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

—

Weekly Report - Snowpack / Drought Monitor Update Date: 01 October 2009

SNOTEL SNOWPACK AND PRECIPITATION SUMMARY

Temperature: SNOTEL and ACIS-day station average weekly temperature anomalies were very warm over the Interior West and below normal over the Cascades and Central to Southern High Plains (Fig. 1). ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over the northeastern California and central Idaho (>+10F) and the greatest negative departures occurred over northeastern New Mexico (<-6F) (Fig. 1a). For the 2009 Water Year that ended yesterday, average temperatures were generally below average over the Northern Tier States of the West and above average over much of interior California, Arizona, and New Mexico.

Precipitation: ACIS 7-day average precipitation amounts for the period ending 30 September shows a mostly dry West with the exception of some precipitation over western Oregon and over northeast Nevada to Montana (Fig 2 and 2a). For the 2009 Water Year, based on ACIS weather stations, much of the West Coast, Southwest, and Northern Tier States had below average precipitation while the Interior West from northern Nevada to the Northern and Central High Plains had above average conditions (Fig 2b). SNOTEL precipitation (rain & snow water equivalent) as a percent of normal shows surplus values over southern Idaho, eastern Nevada, and northeast Wyoming with deficits over the northernmost Tier States, southwest New Mexico, and northwest Oregon and mostly support the ACIS data (Fig. 2c).

WESTERN DROUGHT STATUS

The West: Until a weak frontal system brought light precipitation (0.1 to 0.3 inches, locally to 0.7 near Quillayute, WA) to the Pacific Northwest on the last day of the period, high pressure had kept nearly the entire West bone dry and warm. September is typically dry for the Southwest, but farther north, precipitation normally starts to increase in the early fall, with a rapid onset to the wet season during October and continuing into the winter months in the Northwest. This September, precipitation had been close to or slightly above-normal for northwestern Oregon and western Washington, but relatively dry elsewhere. As a result, 30-day shortages (0.5 to 2 inches) have accumulated across northern California, eastern Washington, and most of Oregon, Idaho, and Montana. The dryness has also increased the fire danger classification to high and very high across this region, with several new large wildfires reported on Sep. 29 in western Montana, south-central Oregon, and northwestern Wyoming. With the sluggish start to the fall precipitation and unseasonable warmth, abnormal dryness was expanded to include most of Oregon, eastern Washington, northern Idaho, and western Montana. Author: David Miskus, JAWF/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, 3a, and 3b).

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/.

OBSERVED FIRE DANGER CLASS

The adjective class rating is a method of normalizing rating classes across different fuel models, indexes, and station locations. It is based on the primary fuel model cataloged for the station, the fire danger index selected to reflect staffing levels, and climatological class breakpoints. This information is provided by local station managers. About 90% use the Burning Index (BI); others use Energy Release Component (ERC). Staffing class breakpoints are set by local managers from historical fire weather climatology (Figs. 5).

Only reporting station locations are indicated with a marker on the maps. Values between stations are estimated with an inverse distance-squared technique on a 10-km grid. This works pretty well in areas of relatively high station density, but has obvious shortcomings in other areas.

VEGETATION STRESS (Figure 6)

(http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php)

Image Interpretation: The images are color-coded maps of vegetation condition (health) estimated by the Vegetation and Temperature Condition Index (VT). The VT is a numerical index, which changes from 0 to 100 characterizing change in vegetation conditions from extremely poor (0) to excellent (100). Fair conditions are coded by green color (50), which changes to brown and red when conditions deteriorate and to blue when they improve. The VT reflects indirectly a combination of chlorophyll and moisture content in the vegetation and also changes in thermal conditions at the surface. This new approach combines the visible, near infrared and thermal radiances in a numerical index characterizing vegetation health. This approach is extremely useful in detecting and monitoring such complex and difficult-to-identify phenomenon as drought. The VT values below 35 are used for identifying vegetation stress which is an indirect drought indicator. The VT is very useful for early drought detection, assessing drought area coverage, duration, and intensity, and for monitoring drought impacts on vegetation and agricultural crops.

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.

PASTURE AND RANGELAND CONDITIONS (Figure 8)

This product is produced and compiled by the NOAA's Climate Prediction Center: http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/pasture-range-statewide-conditions.pdf.

