



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

Weekly Report - Snowpack / Drought Monitor Update

Date: 11 April 2013

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: [SNOTEL](#) and ACIS 7-day temperature anomaly ending 10 April were above the long-term average across much of the West. The only exception occurred over northeastern Montana (Fig. 1a). [ACIS 7-day](#) average temperature anomalies show the greatest positive temperature departures scattered across New Mexico (>+6°F). The greatest negative departures occur over northeastern Montana (<-10°F) (Fig. 1b).

Precipitation: [ACIS](#) 7-day average precipitation amounts for the period ending April 10 show the heaviest precipitation confined to western mountains in Oregon and Washington (Fig. 2a). Lesser amounts fell over the Interior West as a spring storm moved through the Four Corner States and Wyoming earlier this week. In what is usually a drier time of year, the past week saw moisture fall at higher percentages (Fig. 2b). The widespread moisture did not alleviate the dryness that has persisted in all but the state of Washington since October, the start of the water year. [SNOTEL month to date](#) precipitation percent of normal pattern for April shows significant precipitation across much of the West. However, total precipitation amounts have been generally light in terms of mountain snowpack, ranging from 0.5 to 1.5 inches (snow-water equivalent). Scattered wetter regions of Oregon and Washington had over 5 inches of moisture (Fig. 2c). For the [2013 Water Year](#) that began on 1 October 2012, the pattern continues to resemble La Niña (e.g., wetter Northern Tier). Parts of Arizona are still the exception for the Southern Tier with near normal amounts (Fig. 2d). Southeastern Oregon, despite slightly below average precipitation, has seen much below average amounts of snowpack this winter (Fig. 3b).

Snow: The [3-day snow depth changes](#) show a spring storm delivering snowfall over the Uinta Mountains in Utah and across the Central Rockies. Elsewhere, a noticeable decrease in snow cover has occurred over the Cascades despite a very wet week in the region (Fig. 3a). [Snow-Water Equivalent](#) (SWE) (Fig. 3b) shows that the Washington Cascades is the only location in the West that has a surplus of SWE. Significant deficits over parts of Oregon are noteworthy and may increase the likelihood of drought over the region this summer. Despite a wet week, SWE continues to decline across the West.

The following **Weather and Drought Summary** is provided by this week's NDMC Author: [David Miskus, NOAA/NWS/NCEP/Climate Prediction Center](#):

The Rockies and Intermountain West: "Light to moderate precipitation (0.5 to 2 inches) fell on the northern and central Rockies and Intermountain West, with little to no precipitation measured in southern sections. Temperatures averaged above normal throughout the region. In general, enough precipitation fell to keep conditions status-quo, with a few exceptions. In northeastern Utah, the Uinta Mountains received between 1 to 2 inches liquid equivalent, which was enough to improve from D2 to D1. In southwestern Montana, 90-day subnormal precipitation warranted the expansion of D1 and D2, with WYTD basin average precipitation declining to 87 percent of normal and SWC at 85 percent of normal. Elsewhere, conditions remained the same, with the exception of modifying the Impact lines to better reflect the short-term dryness in the Far West and more medium-term impacts (both short and long term) elsewhere."

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The Far West and Southwest: “Moderate to heavy rains (2 to 6 inches) fell west of the Cascades, from northern California northward to the Canadian border. In the Sierra Nevada, 1 to 2.5 inches of precipitation occurred, but the Water Year-to-Date (WYTD) average basin precipitation was still between 74 to 86 percent of normal, and the April 9 basin average snow water content (SWC) between 37 to 49 percent of normal. Values were better farther north in southern Oregon, with the southern Cascades WYTD precipitation close to normal, and SWC between 63 to 74 percent of normal. With the heavy rains, D0 was removed from much of southwestern Oregon and extreme northwestern California, although some short-term deficits still remain due to a dry January-March. However, since October 1, WYTD precipitation is close to normal thanks to a very wet November and December. Recent and WYTD precipitation was also enough to make improvements in northwestern Nevada/ northeastern California/southern Oregon (D2 to D1), and D0 removal in northeastern Oregon.”

“Farther south, little or no precipitation and warm weather aided deteriorating conditions in parts of the Southwest. In Arizona and New Mexico, growing deficits in southwestern, southeastern, and northeastern Arizona, and central New Mexico expanded D1-D3 drought. Since early October, precipitation has been less than half of normal in eastern Arizona and much of New Mexico, and the same hold true at 12-months. As a result, drought worsened in Yavapai and Maricopa Counties in southwestern Arizona, and most of southeastern Arizona was degraded to D2. D3 was expanded into northeastern Arizona (Apache County), and increased in size in western and southern New Mexico. Amazingly, central Arizona was close to normal as the WYTD basin precipitation was between 85 to 97 percent of normal. Unfortunately, reservoir storage as of April 1 was below average in Arizona, New Mexico, and Nevada.”

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, water restrictions imposed, and crop or pasture losses. 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 4c).

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 up to 40 inches). To access SCAN data, see the National Water & Climate Center [webpage](#).

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

Weekly Snowpack and Drought Monitor Update Report

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 Snow Survey and Water Supply Forecasting (SSWSF) Program State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SSWSF 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 URLs: <http://drought.unl.edu/dm/> and <http://www.drought.gov>.

For More Information

The National Water and Climate Center (NWCC) Homepage provides 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 online while ones from 2001-2006 can be acquired on 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 Science and Resource Assessment

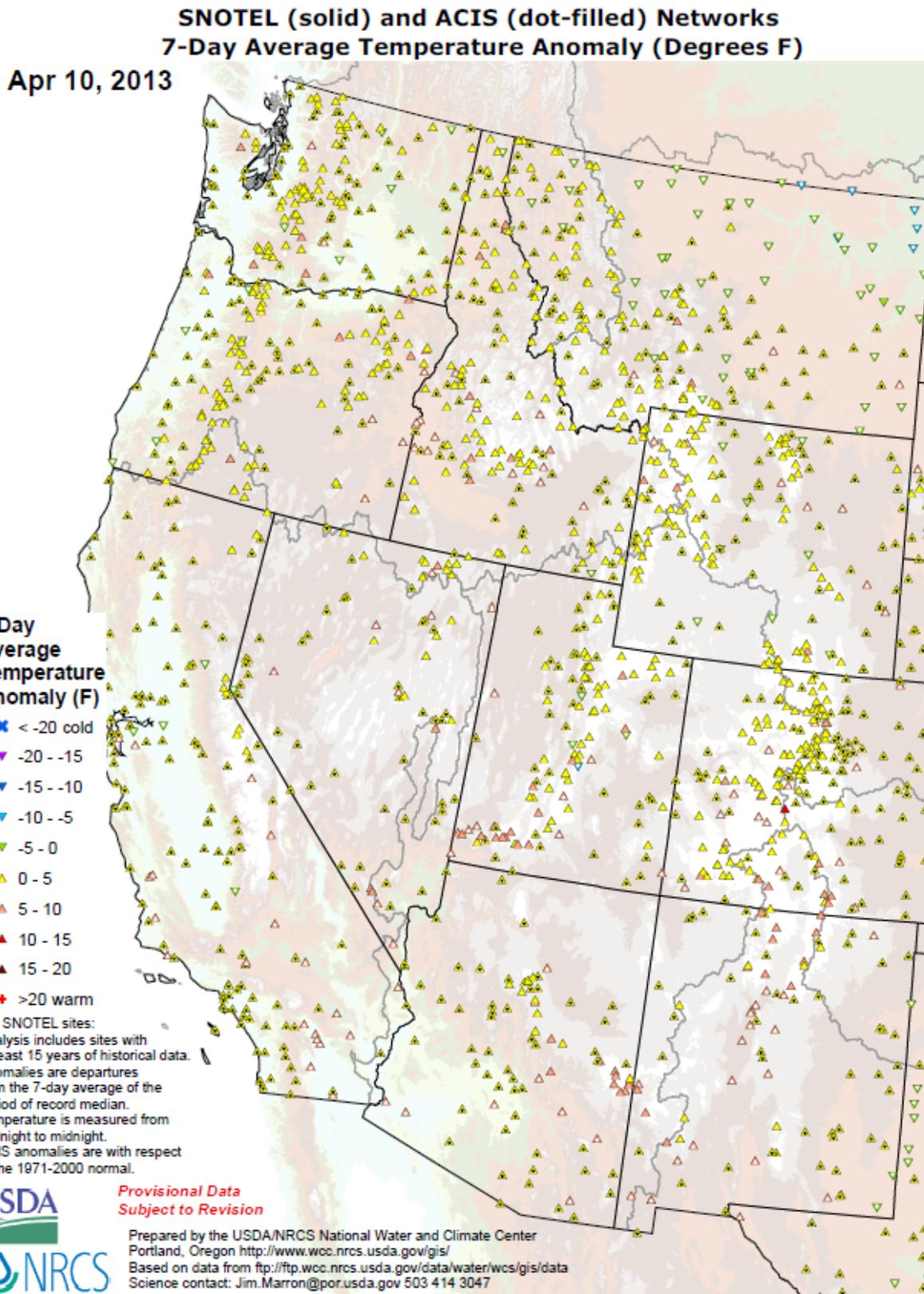
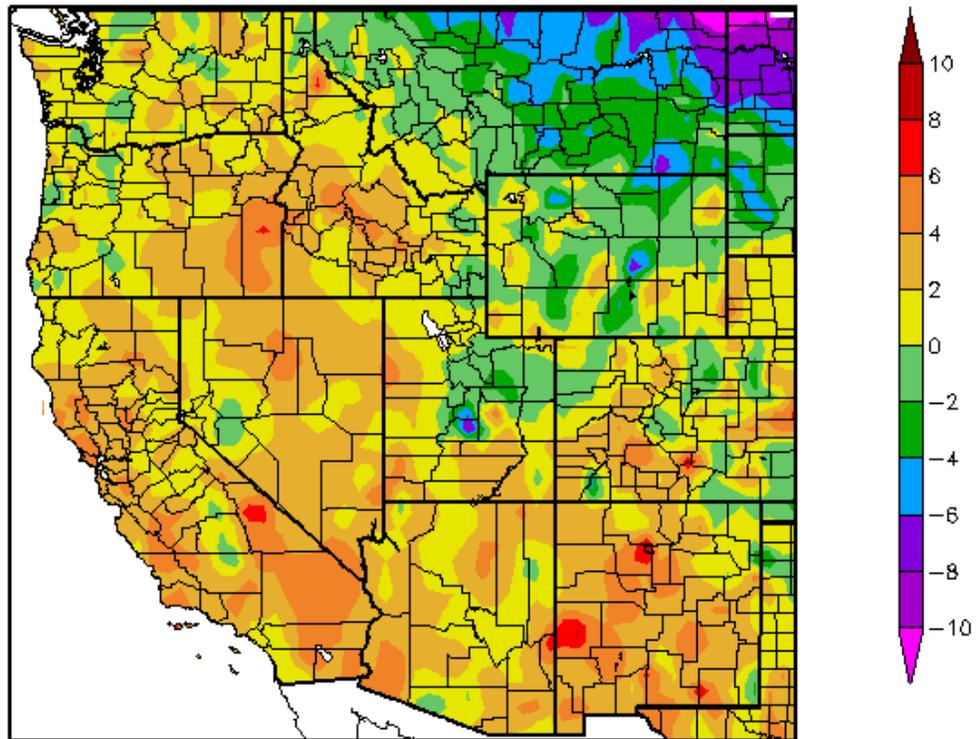


