



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

Weekly Report - Snowpack / Drought Monitor Update Date: 2 April 2010

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Snow: SNOTEL Snow-Water Equivalent percent of normal values for 2 April 2010 shows surpluses over the Southwest and deficits over the Northern Tier States. Slight improvement is noted over southeastern Wyoming since last week (Fig. 1). SNOTEL 7 day snow depth change reveals significant increases across most of the North-Central Rockies, Wasatch, Cascades, and Sierra. Significant decreases are also noted over the Front Ranges of Colorado and Northern Mexico (Fig. 1a).

Temperature: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of northwestern High Plains ($>+10^{\circ}\text{F}$) and the greatest negative departure occurred over parts of the Great Basin ($<-6^{\circ}\text{F}$) (Fig. 2).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 1 April shows the bulk of the heaviest precipitation fell over much of Coastal Oregon and Washington (Fig. 3). In terms of percent of normal, the northern half of the Western States dominated with significant precipitation. Areas with significant deficits occurred over the southern Great Basin, Lower Colorado River Basin, and much of southern California (Fig 3a). For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. A 10% increase is noted this week over northeast Wyoming (Fig. 3b).

WESTERN DROUGHT STATUS

The West: Precipitation fell across much of the eastern slopes of the Rockies from Montana to Colorado to northern New Mexico. Unfortunately most of the areas affected by drought are west of the continental divide, so only minor improvements were made in the drought conditions. Across much of the northern and central Rockies, precipitation was ongoing at the data cutoff (8 am, EDT, Tuesday of each week), so most of the impact from that precipitation will be felt in the coming weeks. Despite the recent precipitation, snowpack is still approximately 3 feet below normal near Franklin County, Idaho.

In northern Colorado, most of the precipitation fell outside of the drought areas, with the exception of Jackson County, where many areas received between 1.0 and 1.5 inches, and a single report in Routt County of 1.5 inches. That precipitation prompted the removal of Moderate Drought from southern Jackson County, and trimming of some abnormal dryness (D0) from northern Jackson, western Larimer, and eastern Grand Counties. Rainfall of about 1.0 inch across Mesa County led to a small trimming of D0.

Across northern Arizona, the impacts of an El Nino winter storm track continued to be felt. Snowpack of approximately 48 inches on the north rim of the Grand Canyon and other areas of deep snowpack at higher terrain across Navajo and Apache Counties prompted a one-category improvement across much of northern Arizona. Severe drought (D2) is now indicated only in the shadow of the Mogollon Rim.

With the storm track shifting northward as the El Nino weakened, rainfall across much of California became scarce. This recent lack of rains is highlighted by 14-day precipitation totals below 5 percent of normal from the central coast of California to central Nevada. Given the prior wetness in this region,

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only a minor expansion of D0 was indicated across Mono and Inyo Counties. This area will need to be closely monitored as the end of the rainy season is quickly approaching. **Author:** Matthew Rosencrans, NOAA/NWS/NCEP/Climate Prediction 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 and 4a).

SOIL MOISTURE

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

U.S. HISTORICAL STREAMFLOW

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

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

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/cqibin/bor.pl>. Additional information describing the products available from the Drought Monitor can be found at the following URL: <http://drought.unl.edu/dm/> and <http://drought.gov>.

FOR MORE INFORMATION

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

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available from the following location on the NWCC homepage -
<http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

