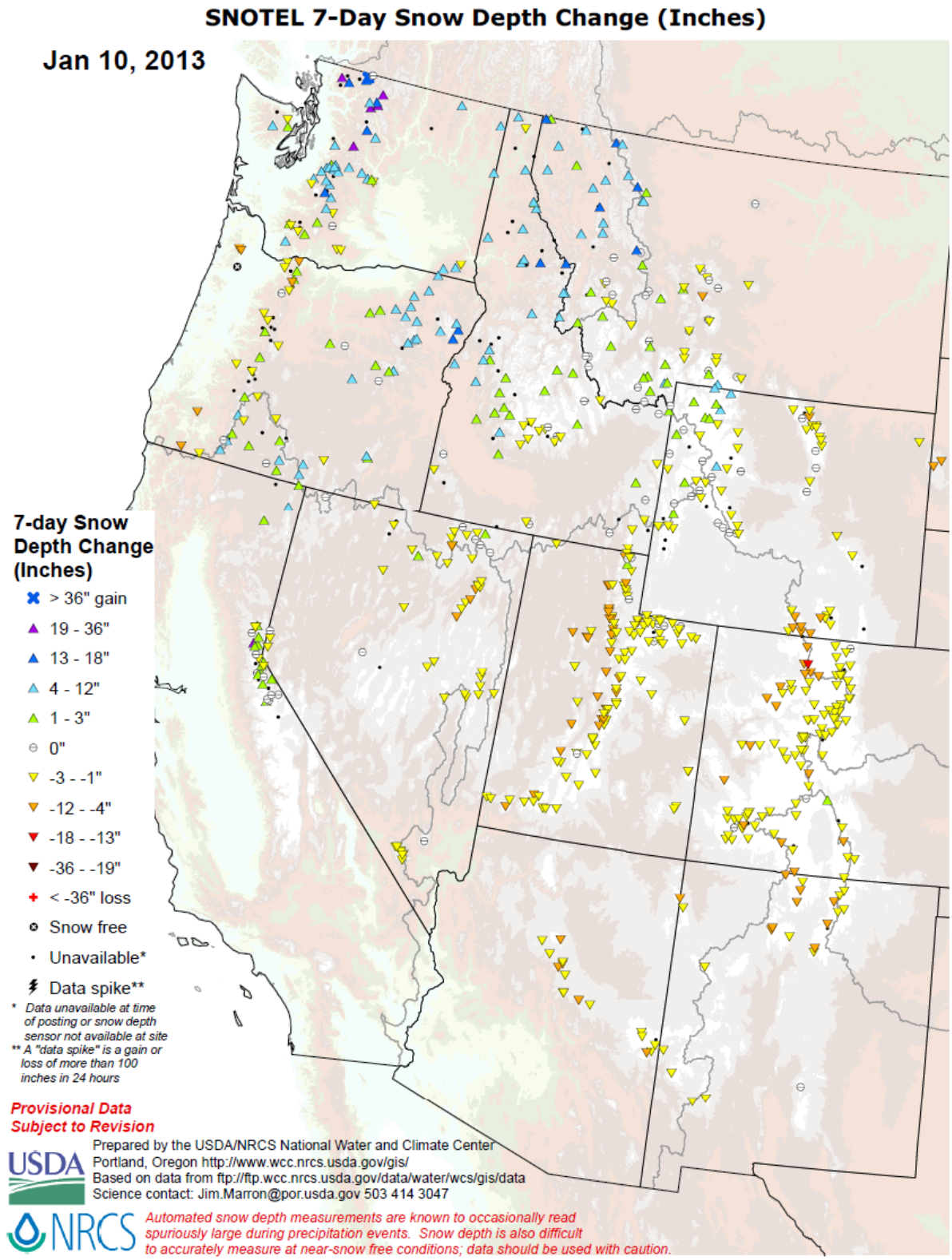


Fig. 3a: Snow depths for the week revealed that increases occurred over the Pacific Northwest and northernmost Rockies.

