United States Department of Agriculture

NRCS

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

Weekly Report - Snowpack / Drought Monitor Update **Date: 30 September 2010**
End of 2010 Water-Year

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: SNOTEL 7-day average temperature departure from normal map shows temperatures coolest over the Cascades and warmest over the Central and parts of the Northern Rockies (Fig. 1). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of southern California and the Northern Rockies (>+12°F) and the greatest negative departures occurred over southwest New Mexico (<-3°F) (Fig. 1a). During the 2010 Water-Year, the West experienced mostly below average temperatures. The greatest positive temperature departures were over parts of Southwest and northernmost portions of the Pacific Northwest (>+2°F) and the greatest negative departures occurred over the Great Basin and northern Montana (<-3°F) (Fig. 1b).

Precipitation: ACIS 7-day average precipitation amounts for the period ending 29 September shows the heaviest precipitation confined to the extreme corner of the Pacific Northwest (Fig. 2). In terms of percent of normal, unusually heavy precipitation for this time of year fell over the regions of the Pacific Northwest and from New Mexico to the High Plain over Montana (Fig. 2a). For the 2010 Water-Year, the heaviest precipitation occurred over the typically wet Pacific Northwest (Fig. 2b). In terms of percent of normal, the heaviest precipitation fell over parts of the Northern Cascades, Montana, southern California, and near the 4-Corners. The driest region was the Great Basin (Fig. 2c). Data from the NRCS SNOTEL sites shows that for the 2010 Water-Year that began on 1 October 2009, Arizona, southern New Mexico, central Montana, the Olympics (WA), and eastern Wyoming have the largest surpluses while much of northern Idaho, Upper Snake River, Northern Wasatch (UT), central Nevada, and southern Oregon have the greatest deficits. By this late period in the Water Year, significant changes to the overall percentages on week to week bases become very unusual (Fig. 2d).

WESTERN DROUGHT STATUS

West: With the shift in weather patterns, temperatures in the West were above normal for the week, increasing evapotranspiration. The downtown Los Angeles, California weather station set an all-time high temperature record on September 27 with a maximum of 113 degrees F (records go back to 1877). D0 was expanded in Wyoming where minimal precipitation occurred this week, to make the USDM depiction consistent with longer-term deficits. A small strip of Wyoming D0 spillage was pulled out of Montana to bring the USDM depiction in line with the Montana state drought assessment. USDA reports indicated that 31% of Idaho's topsoil was rated short or very short and 22% of the state's pastures and rangeland poor or very poor. The satellite hybrid VegDRI indicator revealed areas of vegetative stress which coincided with precipitation deficits on the Standardized Precipitation Index (SPI) maps, so a spot of D0 was added to southwest Idaho and D0 expanded from Wyoming across southeast Idaho and into more of northern Utah. USDA reports for Utah rated 50% of the topsoil short or very short, and

14% of the pastures and rangeland and 23% of the stock water supplies in poor or very poor condition. An oval of D1 was added to cover the worst impacts from Cache to Morgan counties as reflected in the USDA reports, VegDRI, and SPI. D0 expanded in eastern Nevada into adjacent Utah. The AH impact boundary over Oregon, California, and Nevada was contracted to encompass just the D1 and D2 areas. Author: Richard Heim, NOAA/NESDIS/NCDC.

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 (unavailable this week)
Soil moisture 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. 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.

RANGELAND CONDITIONS
The maps in Figure 6 show the general (inferred) soil conditions by state over the past one and four weeks.

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

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

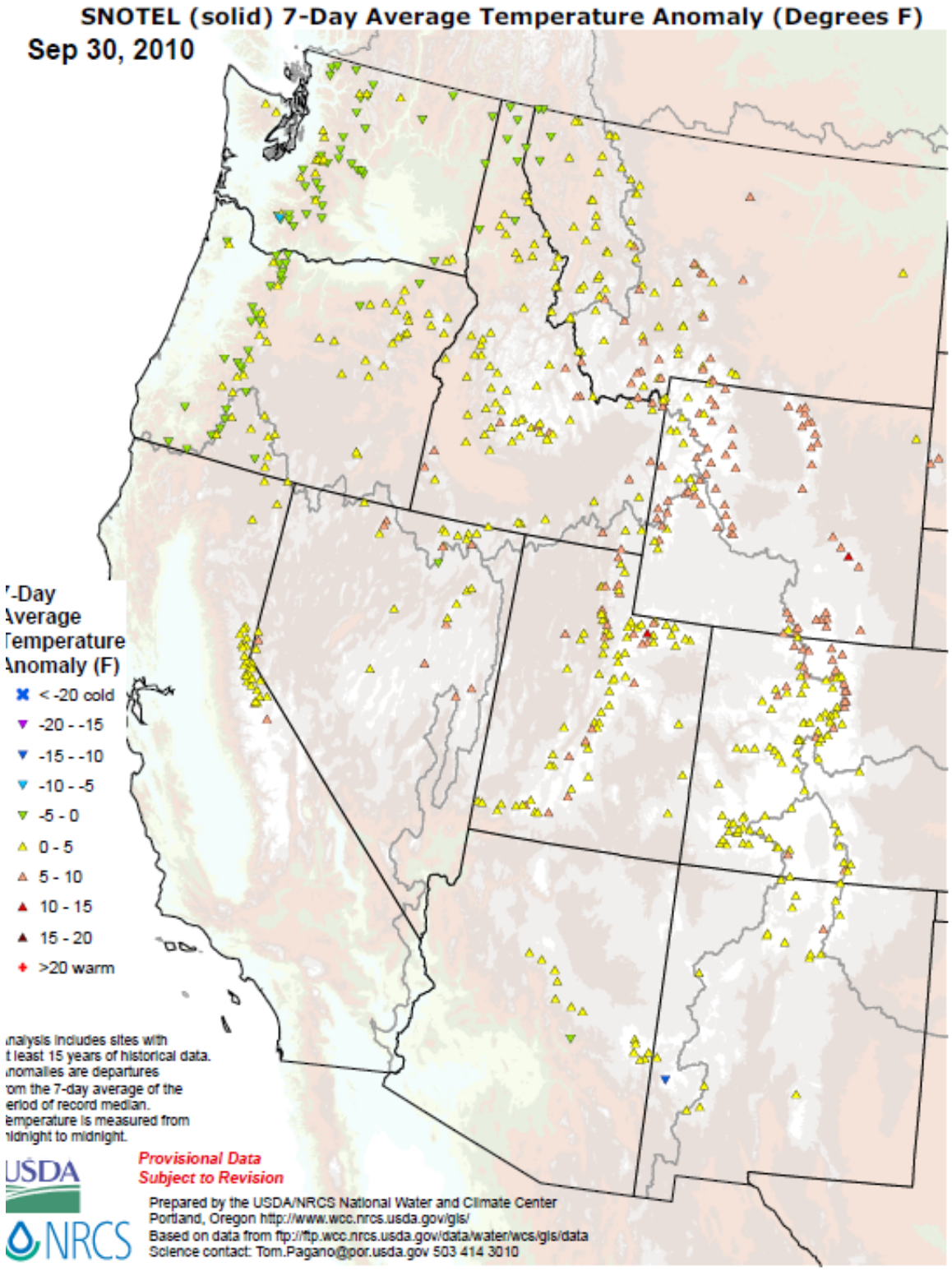


Fig. 1: SNOTEL 7-day average temperature departure from normal map shows temperatures coolest over the Cascades and warmest over the Central and parts of the Northern Rockies. Ref: http://www.wcc.nrcs.usda.gov/ftpref/data/water/wcs/gis/maps/WestwideTavg7dAnomaly.pdf