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

/s/ NOLLER HERBERT
Director, Conservation Engineering Division

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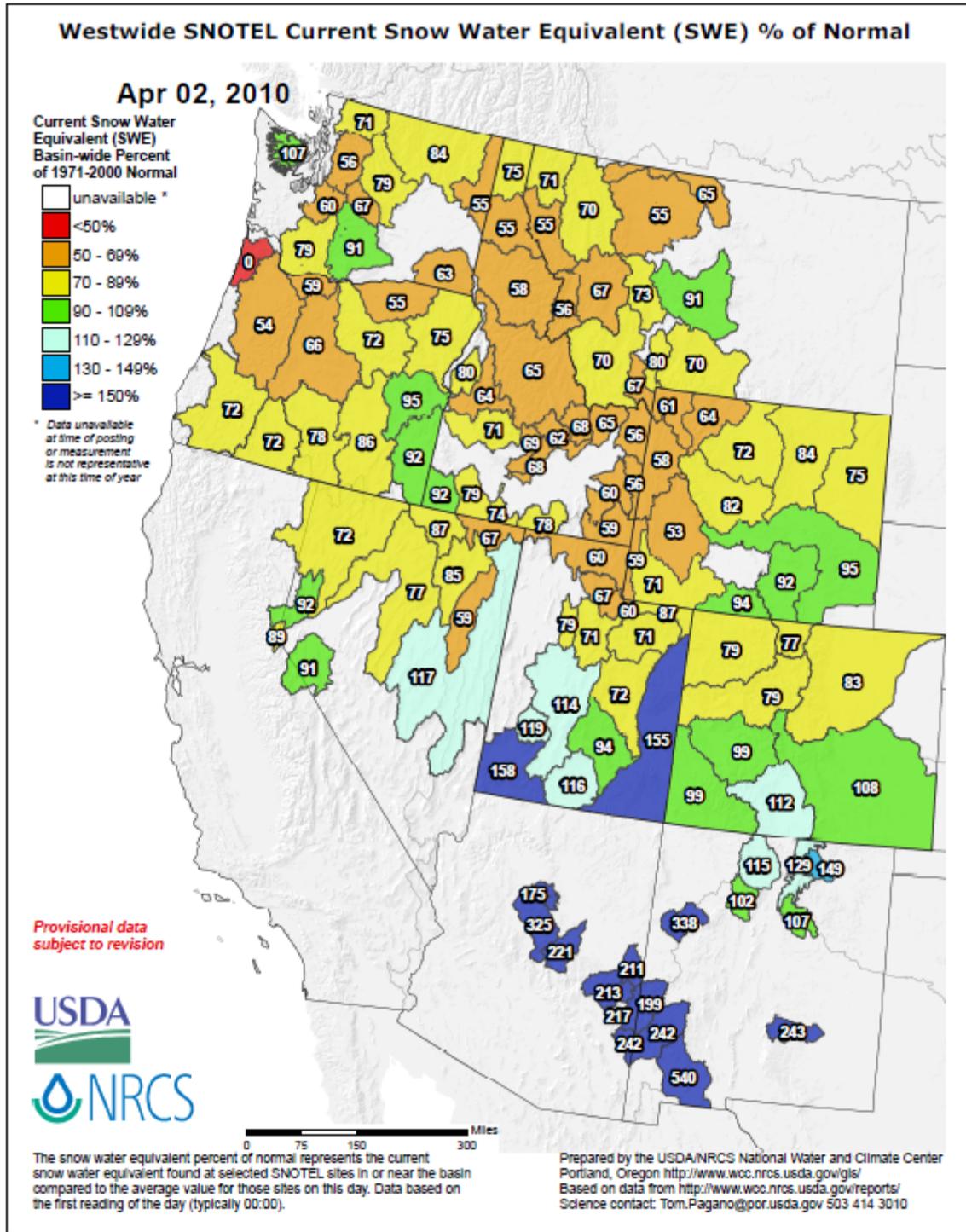


Fig. 1: SNOTEL Snow-Water Equivalent percent of normal values for 2 April 2010 shows surpluses over the Southwest and deficits over the Northern Tier States. Slight improvement is noted over southeastern Wyoming since last week.