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/ NOLLER HERBERT
Director, Conservation Engineering Division

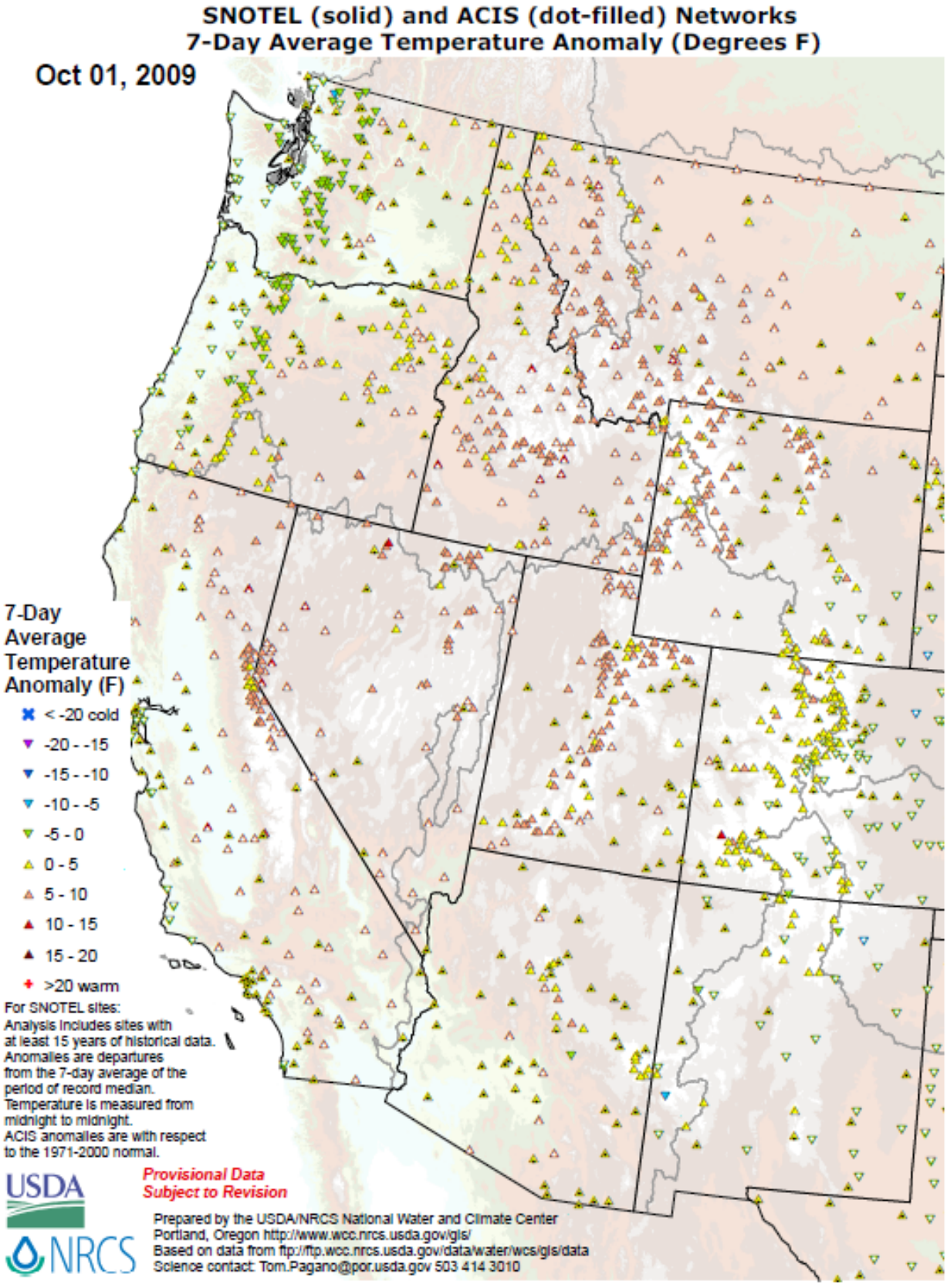


Fig. 1. SNOTEL and ACIS-day station average weekly temperature anomalies were very warm over the Interior West and below normal over the Cascades and Central to Southern High Plains. ftp://ftp.wcc.nrcs.usda.gov/data/water/wcs/gis/maps/WestwideTavg7dAnomalyAcis.pdf.