Fig. 1a: **SNOTEL** and ACIS 7-day temperature anomaly ending 10 April were above the long-term average across much of the West. The only exception occurred over northeastern Montana.

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Departure from Normal Temperature (F)
4/4/2013 - 4/10/2013



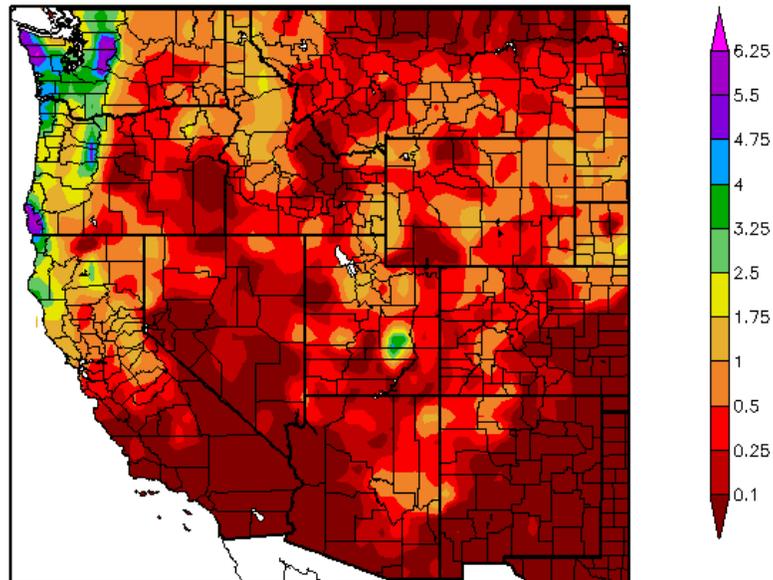
Generated 4/11/2013 at HPRCC using provisional data.

Regional Climate Centers

Fig. 1b: [ACIS 7-day](#) average temperature anomalies show the greatest positive temperature departures scattered across New Mexico (>+6°F). The greatest negative departures occur over northeastern Montana (<-10°F). For more figures, see the Western Water Assessment's Intermountain West Climate [Dashboard](#).

Weekly Snowpack and Drought Monitor Update Report

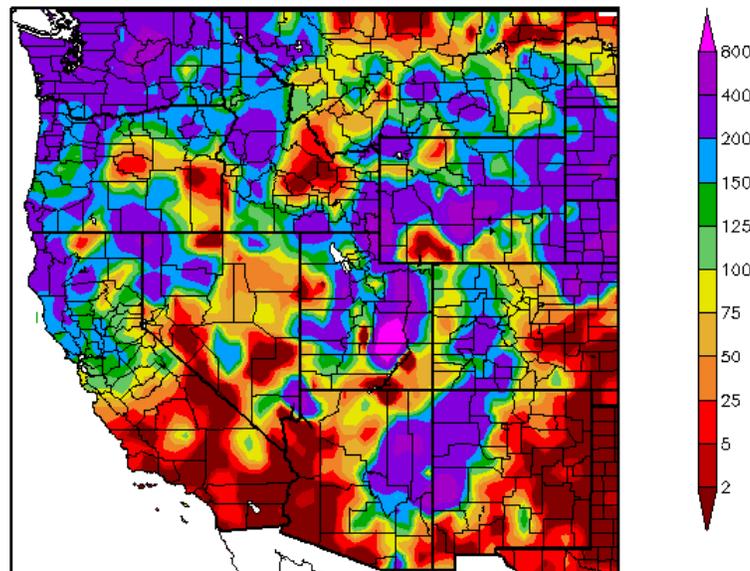
Precipitation (in)
4/4/2013 - 4/10/2013



Generated 4/11/2013 at HPRCC using provisional data.

Regional Climate Centers

Percent of Normal Precipitation (%)
4/4/2013 - 4/10/2013



Generated 4/11/2013 at HPRCC using provisional data.

Regional Climate Centers

Fig. 2a and 2b: [ACIS](#) 7-day average precipitation amounts for the period ending April 10 show the heaviest precipitation confined to western mountains in Oregon and Washington (Fig. 2a). Lesser amounts fell over the Interior West as a spring storm moved through the Four Corner States and Wyoming earlier this week. In what is usually a drier time of year, the past week saw moisture fall at higher percentages (Fig. 2b). The widespread moisture did not alleviate the dryness that has persisted in all but the state of Washington since October, the start of the water year..

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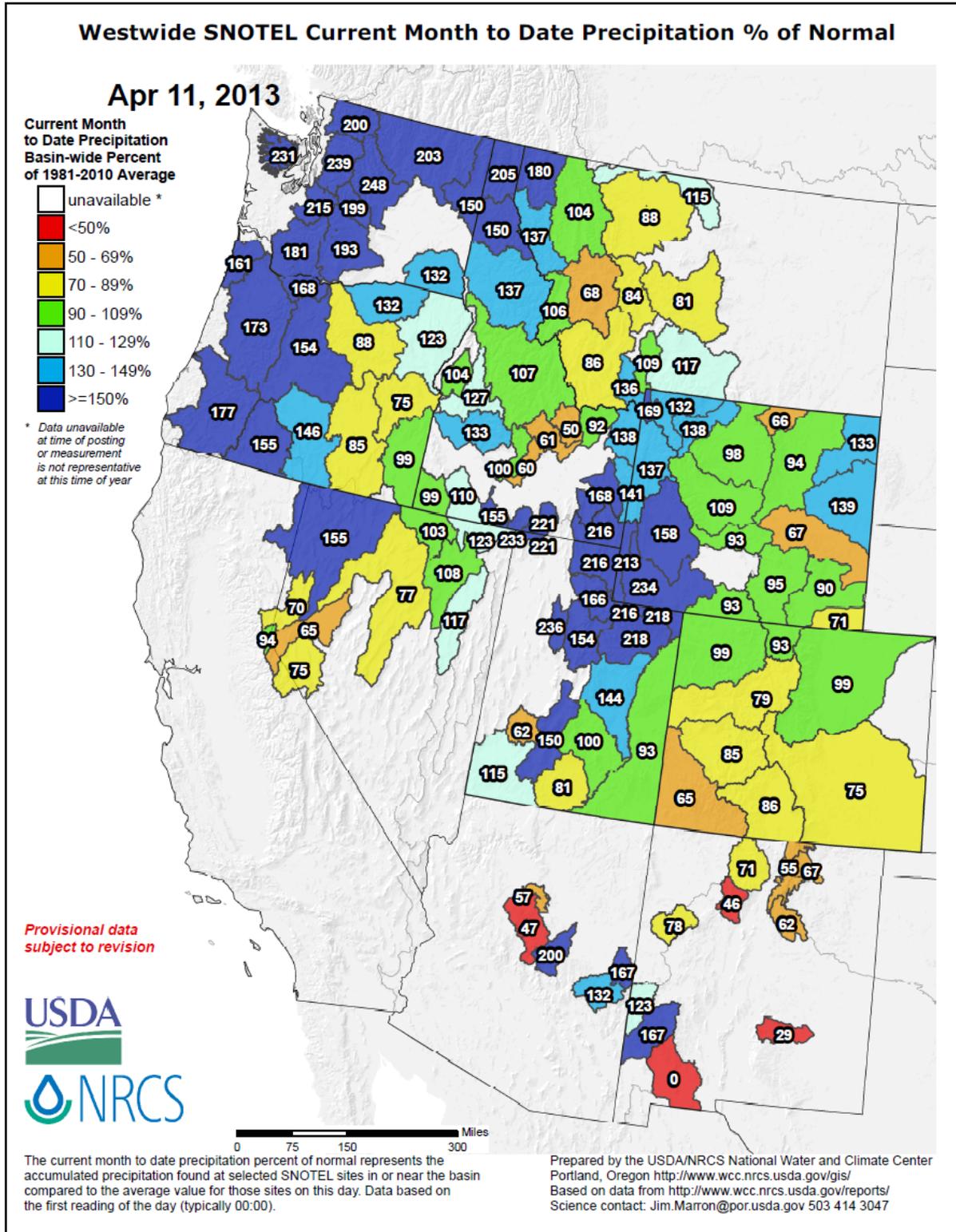