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

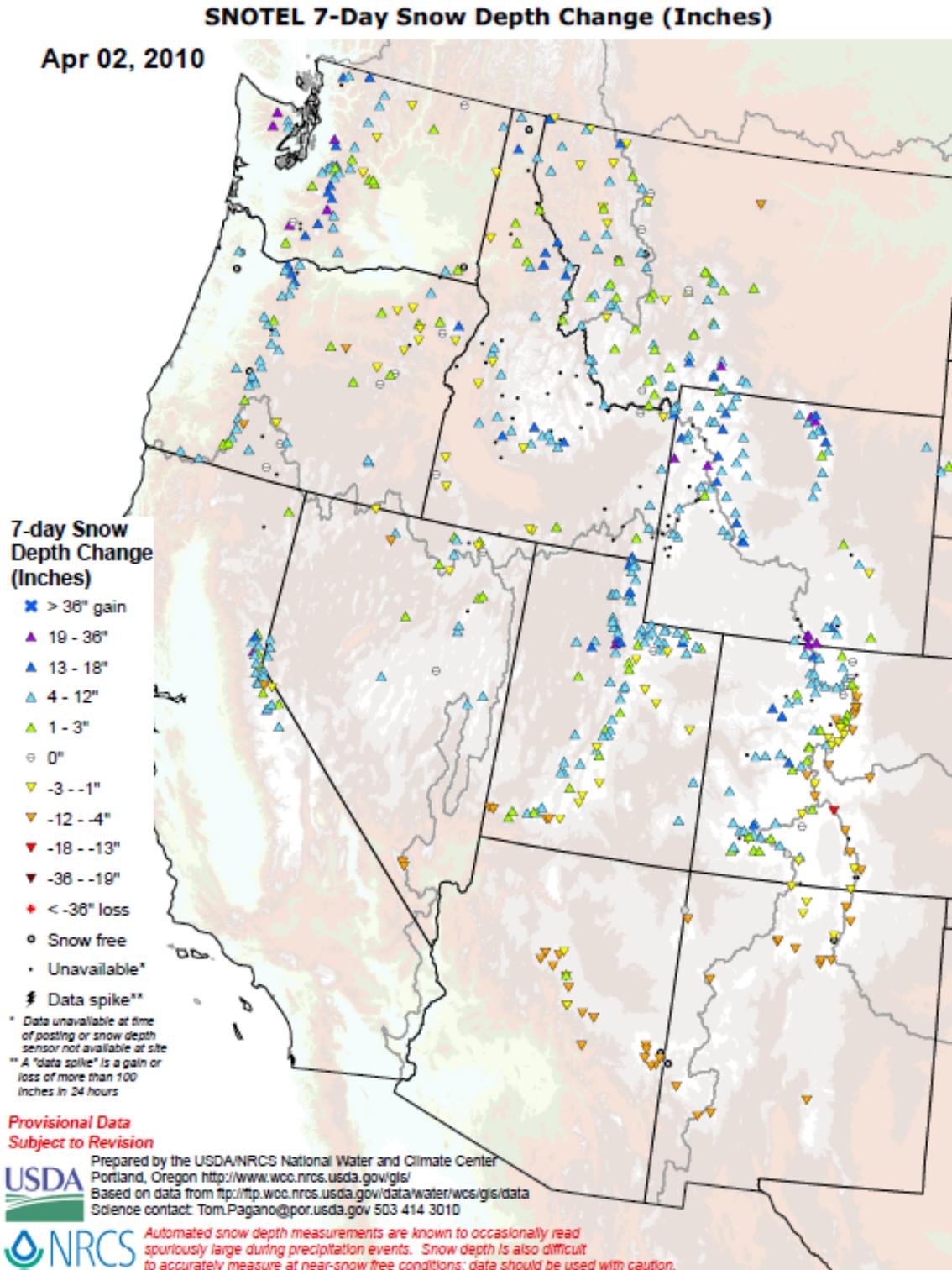
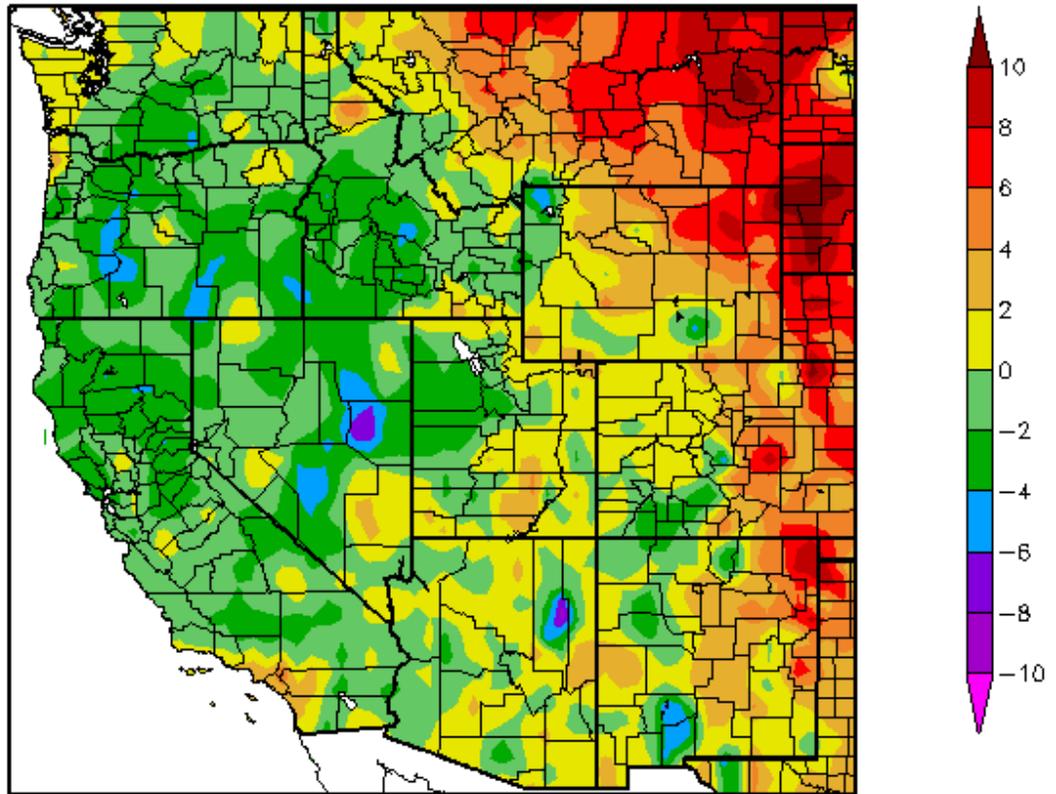


Fig. 1a: SNOTEL 7 day snow depth change reveals significant increases across most of the North-Central Rockies, Wasatch, Cascades, and Sierra. Significant decreases are also noted over the Front Ranges of Colorado and Northern Mexico.

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

Departure from Normal Temperature (F)
3/26/2010 – 4/1/2010



Generated 4/2/2010 at HPRCC using provisional data.