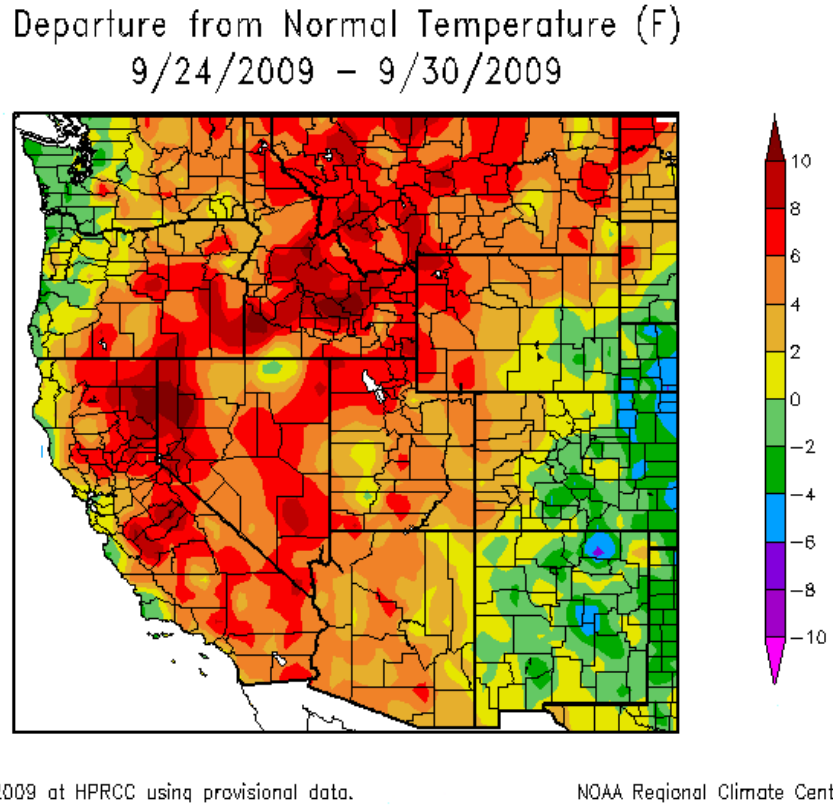
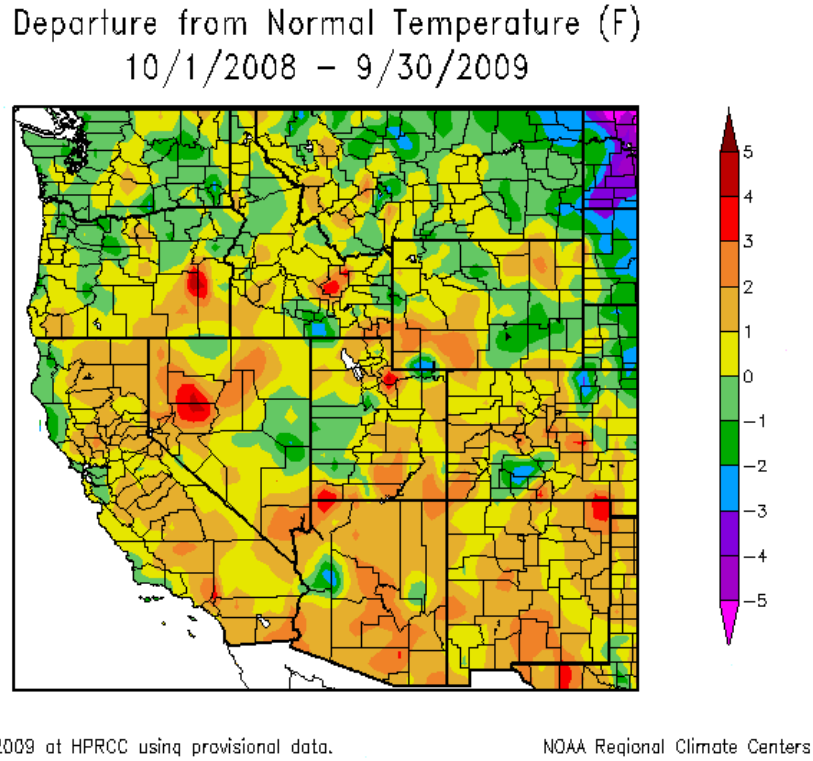


Fig. 1a. ACIS 7-day average temperature anomalies show that the greatest positive temperature departures occurred over the northeastern California and central Idaho (>+10F) and the greatest negative departures occurred over northeastern New Mexico (<-6F).
The figure below shows the temperature departure for the 2009 Water-Year that ended yesterday.
Ref: http://www.hprcc.unl.edu/maps/current/index.php?action=update_product&product=TDept.