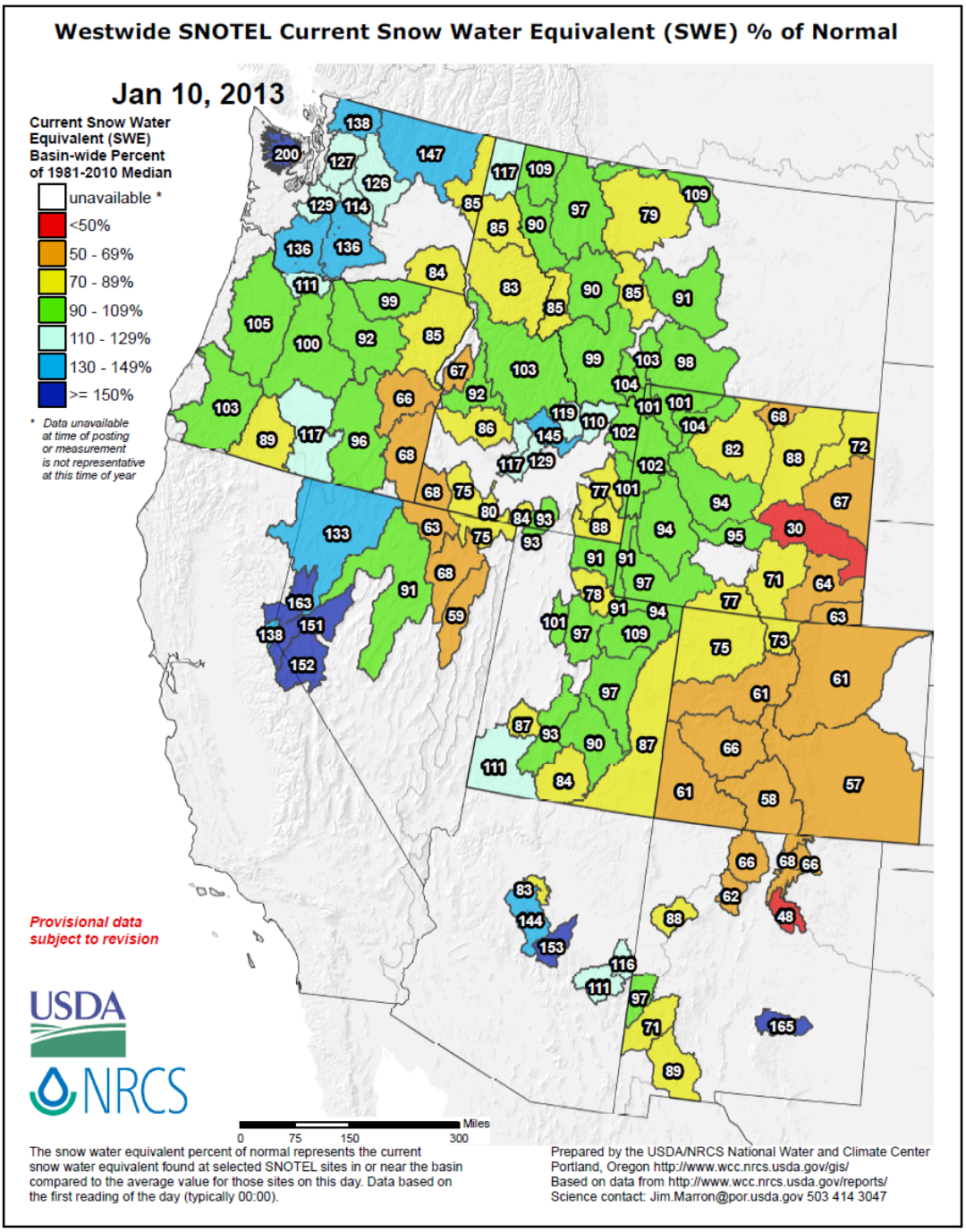


Fig. 3b: Snow Water-Equivalent: Largest deficits continue over much of New Mexico, all of Colorado, eastern Wyoming, and the northeastern Great Basin. Significant surpluses exist over the Northern Cascades, Sierra, mountain of Arizona, and Snake River Basin. However, since last week, many basins with surpluses continue to lower their SWE by significant percentages. For example, the Northern Sierra has had a decrease in SWE between 30 and 40 percent. A continuation of this decline is expected over the next 10 days as high pressure dominates the West. The upside of this situation is that temperatures will remain well below average. Currently winter storm warnings are posted for the Interior West and much of Montana. For expected snowfall amounts, click here. A useful basin by basin assessment of SWE to date can be viewed by state by clicking here and here.