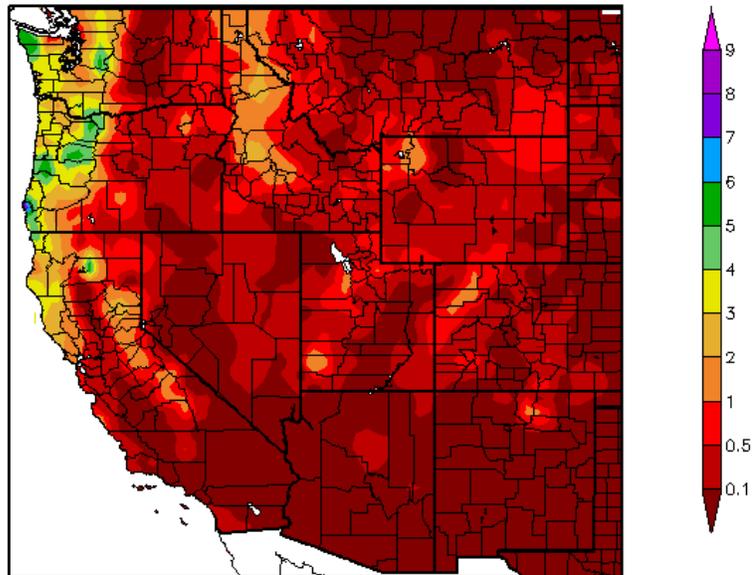
NOAA Regional Climate Centers

Fig. 2: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of northwestern High Plains (>+10°F) and the greatest negative departure occurred over parts of the Great Basin (<-6°F).

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

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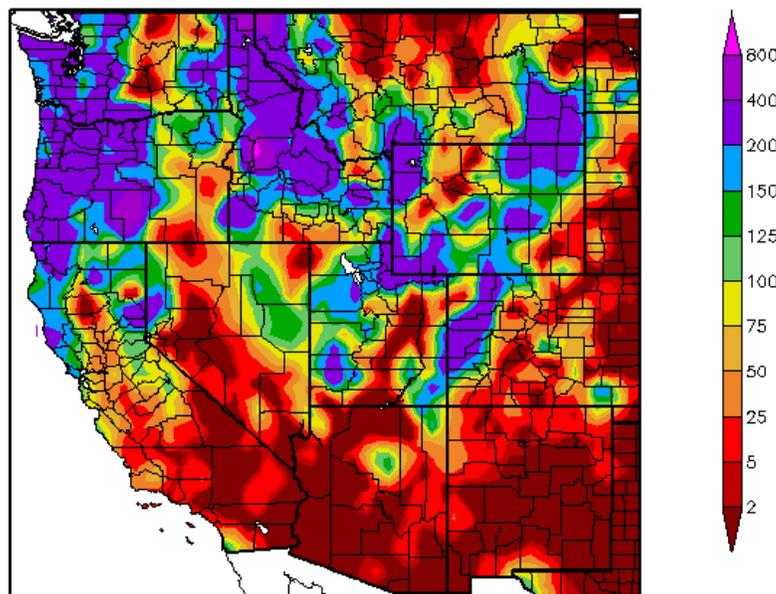
Precipitation (in)
3/26/2010 - 4/1/2010



Generated 4/2/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)
3/26/2010 - 4/1/2010



Generated 4/2/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Fig. 3. and 3a: ACIS 7-day average precipitation amounts for the period ending 1 April shows the bulk of the heaviest precipitation fell over much of Coastal Oregon and Washington. *In terms of percent of normal, the northern half of the Western States dominated with significant precipitation. Areas with significant deficits occurred over the southern Great Basin, Lower Colorado River Basin, and much of southern California.* Ref: <http://www.hprcc.unl.edu/maps/current/>

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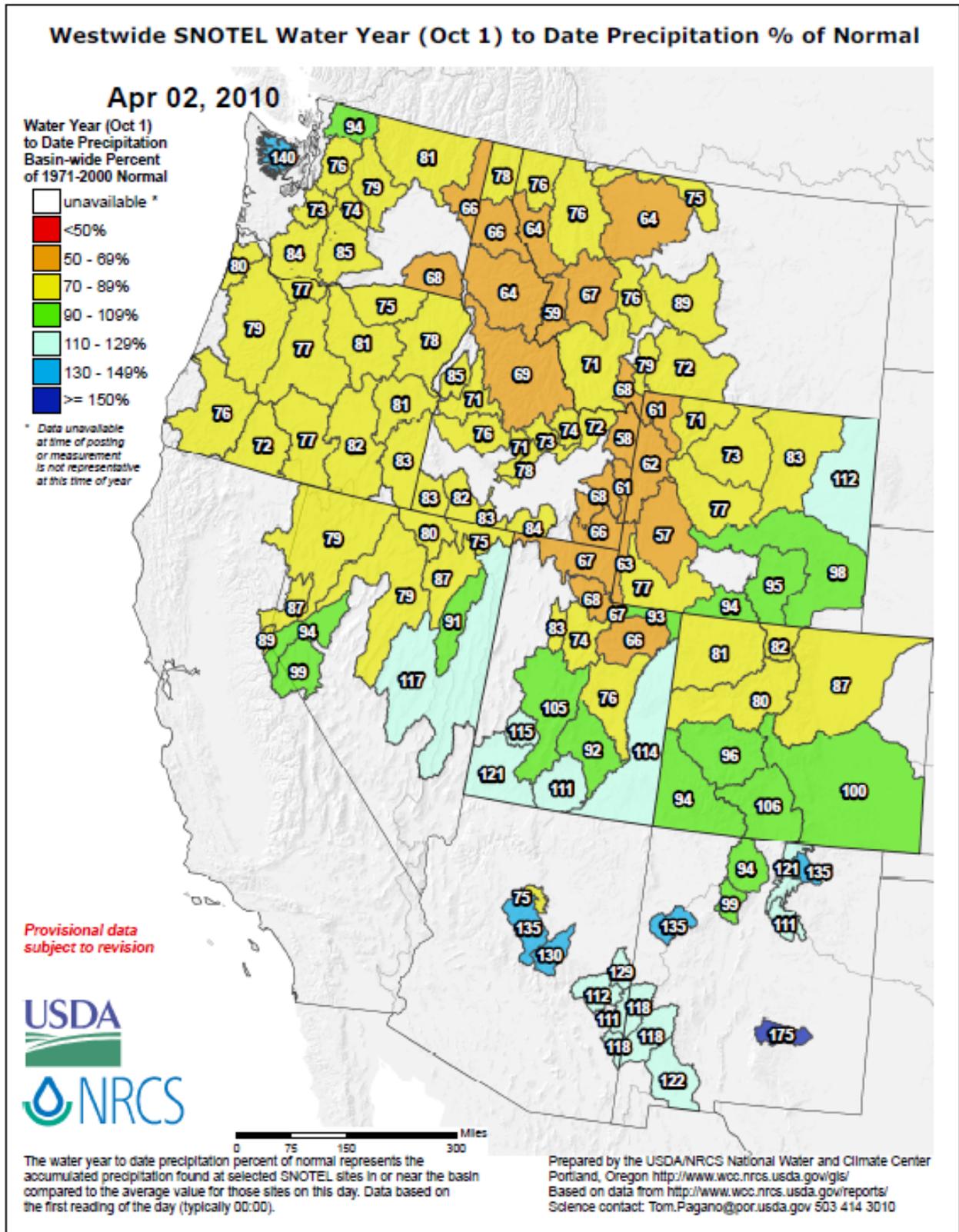