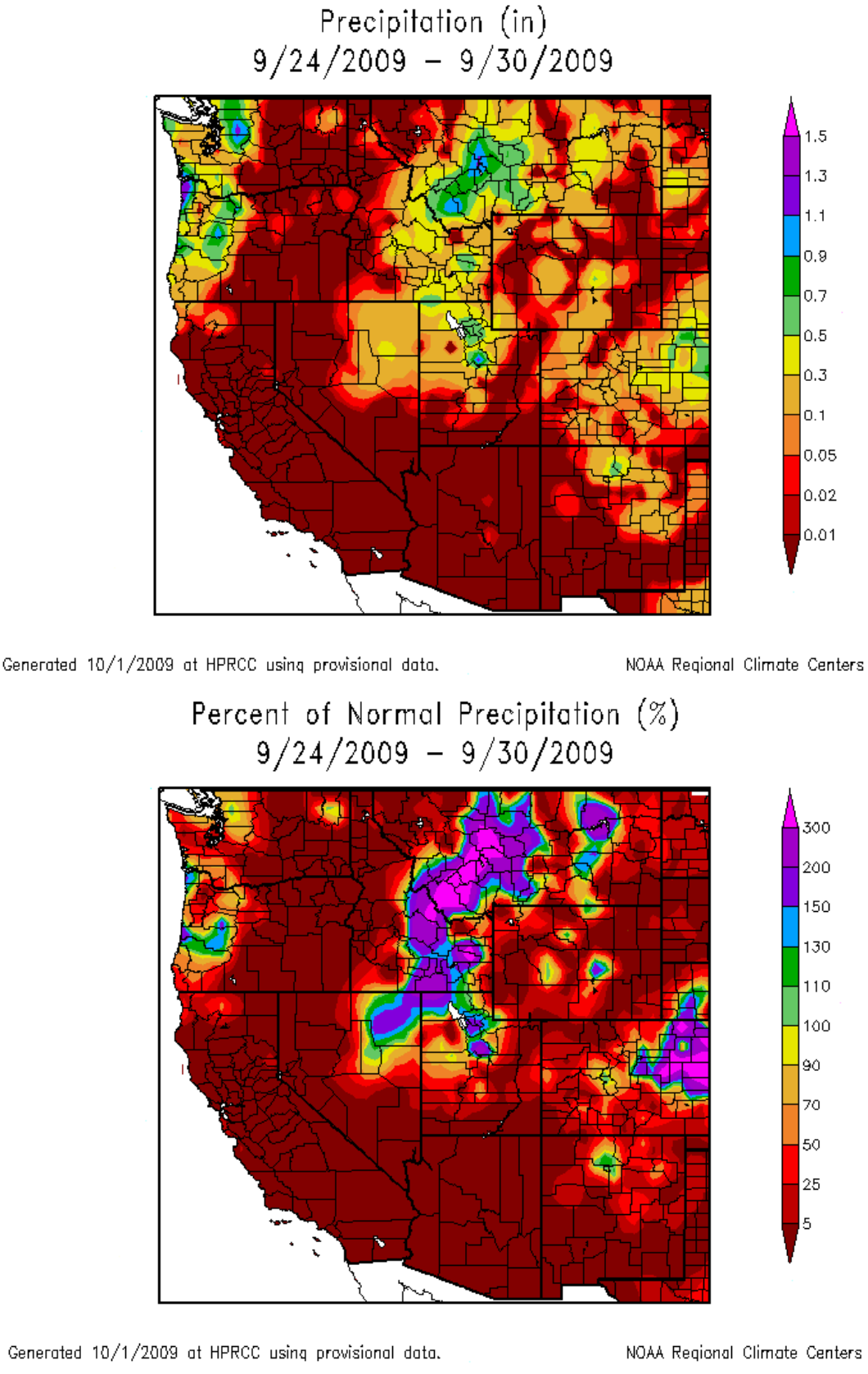


Fig. 2. and 2a. ACIS 7-day average precipitation amounts for the period ending 30 September shows a mostly dry West with the exception of some precipitation over western Oregon and over northeast Nevada to Montana. Ref: http://www.hprcc.unl.edu/maps/current/.