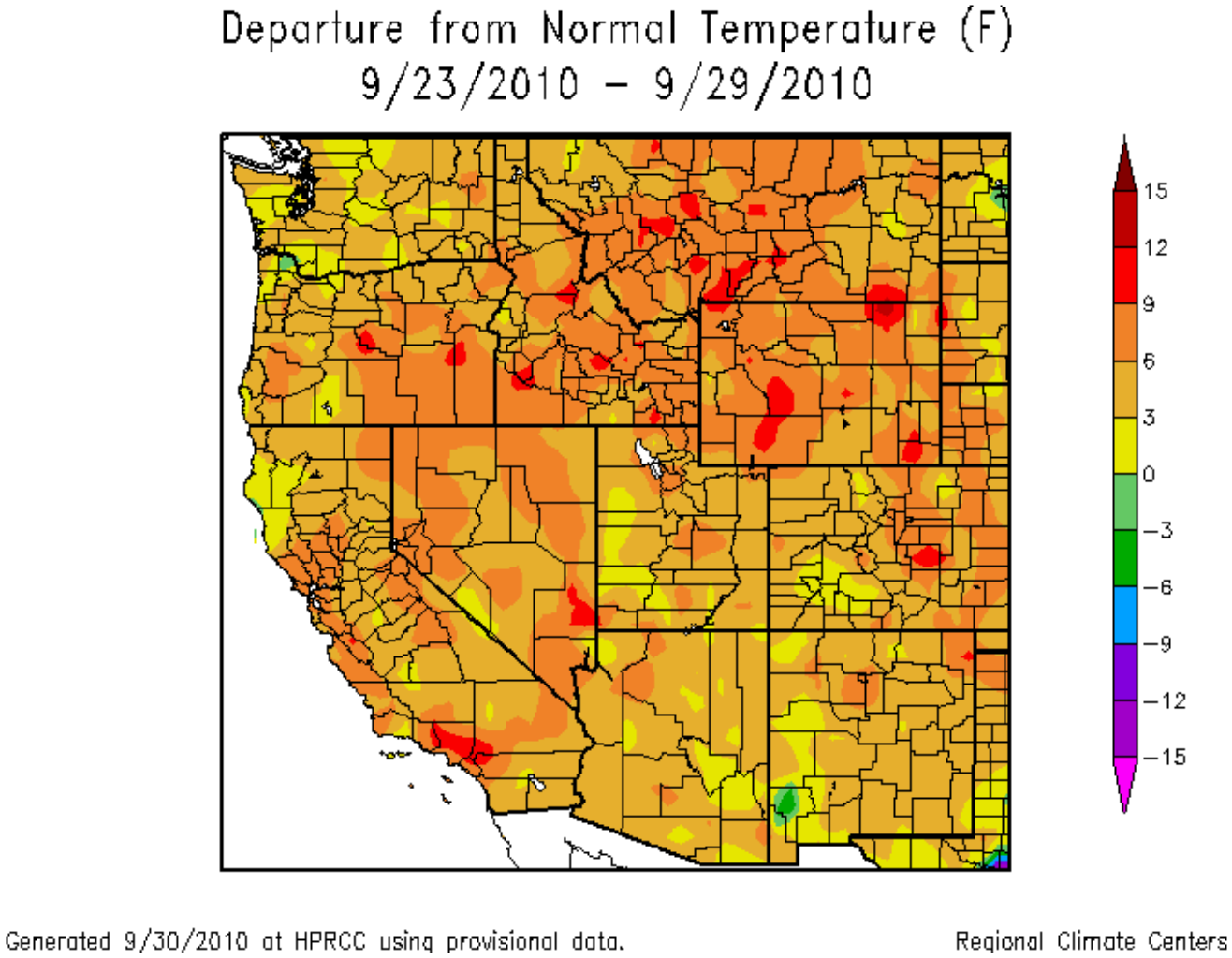


Fig. 1a: ACIS 7-day average temperature anomalies show that the greatest positive temperature departures were over parts of southern California and the Northern Rockies (>+12°F) and the greatest negative departures occurred over southwest New Mexico (<-3°F).

