



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

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## Weekly Report - Snowpack / Drought Monitor Update

Date: 29 July 2010

### SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

**Temperature:** SNOTEL 7-day average temperature departures from normal map show that temperatures were within 5°F of normal across the West (Fig. 1). ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over northern California and northwest Nevada (>+6°F) and the greatest negative departures occurred over the central California coastal (<-6F) (Fig. 1a).

**Precipitation:** ACIS 7-day average precipitation amounts for the period ending 28 July shows the bulk of the heaviest precipitation falling over central Arizona and most of New Mexico (Fig. 2). In terms of percent of normal, scattered thunderstorms throughout all but the Pacific Northwest, western Montana, and southern California resulted in two to four times the normal precipitation this week (Fig. 2a). For the 2010 Water-Year that began on 1 October 2009, Arizona, southern New Mexico, eastern Nevada, southeast & southwest Utah, the Olympic Range (WA), central Montana, and central-eastern Wyoming have the largest surpluses while much of northern Idaho, Upper Snake River, Northern Wasatch (UT), and southern Colorado have the greatest deficits. No significant changes since last week (Fig. 2b).

### WESTERN DROUGHT STATUS

**The Southwest:** The southwest monsoon surged into most of the Southwest, dumping 2 to 4 inches of rain on southwestern Texas, most of New Mexico, east-central Arizona, and southern Colorado, reducing or eliminating short-term dryness (D0A) and trimming away D1 where over 2 inches fell. In southern Colorado, however, even though 1 to 2.5 inches fell, it was not enough to overcome accumulated short and medium-term deficits and D0 remained. In contrast, the monsoon has failed to reach into western and northern Arizona and southern sections of Nevada and Utah. This region doesn't receive a lot of monsoonal rain (normally 1 to 2 inches in July), but gets enough to support the growth of summer grasses. With the lack of rain and reports of very poor pasture and range conditions, D1 was expanded across much of northern Arizona. Abnormal dryness was slightly extended into southern Utah, southern Nevada, and western Arizona. Last week's D2 in northeastern Arizona was repositioned northwestward to better represent the area with reports of lingering long-term drought impacts and minimal summer rains (northern Navajo and northeastern Coconino counties).

**Great Basin and Rockies:** Light, scattered showers (0.1 to 0.5 inches) fell on the eastern Great Basin and the northern and central Rockies, while dry weather prevailed in the western Great Basin. Temperatures averaged slightly above-normal in the Great Basin, and slightly below-normal in the Rockies. With lingering long-term drought from this year's subnormal winter precipitation and slight shortages from the spring and summer months, D0 was expanded into northeastern Nevada to better reflect the short and long-term blends and percent of normal maps. Fortunately, adverse impacts have yet to surface except for surface irrigation water supplies near Lovelock. Most state agricultural and water interests are reporting adequate or normal conditions. In the northern Rockies, a reevaluation was made for the upper Snake River basin of eastern Idaho and northwestern Wyoming after noting the effects of a very wet and cool spring and early summer. With a second filling of the American Falls Reservoir this year (last one in late June), near or above-average stream flows, and projected reservoir carryover of 60% for next year for Palisades Reservoir and Jackson Lake, D0 was removed. Similarly in

## Weekly Snowpack and Drought Monitor Update Report

extreme northern Idaho, near-normal Water-Year-to-Date precipitation, short-term wetness, and near-normal stream flows were enough to erase D0. Author: David Miskus, CPC/NCEP/NWS/NOAA.

***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. 3 and 3a).

### **SOIL MOISTURE**

Soil moisture (Figs. 4a and 4b), 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](http://water.usgs.gov/cgi-bin/waterwatch?state=us&map_type=dryw&web_type=map).