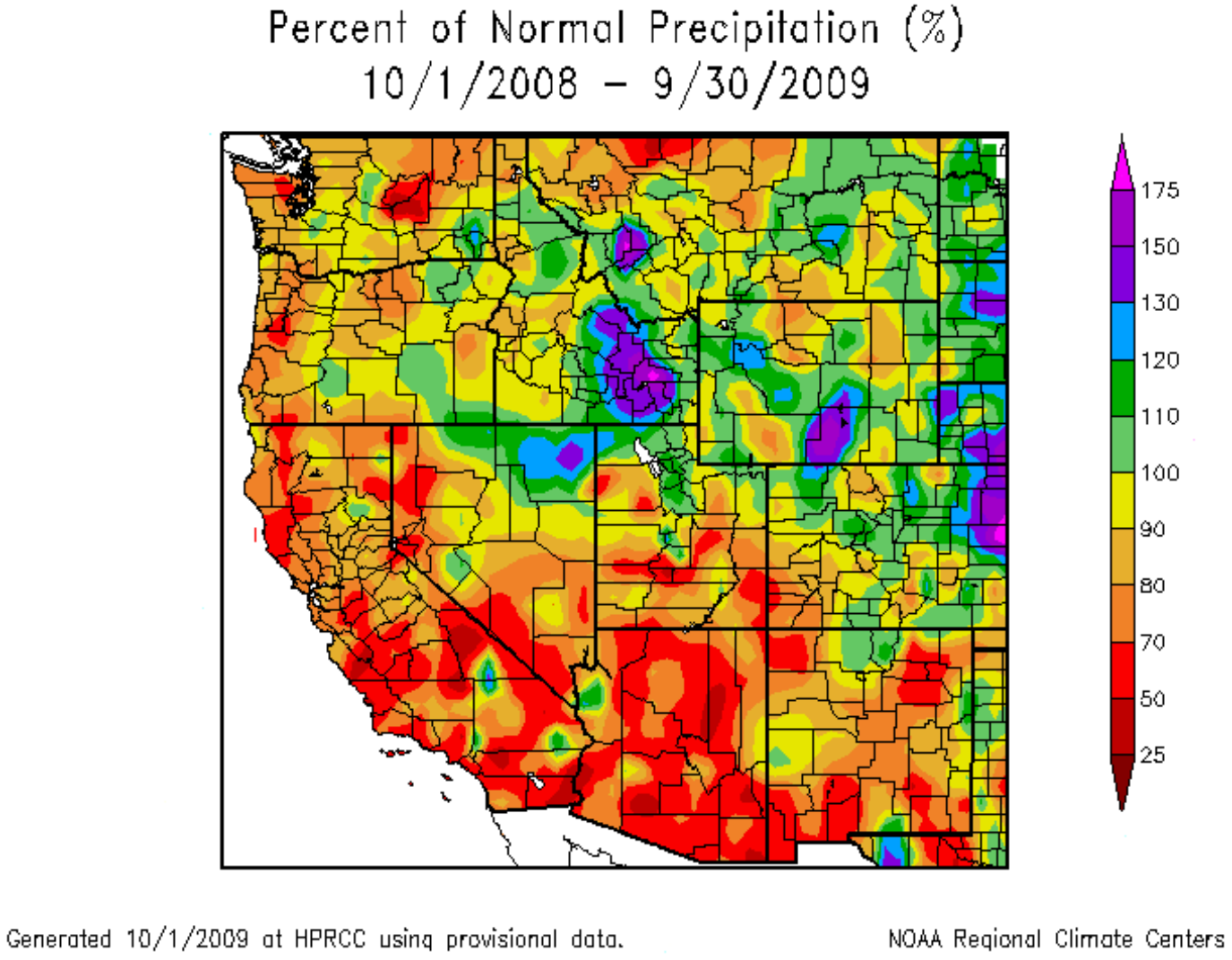


Fig. 2b. For the 2009 Water Year, much of the West Coast, Southwest, and Northern Tier States had below average precipitation while the Interior West from northern Nevada to the Northern and Central High Plains had above average conditions.