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

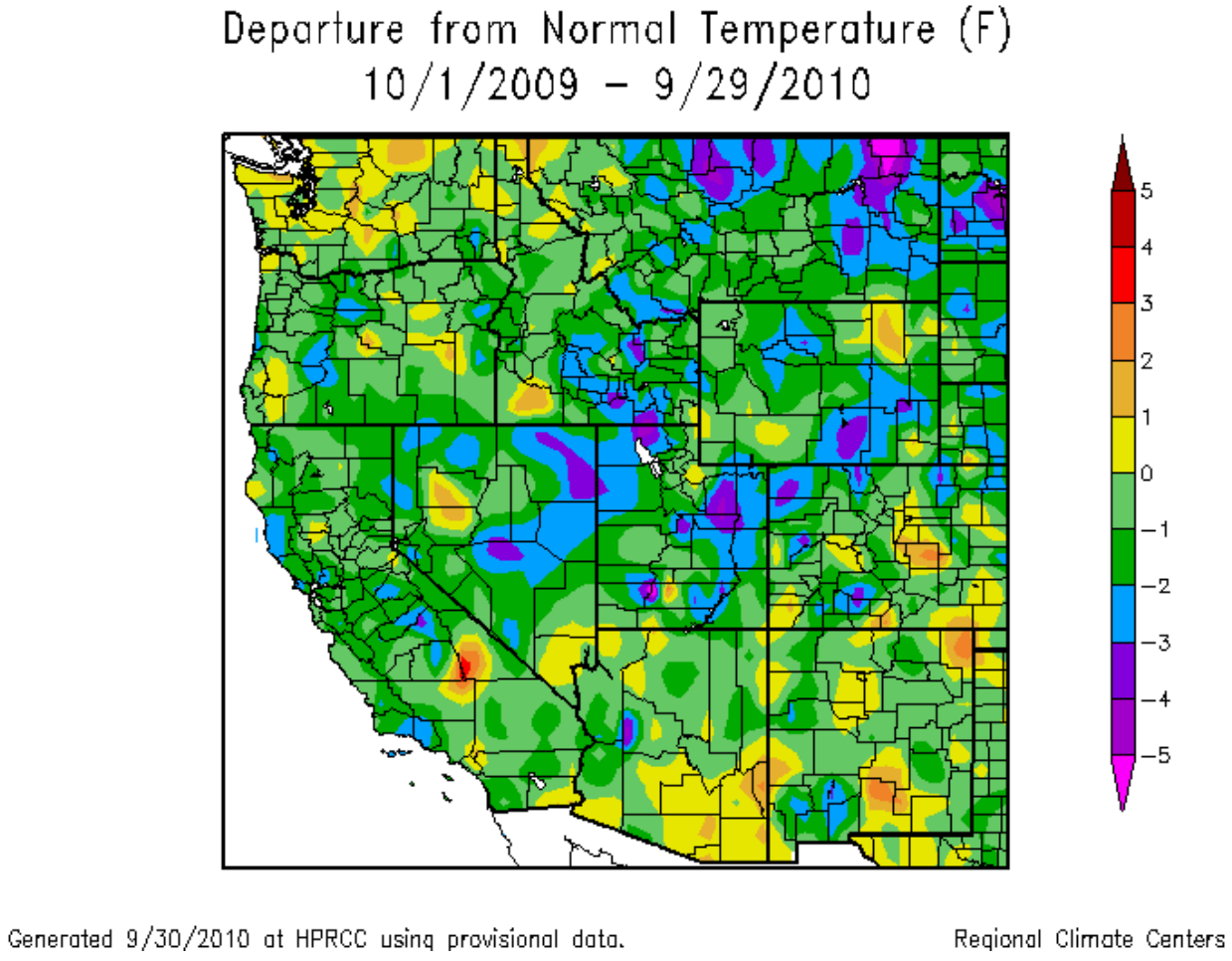
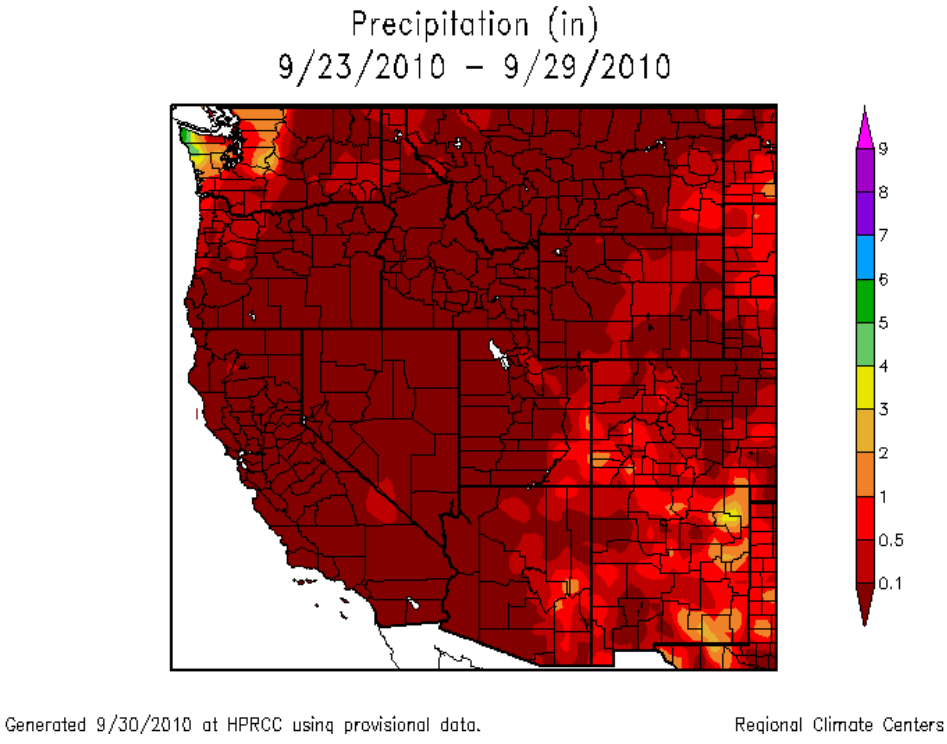


Fig. 1b: For the 2010 Water-Year, the West experienced mostly below average temperatures. The greatest positive temperature departures were over parts of Southwest and northernmost portions of the Pacific Northwest (>+2°F) and the greatest negative departures occurred over the Great Basin and northern Montana (<-3°F).



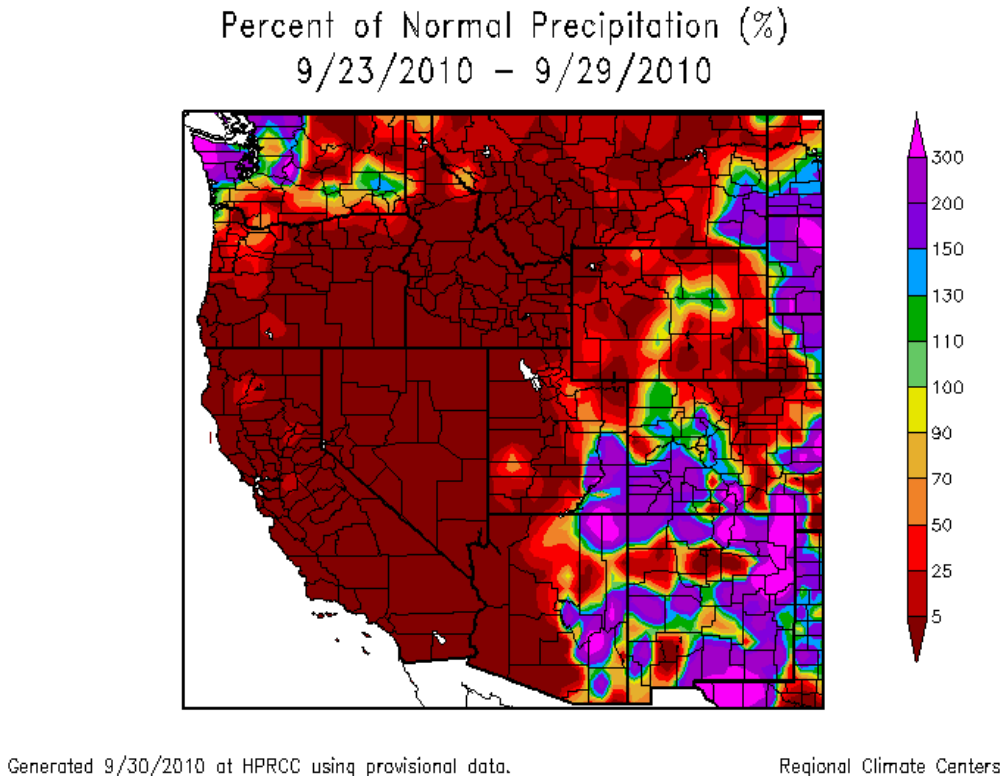
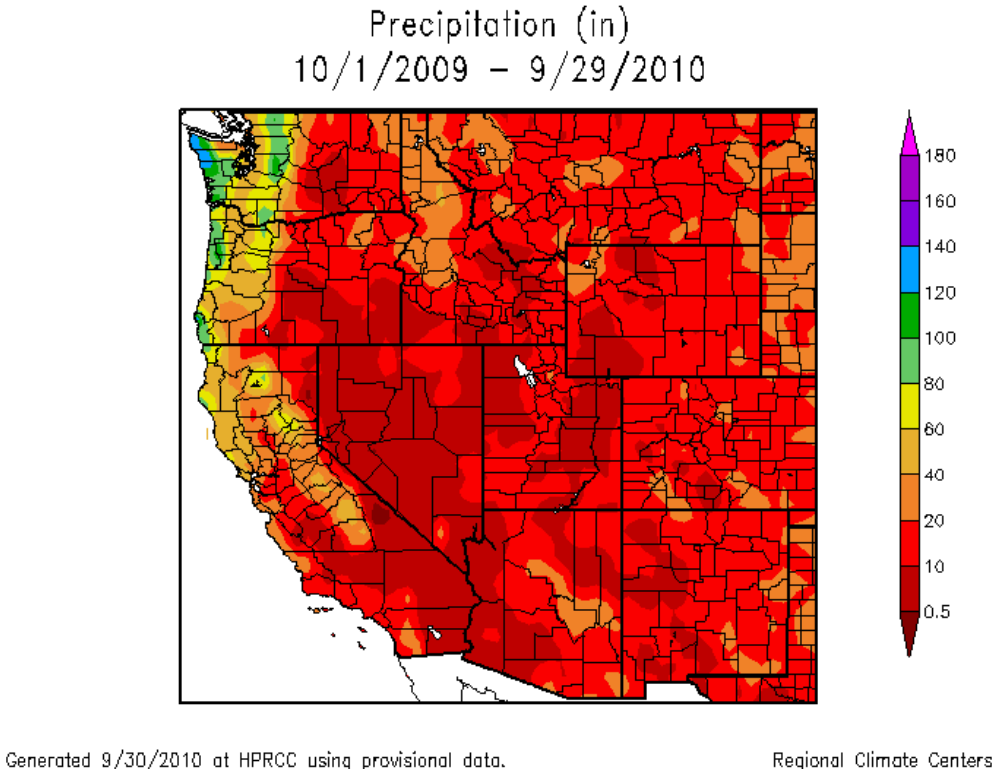