This map, (Fig. 5) 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**

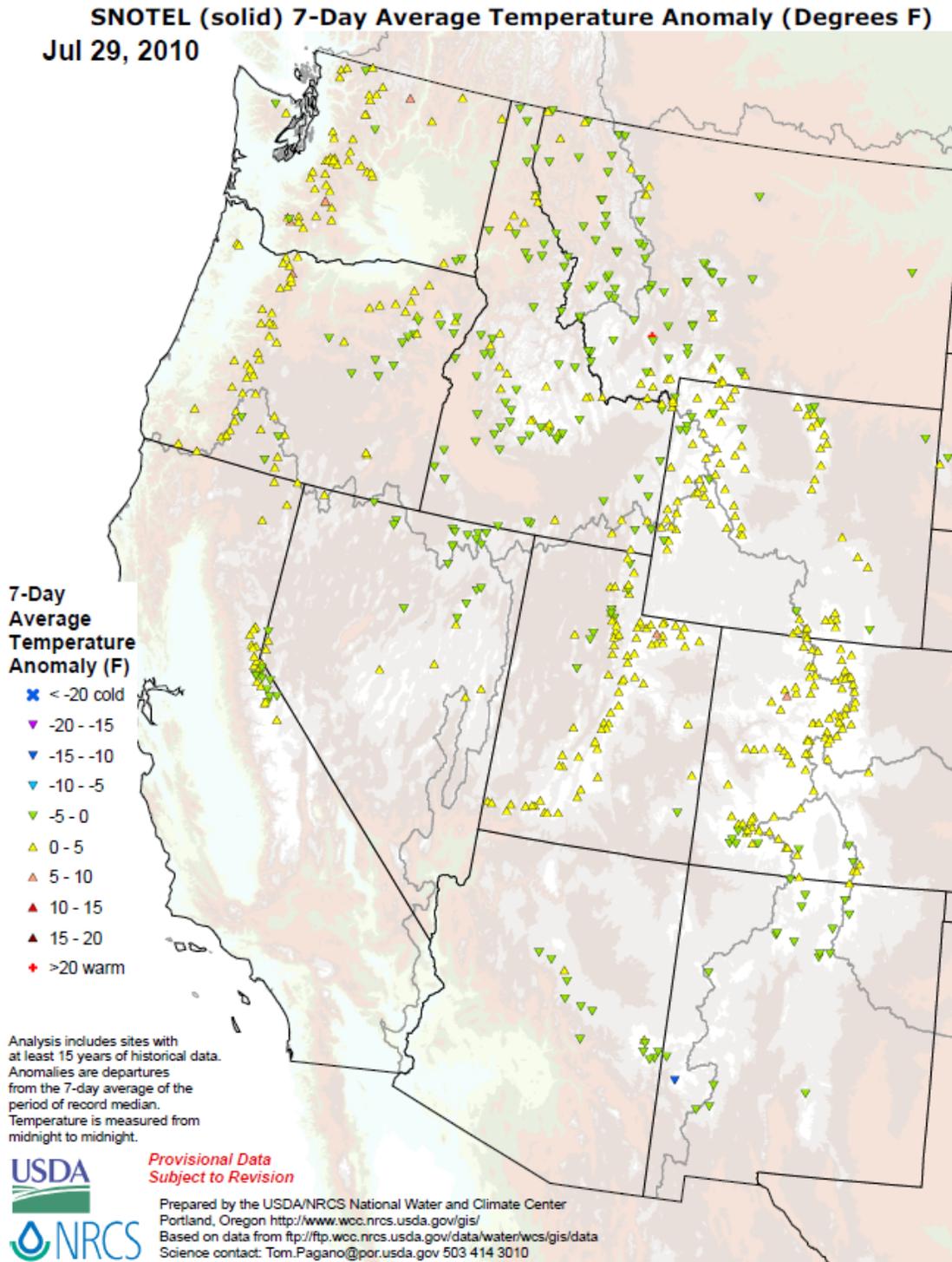
The National Water and Climate Center Homepage provide the latest available snowpack and water supply information. Please visit us at <http://www.wcc.nrcs.usda.gov>. This document is available from the following location on the NWCC homepage - <http://www.wcc.nrcs.usda.gov/water/drought/wdr.pl>

## **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/ JEFF GOEBEL  
Acting Director, Resource Inventory Division

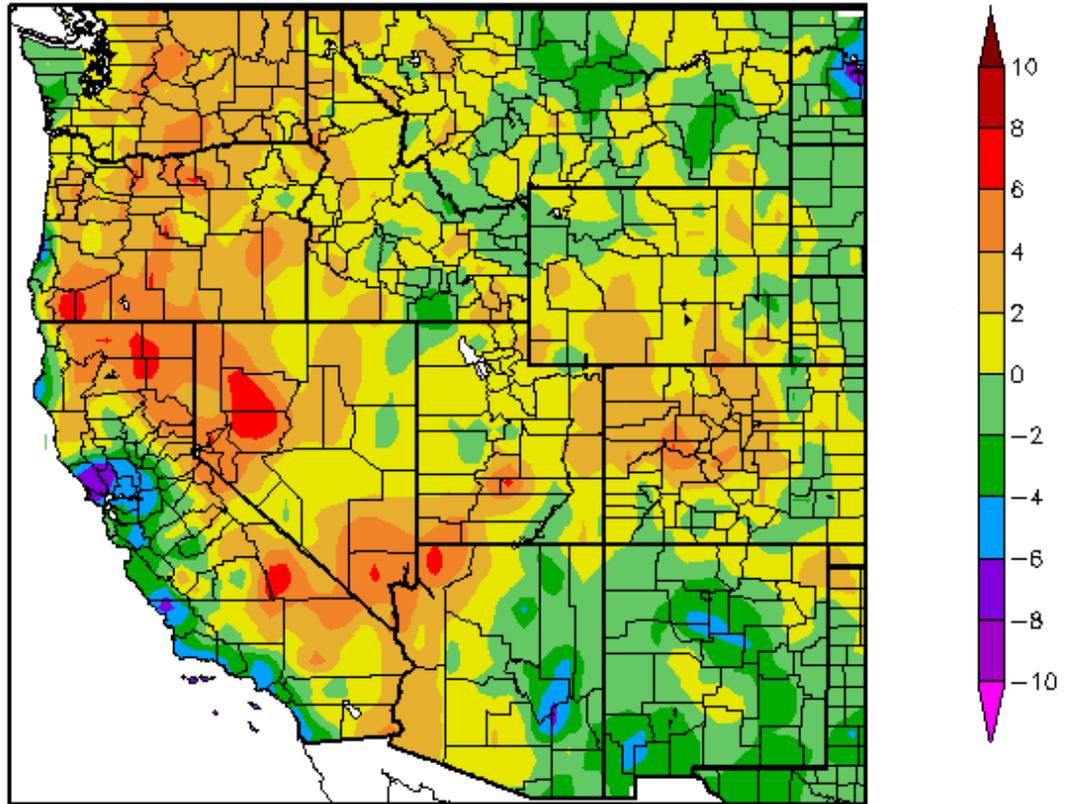
# Weekly Snowpack and Drought Monitor Update Report



**Fig. 1: SNOTEL 7-day average temperature departures from normal map show that temperatures were within 5°F of normal across the West.**

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

Departure from Normal Temperature (F)  
7/22/2010 – 7/28/2010



Generated 7/29/2010 at HPRCC using provisional data.