Fig 3b. For the 2010 Water-Year that began on 1 October 2009, Arizona and New Mexico have the largest surpluses while the northern interior Western States have the greatest deficits. A 10% increase is noted this week over northeast Wyoming.

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

U.S. Drought Monitor

March 30, 2010
Valid 8 a.m. EDT

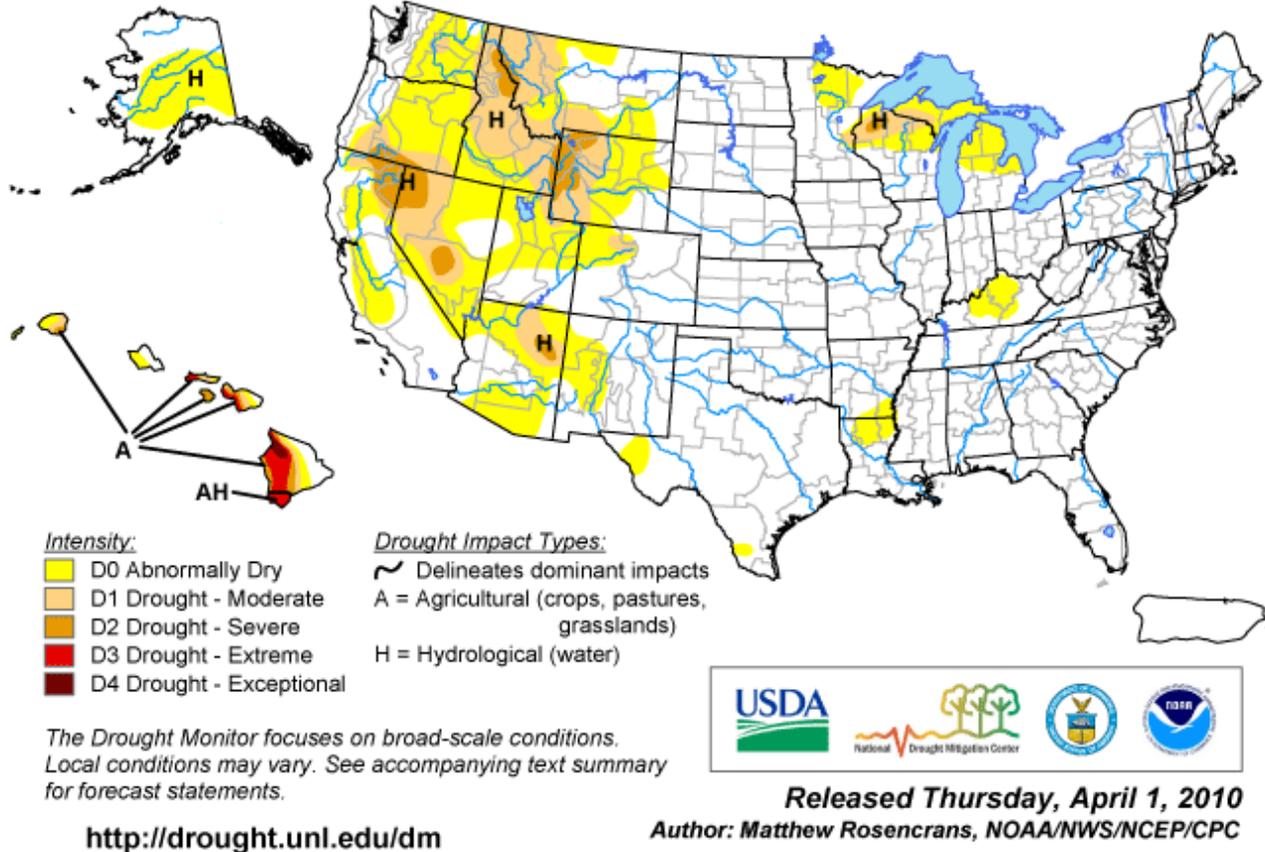


Fig. 4. Current Drought Monitor weekly summary. Note Hawaii is the only state that is in D4 Drought. Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