Fig. 2 and 2a: ACIS 7-day average precipitation amounts for the period ending 29 September shows the heaviest precipitation confined to the extreme corner of the Pacific Northwest (Fig. 2). In terms of percent of normal, unusually heavy precipitation for this time of year fell over the regions of the Pacific Northwest and from New Mexico to the High Plain over Montana (Fig. 2a). Ref: http://www.hprcc.unl.edu/maps/current/



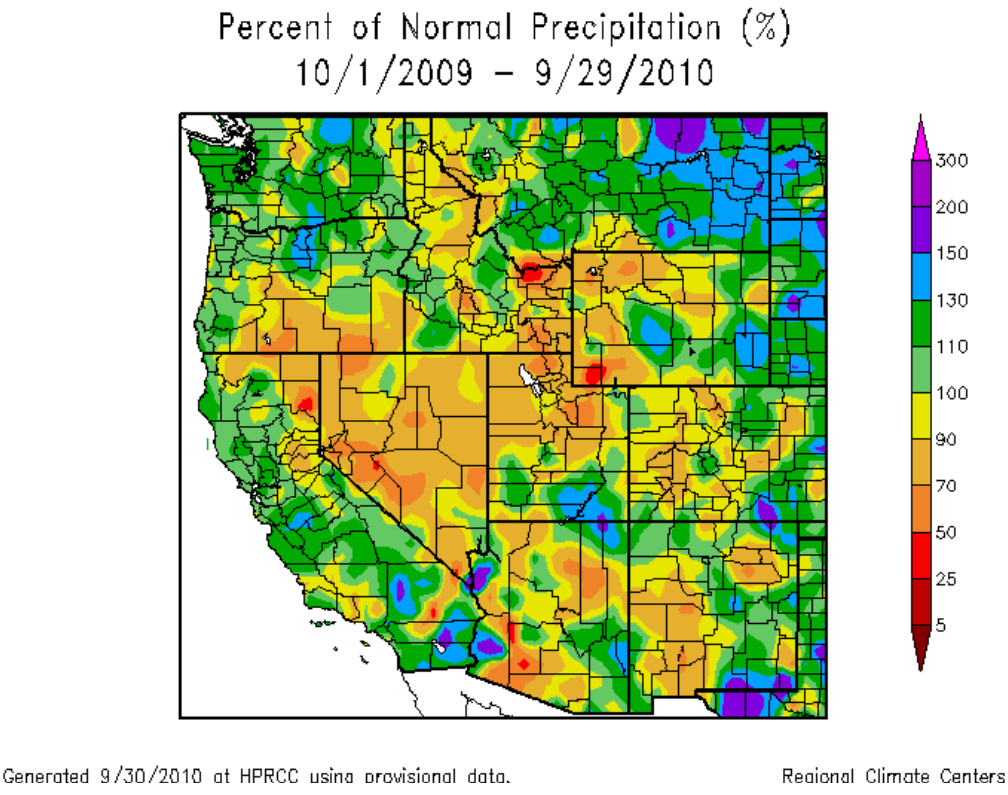


Fig. 2b and 2c: For the 2010 Water-Year, the heaviest precipitation occurred over the typically wet Pacific Northwest. In terms of percent of normal, the heaviest precipitation fell over parts of the Northern Cascades, Montana, southern California, and near the 4-Corners. Driest region was the Great Basin. Ref: http://www.hprcc.unl.edu/maps/current/