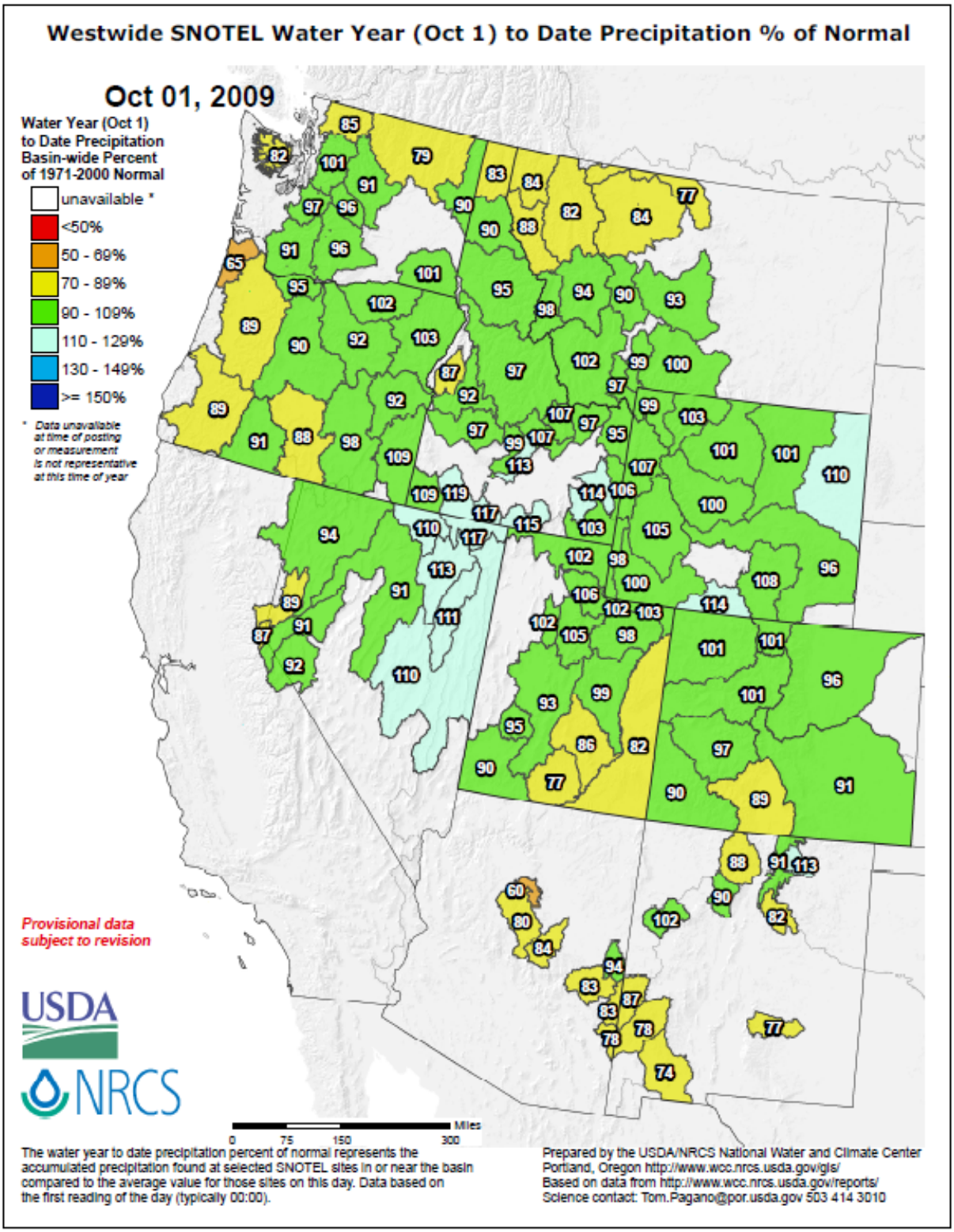


Fig 2c. As we close on the 2009 Water Year, precipitation (rain & snow water equivalent) as a percent of normal shows surplus values over southern Idaho and eastern Nevada with deficits over the northernmost Tier States, southwest New Mexico, and northwest Oregon.