Fig. 2c: SNOTEL month to date precipitation percent of normal pattern for April shows significant precipitation across much of the West. However, total precipitation amounts have been generally light in terms of mountain snowpack, ranging from 0.5 to 1.5 inches (snow-water equivalent). Scattered wetter regions of Oregon and Washington had over 5 inches of moisture.

Weekly Snowpack and Drought Monitor Update Report

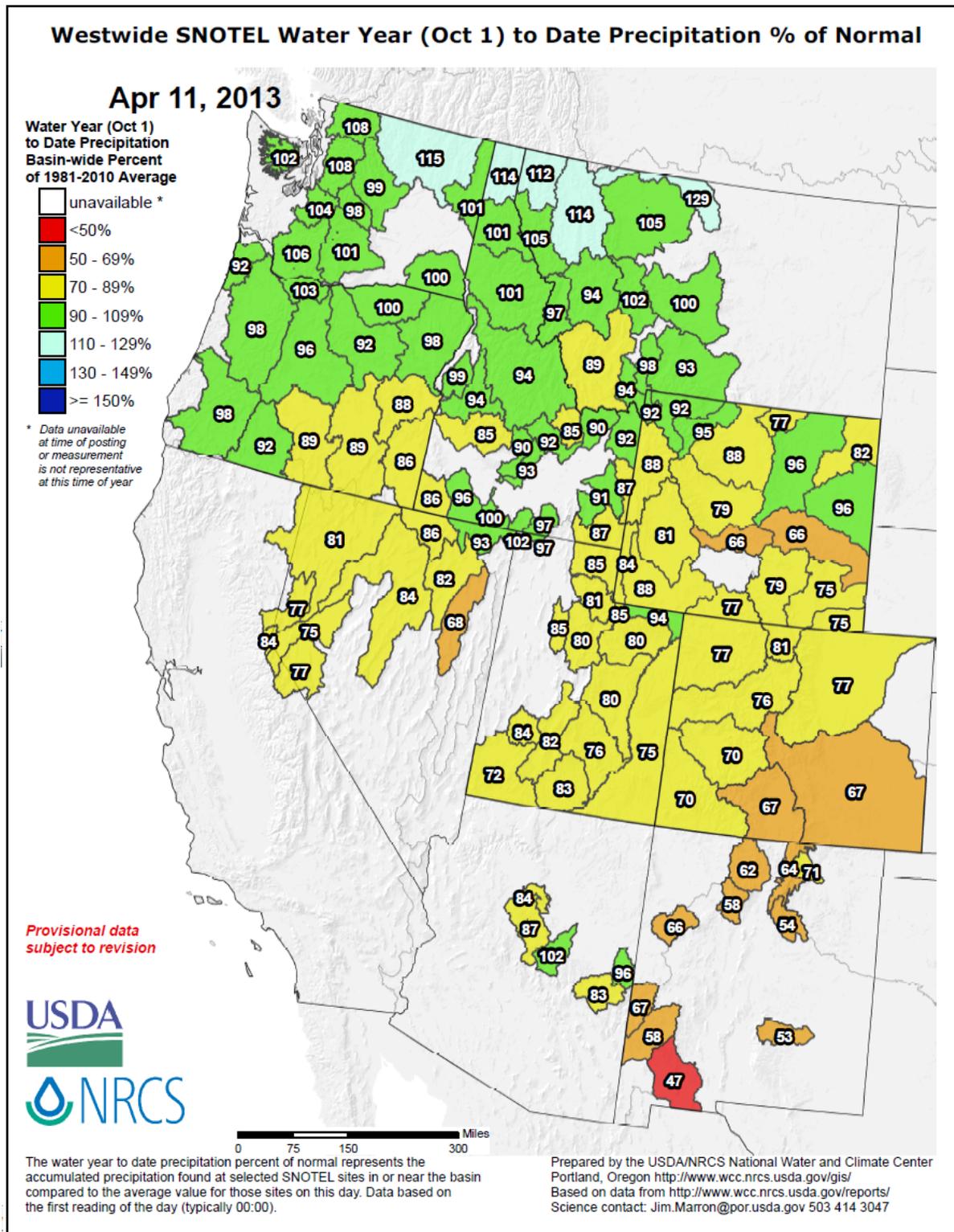


Fig. 2d: For the **2013 Water Year** that began on 1 October 2012, the pattern continues to resemble La Niña (e.g., wetter Northern Tier). Parts of Arizona are still the exception for the Southern Tier with near normal amounts. Southeastern Oregon, despite slightly below average precipitation, has seen much below average amounts of snowpack this winter (Fig. 3b). For additional information, daily reports by SNOTEL sites are available [here](#).

SNOTEL 3-Day Snow Depth Change (Inches)

Apr 11, 2013

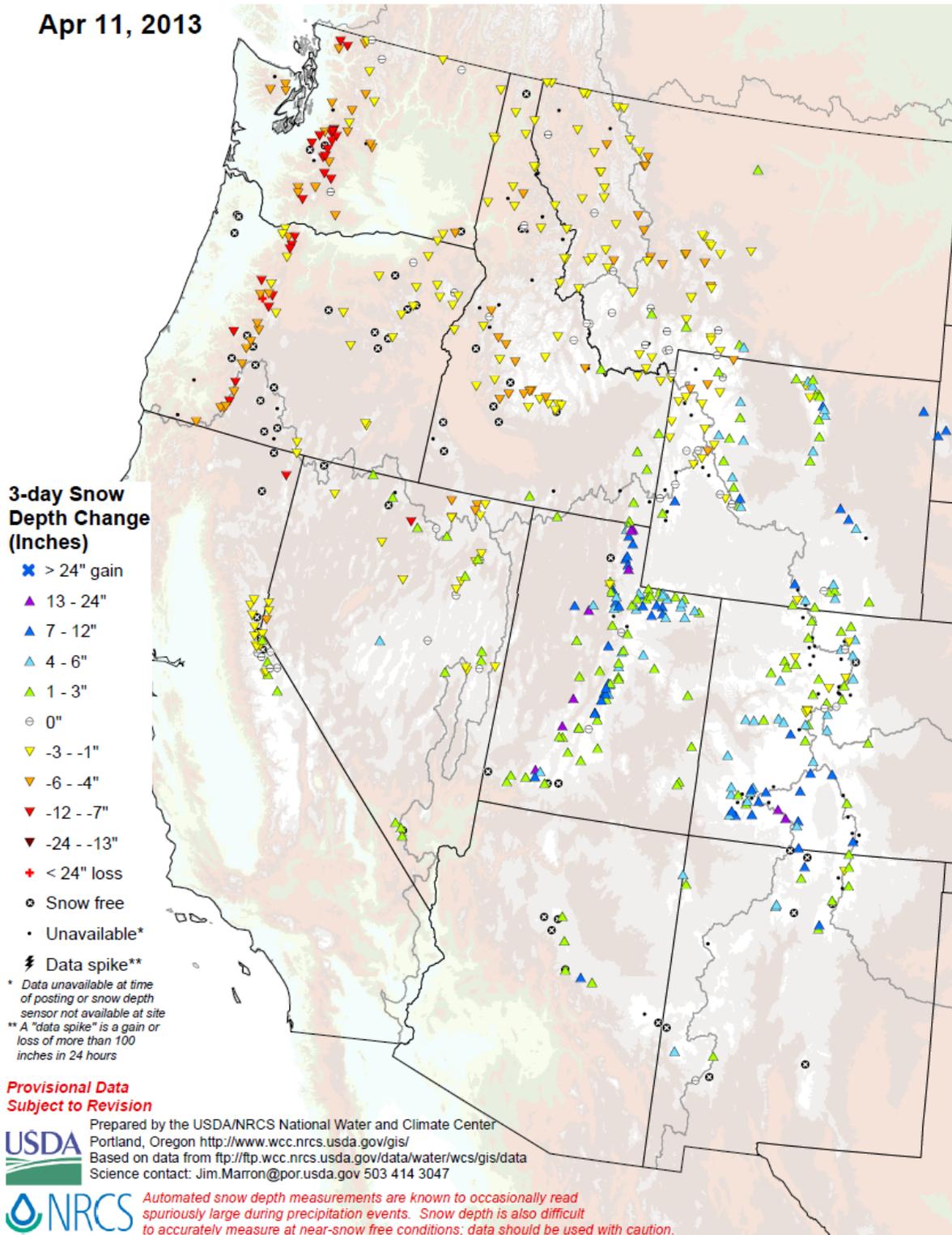


Fig. 3a: The 3-day snow depth changes show a spring storm delivering snowfall over the Uinta Mountains in Utah and across the Central Rockies. Elsewhere, a noticeable decrease in snow cover occurred over the Cascades despite a very wet week in the region.