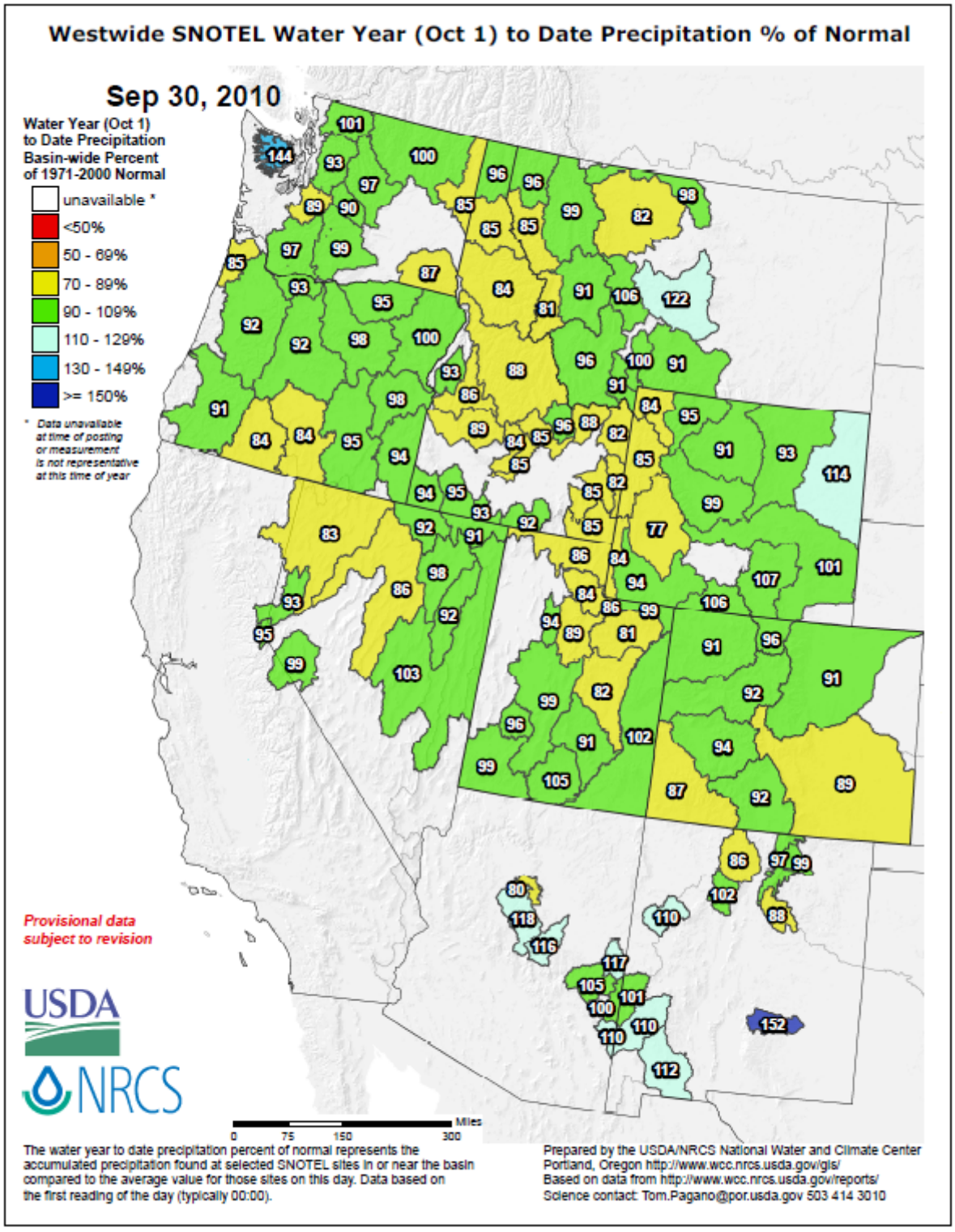


Fig 2d: For the 2010 Water-Year that began on 1 October 2009, Arizona, southern New Mexico, central Montana, the Olympics (WA), and eastern Wyoming have the largest surpluses while much of northern Idaho, Upper Snake River, Northern Wasatch (UT), central Nevada, and southern Oregon have the greatest deficits. By this late period in the Water Year, significant changes to the overall percentages on week to week bases become very unusual. This is the final map for the 2010 Water-Year.

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

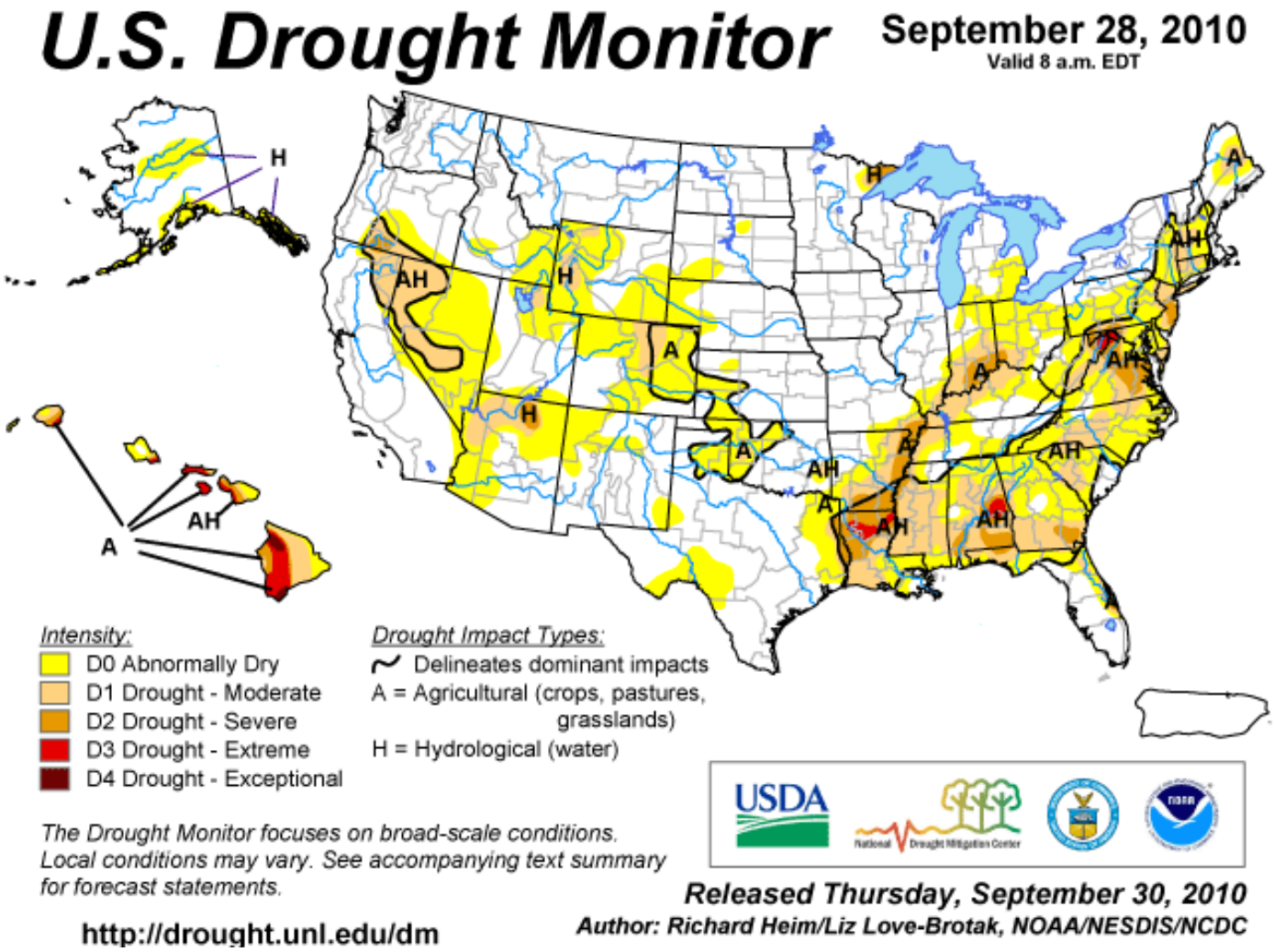


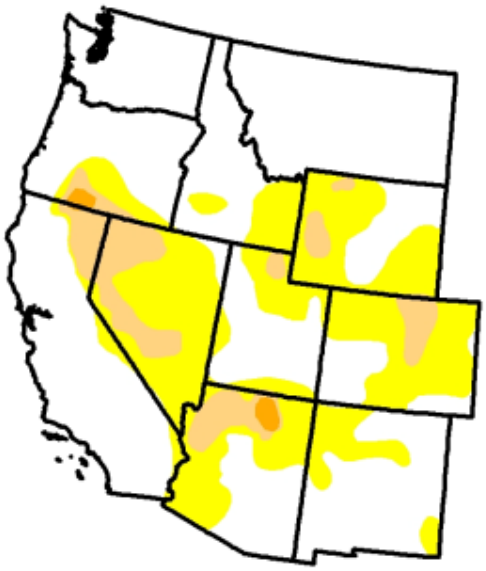
Fig. 3: Current Drought Monitor weekly summary. Hawaii is only state that has a D4 drought level. The D3 levels dominate northern Louisiana, southeast Alabama, and the Washington DC area. Ref: http://www.drought.unl.edu/dm/monitor.html