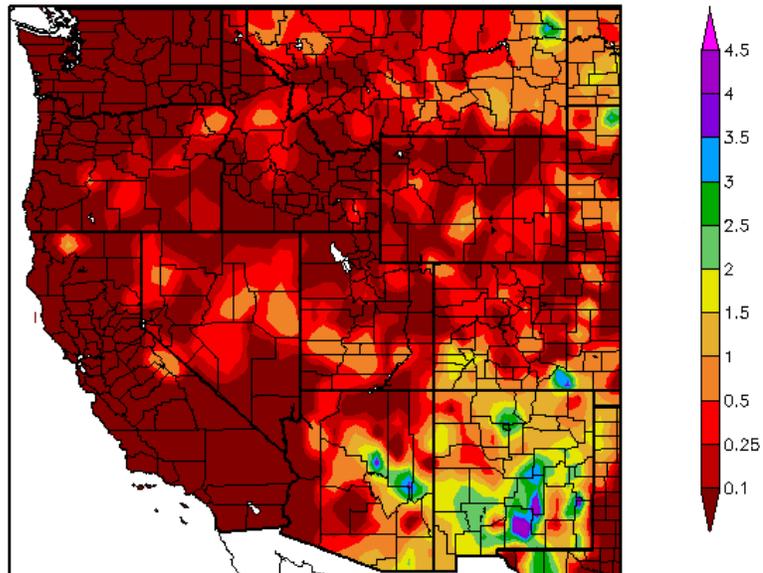
NOAA Regional Climate Centers

**Fig. 1a: ACIS 7-day average temperature anomalies show that the greatest positive temperature departure was over northern California and northwest Nevada (>+6°F) and the greatest negative departures occurred over the central California coastal (<-6F).**

Ref: [http://www.hprcc.unl.edu/maps/current/index.php?action=update\\_daterange&daterange=7d](http://www.hprcc.unl.edu/maps/current/index.php?action=update_daterange&daterange=7d)

## Weekly Snowpack and Drought Monitor Update Report

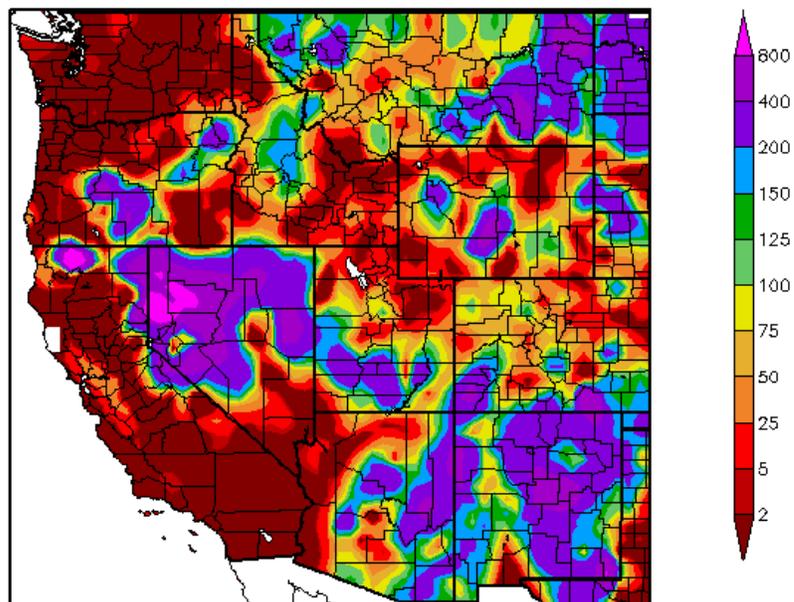
Precipitation (in)  
7/22/2010 – 7/28/2010



