



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

Weekly Report - Snowpack / Drought Monitor Update **Date: 23 April, 2009**

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: Snow-water equivalent (SWE) percent to date shows values starting to accelerate downward as the spring snowmelt is taking hold. Several areas in eastern Oregon and southern Utah saw SWE dropping by more than 15 percent during this past week (Fig 1). Unofficial forecast changes for the past 7 days in spring and summer streamflow runoff for selected SNOTEL sites show that forecast values have increased over much of the Frontal Range of the Rockies in New Mexico and Colorado and have decreased over the Bighorn Mountains of Wyoming and most locales west of the Continental Divide (Fig. 1a). This past week's snow depth changes show late season increases over the Frontal Range of the Colorado Rockies. Decreases are noted elsewhere; especially in Utah (Fig. 1b).

Temperature: SNOTEL and ACIS-day station average temperature anomalies were above average across the West with the exception over the higher elevations of Colorado and were above average over the eastern slope (Fig. 2). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas over northern California (>+10F) and the greatest negative departures occurred over northwest New Mexico (<-6F) (Fig. 2a).

Precipitation: ACIS 7-day average precipitation anomaly for the period ending 22 April shows an unusually wet pattern across the High Plains of Colorado and Wyoming and over northwest New Mexico. Most areas west of the Continental Divide had well below average precipitation (Fig. 3). Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values within a few percentage points of last week's values. The only significant change has occurred over northeast Wyoming where the value has fallen 10% (Fig 3a). For precipitation totals, departures, and percent of normal for several time periods. See: <http://www.water.gov/> and <http://cig.mesonet.org/~derek/public/droughtmonitoring/>.

WESTERN DROUGHT STATUS

The West: An inch or more of precipitation fell from this week's weather system over the coastal and Cascade Mountains of the Pacific Northwest, and over pockets of the interior West. Parts of Nevada received up to 3 feet of snow, with snowpack water content increasing to 110 to 160 percent of average at some eastern and northern basin SNOTEL stations. The snow will help with soil moisture and ground water recharge in the weeks ahead. But the system failed to deliver widespread areas of heavy rain and snow across the West this week. Nevertheless, soil moisture and pastures continued to improve in Wyoming, with April 19 USDA ratings 7 percent short for topsoil and 15 percent poor for pasture and range land. D2 in Nevada was shaved, D1 was pulled back in northeast Nevada, southern Idaho, southwest Wyoming, and northwest Utah and D0 was dented in northern Utah where beneficial snow improved snowpack conditions and water year (October-present) precipitation deficits.

The southern areas of the West were largely missed by the system. The USDA reported April 19 that some dry land grain fields in California were showing poor development due to lack of rainfall.

The Natural Resources Conservation Service provides leadership in a partnership effort to help people conserve maintain and improve our natural resources and environment

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Weekly Snowpack and Drought Monitor Update Report

In Arizona, 37 percent of the range and pasture land was rated very poor to poor, while in New Mexico, 53 percent of the range and pasture land and 61 percent of wheat were rated very poor to poor, and 89 percent of the soil moisture was rated very short to short. D1 and D2 were expanded in southern California, southeast Arizona, and southern New Mexico, and D0 expanded in Arizona and New Mexico, to reflect the precipitation deficit pattern of the last 30 days to 6 months. An H impacts designator was added to southern Arizona. Author: Richard Heim, NOAA National Climatic Data Center

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

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

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

SOIL MOISTURE

Soil moisture (Figs. 5a and 5b), is simulated by the [VIC macroscale hydrologic model](#). The detailed, physically-based VIC model is driven by observed daily precipitation and temperature maxima and minima from approximately 2130 stations, selected for reporting reliably in real-time and for having records of longer than 45 years (and various other criteria).

OBSERVED FIRE DANGER CLASS

The National Interagency Coordination Center provides a variety of products that describe the current wildfire status for the U.S. - http://activefiremaps.fs.fed.us/lq_fire2.php. The latest Observed Fire Danger Class is shown in Figs. 6 shows the current active wildfires across the West - <http://geomac.usgs.gov/>.

U.S. HISTORICAL STREAMFLOW

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

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

STATE ACTIVITIES

State government drought activities can be tracked at the following URL:

<http://drought.unl.edu/mitigate/mitigate.htm>. NRCS SS/WSF State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SS/WSF information - <http://www.wcc.nrcs.usda.gov/cgibin/bor.pl>. Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/>