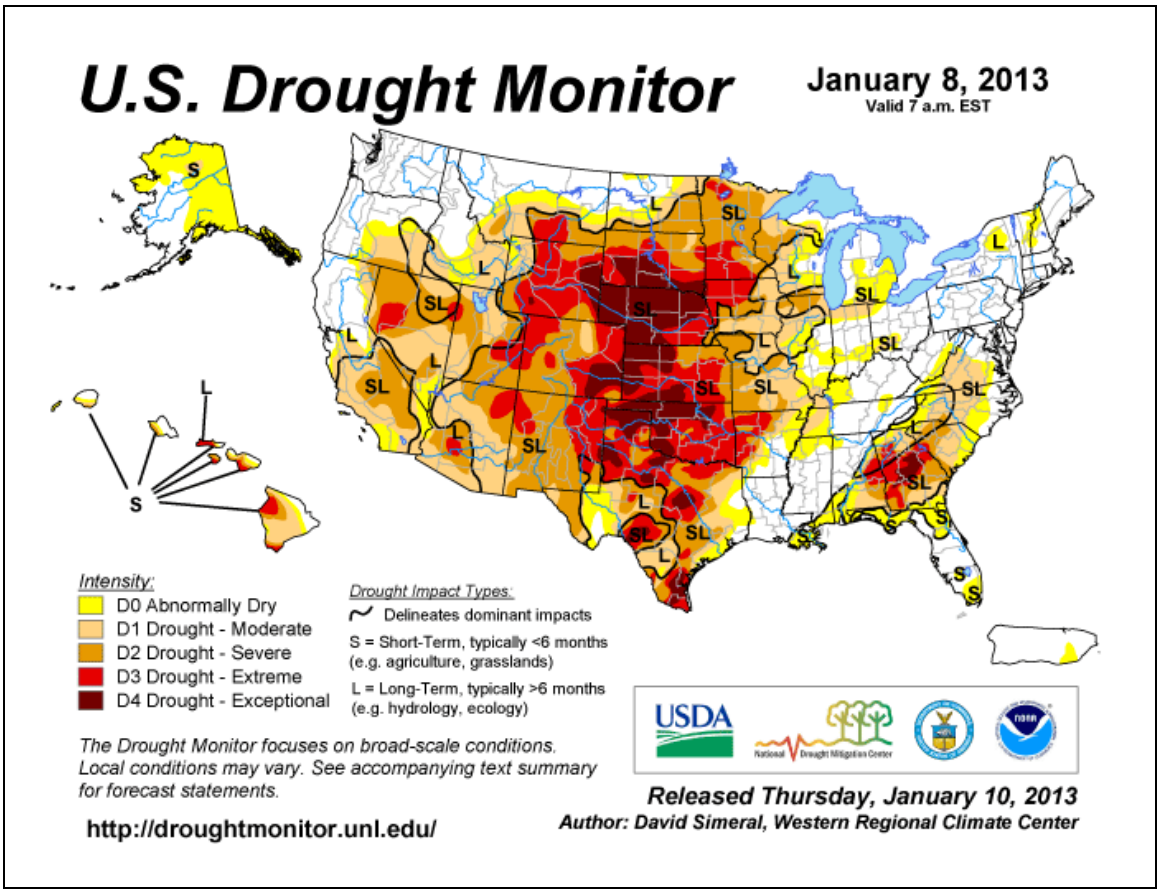


Fig. 4: Current Drought Monitor weekly summary. The exceptional D4 levels of drought are found over Georgia, and scattered across the western corn belt of the Plains into Colorado, Wyoming, easternmost New Mexico, and southward into Texas. For more drought news, see Drought Impact Reporter. Click for the latest statistics for California Reservoirs. The latest drought indicator blend and component percentiles spreadsheet is a great resource for climate division drought statistics. See Fig. 8 for the latest Drought Outlook (forecast).

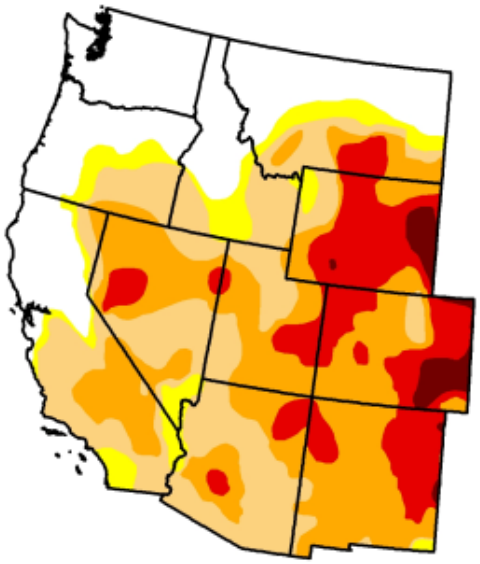
U.S. Drought Monitor

West

January 8, 2013
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.51	75.49	68.47	44.13	16.79	2.15
Last Week (01/01/2013 map)	24.39	75.61	69.31	45.04	18.01	2.15
3 Months Ago (10/09/2012 map)	9.74	90.26	77.20	42.95	16.05	1.93
Start of Calendar Year (01/01/2013 map)	24.39	75.61	69.31	45.04	18.01	2.15
Start of Water Year (09/25/2012 map)	15.12	84.88	77.15	43.65	16.85	1.77
One Year Ago (01/03/2012 map)	50.20	49.80	28.05	11.84	2.67	0.78



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://droughtmonitor.unl.edu

Released Thursday, January 10, 2013
David Simeral, Western Regional Climate Center

Fig. 4a: Drought Monitor for the Western States with statistics over various time periods. No significant changes occurred this past week. See latest Western Water Assessment Report.

In California, there are cooperative snow survey made up of 35 or so utilities, water agencies, government agencies and the Department of Water Resources. The NRCS is one of the cooperating agencies. Through this cooperative, California has over 200 manual snow surveys and has a similar number of snow pillows. With this data they publish a Bulletin 120 every month from February through May which provides a forecast of April through July runoff. We provide daily snow reports through the California Data Exchange Center (which also posts the Bulletin 120 at http://cdec.water.ca.gov/snow/bulletin120/index2.html) through the following links:

Current PAGE6 report: http://cdec.water.ca.gov/cgi-progs/snow/PAGE6
Current DLYSWEQ report: http://cdec.water.ca.gov/cgi-progs/snow/DLYSWEQ
Current Regional Snowpack Plots: http://cdec.water.ca.gov/cgi-progs/snow/PLOT_SWC

California also hosts a statewide water conditions page at:

http://cdec.water.ca.gov/water_cond.html which has links to precipitation, reservoir storage, snowpack, runoff, and summary reports.

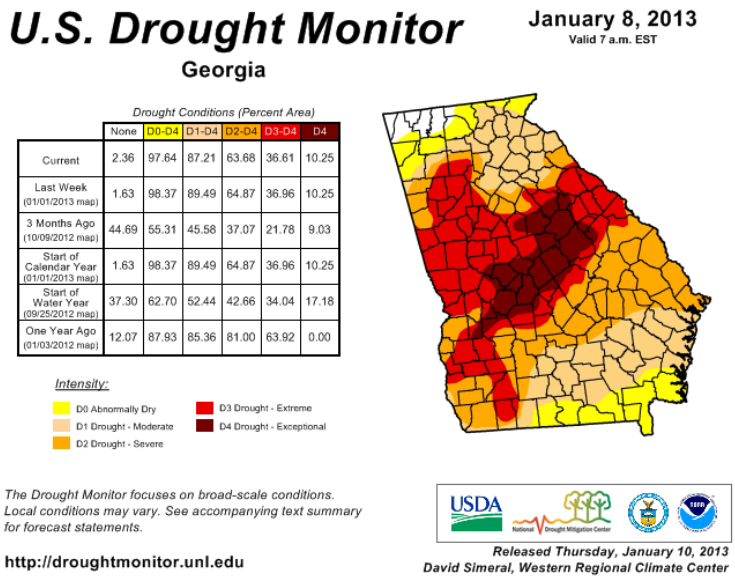


Fig. 4b: **D4 conditions are over Georgia. Note no real improvements in D3 and D4 this past week.**