U.S. Drought Monitor
West

September 28, 2010
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	62.5	37.5	8.1	0.6	0.0	0.0
Last Week (09/21/2010 map)	69.9	30.1	6.9	0.6	0.0	0.0
3 Months Ago (07/06/2010 map)	71.3	28.7	8.4	0.6	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 (09/29/2009 map)	40.7	59.3	22.8	7.5	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

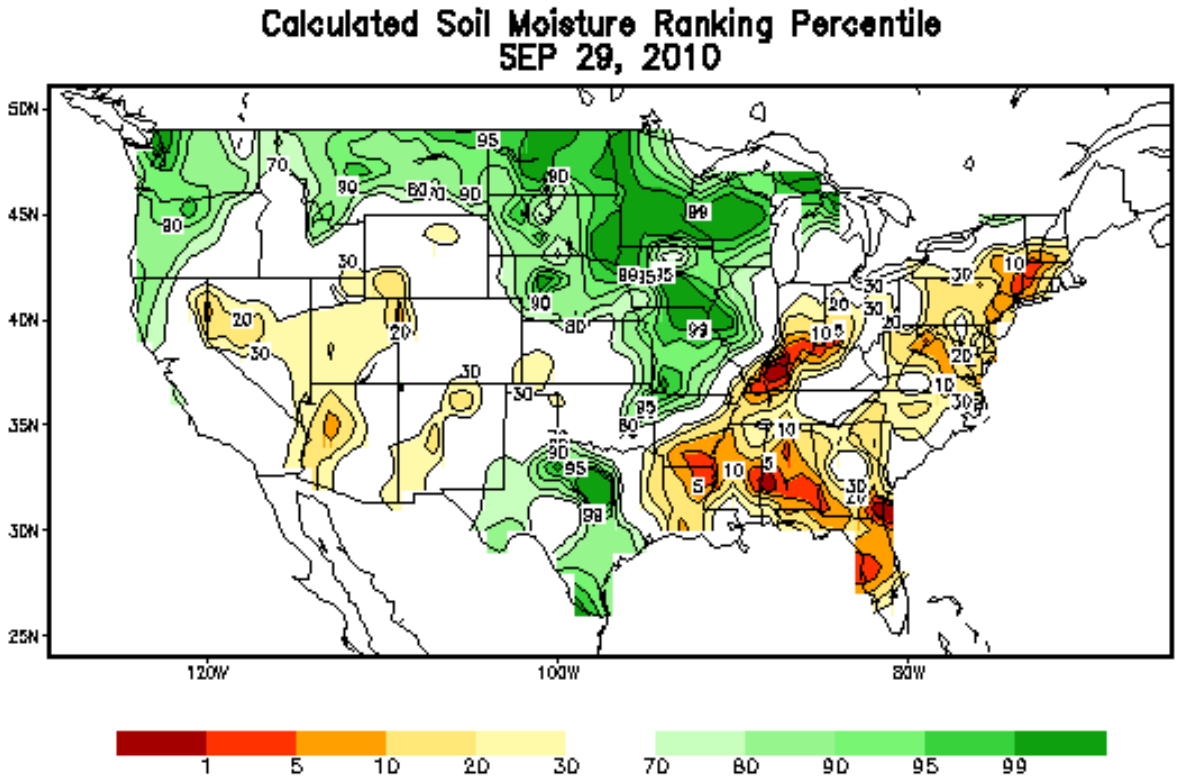
http://drought.unl.edu/dm

USDA National Drought Mitigation Center

Released Thursday, September 30, 2010
Author: R. Heim/L. Lov-Brotak, NCDC/NOAA

Fig. 3a: **Drought Monitor for the Western States with statistics over various time periods. Regionally there was some deterioration; mostly in the D0 category this week.**

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



Figs. 4: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 29 September. Excessive dryness dominates over the eastern third of the nation. Wet soils are scattered across much of the Northern Tier States of the West and Upper Mississippi River Valley. *Note: The University of Washington graphs normally used in this spot are unavailable this week.*

Ref: http://www.cpc.ncep.noaa.gov/products/Soilmst_Monitoring/Figures/daily/curr.w.rank.daily.gif