FOR MORE INFORMATION

The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage -

<http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

Weekly Snowpack and Drought Monitor Update Report

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

/s/ NOLLER HERBERT
Director, Conservation Engineering Division

Weekly Snowpack and Drought Monitor Update Report

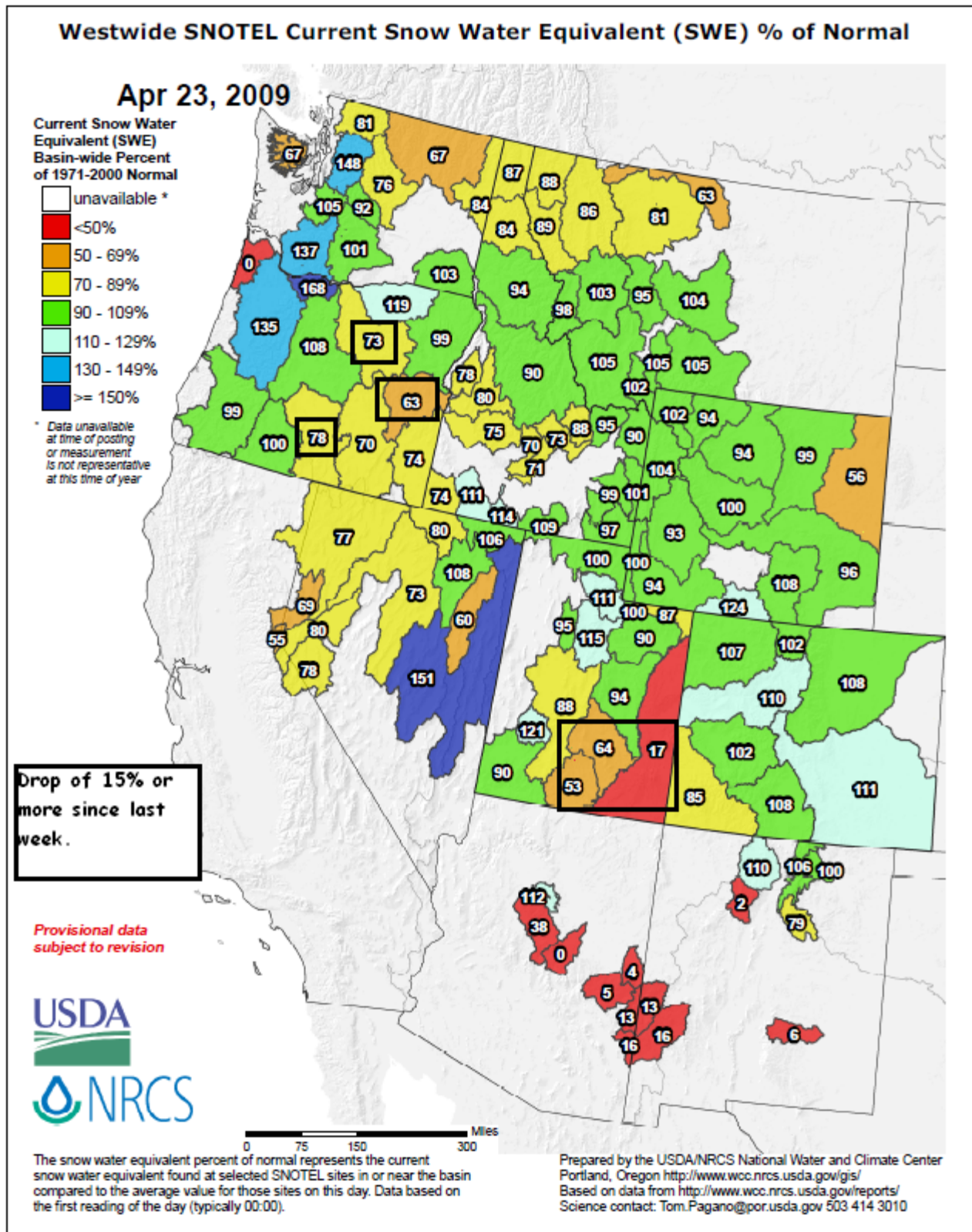


Fig. 1. Snow-water equivalent percent to date shows values starting to accelerate downward as the spring snowmelt is taking hold. Several areas in eastern Oregon and southern Utah saw SWE dropping by more than 15 percent during this past week.

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

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

Apr 23, 2009

For guidance only

7-Day Guidance
Forecast Change
(% normal)

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

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

Provisional Data
Subject to Revision

0 50 100 200 Miles



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

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

Fig. 1a: Selected preliminary daily water supply forecast changes since last week show that forecast values have increased over much of the Frontal Range of the Rockies in New Mexico and Colorado and have decreased over the Bighorn Mountains of Wyoming and most locales west of the Continental Divide.

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

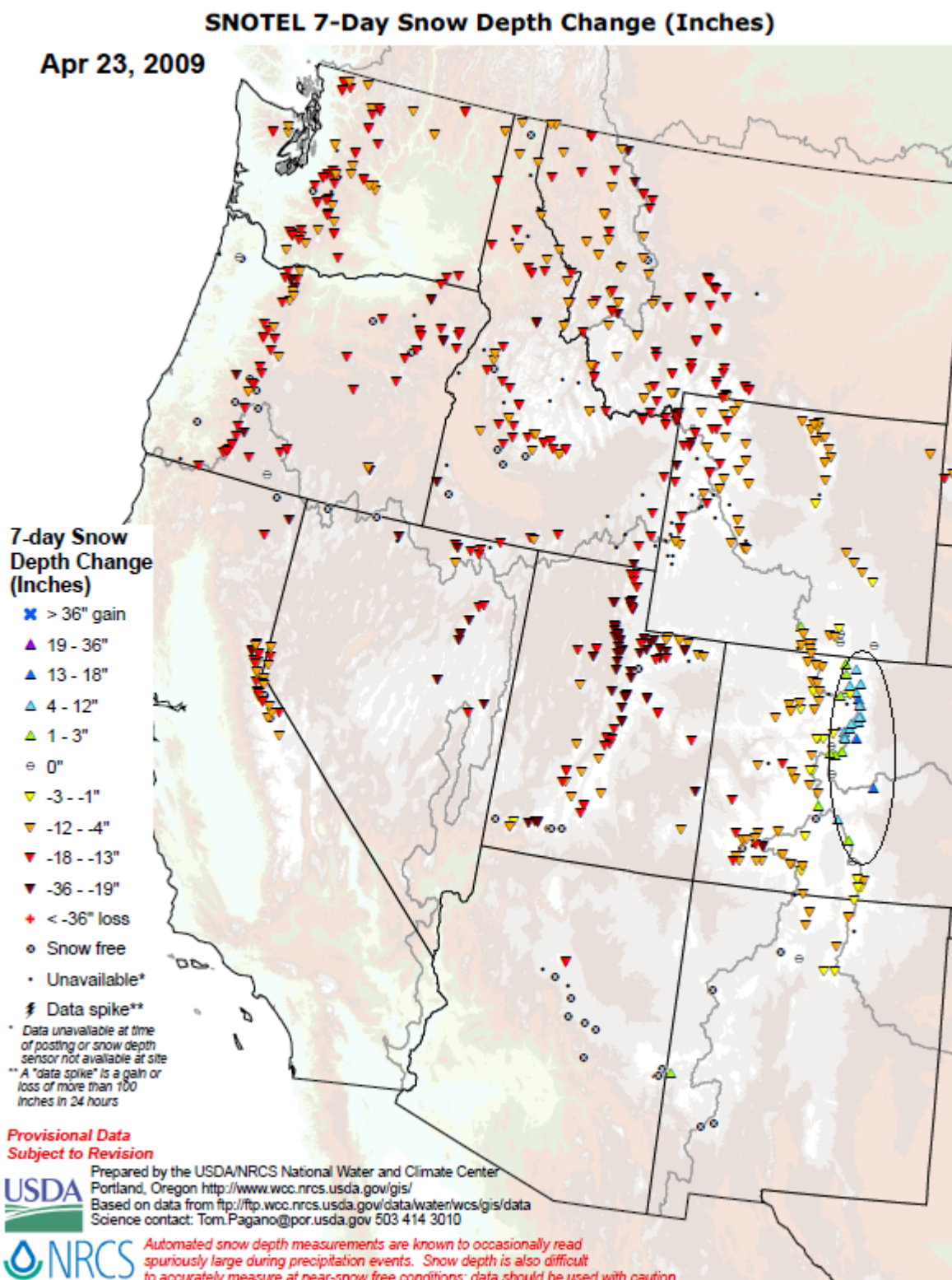


Fig. 1b: This past week's snow depth changes show late season increases over the Frontal Range of the Colorado Rockies. Decreases are noted elsewhere; especially in Utah.
 Ref: ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_snowdepth_7ddelta.pdf