Weekly Snowpack and Drought Monitor Update Report

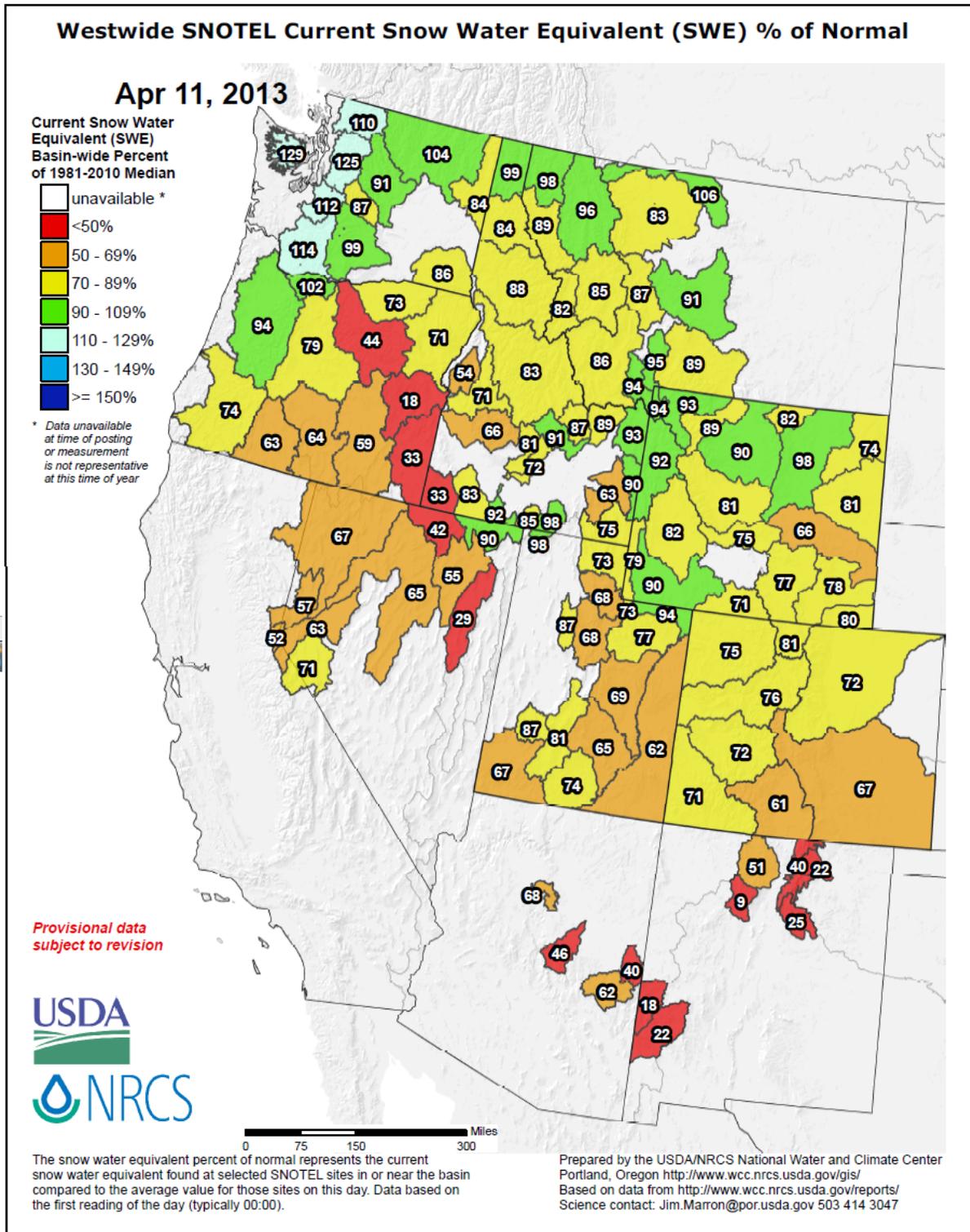


Fig. 3b: Snow-Water Equivalent (SWE): The Washington Cascades is the only location in the West that has a surplus of SWE. Significant deficits over parts of Oregon are noteworthy and may increase the likelihood of drought over the region this summer. Despite a wet week, SWE continues to decline across the West. A useful basin-by-basin assessment of SWE to date can be viewed by state [here](#) and [here](#).

Weekly Snowpack and Drought Monitor Update Report

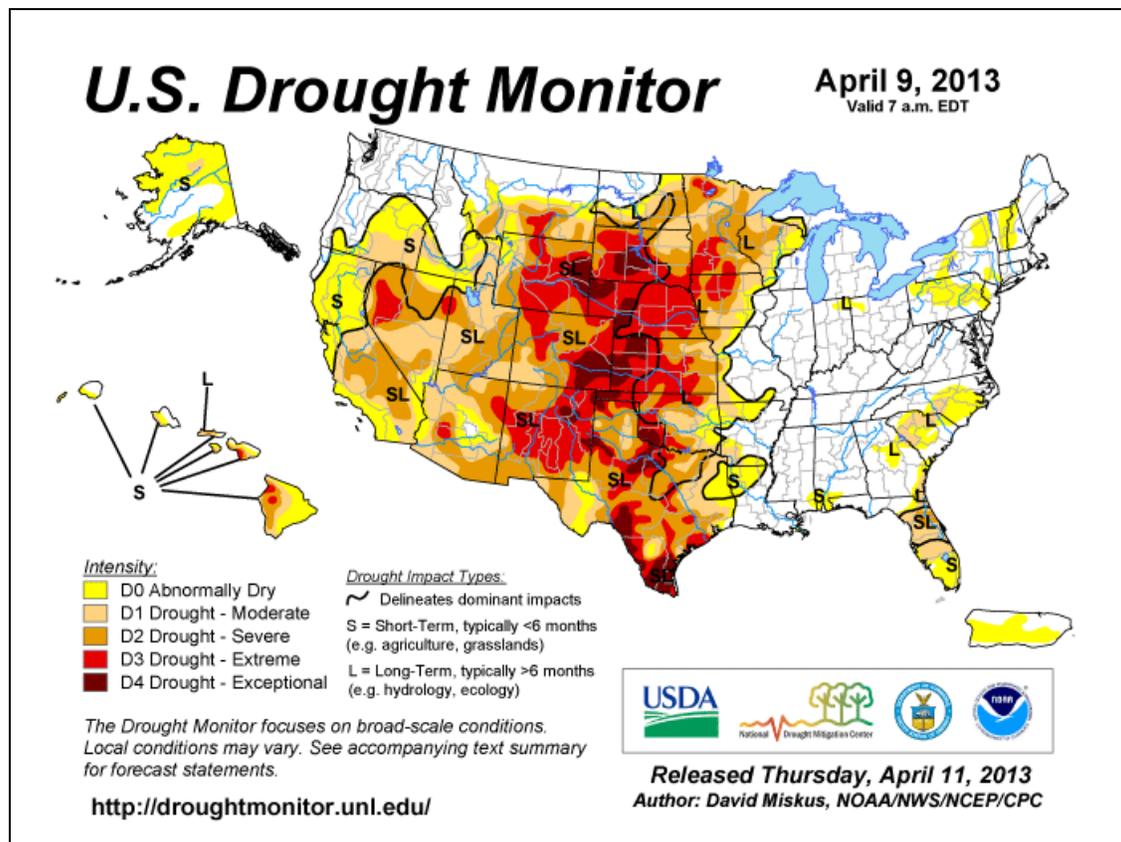


Fig. 4: Current [Drought Monitor](#) weekly summary. The exceptional D4 levels of drought are scattered across the western Corn Belt of the Plains into eastern Colorado, Wyoming, and New Mexico. For more drought news, see [Drought Impact Reporter](#). The latest [drought indicator blend and component percentiles](#) spreadsheet is a great resource for climate division drought statistics. See Fig. 8 for the latest [Drought Outlook](#) (forecast).