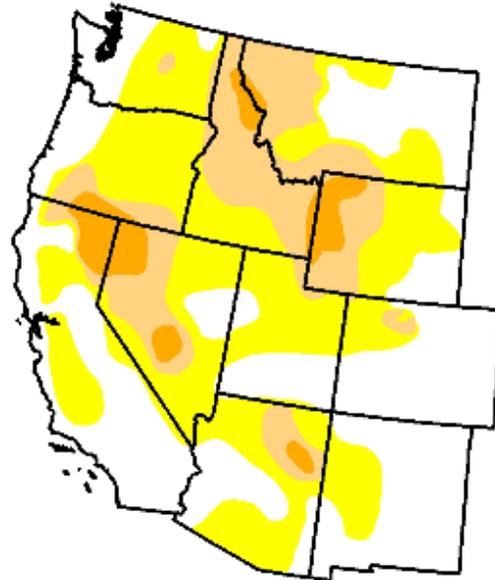
U.S. Drought Monitor

West

March 30, 2010
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	42.2	57.8	21.4	4.9	0.0	0.0
Last Week (03/23/2010 map)	39.9	60.1	22.4	5.4	0.0	0.0
3 Months Ago (01/05/2010 map)	40.1	59.9	30.6	9.9	0.5	0.0
Start of Calendar Year (01/05/2010 map)	40.1	59.9	30.6	9.9	0.5	0.0
Start of Water Year (10/06/2009 map)	42.1	57.9	25.4	8.5	0.0	0.0
One Year Ago (03/31/2009 map)	31.7	68.3	28.2	4.2	0.0	0.0



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://drought.unl.edu/dm>



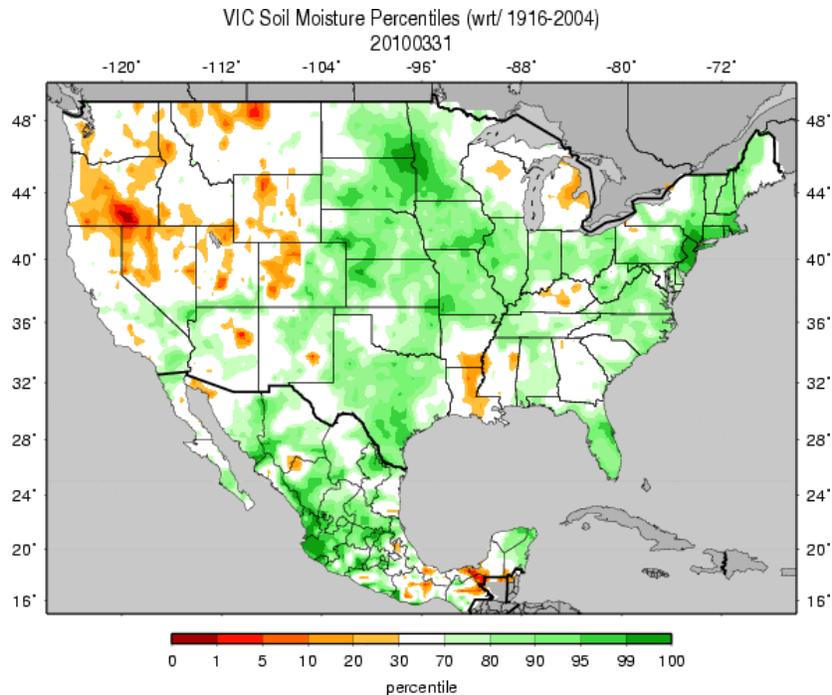
Released Thursday, April 1, 2010

Author: M. Rosencrans, CPC/NOAA

Fig. 4a: Drought Monitor for the Western States with statistics over various time periods. Regionally there was slight improvement since last week.