Generated 7/29/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

Percent of Normal Precipitation (%)  
7/22/2010 – 7/28/2010

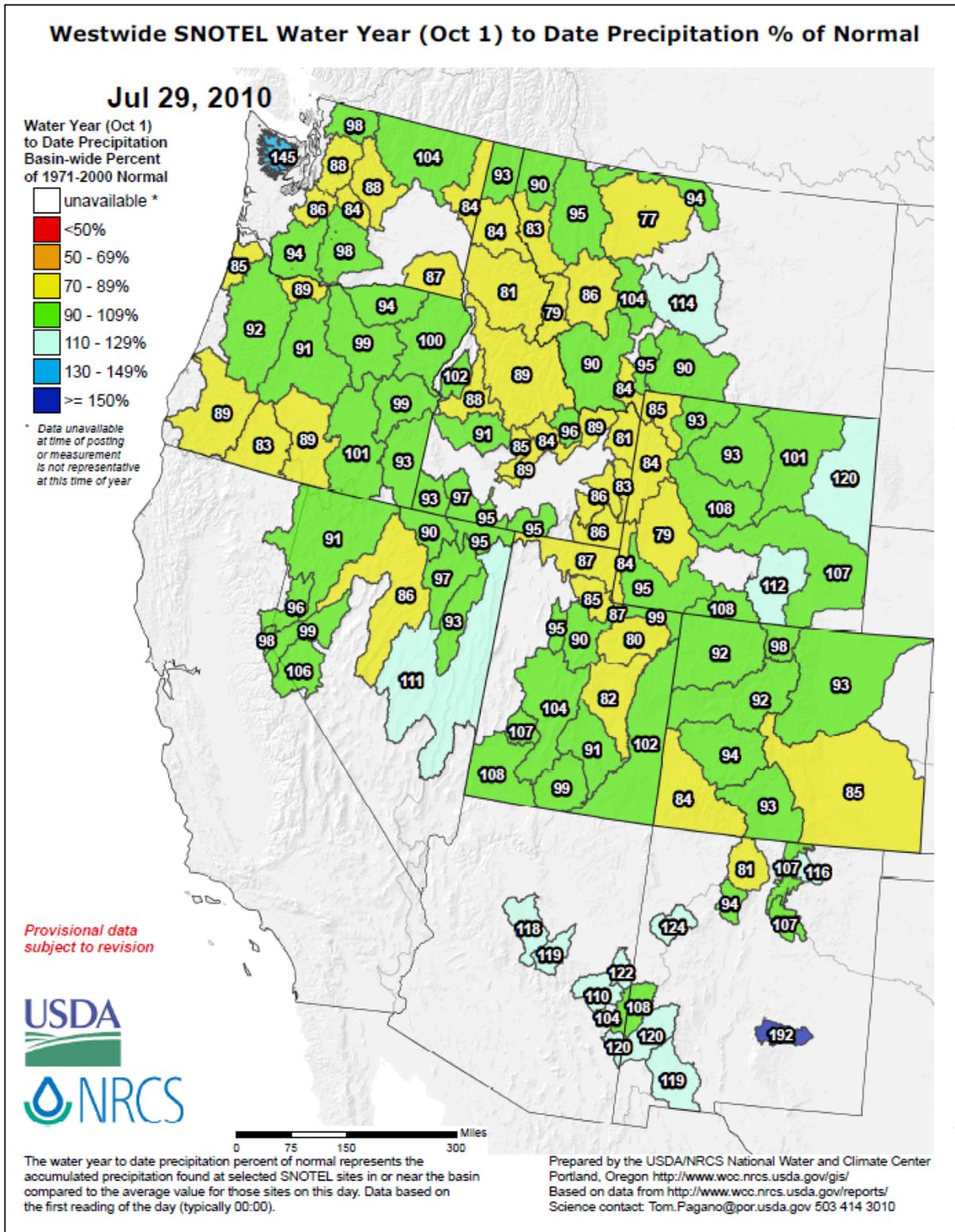


Generated 7/29/2010 at HPRCC using provisional data.

NOAA Regional Climate Centers

**Fig. 2 and 2a:** ACIS 7-day average precipitation amounts for the period ending 28 July shows the bulk of the heaviest precipitation falling over central Arizona and most of New Mexico (Fig. 2). In terms of percent of normal, scattered thunderstorms throughout all but the Pacific Northwest, western Montana, and southern California resulted in two to four times the normal precipitation this week (Fig. 2a). Ref: <http://www.hprcc.unl.edu/maps/current/>

## Weekly Snowpack and Drought Monitor Update Report



**Fig 2b:** For the 2010 Water-Year that began on 1 October 2009, Arizona, southern New Mexico, eastern Nevada, southeast & southwest Utah, the Olympic Range (WA), central Montana, and central-eastern Wyoming have the largest surpluses while much of northern Idaho, Upper Snake River, Northern Wasatch (UT), and southern Colorado have the greatest deficits. No significant changes since last week.

Ref: [ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west\\_wytdprecpcnormal\\_update.pdf](ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/west_wytdprecpcnormal_update.pdf)