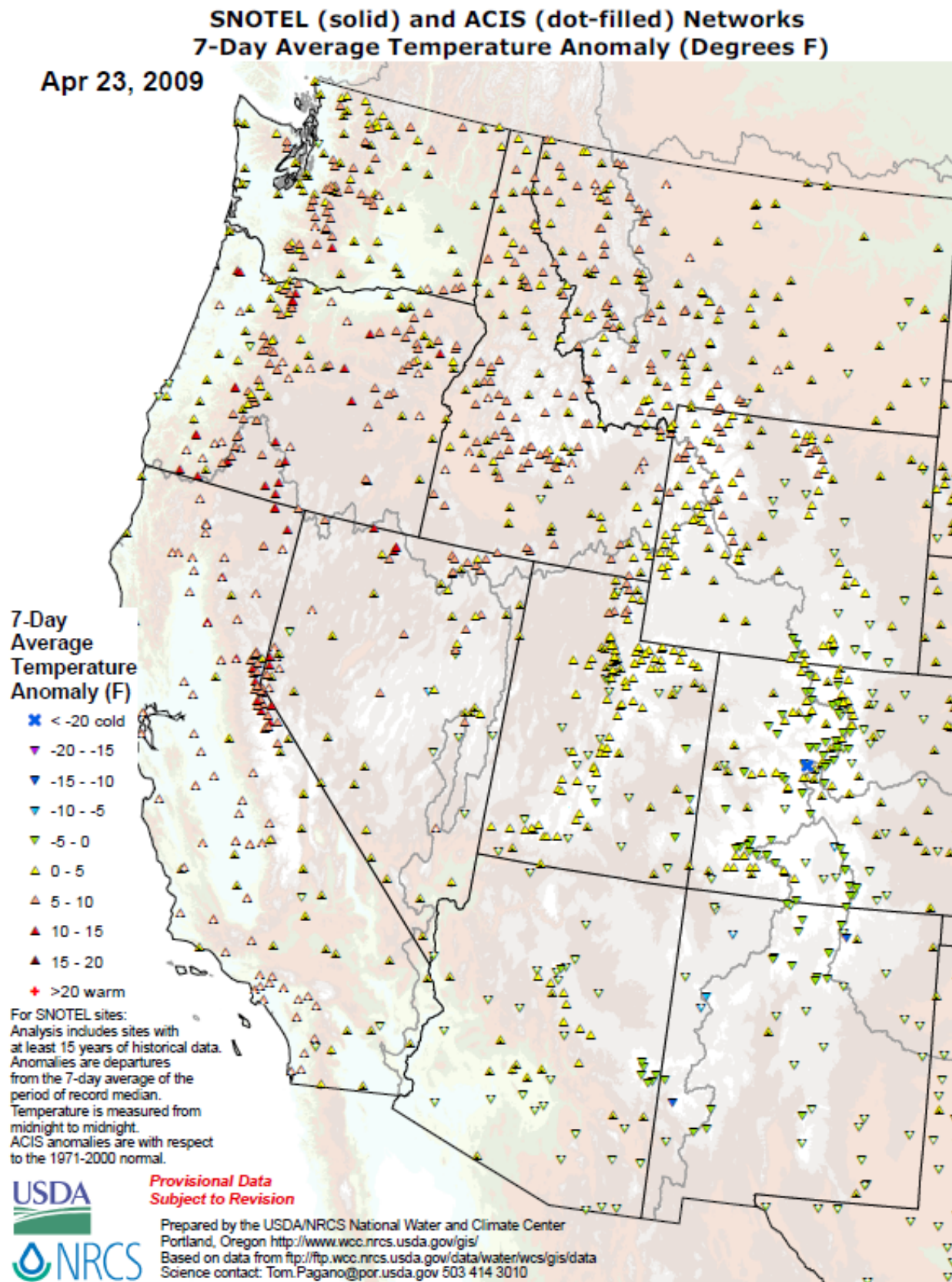
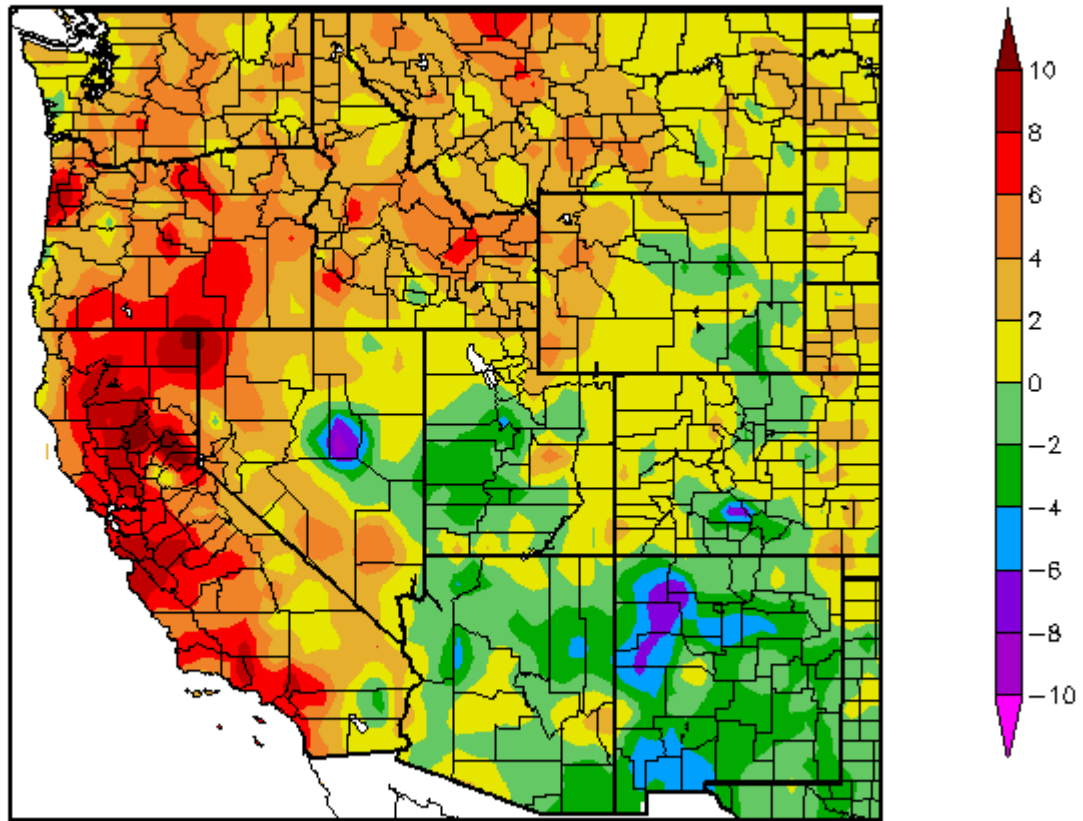


Fig. 2. SNOTEL and ACIS-day station average temperature anomalies were above average across the West with the exception over the higher elevations of Colorado and were above average over the eastern slope.