For an interesting website on Lake Mead drought update, click [here](#).

Drought News—April 5, 2013

This is a collection of drought-related news stories from the past seven days or so. A number of these articles will be posted on the [Drought Headlines](#) page at the NDMC website. Impact information from these articles is also entered into the [Drought Impact Reporter](#).

The talk is all about water this week from parts of California to Colorado and down to Texas.

- Californians are urged to conserve water since the snowpack is thin and irrigation water deliveries will be cut back and delayed, in some instances.
- Utah is looking at a difficult summer, given their meager snowpack.
- Many communities and irrigation districts in Colorado are expecting reduced supplies.
- Water supplies in Texas have been reduced to alarmingly low levels.

Ken Dewey sent along a couple of links to drought updates that he produces.

[High Plains and U.S. Drought Update April 1, 2013](#)

[Lake McConaughy Drought Update, April 4, 2013](#)

Agriculture

[Drought conditions will delay FID water](#) - April 4, **Vicinity of Fresno, California**. Water deliveries to the Fresno Irrigation District will be delayed by 15 days as the snowpack in the Kings River watershed deteriorates.

[Willacy farmers and ranchers express drought frustrations](#) - April 4, **Southern Texas**. U.S. Rep. Vela is working to get water from Mexico to avoid an agricultural disaster in 11 South Texas counties.

U.S. Drought Monitor

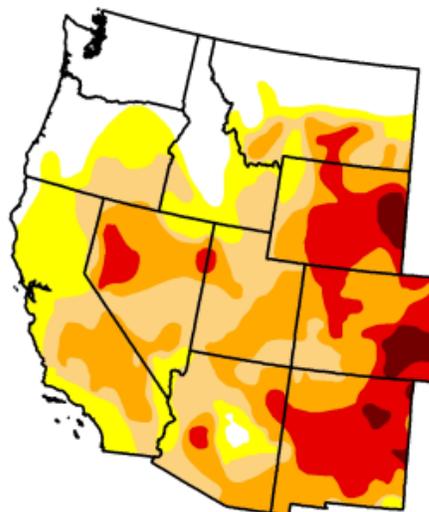
West

April 9, 2013
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	19.71	80.29	63.56	41.59	16.73	2.41
Last Week (04/02/2013 map)	17.18	82.82	63.46	41.28	15.58	2.49
3 Months Ago (01/08/2013 map)	24.51	75.49	68.47	44.13	16.79	2.15
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 (04/03/2012 map)	31.44	68.56	48.66	24.84	3.78	0.93

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.



Released Thursday, April 11, 2013

David Miskus, NOAA/NWS/NCEP/Climate Prediction Center

<http://droughtmonitor.unl.edu>

Fig. 4a: Drought Monitor for the [Western States](#) with statistics over various time periods. No significant changed occurred this past week. See CLIMAS [Southwest Climate Outlook](#).

In California, there are cooperative snow surveys 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. Click for the latest statistics for [California Reservoirs](#).

For the [latest USDA/NASS weekly agricultural report](#) for California:

Also see USDA Agriculture Data:
 U.S. Hay Production [Map](#); U.S. Winter Wheat [Map](#); NASS [Statistics by States](#)

Weekly Snowpack and Drought Monitor Update Report

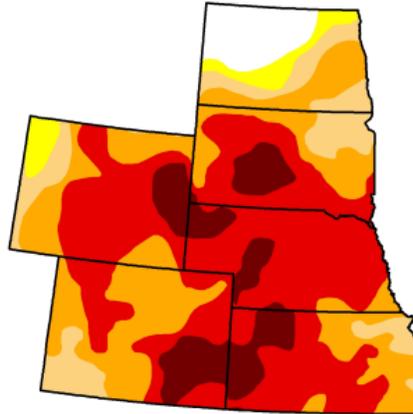
U.S. Drought Monitor
High Plains

April 9, 2013
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	4.96	95.04	91.67	80.57	53.33	11.70
Last Week (04/02/2013 map)	4.96	95.04	91.68	81.27	54.76	22.17
3 Months Ago (01/08/2013 map)	4.78	95.22	92.08	86.20	60.25	26.99
Start of Calendar Year (01/01/2013 map)	1.54	98.46	93.01	86.20	60.25	26.99
Start of Water Year (09/25/2012 map)	0.00	100.00	98.91	83.80	61.28	24.35
One Year Ago (04/03/2012 map)	33.45	66.55	23.17	5.92	0.09	0.00

Intensity:

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



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

<http://droughtmonitor.unl.edu>



Released Thursday, April 11, 2013
David Miskus, NOAA/NWS/NCEP/Climate Prediction Center

Fig. 4b: Drought Monitor for the [High Plains](#) with statistics over various time periods. Note significant improvement in D4 as a result of heavy precipitation over Nebraska this week. See [Kansas Drought Update](#).

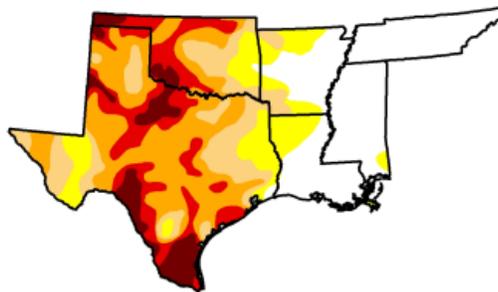
U.S. Drought Monitor
South

April 9, 2013
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	29.39	70.61	57.93	43.15	19.96	6.98
Last Week (04/02/2013 map)	28.19	71.81	60.23	43.79	23.69	7.28
3 Months Ago (01/08/2013 map)	24.31	75.69	61.96	50.73	32.67	10.70
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 (04/03/2012 map)	48.69	51.31	35.56	28.26	18.08	7.10

Intensity:

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



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

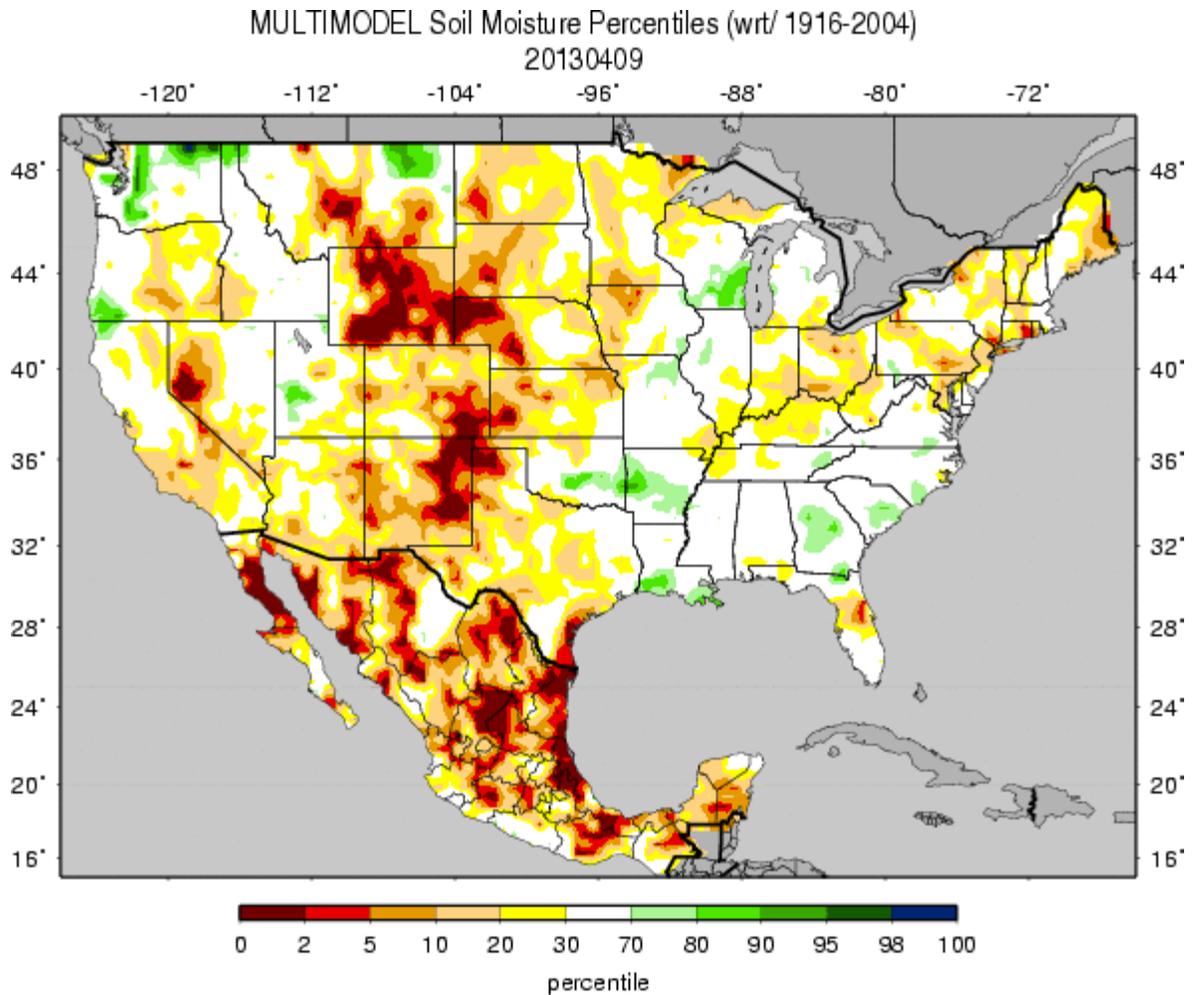
<http://droughtmonitor.unl.edu>



Released Thursday, April 11, 2013
David Miskus, NOAA/NWS/NCEP/Climate Prediction Center

Fig. 4c: Drought Monitor for the [South-Central Region](#) with statistics over various time periods. Note improvement in D3-D4 this week. Check out the [Texas Drought Website](#). See [Texas Reservoirs](#). Also [Drought conditions worse in Texas after dry winter](#).