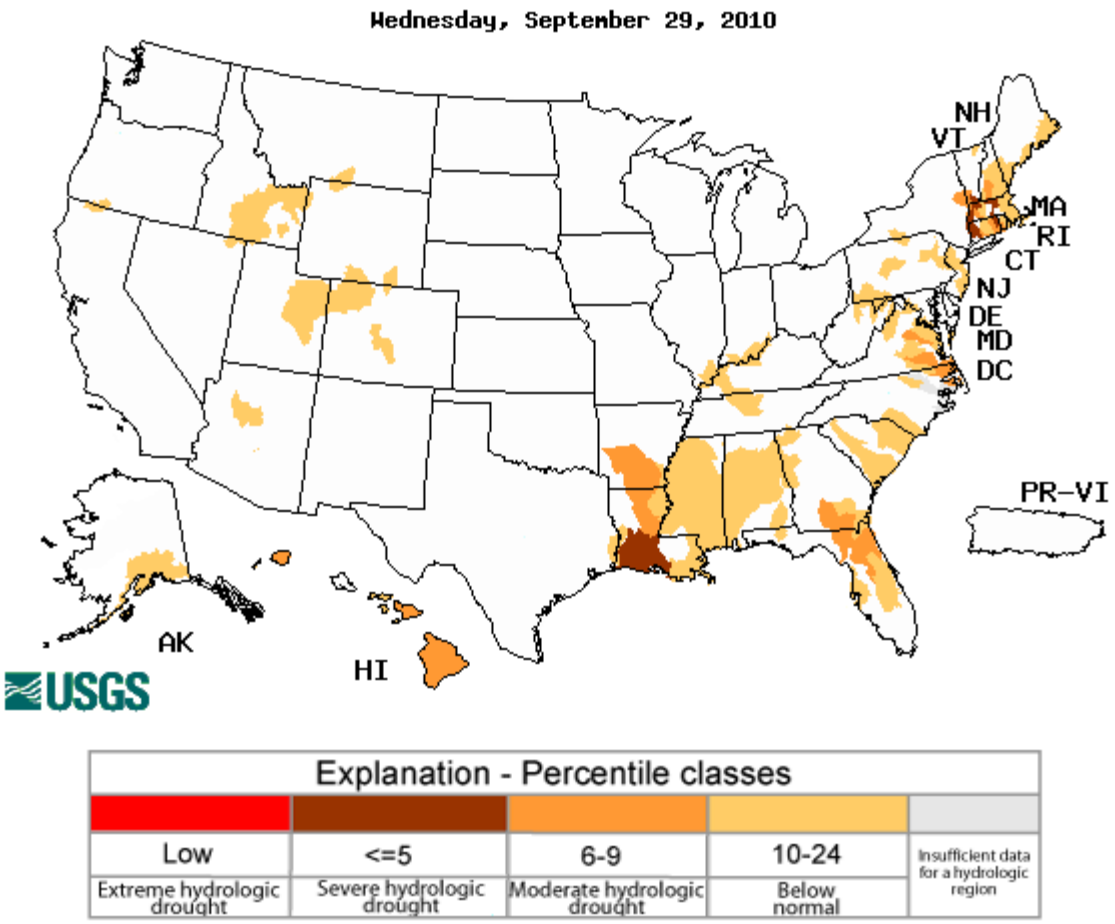


Fig. 5: Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Dryness over the East Coast States has decreased since last week although parts of New England have severe low flow conditions. The Gulf Coast areas from Louisiana eastward to Florida have the largest stream flow deficits in the U.S. this week. Ref: http://waterwatch.usgs.gov/?m=dryw&r

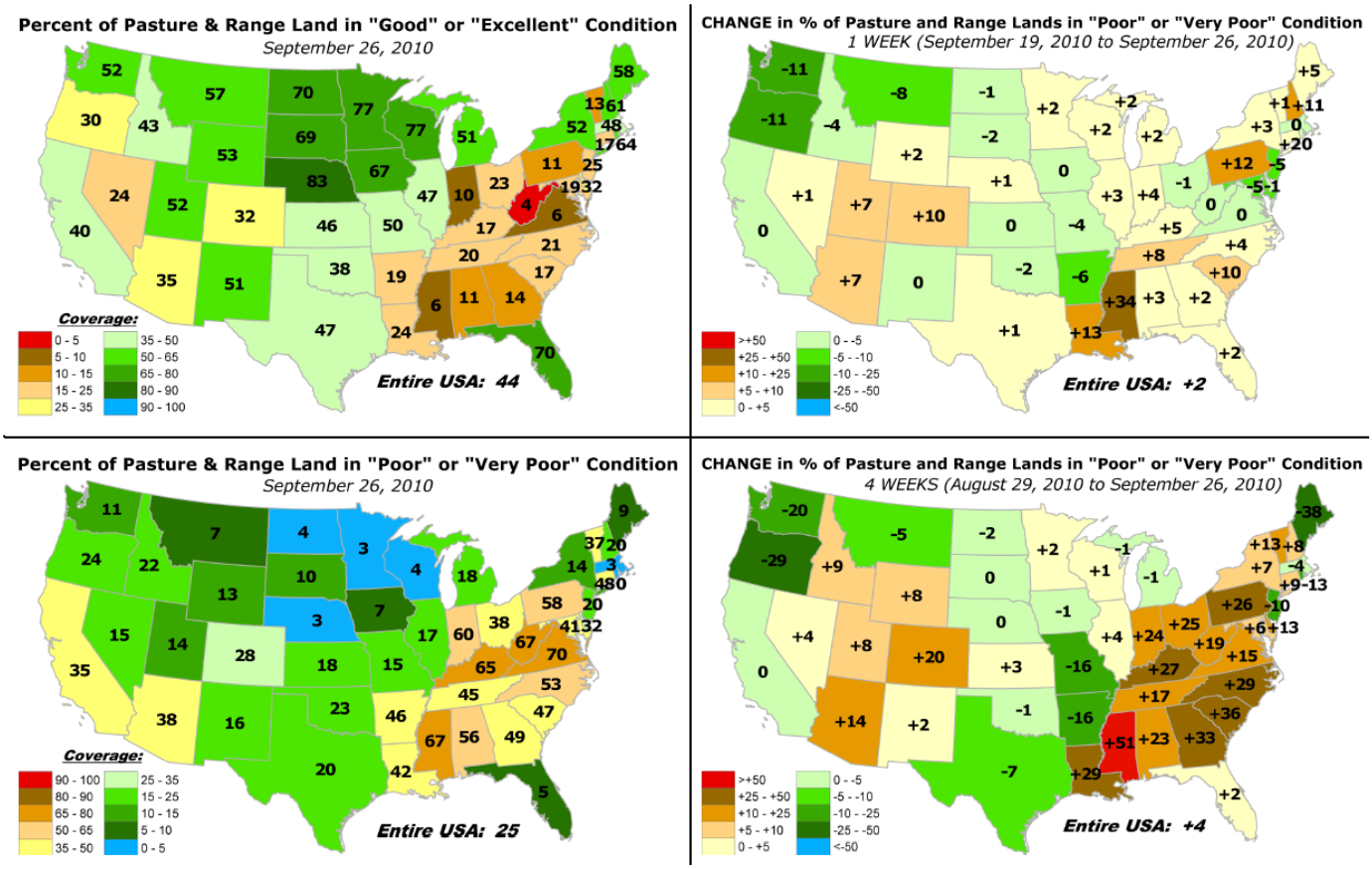


Fig. 6: These maps show the overall pasture and rangeland conditions by state. Note that Nevada has the least amount of good or excellent condition (upper left panel) in the West and during the previous week (upper right panel), Colorado had the highest percentage of poor conditions; conditions improved the most in Washington and Oregon.

Ref: http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/pasture-range-statewide-conditions.pdf

National Drought Summary -- September 28, 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 first half of this U.S. Drought Monitor (USDM) week, the Bermuda High dominated the weather across the southern tier states while tropical moisture moved across the Southwest and became entrained in the westerly flow across the Midwest to Great Lakes. A shift in the weather pattern occurred later in the week with the passage of a vigorous cold front into the South and East, followed by a large, slow-moving upper-level low pressure system. The front and upper low tapped Gulf of Mexico moisture to bring widespread beneficial rains to the drought areas of the South and East. While beneficial, the rains were not enough to erase long-term precipitation deficits in most areas. The Far West and intermountain basin saw little if any precipitation. Agricultural impacts have been mixed. Crop harvesting is ahead of schedule in many areas because of the drought, but the dry ground is inhibiting planting of fall and winter crops and stressing crops still in the ground. September 26 U.S. Department of Agriculture (USDA) reports revealed a huge area of parched soils, with 70% or more of the topsoil rated "short or very short" of moisture (dry to very dry) from Mississippi to Indiana and from Georgia to Pennsylvania. Nearly 90% of the topsoil was short or very short in Alabama, Kentucky, West Virginia, Maryland, Virginia, and Connecticut.