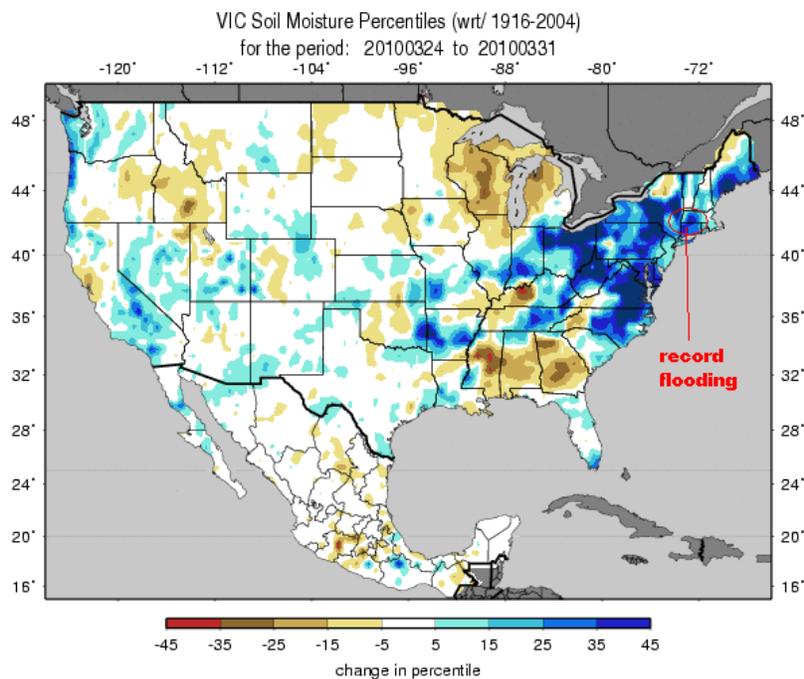
Ref: http://www.drought.unl.edu/dm/DM_west.htm

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Figs. 5a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 31 March. The same general regional patterns of dry and wet persist since last week.

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 the week shows a complete reversal of conditions over the Mid-Atlantic and New England area since last week with record flooding. Ref:

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

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Thursday, April 01, 2010

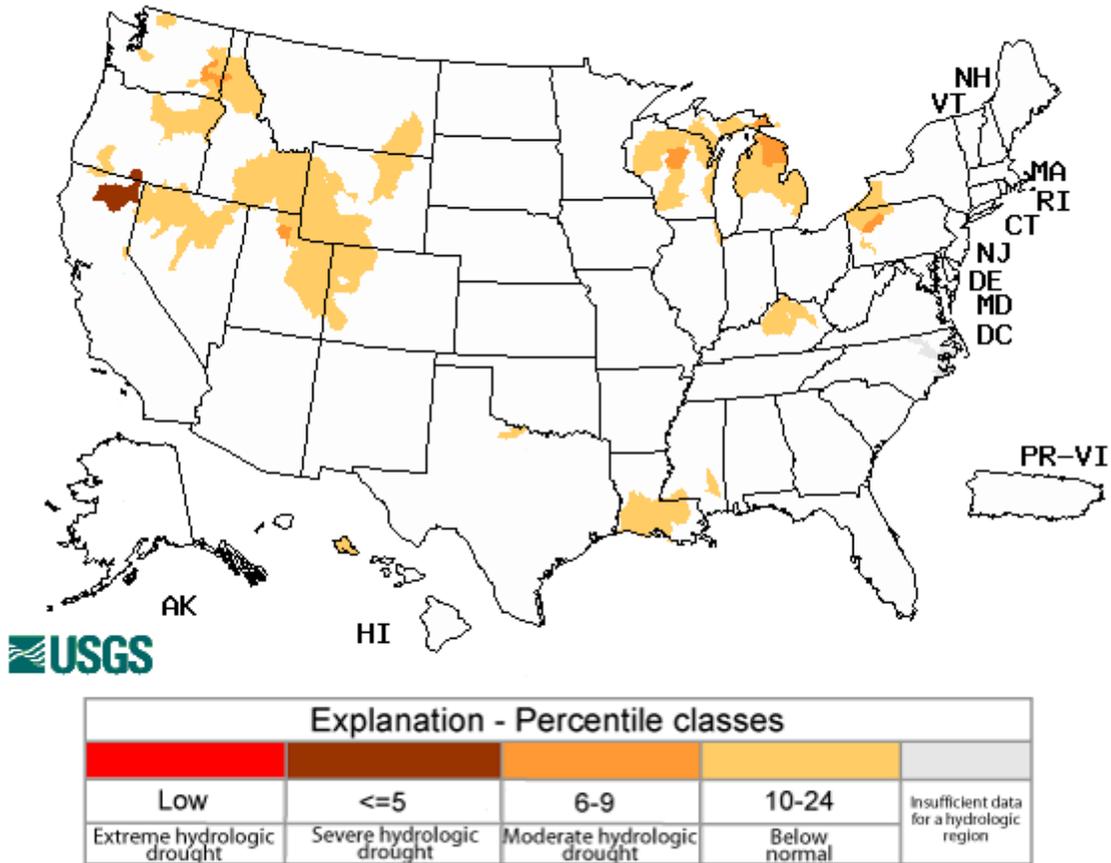


Fig. 6. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Flows over some areas over the Pacific Northwest improved this week.

Ref: <http://water.usgs.gov/waterwatch/?m=dryw&w=map&r=us>

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National Drought Summary -- March 30, 2010

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/>.