Weekly Snowpack and Drought Monitor Update Report



Figs. 5: Soil moisture ranking in [percentile](#) as of 9 April shows dryness over the western High Plains, much of the Rockies and western Great Basin. Moist conditions are noted in Washington. Useful Hydrological Links: [Crop Moisture Index](#); [Palmer Drought Severity Index](#); [Standardized Precipitation Index](#); [Surface Water Supply Index](#);

Weekly Snowpack and Drought Monitor Update Report

Soil Climate Analysis Network ([SCAN](#))

Station (2021) MONTH=2013-03-12 (Daily) NRCS National Water and Climate Center - Provisional Data - subject to revision Thu Apr 11 09:18:42 CDT 2013

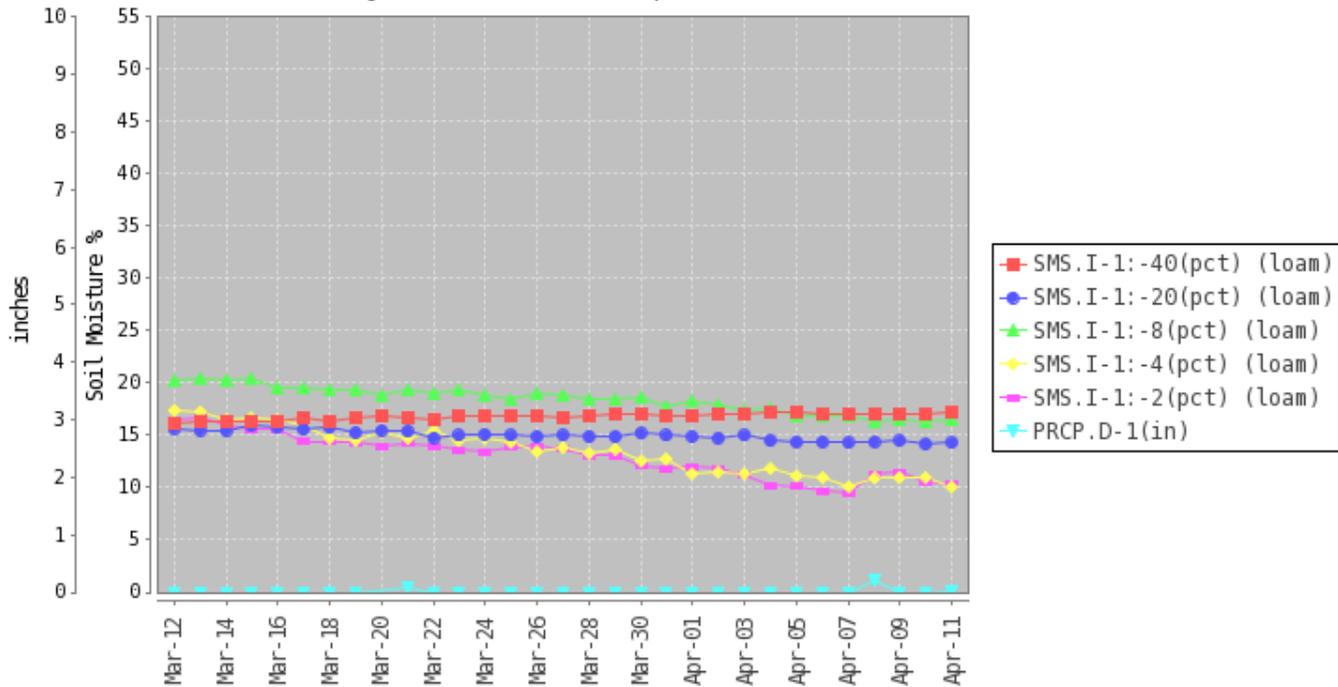
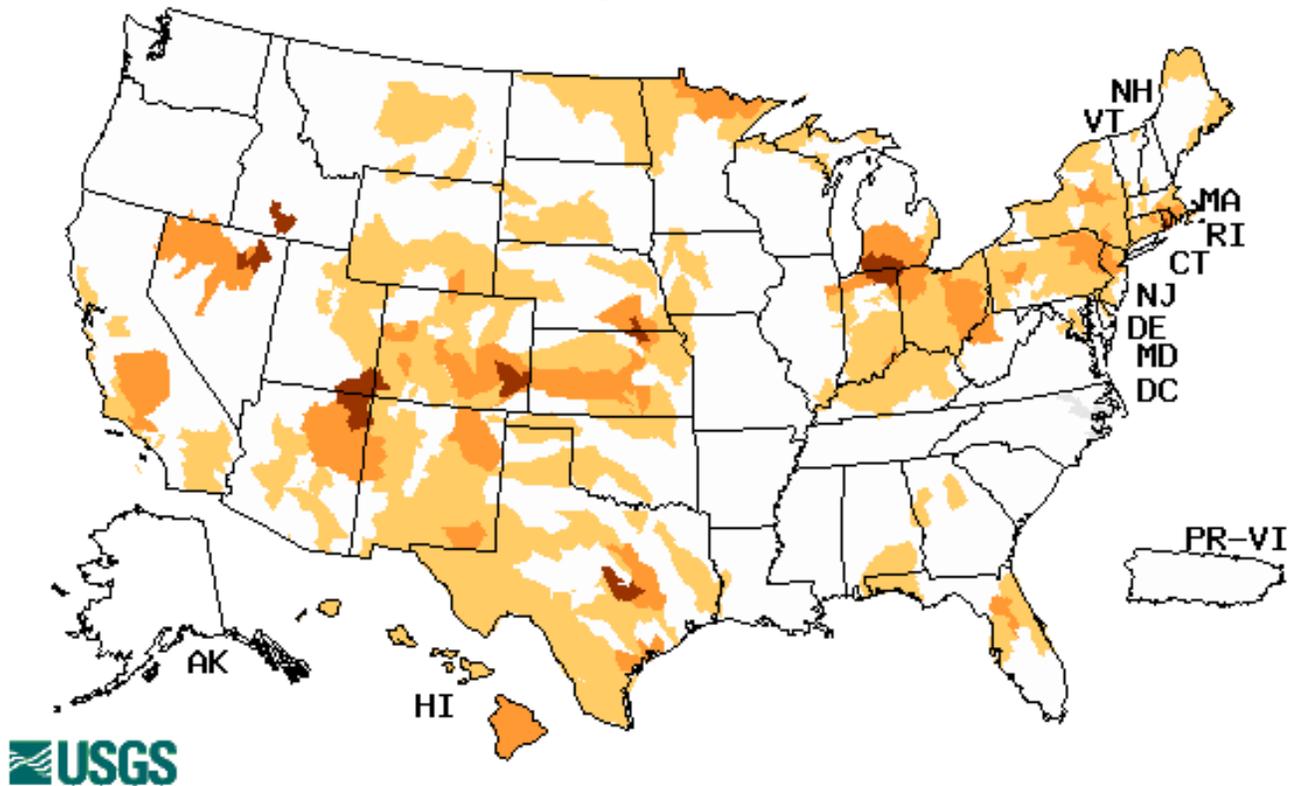


Fig. 6: This NRCS resource shows a site over [eastern Washington](#) with moderate soil moisture values at depth. Useful Agriculture Links: [Vegetation Drought Response Index](#); [Evaporative Stress Index](#); [Vegetation Health Index](#); [NDVI Greenness Map](#); [GRACE-Based Surface Soil Moisture](#); [North American Soil Moisture Network](#).

Weekly Snowpack and Drought Monitor Update Report

Wednesday, April 10, 2013



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 the year. **Severe** conditions exist over parts of Indiana-Michigan, Kansas-Nebraska, Texas, eastern Colorado, the Four Corners Region, Idaho, and Nevada. See the USGS [National Water Information System Mapper](#).