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

Departure from Normal Temperature (F)
4/16/2009 – 4/22/2009



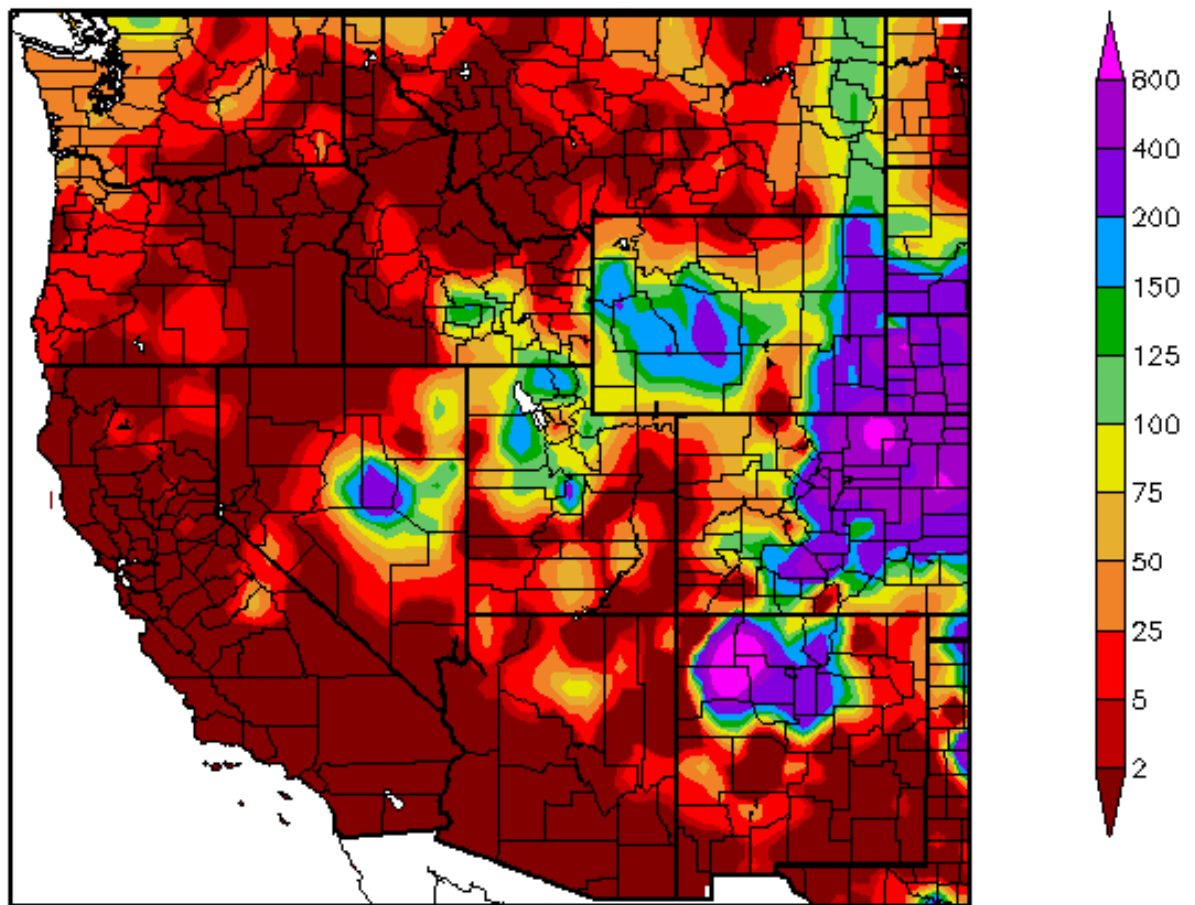
Generated 4/23/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 2a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over areas over northern California (>+10F) and the greatest negative departures occurred over northwest New Mexico (<-6F).

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

Percent of Normal Precipitation (%)
4/16/2009 – 4/22/2009



Generated 4/23/2009 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. ACIS 7-day average precipitation anomaly for the period ending 22 April shows an unusually wet pattern across the High Plains of Colorado and Wyoming and over northwest New Mexico. Most areas west of the Continental Divide had well below average precipitation.