# U.S. Drought Monitor

July 27, 2010  
Valid 8 a.m. EDT

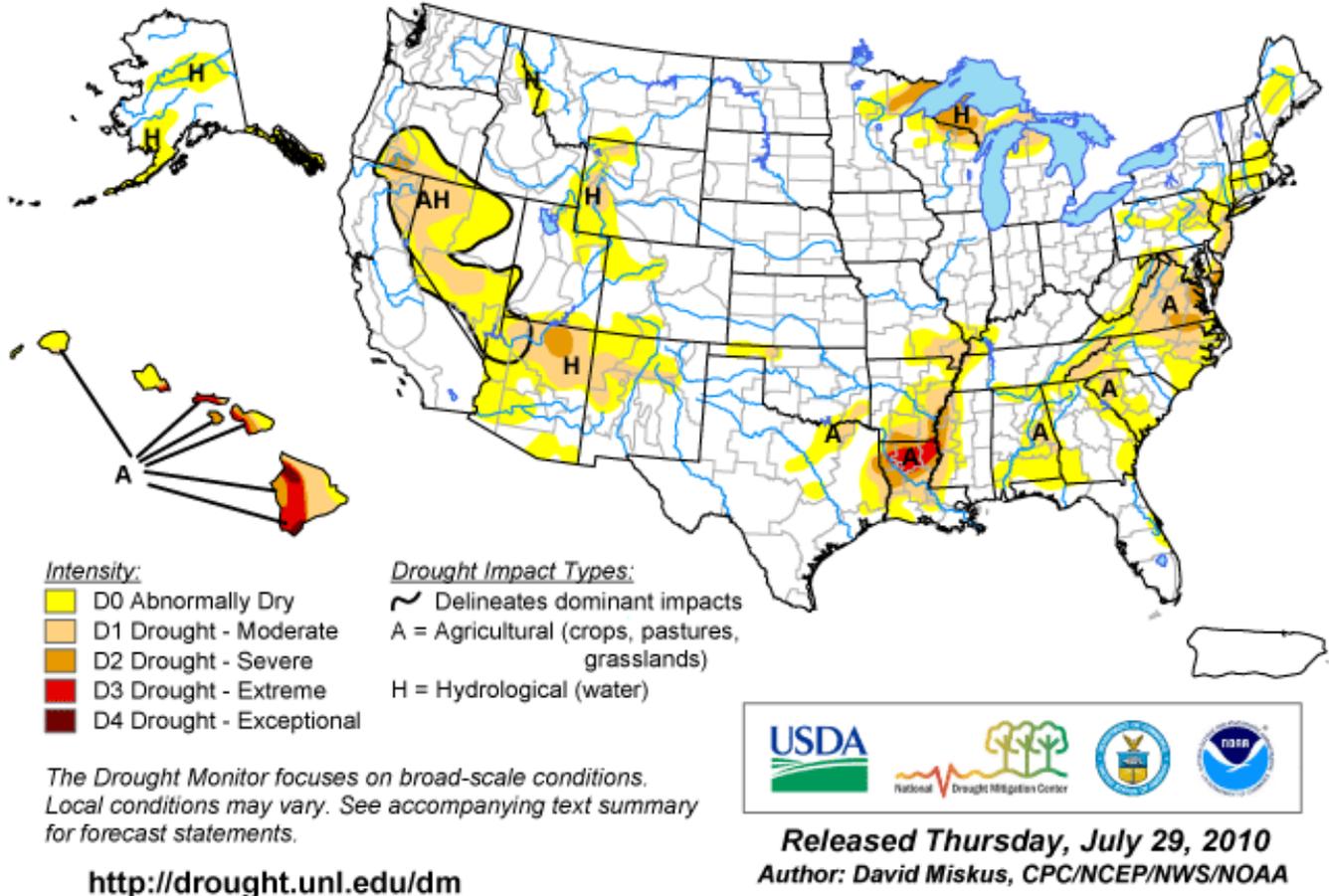


Fig. 3: Current Drought Monitor weekly summary. Hawaii is only state that has a D4 drought level. D3 levels dominate northern Louisiana. Ref: National Drought Mitigation Center (NDMC) - <http://www.drought.unl.edu/dm/monitor.html>

# U.S. Drought Monitor West

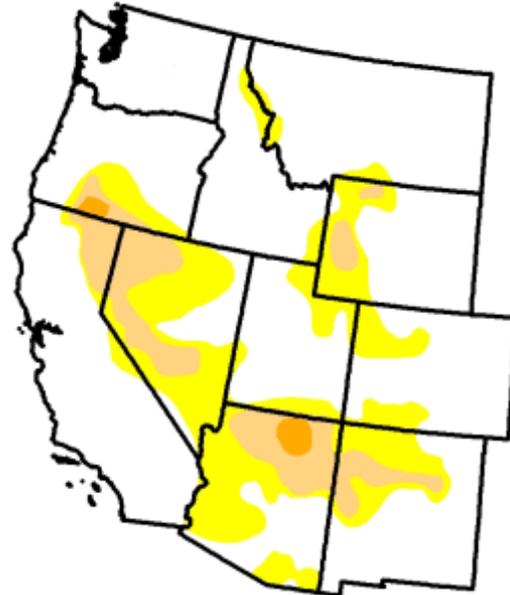
July 27, 2010  
Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	71.3	28.7	9.2	0.7	0.0	0.0
Last Week (07/20/2010 map)	69.0	31.0	9.6	0.6	0.0	0.0
3 Months Ago (05/04/2010 map)	47.5	52.5	19.4	4.9	0.0	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 (07/28/2009 map)	57.1	42.9	17.5	7.2	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>