Weekly Snowpack and Drought Monitor Update Report

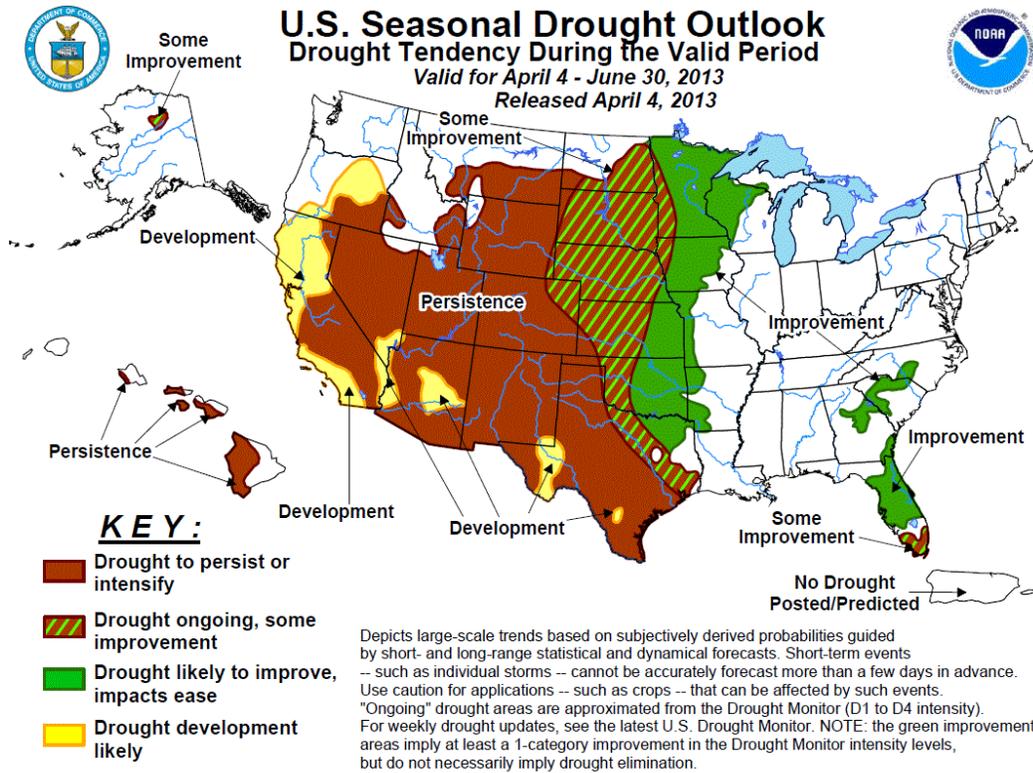
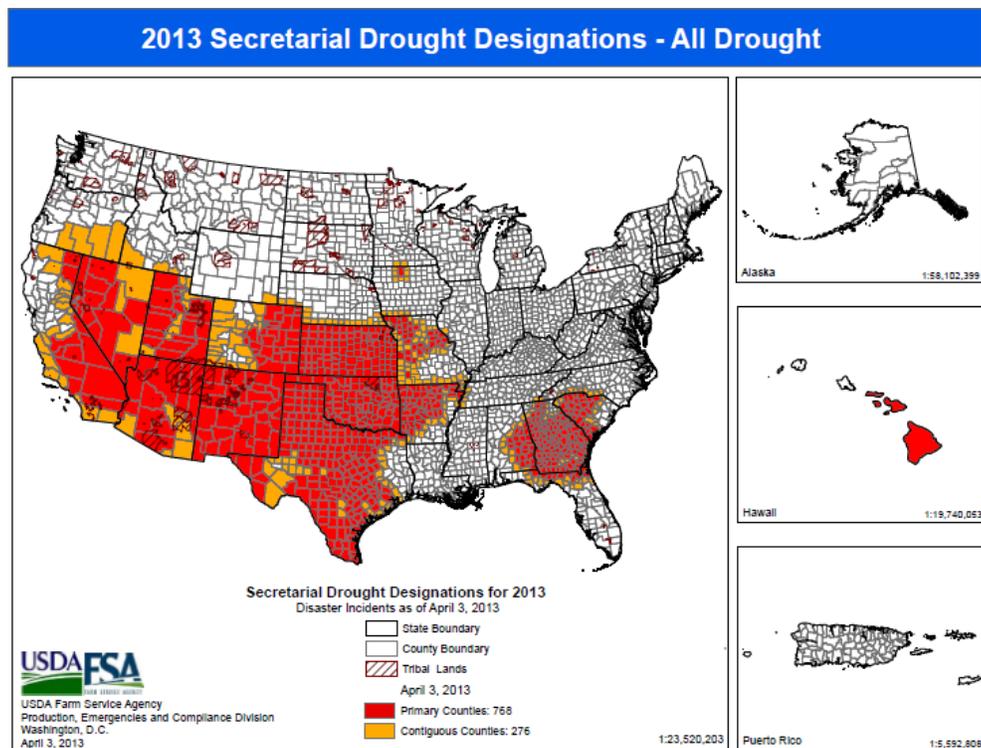


Fig. 8: U.S. Seasonal [Drought Outlook](#) updated 4 April.



See [USDA Drought Assistance website](#).
See [National Sustainable Agriculture Information Service](#)

Weekly Snowpack and Drought Monitor Update Report

**National Drought Summary provided by the National Drought Mitigation Center --
Drought Author:** [David Miskus, NOAA/NWS/NCEP/Climate Prediction Center](#)

National Drought Summary -- April 9, 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/>.

Weather Summary: An active weather pattern, with several fronts and storm systems traversing the lower 48 States, brought welcome precipitation to much of the Nation, and particularly the Plains. Decent precipitation (2 to 6 inches) returned to the Northwest, with 1-2 inches as far south as central California and the Sierra Nevada. Two separate storm systems, one in the Midwest and one in the South, dropped light to moderate precipitation on both areas earlier in the week. As the period ended, a potent storm system located over the central Rockies had already produced beneficial precipitation in parts of the north-central Plains and western Corn Belt, with more rain and severe weather possible for the eastern half of the U.S. during the next few days. Unfortunately, little or no precipitation fell on the Southwest, northern Plains, and Northeast, although the latter area was expecting precipitation this week. After a cold start to the period in the East and a mild one in the West, temperatures began to moderate as the week ended. In Alaska, dry and cold conditions enveloped the state except the southeastern Panhandle, while Hawaii was mostly dry with some light windward showers. Puerto Rico experienced scattered light showers during the week.

The Northeast: With another week of little or no precipitation (less than 0.5 inches), deficits accumulated during the past 90- (2 to 4 inches) to 180-days (4 to 8 inches) continued to grow. However, with temperatures averaging 2 to 4 degrees F below normal, the growing season not yet started, snow still covering parts of western New England, and most streams running near normal, only a slight expansion of D0 was added where the deficits were the greatest. This included western New York, along the Vermont and New Hampshire border, and in central Pennsylvania. The latter state will be closely monitored as USGS stream flows have dropped below the tenth percentile. Deficits also existed in Maine, but with much of this state still snow covered, soil moisture will be assessed once the snow melts and the ground thaws.

The Southeast: Much of this region received light to moderate precipitation (0.5 to 1.5 inches), with a few areas (southern sections of Louisiana, Mississippi, Alabama, and Florida) recording over 2 inches of rain. With the wet pattern continuing across Georgia since late January, additional removal of D1 and D0 were made in central and eastern sections as 3-, 6-, and 12-month surpluses were common in these areas. The April 9 NASS/USDA statewide topsoil (subsoil) moisture for Georgia was rated 2 percent (7 percent) very short to short, 67 percent (71 percent) adequate, and 31 percent (22 percent) surplus. In addition, stream flows, soil moisture models, CMI and

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PDI, and SPI indices were all near normal to moist. Where medium- to long-term deficiencies persisted, D0 and D1 remained, mainly in east-central and coastal Georgia. Farther north, where 3-month totals have been lower than Georgia, conditions were unchanged. In Florida, extreme southern sections measured 2 to 3 inches of rain, improving conditions by one category. In central and northern Florida, 0.5 to 1.5 inches of rain were not enough to make a significant dent in the 60- (3 to 6 inches) to 90-day (5 to 10 inches) departures, hence no improvement was made. USGS stream flows remained below the tenth percentile in north-central Florida. Farther west, heavy rains (more than 2 inches) along the Gulf Coast erased abnormal dryness in parts of southeastern Louisiana and southern Mississippi; however, lighter rains (0.5 inches) in southern Alabama increased short-term deficits, and D0 was expanded slightly eastward.

The Midwest: Light to moderate precipitation (0.5 to 1.5 inches), with pockets of heavier amounts (more than 2 inches), fell across the western Corn Belt, providing some relief in areas where there was no snow cover and the soil had thawed. To back this, NWS frost tubes showed that the last of the frozen soils in northern and central Iowa had thawed, and that some farm tiles were running in eastern Iowa and northern Illinois, indicating more subsoil moisture than previously thought. Many USGS stream flows were in the upper 75th percentile. Accordingly, improvements included the removal of D0 in eastern Iowa, northern Illinois, and southern Wisconsin, D1 to D0 in east-central Iowa, and some slight improvement of D2 to D1 in central Iowa. In Missouri, the eastern edge of the D0 and D1 areas were slightly edged westward in response to 1 to 1.5 inches of rain and declining deficits. In contrast, soils north of this region still had some ice in lower soil layers, and snow remained on the ground in most of North Dakota and the northern halves of Minnesota and Wisconsin. The southern third of Minnesota was thawed to a depth of 12 inches, and will be reassessed next week to determine soil moisture infiltration amounts. Therefore, no changes were made to the upper Midwest this week. For Nebraska improvements, please refer to **The Plains** narrative.