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

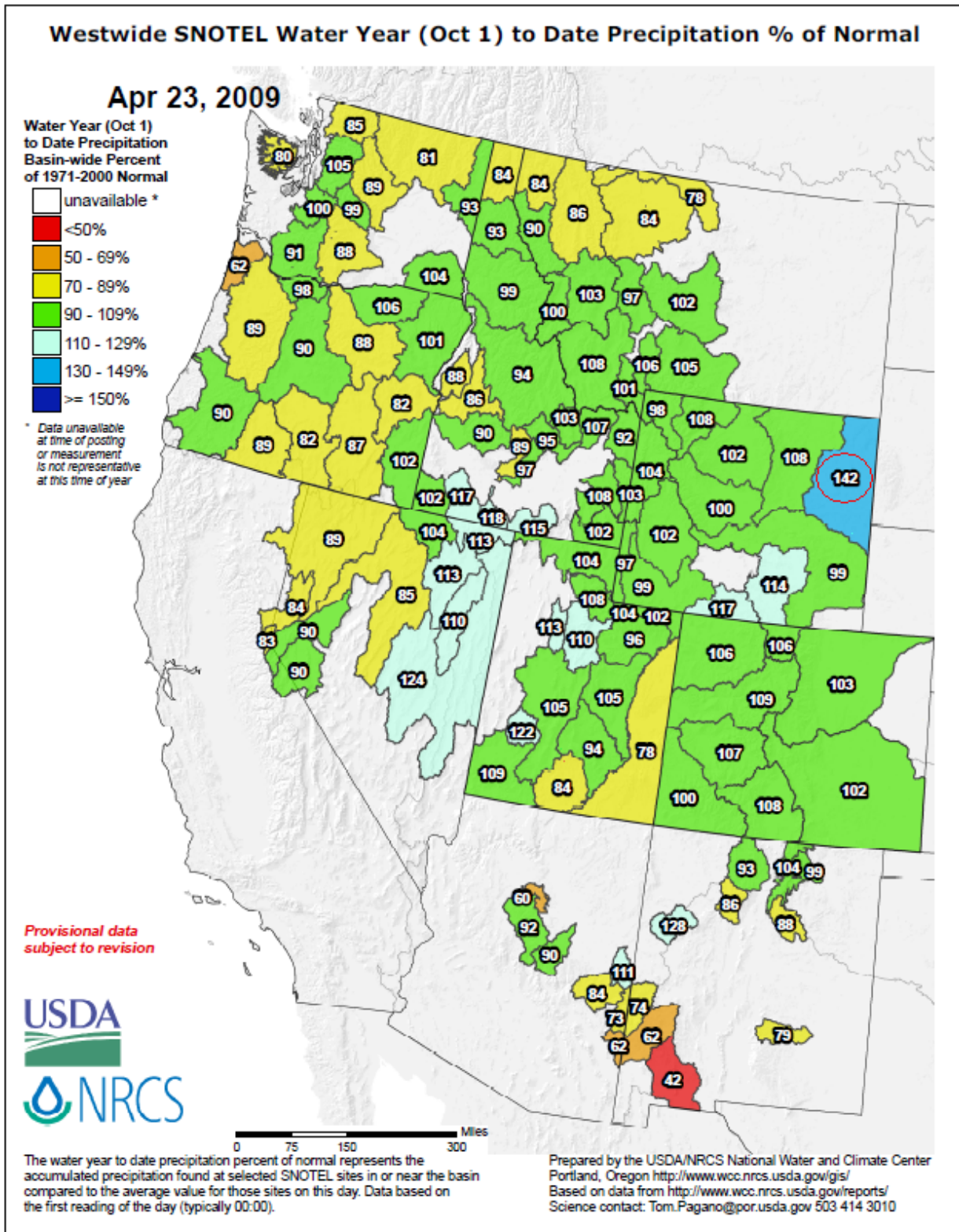


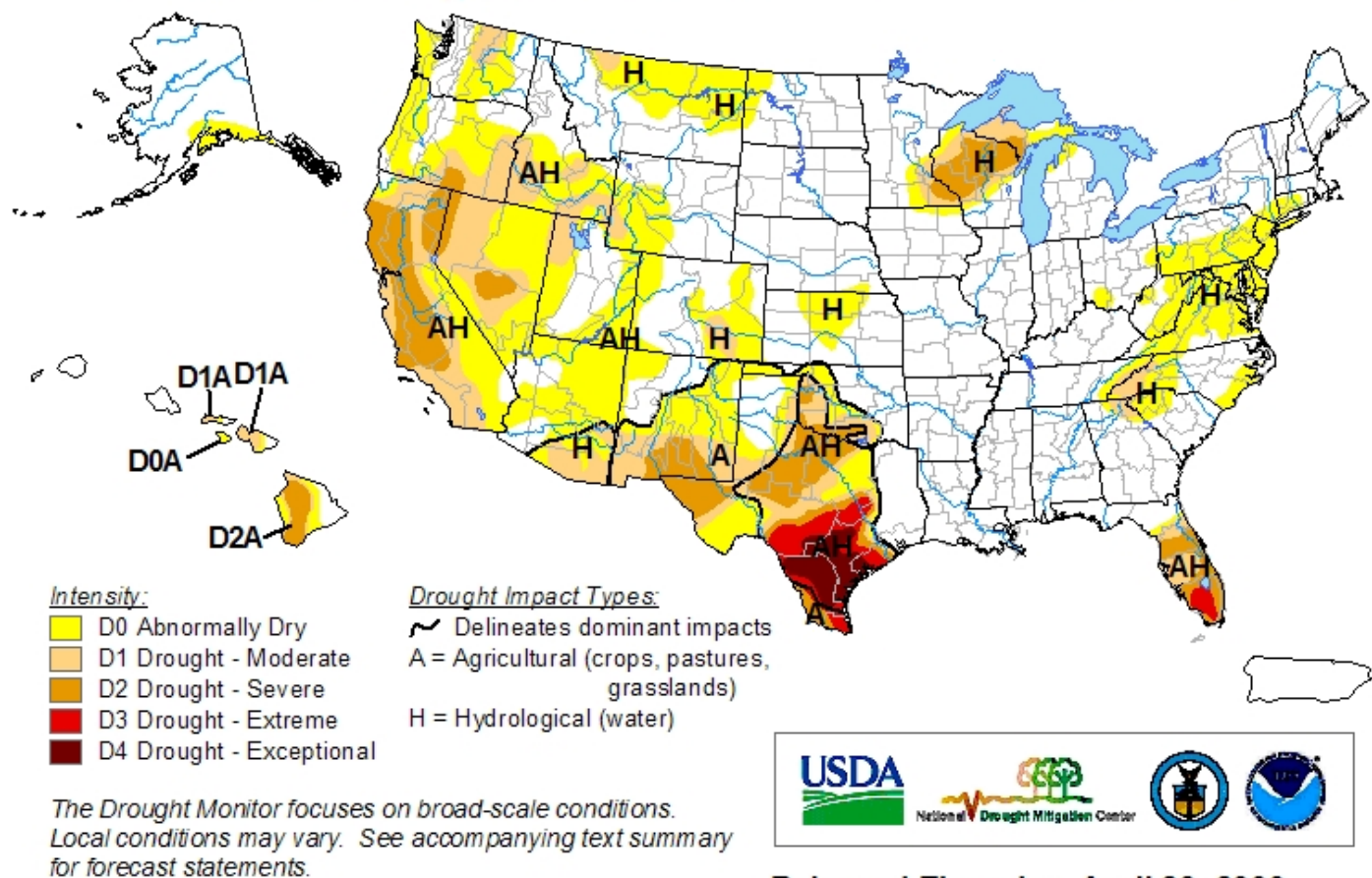
Fig 3a. Seasonal precipitation (rain & snow water equivalent) as a percent of normal for the 2009 Water Year that began on October 1, 2008 shows values within a few percentage points of last week's values. The only significant change is over northeast Wyoming where the value has fallen 10%.

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

U.S. Drought Monitor

April 21, 2009

Valid 8 a.m. EDT



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

Released Thursday, April 23, 2009

Author: Richard Heim/Liz Love-Brotak, NOAA/NESDIS/NCDC

Fig. 4. Current Drought Monitor weekly summary.

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

U.S. Drought Monitor

West

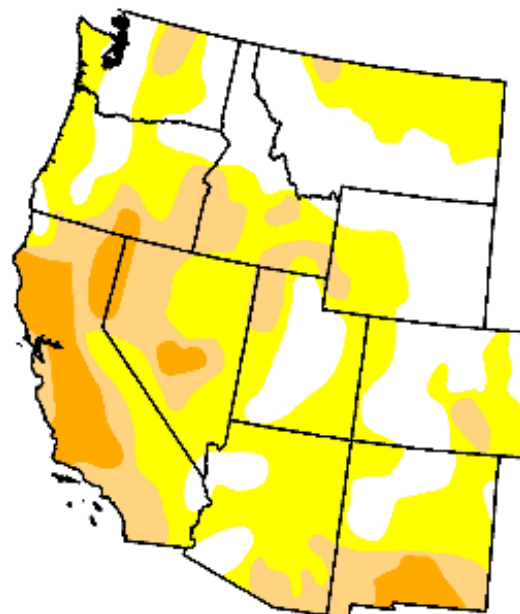
April 21, 2009

Valid 7 a.m. EST

Drought Conditions (Percent Area)						
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	32.9	67.1	25.8	7.7	0.0	0.0
Last Week (04/14/2009 map)	34.7	65.3	25.6	7.1	0.0	0.0
3 Months Ago (01/27/2009 map)	42.0	58.0	28.2	9.8	2.1	0.0
Start of Calendar Year (01/06/2009 map)	37.4	62.6	28.9	8.8	0.4	0.0
Start of Water Year (10/07/2008 map)	41.3	58.7	28.6	10.4	0.1	0.0
One Year Ago (04/22/2008 map)	40.8	59.2	35.1	8.1	0.0	0.0

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://drought.unl.edu/dm>



Released Thursday, April 23, 2009

Author: R. Heim/L. Love-Brotak, NOAA/NESDIS/NCDC

Fig. 4a. Drought Monitor for the Western States with statistics over various time periods. Conditions have worsened slightly during the past week. Ref: http://www.drought.unl.edu/dm/DM_west.htm

U.S. Drought Monitor

Texas

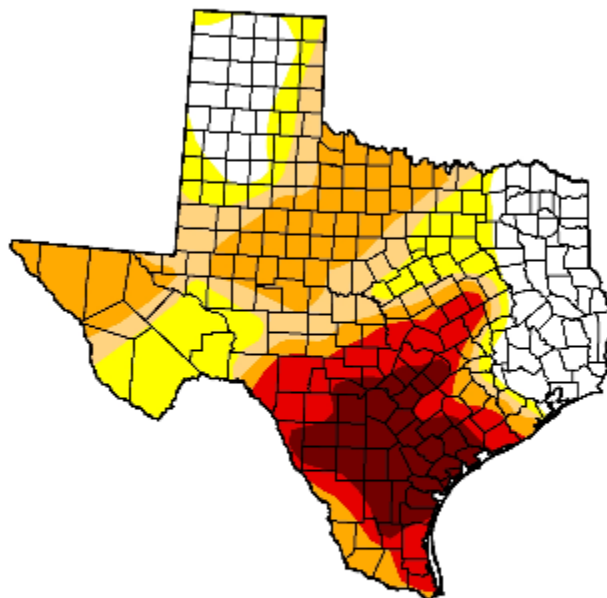
April 21, 2009

Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	22.1	77.9	60.5	45.9	22.7	11.2
Last Week (04/14/2009 map)	14.9	85.1	68.2	50.6	25.1	11.5
3 Months Ago (01/27/2009 map)	11.6	88.4	62.1	37.5	16.5	4.2
Start of Calendar Year (01/06/2009 map)	41.7	58.3	24.5	15.0	9.1	4.2
Start of Water Year (10/07/2008 map)	67.2	32.8	20.5	11.0	3.6	0.0
One Year Ago (04/22/2008 map)	37.2	62.8	43.6	18.4	10.5	3.3