East and South: Widespread 2 to 4-inch rains fell across much of the South and East from Alabama to Maryland, with 1 to 2-inch rains over most of the Northeast, but this was not sufficient to erase deficits which have built up over several months. For example, in spite of the week's rain, September month-to-date precipitation totals were still below normal across most of the Northeast, resulting in no change to the USDM depiction. River levels spiked upward temporarily with the rain, but long-term hydrological conditions remained depressed.

Bands of 4 to 8 inches of rain, or more, fell across parts of Georgia, Florida, the Carolinas, and extreme southeast Virginia. Wilmington, North Carolina, reported a record 10.33 inches of rain on September 27 (but the drought has been so severe there that the station still had a precipitation deficit for the year-to-date and March-to-date). These heavy rains resulted in significant improvement in some areas. Long-term moisture conditions were brought to near normal under the heaviest rains, so drought conditions were eliminated (changed to "D-nothing") in west-central Alabama, central Georgia, the northern coastal plain of South Carolina, the southern coastal plain of North Carolina, and the adjacent piedmont area of North Carolina and Virginia. One-category improvements were made to parts of the D1 and D2 areas from Alabama to Virginia.

Other parts of the South received considerably less rain. Scattered 1-inch showers dotted the Lower Mississippi Valley, but rainfall amounts were generally half an inch or less. Severe agricultural impacts continued in many areas. According to USDA reports, from September 19 to 26, the percent of pasture and rangeland in poor or very poor condition increased from 29% to 42% in Louisiana, from 37% to 45% in Tennessee, and from 33% to 67% in Mississippi. D0

expanded across Tennessee and D1 ballooned across most of Mississippi. D0-D1-D2 were expanded in southwest Arkansas to reflect severe impacts, including the complete lack of pasture lands available for grazing, dried up ponds and lakes, and 100+ year old oak trees shedding leaves and dying. D0-D1-D2 also expanded in northeast Arkansas into adjacent western Tennessee, and in southern Louisiana. Southeast Georgia missed out on the rain as well, so D1 expanded to the coast and an oval of D2 was added.

Ohio Valley and Great Lakes: Heavy rains (4-8 inches or more) deluged the Upper Mississippi Valley and northern Great Lakes, while 1 to 2-inch rains fell across the southern Great Lakes, northern portions of the Ohio Valley, and parts of the central Appalachians. Southern portions of the Ohio Valley received half an inch or less of rain, which did little to alleviate long-term deficits and agricultural impacts. Short-term and long-term deficits were eliminated over Michigan's Upper Peninsula and the northern edge of the Lower Peninsula, so the D0 there was deleted, but beneficial rains mostly missed the drought area on the Minnesota Arrowhead. The western edge of the Arrowhead D0 was trimmed back, but the D1-D2 was left untouched.

September 26 USDA reports rated 60% or more of the pasture and rangeland in poor or very poor condition in Indiana (60%), Kentucky (65%), and West Virginia (67%). D0 expanded into northern Indiana and southern Michigan and D1 grew in Indiana, but rains were sufficient in central Ohio to dent the D0 and D1 there. D0 expanded to cover most of West Virginia and D1 advanced south along the Appalachians to better represent the long-term moisture deficits in the state and agricultural impacts. In West Virginia, 57% of the corn crop, 75% of the soybeans, and 85% of the apple crop were rated poor to very poor. D0 extended into the dry areas of Kentucky and adjacent southwest Virginia.

Great Plains and West: Beneficial half-inch-plus rainfall in the northern and central Plains shrank the D0 and eliminated the D1 in north central South Dakota and trimmed the D0 in western Nebraska. In the southern Plains, the edges of D0 in southwestern Texas, the Texas panhandle, and east Texas were adjusted, with minor expansion in some parts and trimming in others. The oval of D1 in northeast Texas was eliminated and D1 dented in east Texas. An oval of D0 was added to southeast New Mexico and adjacent Texas. The D0 in eastern Oklahoma and along the Missouri-Arkansas border was contracted.

The rains mostly missed southwest Kansas, so D0 was extended across this area where long-term moisture deficits were greatest. This resulted in a joining of the western Oklahoma D0A with an expanded Colorado High Plains D0. D1 was added to northern Colorado, along the Rockies and adjacent foothills, with a little spillage of D1 into southeast Wyoming, where precipitation deficits were consistent at several time scales. In Wyoming, conditions were dry with 54% of the topsoil rated short or very short, but impacts were minimal and this is early in the historically-dry fall season for much of the state. Seventy-one percent of the topsoil in Colorado was rated short or very short, and the dryness in eastern Colorado was affecting fall and winter crop planting decisions, so an A impact designation enclosed the D0/D1 from western Oklahoma, across southwest Kansas, up to (but not into) the Colorado Rockies.

With the shift in weather patterns, temperatures in the West were above normal for the week, increasing evapotranspiration. The downtown Los Angeles, California weather station set an all-time high temperature record on September 27 with a maximum of 113 degrees F (records go back to 1877). D0 was expanded in Wyoming where minimal precipitation occurred this week, to make the USDM depiction consistent with longer-term deficits. A small strip of

Wyoming D0 spillage was pulled out of Montana to bring the USDM depiction in line with the Montana state drought assessment. USDA reports indicated that 31% of Idaho's topsoil was rated short or very short and 22% of the state's pastures and rangeland poor or very poor. The satellite hybrid VegDRI indicator revealed areas of vegetative stress which coincided with precipitation deficits on the Standardized Precipitation Index (SPI) maps, so a spot of D0 was added to southwest Idaho and D0 expanded from Wyoming across southeast Idaho and into more of northern Utah. USDA reports for Utah rated 50% of the topsoil short or very short, and 14% of the pastures and rangeland and 23% of the stock water supplies in poor or very poor condition. An oval of D1 was added to cover the worst impacts from Cache to Morgan counties as reflected in the USDA reports, VegDRI, and SPI. D0 expanded in eastern Nevada into adjacent Utah. The AH impact boundary over Oregon, California, and Nevada was contracted to encompass just the D1 and D2 areas.

Hawaii, Alaska, and Puerto Rico: It was another drier-than-normal week across most of the Hawaiian Islands. Local reports indicated that lower elevation pastures in east Kauai were in the worst condition in many years, so D3 was expanded to the northeast on the island. In Alaska, most stations were below-normal for the week, with long-term deficits accumulating across the Anchorage to Kodiak Island area, which prompted the addition of D0 there. The southern half of Puerto Rico was drier than normal, but longer-term precipitation was near- to wetter than normal, so the island remained drought-free.

Looking Ahead: Early in the September 29-October 4 period, moisture from the remnants of Tropical Storm Nicole will become entrained in the circulation and move up the east coast, with an inch or more of rain expected from the coastal Carolinas to New England by October 4. Some areas could receive several inches of rain in total. An upper-level ridge will dominate the West, with warmer and drier than normal weather, while a cold upper trough holds sway over the eastern United States. This pattern continues for October 5-13, with dry weather progged for most of the country, including Alaska. Temperatures are expected to be warmer than normal for much of the West to the Great Lakes and Alaska, and cooler than normal for the Southeast.

Author: Richard Heim, NOAA/NESDIS/NCDC

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 September 29, 2010