Lower Mississippi Valley/Delta region: Two bands of heavy rain (more than 2 inches) fell across the Delta, but in-between the rain, little or no precipitation fell. In central Arkansas, 1.5 to 2.5 inches of rain (and more extending into Oklahoma) was enough to reduce D0 and D1 by a category as 60- and 90-day small deficits shrunk or were eliminated. Another band of heavy rain fell along the Gulf Coast, easing drought in southeastern Texas and extreme southeastern Louisiana. In-between the bands, only 0.5 to 1 inch fell on northwestern Louisiana and southwestern Arkansas, maintaining D0 and D1.

The Plains: Beneficial, soaking rains finally fell on badly-needed D2, D3, and D4 drought areas of hard-hit Texas, Oklahoma, and Nebraska, with more falling after the 12 GMT Tuesday cutoff. In Texas, 1 to 3 inches of rain was measured in north-central, central, and southeastern Texas, providing a one category improvement many areas. Unfortunately, little or no rain was observed in western and extreme southern Texas, and some degradation was made. In Oklahoma, a large band of heavy rain (2 to 5 inches) fell from central to southeastern parts of the state, resulting in a one-category improvement. Most other areas of the state received enough precipitation (0.5 to 1.5 inches) to maintain conditions. Kansas was unfortunately left out of the heavy rains,

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with most stations reporting under 0.5 inches. In extreme northeastern Kansas, however, a small band of heavier rain (1.5 to 2.5 inches) was enough to diminish deficits and ease drought from D2 to D1.

Farther north, long overdue widespread and heavy rains finally fell on much of north-central Plains, especially from the southwestern Nebraska northeastward into southeastern South Dakota. Most locations reported 1.5 to 3 inches of rain, and a significant number of them likely received their greatest 24-hour totals in the past 12 months. According to the Nebraska State Climatologist Al Dutcher, all soil moisture sites in this area have hit 25 percent for the 4 foot layer, and 20 percent for the top 5 five foot. By next week it will become apparent how deep the moisture made it into the profile. Based upon past experiences, it is likely that field capacity will be reached in the top 2 feet of the profile at most locations. But due to the prolonged and severe drought, there is no deep moisture, but moisture is available to support planting and early emergence. Even with the April 9 rains, 12-month deficits still stood at: 10.59 inches at North Platte; 9.31 inches at Valentine; 16.59 inches at Broken Bow; and 6.55 inches at Imperial. And it will take substantial additional moisture to improve drought conditions further. Some reanalysis may occur next week as the full extent of the precipitation associated with this event can be examined. This event was a good start to the northern and central Plains rainy season which normally occurs from April into August. Similarly, some improvements were made farther north in western South Dakota and eastern Montana as 0.5 to 1.5 inches of precipitation reduced deficiencies. This area will also be reassessed next week as additional precipitation fell after the 12 GMT Tuesday cutoff. And lastly in North Dakota, snow covered ground and frozen soils meant status-quo for this state.

The Rockies and Intermountain West: Light to moderate precipitation (0.5 to 2 inches) fell on the northern and central Rockies and Intermountain West, with little to no precipitation measured in southern sections. Temperatures averaged above normal throughout the region. In general, enough precipitation fell to keep conditions status-quo, with a few exceptions. In northeastern Utah, the Uinta Mountains received between 1 to 2 inches liquid equivalent, which was enough to improve from D2 to D1. In southwestern Montana, 90-day subnormal precipitation warranted the expansion of D1 and D2, with WYTD basin average precipitation declining to 87 percent of normal and SWC at 85 percent of normal. Elsewhere, conditions remained the same, with the exception of modifying the Impact lines to better reflect the short-term dryness in the Far West and more medium-term impacts (both short and long term) elsewhere.

The Far West and Southwest: Moderate to heavy rains (2 to 6 inches) fell west of the Cascades, from northern California northward to the Canadian border. In the Sierra Nevada, 1 to 2.5 inches of precipitation occurred, but the Water Year-to-Date (WYTD) average basin precipitation was still between 74 to 86 percent of normal, and the April 9 basin average snow water content (SWC) between 37 to 49 percent of normal. Values were better farther north in southern Oregon, with the southern Cascades WYTD precipitation close to normal, and SWC between 63 to 74 percent of normal. With the heavy rains, D0 was removed from much of southwestern Oregon and extreme northwestern California, although some short-term deficits still remain due to a dry January-March. However, since October 1, WYTD precipitation is close to normal thanks to a very wet November and December. Recent and WYTD

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precipitation was also enough to make improvements in northwestern Nevada/northeastern California/southern Oregon (D2 to D1), and D0 removal in northeastern Oregon.

Farther south, little or no precipitation and warm weather aided deteriorating conditions in parts of the Southwest. In Arizona and New Mexico, growing deficits in southwestern, southeastern, and northeastern Arizona, and central New Mexico expanded D1-D3 drought. Since early October, precipitation has been less than half of normal in eastern Arizona and much of New Mexico, and the same hold true at 12-months. As a result, drought worsened in Yavapai and Maricopa Counties in southwestern Arizona, and most of southeastern Arizona was degraded to D2. D3 was expanded into northeastern Arizona (Apache County), and increased in size in western and southern New Mexico. Amazingly, central Arizona was close to normal as the WYTD basin precipitation was between 85 to 97 percent of normal. Unfortunately, reservoir storage as of April 1 was below average in Arizona, New Mexico, and Nevada.

Hawaii, Alaska, and Puerto Rico: In Hawaii, although most locations received little or no rain during the week (except for 0.5 to 1 inches on windward sites on Oahu, Maui, and the Big Island), solid March rainfall (150 to 200 percent of normal) on northeastern Kauai eliminated the D0 there. On Maui and the Big Island, the windward slopes have been unseasonably dry recently, thus D0 was added to the rest of those islands. On Molokai, the current D2 area for low reservoir levels at Kualapuu Reservoir was eased from 30 percent to 20 percent cutback, but since this is still a significant reduction, D2 remained. Although the level is 4 to 5 feet higher than a year ago, it's currently at 21 feet, and the maximum capacity is 51 feet. In Alaska, cold and dry weather, except in the southeastern Panhandle (2 to 3 inches), maintained conditions there. In Puerto Rico, widespread light showers (0.5 to 2 inches) were enough to maintain conditions but not improve them.

Looking Ahead: The next 5 days (April 11-15) are expected to be wet across much of the eastern half of the U.S., with the greatest totals (more than 2 inches) forecast for the South and lower Great Lakes region. Light to moderate precipitation should fall along the Pacific Northwest Coast and in the northern Rockies. Much of the Southwest and High Plains will be dry. Temperatures should average below normal across the northern third of the U.S., especially in the northern Plains and upper Midwest, while above-normal readings are expected in the Southwest and Southeast.

For the ensuing 5 days (April 16-20), the odds favor above-normal precipitation in the eastern half of the Nation and the north-central Plains. Drier-than-normal weather is forecast for the West, Southwest, southern Florida, and Alaska. Temperatures are expected to be similar to the Day 1-5 forecast, with odds favoring below-normal readings in the North-Central States, and above-normal temperatures in California and the eastern Gulf and southern Atlantic States.

Dryness Categories

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

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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 April 10, 2013

More USDA Drought Highlights by Brad Rippey, USDA Meteorologist

The “Ag in Drought” file that had been previously posted each week by Brian Fuchs at NDMC is now available at: <http://www.usda.gov/oce/weather/Drought/AgInDrought.pdf>

PPTs slides are still available upon request.

The delay in sending this week’s maps is due to my attendance at a USDA-sponsored drought conference in D.C.

Highlights for the drought-monitoring period ending 7 am EDT on April 2 include:

- Overall U.S. drought coverage increased slightly (0.28%) to 51.92% of the contiguous U.S. Despite the slight weekly increase, drought coverage is down 9.17% since the beginning of 2013 and down 13.53% from the record-high of 65.45% on September 25, 2012. During the most recent monitoring period, drought-easing precipitation was mostly confined to the southeastern Plains. In that region, precipitation topped 2 inches in much of central and eastern Oklahoma and northeastern Texas. Beneficial precipitation also fell in northern California and southwestern Oregon, where some locations received in excess of an inch. However, little or no precipitation fell in other drought-affected regions.

- The portion of the contiguous U.S. in the worst category – D4, or exceptional drought – increased one-tenth of a percentage point 5.20%. D4 coverage has ranged from 5 to 7% for 34 consecutive weeks (August 14, 2012 – April 2, 2013).

- Once again, there were no changes in hay in drought (51%), cattle in drought (62%), and winter wheat in drought (56%). Those numbers have remained unchanged since March 12.

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