During the past 7 days, significant rains fell across much of the Pacific Northwest and from the middle Mississippi Valley to the Mid-Atlantic and New England. Those rains were part of a low-pressure system that moved from the central Great Plains to the Mid-Atlantic coast late last week. As that storm system moved eastward, another low-pressure system moved into and across the Northwest. During the weekend, the second storm wrapped up in the center of the contiguous 48 states, then moved eastward. This storm system tapped deep moisture from the Gulf of Mexico and brought it northward, creating flooding rains across many locations east of the Appalachians. The drier regions of the country during the past 7 days were across portions of Alaska, Hawaii, eastern Puerto Rico, the Gulf Coast, the central Appalachians, the Great Lakes, and the central and southern Rockies. These areas missed out on the storm activity of the past week.

Great Lakes and Ohio River Valley: Precipitation deficits continued to mount across the Great Lakes region as the storm track was firmly south of the region. Precipitation totals for the previous 14- and 90-day periods were less than 50 percent of normal, with the most recent 14 days showing most of the Great Lakes region below 5 percent of normal. Low vegetation demand for water and minimal evaporation during the colder months precluded the expansion of the more intense drought categories; however, the area of abnormal dryness (D0) was expanded to include most of Michigan. The Standardized Precipitation Index (SPI) for the past 3 months (less than -2.0) painted a dire picture, while the 6- and 9-month SPI values across northern lower Michigan (0.0 to -0.8) were not as low. With spring thaws upon us and more active vegetation not too far off, this area should be monitored closely.

Precipitation over the past week bypassed most of Kentucky (precipitation totals less than 0.6 inch) while many reports out of southern Indiana indicated widespread rain totals of 1.5-2.5 inches. Soil moisture models indicated that soil moisture values in the region were mostly between the twentieth and thirtieth percentiles across Kentucky, with isolated areas below the twentieth percentile. Analyses of rainfall totals (percent of normal and SPI) for periods longer than 6 months indicated some wetness across this region, while for shorter time scale dryness is most pronounced at 30 days (totals between 5 and 25 percent of normal). The area of abnormal dryness in this region was modified to reflect the heavier rains in Indiana and the continued dryness in Kentucky.

Southeast and Texas: Dryness across the southern Mississippi Valley continued. Climate divisions 2 and 3 in Louisiana reported rainfall deficits of 4.70 and 5.88 inches over the past 45 days. Soil Moisture values from models run at the University of Washington (UW) and the National Centers for Environmental Prediction (NCEP) both indicated moisture deficits in this region, with the North American Land Data Assimilation System (N-LDAS) showing D0 conditions and the UW model more consistent with moderate drought (D1). The mitigating factor in indicating D0 rather than D1 was that some light precipitation fell across the region during the past 7 days.

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The areas of abnormal dryness in southern and western Texas persisted, with little precipitation reported in these regions during the past 7 days. As temperatures continue to rise and agricultural use of water increases, these areas will need to be closely monitored.

The West: Precipitation fell across much of the eastern slopes of the Rockies from Montana to Colorado to northern New Mexico. Unfortunately most of the areas affected by drought are west of the continental divide, so only minor improvements were made in the drought conditions. Across much of the northern and central Rockies, precipitation was ongoing at the data cutoff (8 am, EDT, Tuesday of each week), so most of the impact from that precipitation will be felt in the coming weeks. Despite the recent precipitation, snowpack is still approximately 3 feet below normal near Franklin County, Idaho.

In northern Colorado, most of the precipitation fell outside of the drought areas, with the exception of Jackson County, where many areas received between 1.0 and 1.5 inches, and a single report in Routt County of 1.5 inches. That precipitation prompted the removal of Moderate Drought from southern Jackson County, and trimming of some abnormal dryness (D0) from northern Jackson, western Larimer, and eastern Grand Counties. Rainfall of about 1.0 inch across Mesa County led to a small trimming of D0.

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With the storm track shifting northward as the El Nino weakened, rainfall across much of California became scarce. This recent lack of rains is highlighted by 14-day precipitation totals below 5 percent of normal from the central coast of California to central Nevada. Given the prior wetness in this region, only a minor expansion of D0 was indicated across Mono and Inyo Counties. This area will need to be closely monitored as the end of the rainy season is quickly approaching.

Hawaii and Alaska: No change was made to the drought indications across the Hawaiian Island chain.

In Alaska, western and interior portions continued to see dry conditions. Unalakleet reported no precipitation over the past 90 days while McGrath reported less than an inch over the past 3 months (less than 30 percent of normal). Bethel, near the west coast and just a bit south of Unalakleet has reported near normal precipitation for the past 90 days.

Looking Ahead: Moderate rainfall is expected across portions of the central Great Plains and the middle Mississippi Valley between March 31 and April 5, 2010. Additional heavy rains are expected across the Pacific Northwest, with storm systems moving from the north Pacific into the northern Rockies. Beyond April 5, wetter than normal conditions are expected across the Pacific Northwest, Great Lakes, lower Mississippi Valley, and into the Northeast. Dry conditions are expected to continue across much of Alaska, with the exception of the Panhandle and Aleutians.

Author: [Matthew Rosencrans, NOAA/NWS/NCEP/Climate Prediction Center](#)

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

A ... Agricultural

H ... Hydrological

Updated March 31, 2010