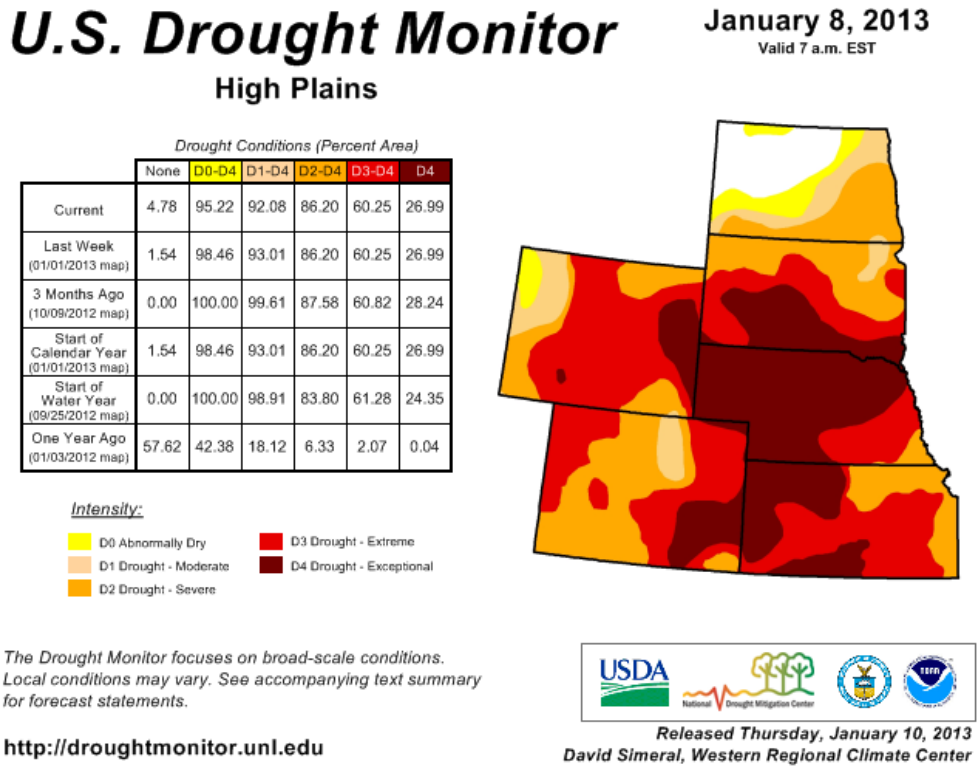


Fig. 4c: Drought Monitor for the High Plains with statistics over various time periods. Conditions remained unchanged for the week.

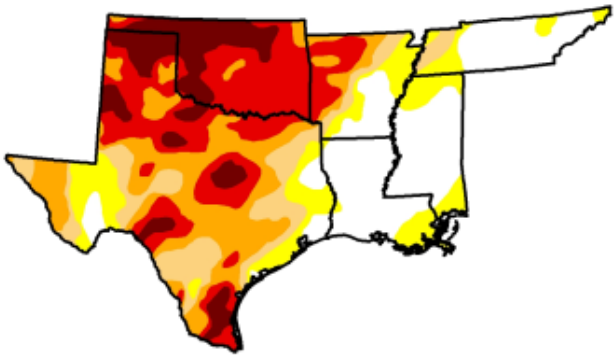
U.S. Drought Monitor

South

January 8, 2013
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	24.31	75.69	61.96	50.73	32.67	10.70
Last Week (01/01/2013 map)	21.18	78.82	63.69	50.50	32.80	10.98
3 Months Ago (10/09/2012 map)	30.52	69.48	57.14	37.67	23.10	6.58
Start of Calendar Year (01/01/2013 map)	21.18	78.82	63.69	50.50	32.80	10.98
Start of Water Year (09/25/2012 map)	24.13	75.87	66.61	51.50	29.86	9.11
One Year Ago (01/03/2012 map)	26.47	73.53	69.01	54.98	40.06	17.24



Intensity:

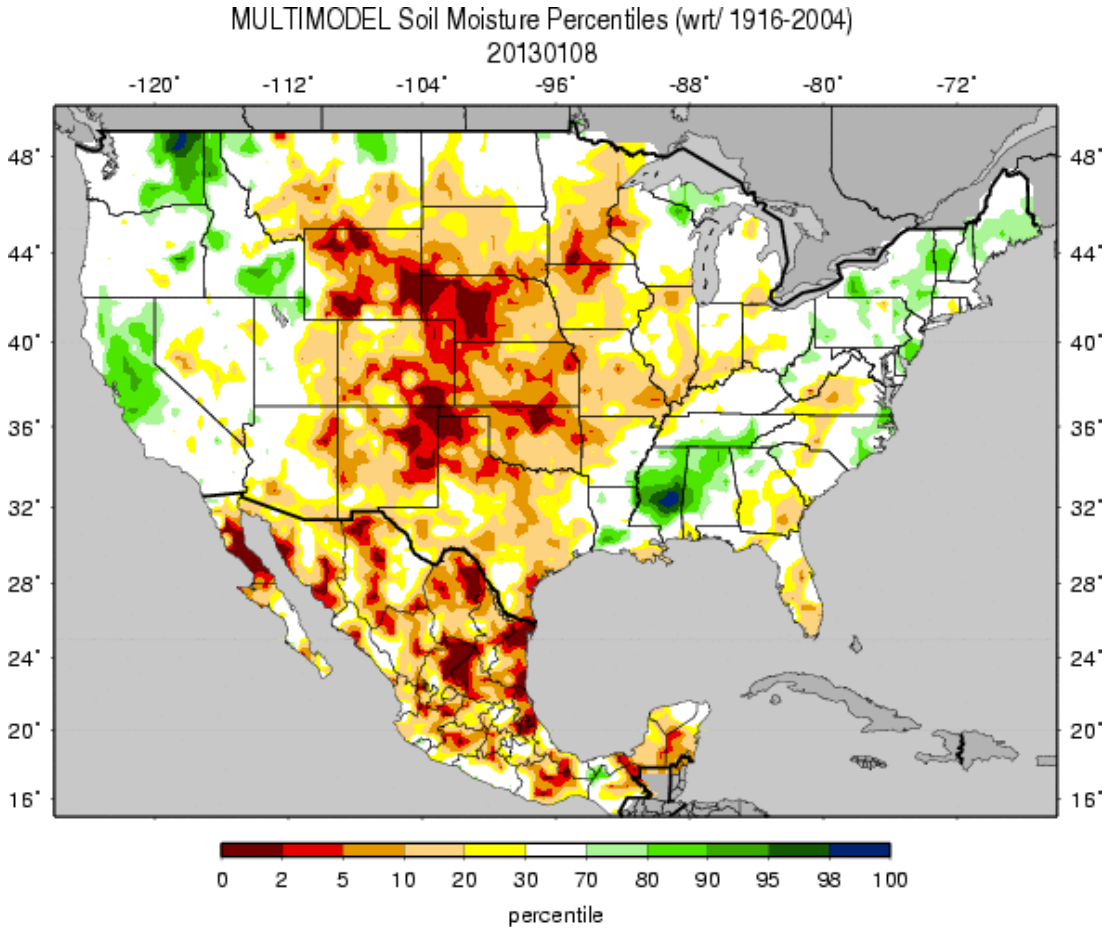
- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

Released Thursday, January 10, 2013
David Simeral, Western Regional Climate Center

Fig. 4d: **Drought Monitor for the South-Central Region with statistics over various time periods. Note some improvement in the D4 category over the past 7 days. Check out the Texas Drought Website. A very wet week is expected in Texas so some improvements are expected to be reflected in next week's map.**



Figs. 5: Soil Moisture ranking in percentile as of 08 January shows dryness scattered across Plains, much of the Rockies, and eastern half of the Southwest. Wetness dominates from northern California, eastern Washington, southeastern Idaho, and in Mississippi. Freezing soils will skew actual moisture values, making them less than reliable over the Northern States.

Useful Hydrological Links:

USDA western U.S. mountain snow water content anomaly map.

USGS (U.S. Geological Service) observed streamflow; NOAA Climate Prediction Center (CPC) modeled runoff anomalies and percentiles; VIC (University of Washington Variable Infiltration Capacity macro scale hydrologic model) 1-, 2-, 3-, and 6-month and water year-to-date runoff percentiles; NLDAS (North American Land Data Assimilation System) modeled streamflow anomalies and percentiles; NLDAS model runoff anomalies and percentiles; USGS groundwater observations (real-time network, climate response network, total active network); USDA snow water content observations for the West (SNOTEL station percentiles and percent of normal, SNOTEL basin percent of normal and percent of average) and Alaska (SNOTEL station percent of normal, SNOTEL basin percent of normal); USDA reservoir storage as percent of capacity.

Soil Climate Analysis Network (SCAN)