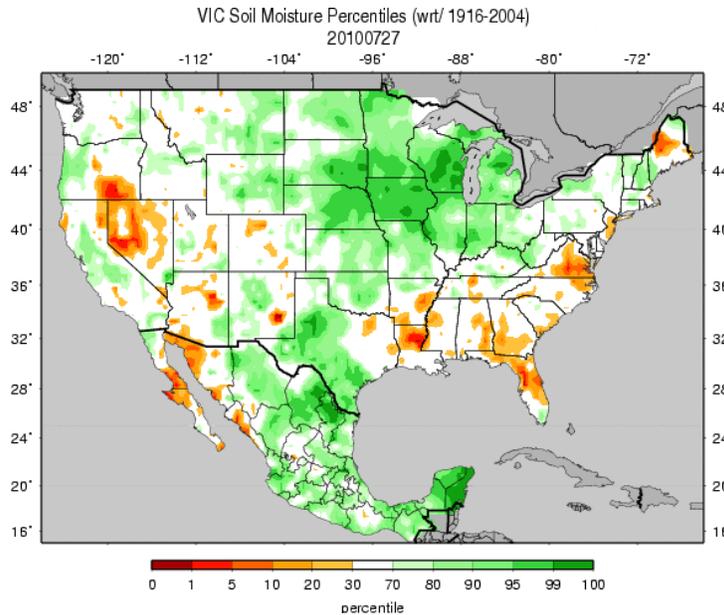


Released Thursday, July 29, 2010

Author: D. Miskus, CPC/NOAA

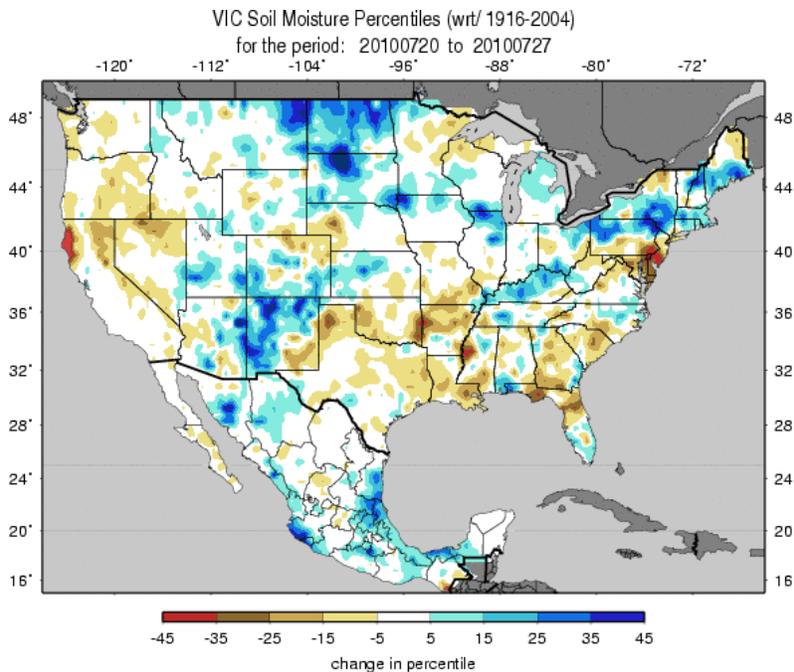
**Fig. 3a: Drought Monitor for the Western States with statistics over various time periods. Regionally there were small improvements this week.**  
[http://www.drought.unl.edu/dm/DM\\_west.htm](http://www.drought.unl.edu/dm/DM_west.htm)

## Weekly Snowpack and Drought Monitor Update Report



**Figs. 4a:** Soil Moisture ranking in percentile based on 1916-2004 climatology as of 27 July. Excessive moisture dominates over the Eastern High Plains and Great Lakes. Dry soils dominate over the Mid-Atlantic, Maine, and Arizona to southern Oregon but have lessened in aerial extent since the previous 7-day period.

Ref: [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_qnt.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.gif)

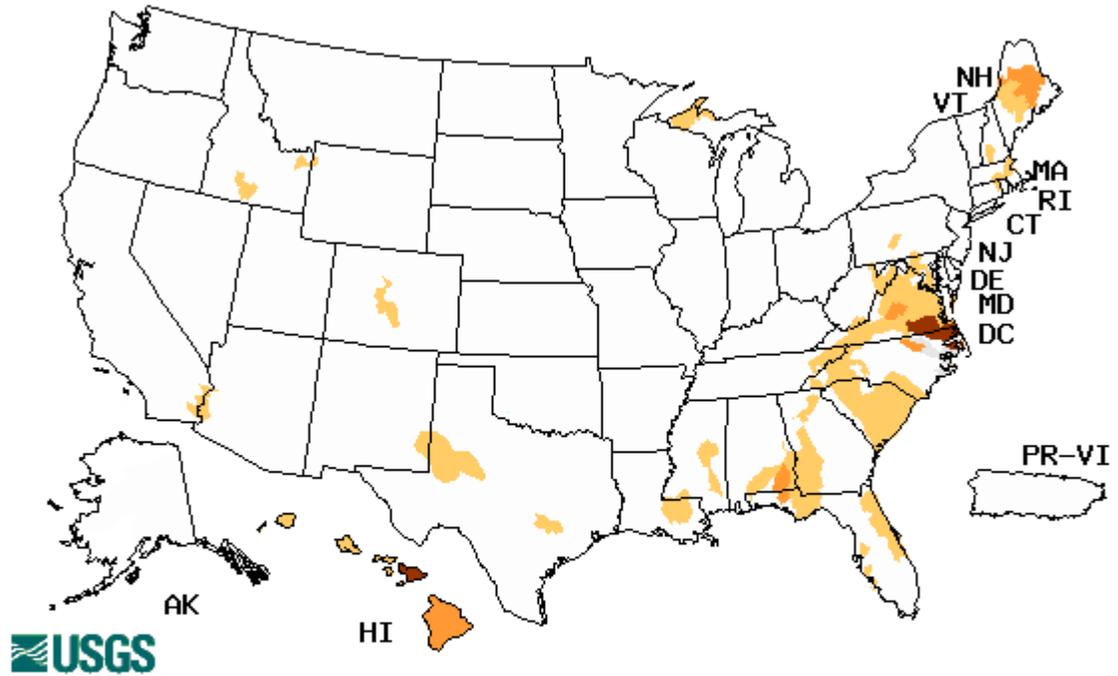


**Figs. 4b:** Soil Moisture change in percentile based on 1916-2004 climatology for the week shows significant moistening over the Northern High Plains, New Mexico, and New England and some drying over southern New Jersey and north coastal California.

Ref: <http://www.emc.ncep.noaa.gov/mmb/nldas/drought/> (very useful resource) and [http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm\\_qnt.1wk.gif](http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif)

# Weekly Snowpack and Drought Monitor Update Report

Wednesday, July 28, 2010



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. 5:** Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Very few regions are showing below normal flows. The Mid-Atlantic and Maui Hawaii has the largest stream flow deficits this week.