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

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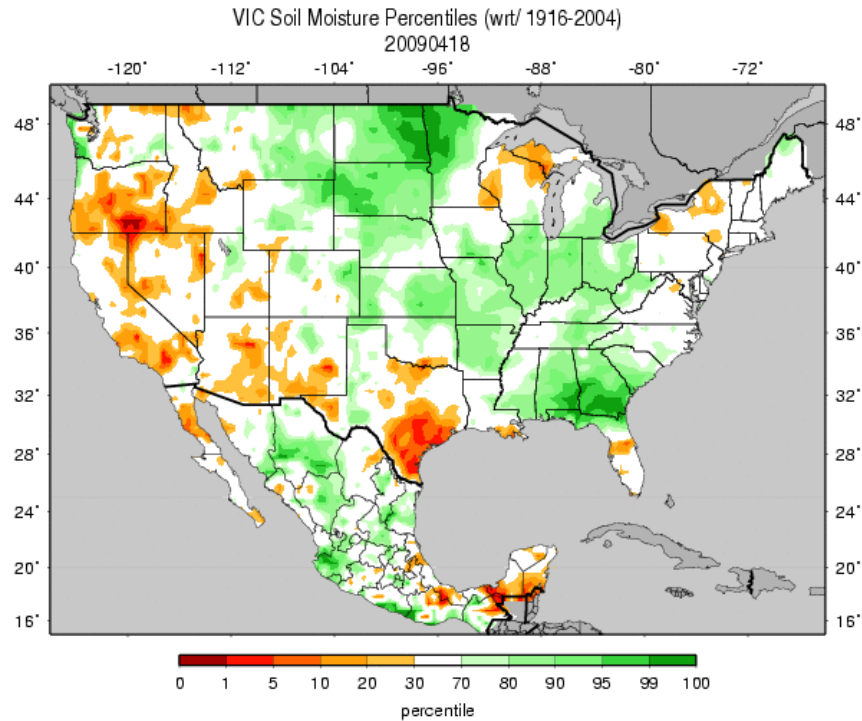


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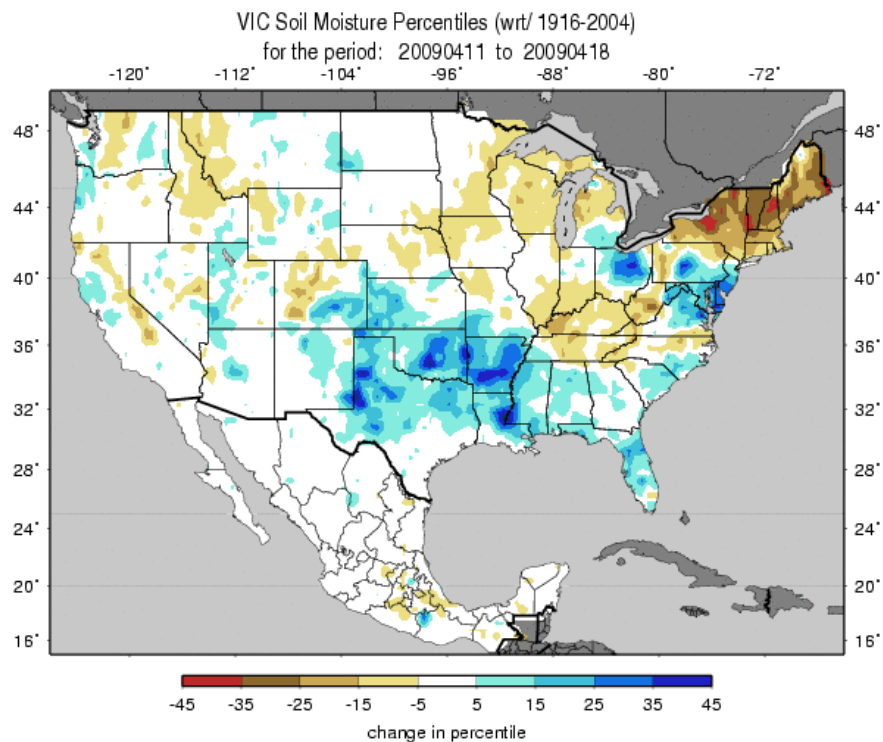
Fig. 4b: Texas is the only state with D4 drought condition in the US. Note slight deterioration in D4 since last week but a decrease in overall drought. Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S

Weekly Snowpack and Drought Monitor Update Report



Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 18 April. Near saturation exists over the Northern Plain while excessive dryness is scattered across the West from Texas to Oregon.

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



Figs. 5b: Soil Moisture change in percentile based on 1916-2004 climatology for this past week. There was no significant change since last week except for some drying over Idaho.