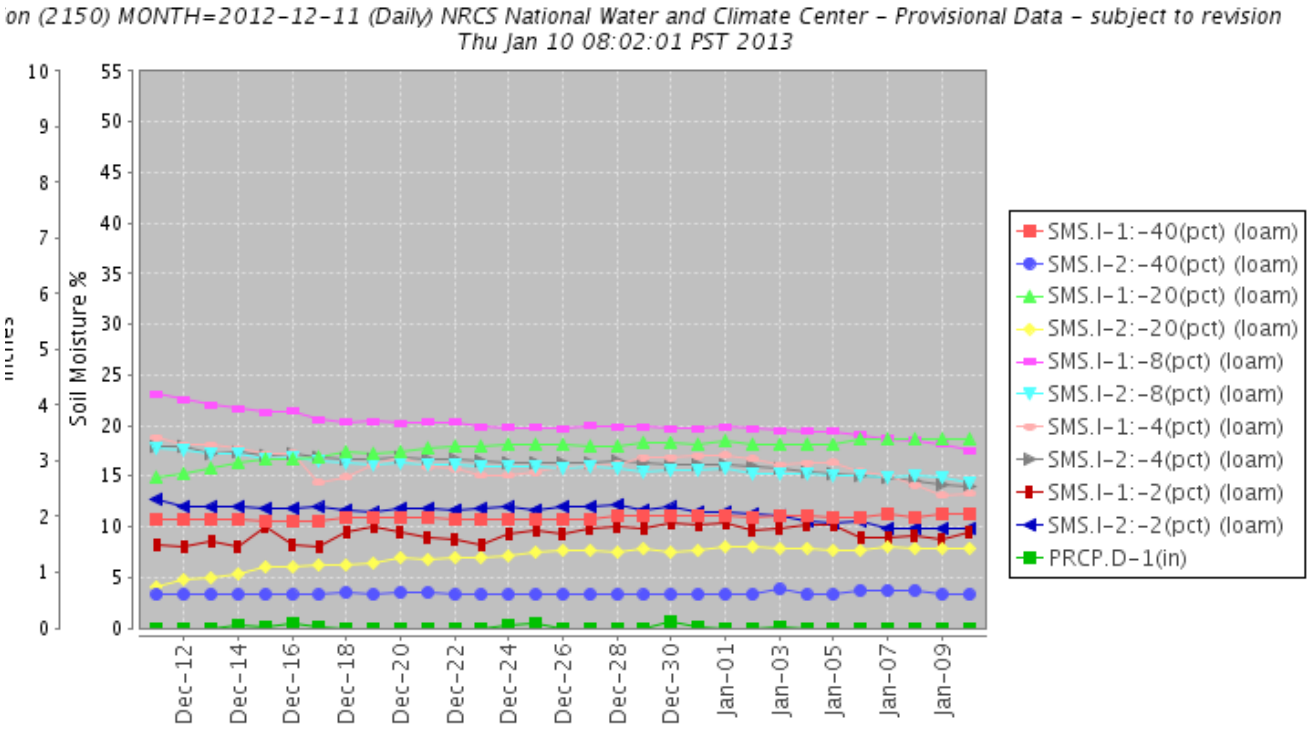


Fig. 6: This NRCS resource shows a site over the Panhandle of Utah with the highest moisture content at the 8 inch depth. Freezing temperatures are probably impacting near surface values.

Useful Agriculture Links:

USDA (U.S. Department of Agriculture) observed soil moisture conditions, departures and percentiles, and comparison to 5-year average and 10-year average; the Palmer Crop Moisture Index (CMI), which intensified during the month in the West and Lower to Mid-Mississippi Valley (weeks 1, 2, 3, 4, 5); CPC modeled soil moisture anomalies and percentiles for end of May, and soil moisture anomaly change compared to previous month; CPC's Leaky Bucket model soil moisture percentiles; NLDAS modeled soil moisture percentiles for the top soil layer and total soil layer; VIC modeled soil moisture percentiles, and soil moisture percentile change compared to previous month; USDA observed pasture and rangeland conditions; Vegetation Drought Response Index (VegDRI); the NOAA/NESDIS satellite-based Vegetation Health Index (VHI); the USGS agro-hydrologic model (Soil Water Index, Water Requirement Satisfaction Index); Selected SNOTEL Sites (measured 2", 4", 8", 20", and 40" soil moisture depths). **The Monthly SCAN Report from Utah**.