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

## Weekly Snowpack and Drought Monitor Update Report

### National Drought Summary -- July 27, 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 much of the week (July 20-26), a stationary front was draped from the central Rockies eastward into the Northeast while several areas of low pressure rode along the front. These lows triggered numerous showers and thunderstorms that dumped copious rainfall (up to a foot) on much of the western Corn Belt, especially in eastern Iowa, southern Wisconsin, and northern Illinois. The cold front finally made its way off the Northeast Coast by late Sunday, providing heat relief to the mid-Atlantic. Heavy rains (more than 2 inches) also fell on the lower Great Lakes region, Northeast, central Great Plains and lower Missouri Valley, and at scattered locations across Texas, Delta, and Southeast. In the Southwest, an active summer monsoon triggered numerous, widespread thundershowers (more than 2 inches of rain) in New Mexico, east-central Arizona, and southern Colorado, but farther west and north conditions were much drier. Minimal Tropical Storm Bonnie quickly fizzled after crossing southern Florida, dropping 2 to 5 inches of rain on southern Florida, eastern Louisiana, and southern Mississippi. In Alaska, unsettled weather brought showery and cool conditions to most of the state while mostly dry weather continued across the leeward sides of Hawaii. In the lower 48 States, temperatures averaged above-normal except along the West Coast and in the northern Plains, upper Midwest, northern New England, and in New Mexico and west Texas.

**The Northeast:** The aforementioned stationary front brought beneficial rains (2 to 4 inches) to much of this region, although lesser totals (less than an inch) fell across interior Maine, southern New Hampshire, eastern Massachusetts, western Long Island and most of New Jersey. Where the amounts exceeded 2 inches, a 1-category improvement was made as recent USGS average stream flows (at 1-, 7-, and 14-days) ending on July 27 have returned to near-normal levels in these improved locations. In contrast, stream flows remained below the 25th percentile where the heavy rains missed (the remaining D0 and D1 areas). Additionally, abnormal dryness was introduced to central Maine where short-term deficits of 1 to 3 inches have accumulated (about 70 percent of normal) over the past 30, 60, and 90-days, and average stream flows levels have dropped below the 25th percentile.

**Mid-Atlantic and Carolinas:** Excessive heat (highs in the upper 90sF to lower 100sF; average temperatures 8 to 12 deg F above normal) and little or no rain through the first 6 days of the period warranted a large expansion of D1 across most of Virginia, in western and northeastern North Carolina, and northern South Carolina. D0 was also expanded westward into the middle and lower Appalachians, and southern North Carolina. Although a cold front on Sunday provided heat relief by Monday, the accompanying thunderstorms dropped disappointing rain totals (generally 0.5 inches or less). Where little or no weekly rain fell, severe drought (D2) was introduced in former D1 areas (southeastern and eastern Virginia and the lower Delmarva Peninsula). Most USGS average stream flow levels from extreme south-central Pennsylvania southward into northern North Carolina fell below the 10th percentile at 1-, 7-, 14-, and 28-days (on July 27), while USDA/NASS reported poor and very poor pasture conditions as of July 25 for: Virginia (71%); Maryland (54%); Pennsylvania (48%); North Carolina (47%); Delaware (44%); and West Virginia (35%). Agricultural crops have also suffered, with poor and very poor conditions for: Virginia corn (71%), cotton (37%), and peanuts (21%); Maryland corn

## Weekly Snowpack and Drought Monitor Update Report

(55%), North Carolina corn (38%), and Delaware corn (31%). In contrast, scattered heavy thundershowers (2 to 3 inches) in west-central North Carolina and central South Carolina erased D0 in those areas.

**Southeast, lower Mississippi River Valley and Southern Plains:** Most of this region from Texas eastward to Georgia and Florida observed above-normal temperatures (anomalies of 2 to 6 deg F) and only isolated thundershowers Tuesday through Sunday, making conditions ideal for deterioration. By Monday, however, the slow-moving cold front finally dipped far enough south to trigger scattered moderate to heavy showers and thunderstorms in the Southeast and halt potential widespread deterioration across this region. In fact, where more than 2 inches fell, D0 was alleviated in parts of northwestern and central Georgia, northeastern and southwestern Alabama, and south-central Missouri. But where the heaviest rains missed, D0 expanded along the Alabama-Tennessee border, into south-central Alabama, western Kentucky and southern Illinois, and portions of western Tennessee and Mississippi. Before the Monday rains fell, parts of the lower Mississippi River Valley had accumulated 60-day deficits of 3 to 7 inches, 90-day deficiencies of 6 to 12 inches, and 6-month shortages of 12 to 20 inches. As a result, D1-D3 expanded northward into the southeastern Arkansas and western Mississippi where these short to medium-term departures were greatest, even though some locations reported 1 to 2 inches of rain on Monday. In east-central Florida, a slight expansion of the abnormal dryness previously limited to Brevard County was made as dry weather persisted. Fortunately, a wet spring has negated any adverse impacts to date.

In the southern Great Plains, additional rains (1 to 2 inches) and a reassessment of conditions since late June indicated that moisture conditions (based upon the SPI and other products) had improved across most of Texas and southeastern Oklahoma to allow a broad one-category improvement. In the Oklahoma Panhandle, 0.4 to 1.5 inches of rain was not enough to overcome past accumulated deficiencies, except in southern Beaver County where D0 was removed.

**Great Lakes region:** Torrential downpours (up to a foot) in the western Corn Belt caused severe urban flooding in both Milwaukee, WI, and Chicago, IL. Additionally, the privately-owned Hartwick Dam on Lake Dehli and the Maquoketa River in northeastern Iowa failed, flooding many homes and roads downstream. Unfortunately, the bulk of this heavy rain remained to the south of the long-term drought area in the upper Great Lakes region. Enough rain (1 to 3 inches), however, did fall across north-central Minnesota, northeastern Wisconsin, and northern Lower Michigan to reduce the D0 and D1 by a category along the southern boundary of the drought. The core hydrological drought area (D1-D3) remained intact; however, as minimal rains (0 to 0.3 inches) fell, and some USGS average stream flows (1-, 7-, 14-, and 28-days) were still in the lower tenth percentile in the Upper Peninsula and extreme northern Lower Michigan. In northeastern Minnesota, the drought areas were adjusted based upon seasonal precipitation historical rankings from the Minnesota State Climatology Office. The D1-D2 has resulted from abnormally low snowfall this winter and subnormal spring and summer precipitation (since March 16, 8 to 12 inches precipitation, or 3 to 5 inches below normal).