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

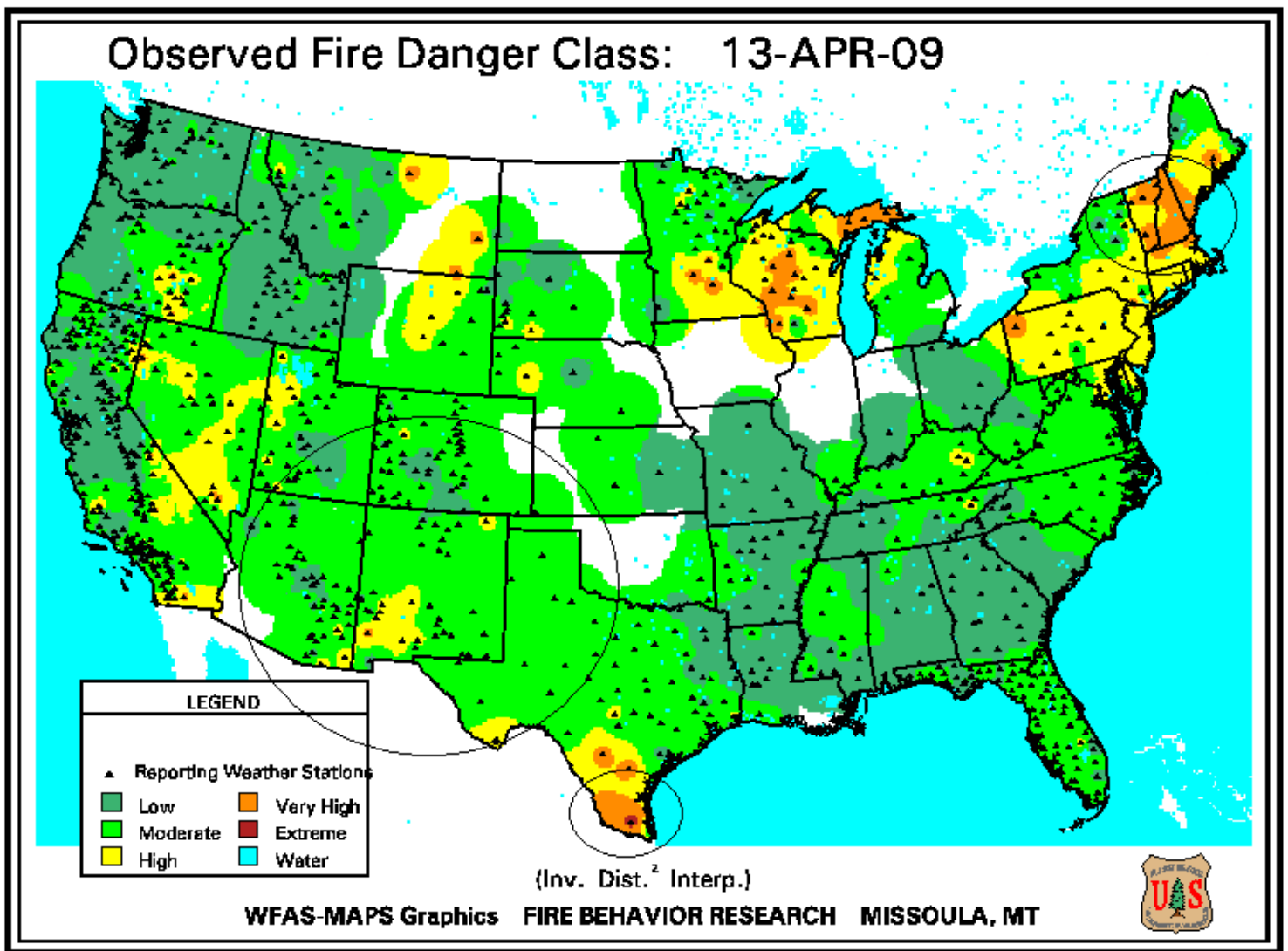


Fig. 6. Observed Fire Danger Class. **Not Updated**

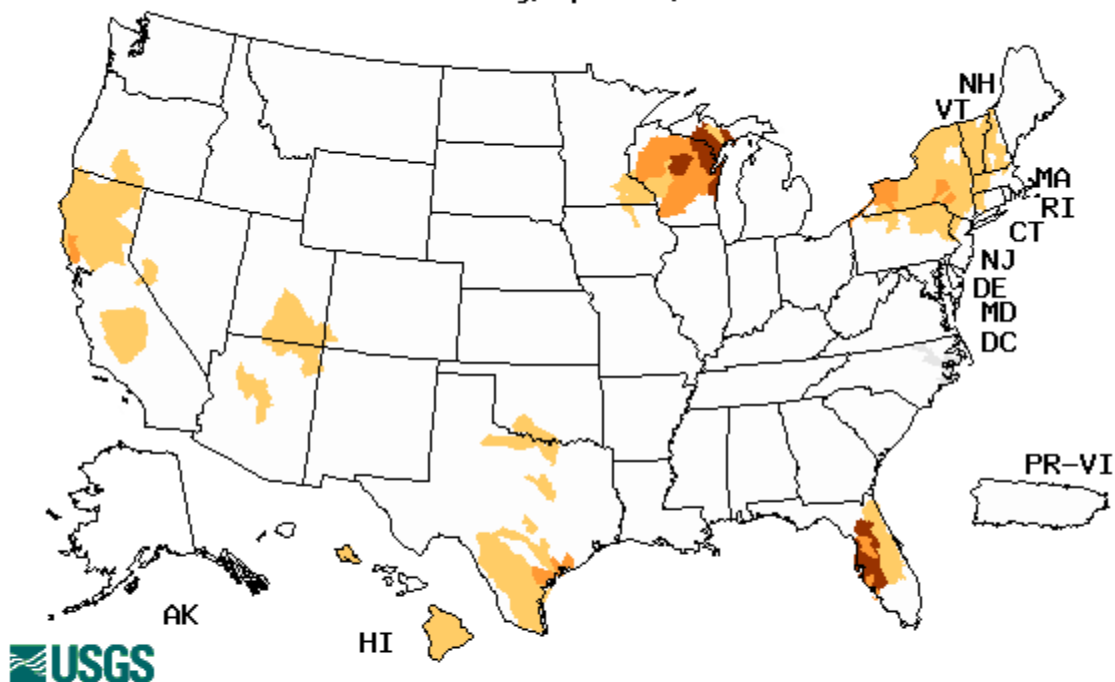
Source: Forest Service Fire Behavior Research – Missoula, MT.

Ref: http://www.fs.fed.us/land/wfas/fd_class.gif

Note: The Forest Service Web server is currently undergoing routine maintenance or has encountered an unexpected problem. We are working to bring the Web server back online as swiftly as possible.

Weekly Snowpack and Drought Monitor Update Report

Wednesday, April 22, 2009



Explanation - Percentile classes				
Low	≤ 5	6-9	10-24	Insufficient data for a hydrologic region
Extreme hydrologic drought	Severe hydrologic drought	Moderate hydrologic drought	Below normal	

Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are very poor over western Florida and Wisconsin-Upper Michigan during the past week. Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

Weekly Snowpack and Drought Monitor Update Report

National Drought Summary – April 21, 2009

The discussion in the Looking Ahead section is simply a description of what the official national guidance from the National Weather Service (NWS) National Centers for Environmental Prediction is depicting for current areas of dryness and drought. The NWS forecast products utilized include the HPC 5-day QPF and 5-day Mean Temperature progs, the 6-10 Day Outlooks of Temperature and Precipitation Probability, and the 8-14 Day Outlooks of Temperature and Precipitation Probability, valid as of late Wednesday afternoon of the USDM release week. The NWS forecast web page used for this section is: <http://www.cpc.ncep.noaa.gov/products/forecasts/>.

As one weather system exited the Northeast at the beginning of this U.S. Drought Monitor (USDM) week, another system entered the country from the west. The second large, strong, wet low pressure system slowly moved across the country during the week, dumping beneficial precipitation over many drought areas from the central Rockies to the East Coast. Much of the country, from the central and southern Plains to the Atlantic coast, received an inch or more of precipitation, with locally heavier amounts.

The Eastern States: While an inch or more of rain fell over the northern and western portions of the drought area in Florida during this USDM week, the southern areas received considerably less rain. About two-thirds of the topsoil and two-thirds of the subsoil, statewide, remained in the very short to short categories, with 40 percent of the pasture rated very poor to poor by the U.S. Department of Agriculture (USDA) as of April 19. Lake Okeechobee continued to drop, down to a level of 11.56 feet as of April 20 (normal is 13.89 feet). D0-D1-D2 were pulled back in the northern and west central drought areas of Florida, while D2 and D3 expanded in southern Florida.