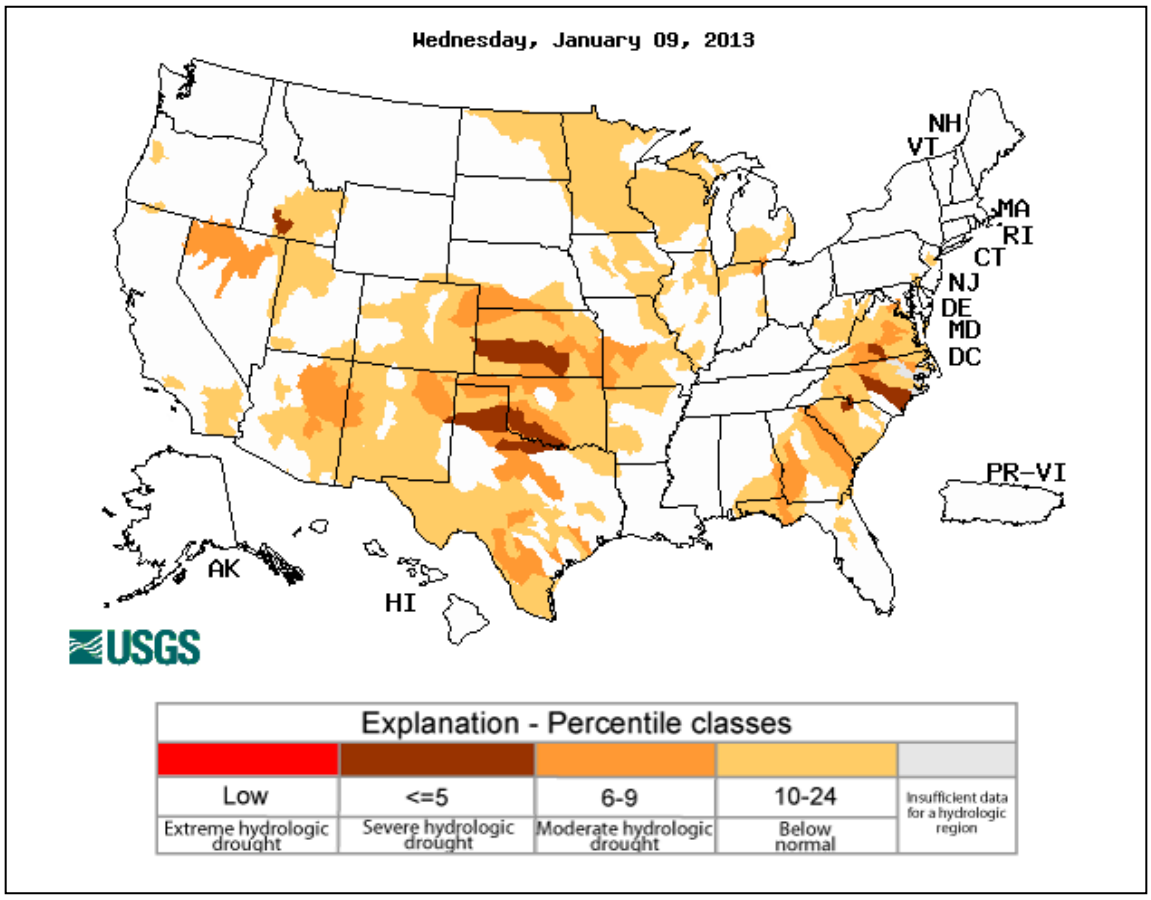


Fig. 7: Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Severe conditions exist over northeast Kansas, northern Texas/southern Oklahoma, southern Idaho, and parts of the Southeast States. As with soil moisture, streamflow data can be severely compromised by prolonged freezing temperatures. See the USGS National Water Information System Mapper.

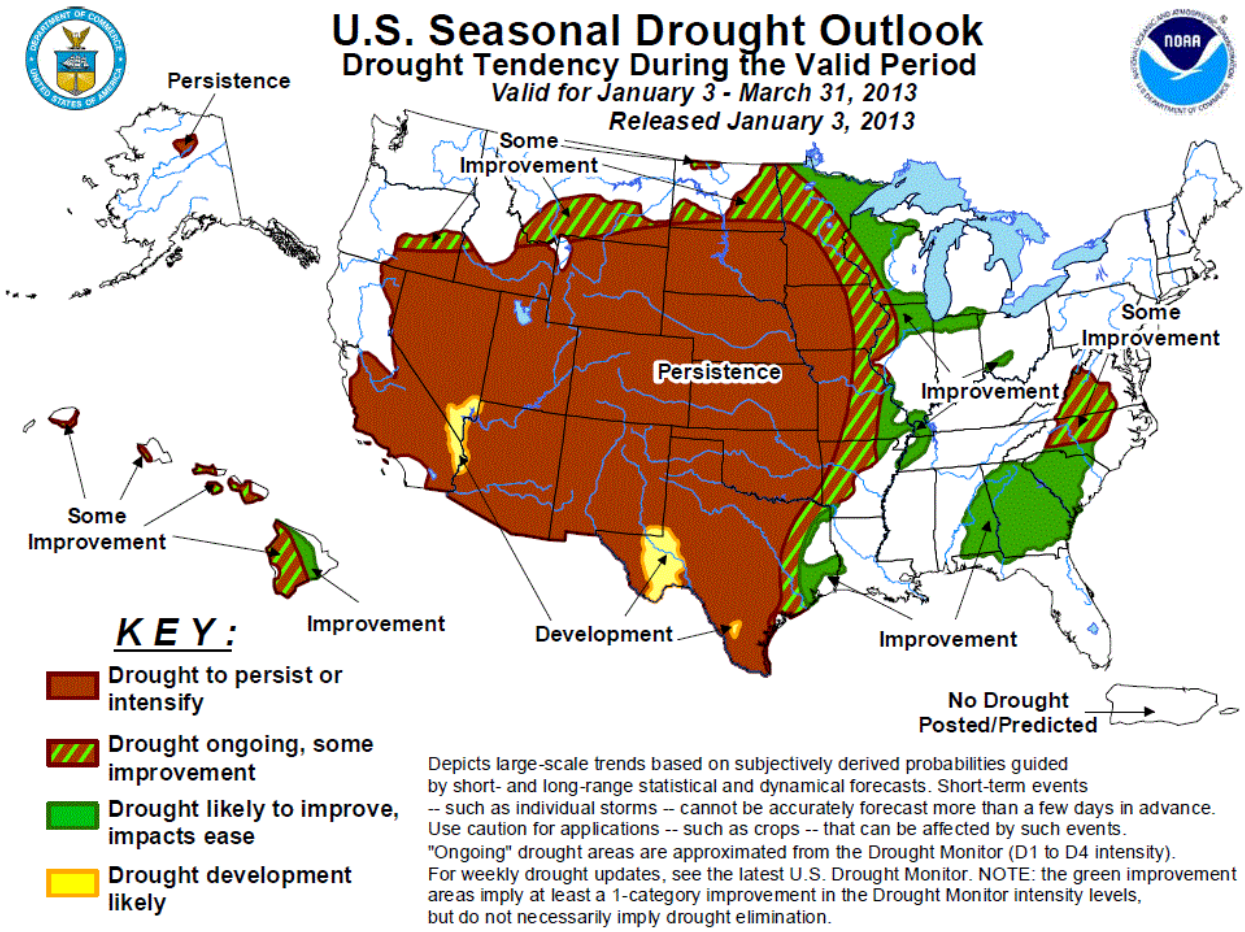


Fig. 8: U.S. seasonal Drought Outlook released 3 January.

See USDA Drought Assistance website.

National Drought Summary -- January 8, 2013

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/.