**The Southwest:** The southwest monsoon surged into most of the Southwest, dumping 2 to 4 inches of rain on southwestern Texas, most of New Mexico, east-central Arizona, and southern Colorado, reducing or eliminating short-term dryness (D0A) and trimming away D1 where over 2 inches fell. In southern Colorado, however, even though 1 to 2.5 inches fell, it was not enough to overcome accumulated short and medium-term deficits and D0 remained. In contrast, the monsoon has failed to reach into western and northern Arizona and southern sections of Nevada and Utah. This region doesn't receive a lot of monsoonal rain (normally 1 to 2 inches in July), but gets enough to support the growth of summer grasses. With the lack of rain and reports of very poor pasture and range conditions, D1 was expanded across much of northern Arizona. Abnormal dryness was slightly extended into

## Weekly Snowpack and Drought Monitor Update Report

southern Utah, southern Nevada, and western Arizona. Last week's D2 in northeastern Arizona was repositioned northwestward to better represent the area with reports of lingering long-term drought impacts and minimal summer rains (northern Navajo and northeastern Coconino counties).

**Great Basin and Rockies:** Light, scattered showers (0.1 to 0.5 inches) fell on the eastern Great Basin and the northern and central Rockies, while dry weather prevailed in the western Great Basin. Temperatures averaged slightly above-normal in the Great Basin, and slightly below-normal in the Rockies. With lingering long-term drought from this year's subnormal winter precipitation and slight shortages from the spring and summer months, D0 was expanded into northeastern Nevada to better reflect the short and long-term blends and percent of normal maps. Fortunately, adverse impacts have yet to surface except for surface irrigation water supplies near Lovelock. Most state agricultural and water interests are reporting adequate or normal conditions. In the northern Rockies, a reevaluation was made for the upper Snake River basin of eastern Idaho and northwestern Wyoming after noting the effects of a very wet and cool spring and early summer. With a second filling of the American Falls Reservoir this year (last one in late June), near or above-average stream flows, and projected reservoir carryover of 60% for next year for Palisades Reservoir and Jackson Lake, D0 was removed. Similarly in extreme northern Idaho, near-normal Water-Year-to-Date precipitation, short-term wetness, and near-normal stream flows were enough to erase D0.

**Hawaii and Alaska:** In Hawaii, scattered showers occurred this week on the windward sides of Kauai, Oahu, Maui, and the Big Island, but daily amounts were generally less than 0.2 inches and included a few days where little or no rain fell. The greatest 7-day (8am HST July 20 to 8am HST July 27) total was 4.01 inches at Mount Waialeale on Kauai, which was still only half of normal for the week (July normal total = 33.20 inches). On the leeward sides, little or no rain was measured. Status-quo was maintained as the showers were not frequent or heavy enough on the windward sides to warrant improvement, while the lack of rain did little to further deteriorate the already severe to exceptional drought on the leeward sides.

In Alaska, a second week of unsettled weather (cool and showery) and some heavy rains (2 to 3 inches) across the south-central sections of the state (2.71 inches at Iliamna; 2.54 inches at Nenana; 2.07 inches at Anchorage; 2.03 inches at Northway; 2.00 inches at Talkeetna), including additional flooding (initial floods occurred on July 12) in eastern interior Alaska on the Fortymile River basin that has damaged the Taylor Highway (from Chicken to Eagle), called for further D0 improvements. With another wet July week, the main D0 area was split in two around the Denali National Park region (between Nenana and Talkeetna) and abnormal dryness removed. Similarly, D0 was erased around the Iliamna area, as well as the extreme eastern Alaska interior (near Eagle). Elsewhere, rainfall amounts were not as large, and D0 was maintained.

**Looking Ahead:** During the next 5 days (July 28-August 1), a series of cold fronts across the northern tier of States should bring unwanted rain to the saturated western and central Corn Belt, but welcome rain to most of the Atlantic Seaboard. The southwest monsoon should remain active, with the bulk of the rains to move further west into most of Arizona, Utah, and western Colorado. The Far West should remain mostly dry, with meager precipitation expected in the southern half of the Plains, lower Mississippi River Valley, western sections of the Southeast, and New England. Above-normal temperatures should persist across the southeastern quarter of the U.S., while subnormal temperatures should occur from the upper Midwest into New England, in the Southwest where the monsoon should be active, and along the West Coast.

The CPC 6-10 day forecast (August 2-6) calls for subnormal precipitation in the Northwest, along the southern tier of States from Texas to Florida, and northwestern Alaska. Above-normal precipitation is

## Weekly Snowpack and Drought Monitor Update Report

expected from the southern Rockies northeastward into the northern Plains, from the Corn Belt east into the mid-Atlantic, and in Alaska's Aleutian Islands. Unseasonable warmth is predicted in interior Alaska, and for the eastern half of the Nation except the Northeast (near-normal), while subnormal temperatures persist along the West Coast and in Alaska's Aleutians.

**Author:** [David Miskus, CPC/NCEP/NWS/NOAA](#)

### **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 July 28, 2010