An inch or more of rain fell across Ohio and the D1 area of the Mid-Atlantic States. The wet conditions of this week and last week resulted in the elimination of the D1. D0 was pulled back in southern Virginia, West Virginia, and Ohio, but spots of D0 were left in southwest Ohio and western West Virginia where long-term precipitation deficits remained. Streamflow and soil moisture improved, with only 6 percent of topsoil moisture short and 9 percent of pasture rated very poor to poor in Virginia. While soil moisture improved, the USDA rated 22 percent of pasture land still very poor to poor in West Virginia. Groundwater levels improved but remained low at some wells, and widespread year-to-date precipitation deficits of 4+ inches, with 6 inches or more in some areas, persisted. D0 remained over much of the Mid-Atlantic area to reflect long-term precipitation deficits, and the impacts designator was changed to H to reflect lingering hydrological concerns.

Rains fell over the southern Appalachian drought area this week. But the 1+ inch rains were not enough to eliminate long-term deficits. Eleven percent of North Carolina's pasture was rated very poor to poor and 90-day precipitation deficits ranged from 3 to 6 inches and 12-month deficits exceeded 10 inches, and some wells indicated continued low ground water, in the southern mountains of western North Carolina. While precipitation deficits have been reduced and streamflows improved in northeast Georgia, lake levels (Lanier and Hartwell) continued low. Lake Hartwell's level was 654.13 feet, or 5.87 feet below full pool, as of April 16. No change was made to the depiction across the Carolinas and Georgia to reflect continuing hydrological drought impacts.

The Great Lakes and Upper Mississippi Valley Region: The half-inch or more of precipitation that fell across parts of the Minnesota to Michigan drought area had little impact on the long-term deficits. D2 was pulled back from the Minneapolis-St. Paul area, but no other changes were made this week. April 19 USDA reports rated 38 percent of soil moisture very short to short and 43 percent of pastures very poor to poor in Wisconsin, and 18 percent of topsoil and 17 percent of subsoil moisture very short to short in Minnesota. In Iowa, 21 percent of the range and pasture land was rated very poor to poor.

Weekly Snowpack and Drought Monitor Update Report

The Plains: The slow-moving low pressure system dropped an inch or more of precipitation over a widespread area of the central to southern Plains this week, with very heavy rains deluging parts of the drought areas. Two to four inches of rain and melted equivalent of snow fell over parts of western Kansas, western Nebraska, and northeast Colorado. Southeast Texas was deluged with over 6 inches of rain over large areas. Locally heavier amounts were recorded, with the station at Schulenberg, Texas reporting 12.15 inches. The Harris County Flood Control station measured 6.26 inches of rain in one hour, which is comparable to the hourly rainfall rates that occurred with Tropical Storm Allison. After the rains, College Station, Texas, was above normal for 2009 and had the third wettest spring, so far, based on data going back to 1951. As of April 19, the USDA rated Texas crops in very poor to poor condition for 58 percent of the range and pasture land, 73 percent of oats, 74 percent of wheat, and 40 percent of sorghum. USDA ratings for Oklahoma topsoil moisture improved from 34 percent very short to short last week to 27 percent this week, and from 61 percent very short to short for subsoil last week to 55 percent this week. Oklahoma crops were rated 32 percent very poor to poor for pasture and range land, 60 percent for winter wheat, 65 percent for oats. Pasture and range land was rated 46 percent very poor to poor in Colorado and 17 percent very poor to poor in Kansas.

D0 was eliminated from southwest South Dakota, western Nebraska, and southeast Wyoming, and pulled back over Colorado, Kansas, Oklahoma, and the Texas panhandle. D1 contracted over Colorado, western Oklahoma, and the Texas panhandle. D2 shrunk in western Oklahoma and adjacent Texas. D1, D2, and D3 were shaved in Texas from the Pecos River region across parts of the Edwards Plateau. D0 to D4 were dented in southeast Texas. The A impacts designator was pulled down to the vicinity of the Colorado-New Mexico and Kansas-Oklahoma state lines. The remaining D0-D1 in Colorado and D0 triangular wedge in north central Kansas were given an H impacts designator.

In North Dakota, D0 was expanded over the western counties where 30-90 day precipitation deficits were growing and which were farthest removed from the recent flooding in central and eastern North Dakota. The lack of snowfall, increasing temperatures, low humidity, and windy weather were drying out the western grasslands and increasing fire danger. D4 was expanded slightly in southern Texas to better reflect long-term severe moisture shortages.

The West: An inch or more of precipitation fell from this week's weather system over the coastal and Cascade Mountains of the Pacific Northwest, and over pockets of the interior West. Parts of Nevada received up to 3 feet of snow, with snowpack water content increasing to 110 to 160 percent of average at some eastern and northern basin SNOTEL stations. The snow will help with soil moisture and ground water recharge in the weeks ahead. But the system failed to deliver widespread areas of heavy rain and snow across the West this week. Nevertheless, soil moisture and pastures continued to improve in Wyoming, with April 19 USDA ratings 7 percent short for topsoil and 15 percent poor for pasture and range land. D2 in Nevada was shaved, D1 was pulled back in northeast Nevada, southern Idaho, southwest Wyoming, and northwest Utah and D0 was dented in northern Utah where beneficial snow improved snowpack conditions and water year (October-present) precipitation deficits.

The southern areas of the West were largely missed by the system. The USDA reported April 19 that some dry land grain fields in California were showing poor development due to lack of rainfall. In Arizona, 37 percent of the range and pasture land was rated very poor to poor, while in New Mexico, 53 percent of the range and pasture land and 61 percent of wheat were rated very poor to poor, and 89 percent of the soil moisture was rated very short to short. D1 and D2 were expanded in southern California, southeast Arizona, and southern New Mexico, and D0 expanded in Arizona and New Mexico, to reflect the precipitation deficit pattern of the last 30 days to 6 months. An H impacts designator was added to southern Arizona.

Weekly Snowpack and Drought Monitor Update Report

Alaska, Hawaii, and Puerto Rico: Pastures and general vegetation improved this week over parts of Hawaii, so the D3A over the Big Island was improved to D2A. In Alaska, some streams along the southern coast were below normal, and several stations in the area had below-normal precipitation over the last 7 days out to the last 12 months. D0 was introduced to the southern Alaska coast at the driest stations. Puerto Rico was not showing signs of any significant dryness or drought at this time.

Looking Ahead: Another slow-moving weather system is expected to track across the country during the next USDM week (April 23-27), bringing half an inch or more of precipitation to a large area from the northern and central Rockies to the Great Plains and western Great Lakes. Heavier amounts are expected from central Kansas to central Wisconsin. Above-normal temperatures are forecast for the eastern two-thirds of the Lower 48 States, with below-normal temperatures moving in from the northwest as the weather system progresses across the country.

According to the CPC 6- to 10-day and 8- to 14-day forecasts (covering the period April 28-May 6), precipitation chances will be above normal over Alaska and the central Plains to Mid-Atlantic States, but below normal across the Southwest. The period should start out dry in the Southeast and Northwest, but precipitation chances might improve later in the period. Warmer-than-normal temperatures are expected over Alaska and the southern Plains to Mid-Atlantic States, with colder-than-normal temperatures forecasted from parts of the West into the northern and central Great Plains to western Great Lakes.

Author: Richard Heim, NOAA National Climatic Data 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

A...Agricultural

H...Hydrological

Updated: 23 April 2009