This U.S. Drought Monitor week saw minor modifications as the conterminous U.S. experienced relatively tranquil weather conditions. Some modest amounts of precipitation fell over the central Gulf Coast states, California, and the Pacific Northwest while some lesser amounts were observed over portions of the Southeast and Mid-Atlantic states. Overall, temperatures across much of the conterminous U.S. were well below normal except for portions of the Southeast, Mid-Atlantic, Northern Great Plains, and the Upper Great Lakes region where temperatures were above average. The northern Great Basin, Intermountain West, and central Rocky Mountains experienced well-below-normal temperatures during the last week, and numerous records were broken. In Alaska, temperatures were well above normal during the last week while the Hawaiian Islands experienced generally cooler-than-normal conditions.

The Northeast: The region received minor amounts of precipitation during the past week, and conditions on the map remained unchanged. Temperatures throughout the region were slightly below normal during the past seven-day period.

Mid-Atlantic: Overall, the Mid-Atlantic was generally dry during the last week, except for some light shower activity over southeastern Virginia. Average temperatures in the region were generally near normal. No changes were made on this week's map for the region.

The Southeast: The Southeast remained relatively dry during the past week, with the exception of some scattered showers over portions of northern Alabama, northern Georgia, and northwestern South Carolina. Recent rainfall accumulations led to one category improvements in northwestern Georgia. Continued short-term dryness and increased wildfire risk led to the expansion and introduction of Abnormally Dry (D0) areas in south Florida. Temperatures in the region during the past week were well above normal over most of Florida, Georgia, and South Carolina.

The South: Some scattered shower activity over the region helped to alleviate some Abnormally Dry (D0) areas in southwestern Louisiana and along the Gulf Coast of Texas, as well as areas of Extreme Drought (D3) and Exceptional Drought (D4) in southern Texas. Some slight deterioration of conditions related to short-term precipitation deficits led to minor expansion of Severe Drought (D2) and Extreme Drought (D3) in the Hill Country of Texas while recent snow accumulations and cool temperatures in the Panhandle led to minor improvements from Exceptional Drought (D4) to Extreme Drought (D3) and a new area of Severe Drought (D2). Throughout this region, temperatures were below normal during the past week.

Midwest: Overall, the Midwest was generally dry during the past week with the exception of some scattered snow showers over central Illinois and mixed rain/snow over Missouri. Some

minor modifications were made to the map joining areas of Abnormally Dry (D0) in southeastern Indiana and southwestern Ohio to reflect lingering dryness in the region. Temperatures in the southern tier were below normal, while the Northern Great Lakes Region experienced warmer-than-normal conditions.

The Plains: The region continued to experience an overall dry pattern during the past seven-day period with the exception of some light rainfall in portions of Oklahoma and scattered snow showers over Kansas. Shorter-term (30-day) snowfall accumulations in the northern portion of North Dakota led to improvements from Moderate Drought (D1) to Abnormally Dry (D0) as well as a return to normal conditions in the northwestern part of the state. In the Northern Plains, temperatures were above average for the period while the Central and Southern Plains experienced near-normal to below-normal conditions.

The West: During the last seven-day period, the West was generally dry with only some light rainfall over portions of central California. Current snowpack conditions show significant deficits in snow water content over the mountains of Colorado, New Mexico, northeastern Nevada, eastern Oregon, eastern Wyoming, and sections of northern Montana. Conversely, notable surpluses exist over the Cascades, Sierras, Sawtooths, Uintas, and the mountains of Arizona. Short-term precipitation accumulations since October 1 led to categorical improvements in areas of the Great Basin and eastern Sierra Nevada along the California-Nevada border. The two areas of Extreme Drought (D3) in the Great Basin saw reductions to Severe Drought (D2) due to the net effect of short-term precipitation accumulations. Temperatures over the West have been well below normal with the exception of large portions of Montana and northwestern Wyoming. During the past week, the Great Basin, Intermountain West, southern Idaho, southeastern Oregon, and western Colorado experienced well-below-normal temperatures with minimums ranging from -10° F to -30° F.

Hawaii, Alaska, and Puerto Rico: The Hawaiian Islands saw some slight improvements as a result of wet trade winds delivering moisture to the windward areas, while some lesser accumulations also carried over to the leeward sides of the smaller islands. The islands of Maui and Molokai saw slight expansion of Extreme Drought (D3) in response to deteriorating pasture conditions.

Looking Ahead: For the remainder of the week, the conterminous U.S. will shift toward a more active weather pattern. The NWS HPC 5-Day Quantitative Precipitation Forecast (QPF) calls for heavy precipitation to fall over eastern Texas as well as portions of the Lower Mississippi and Ohio Valleys. The Pacific Northwest will remain in an active pattern this week as will the Northern Rockies. Temperatures are forecasted to be above average east of the Rockies while most of the West will continue to remain well below normal. The 6–10 day outlooks call for a high probability of below-normal precipitation west of the Rockies and an elevated probability of above-normal precipitation in the eastern half of the conterminous U.S. In Alaska, the 6–10 day forecasts call for an elevated probability of above-normal precipitation and temperatures.

Author: David Simeral, Western Regional Climate Center

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
S ... Short-Term, typically <6 months (e.g. agricultural, grasslands)
L ... Long-Term, typically >6 months (e.g. hydrology, ecology)

Updated January 9, 2013

USDA is getting off to a very early start in 2013 with secretarial drought declarations in nearly 600 counties. The department, recognizing that drought is not going away anytime soon, wants to be proactive in helping producers procure low-interest loans.

The full scoop…

Announcement:
http://www.usda.gov/wps/portal/usda/usdahome?contentid=2013/01/0002.xml&contentidonly=true

USDA Drought Page:
http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

PDF Map of Counties: http://www.usda.gov/documents/usda-drought-fast-track-designations-010913.pdf

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