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

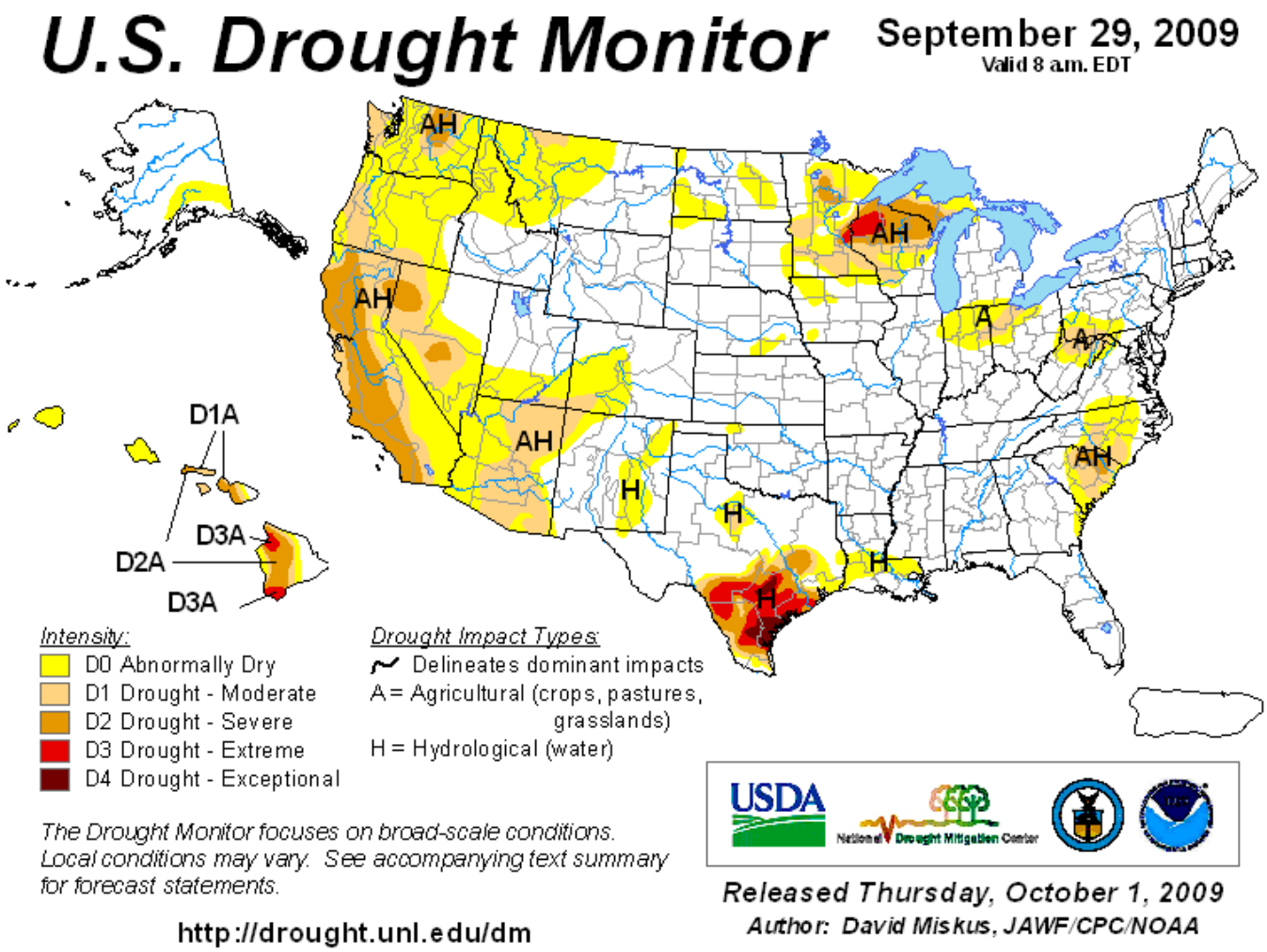


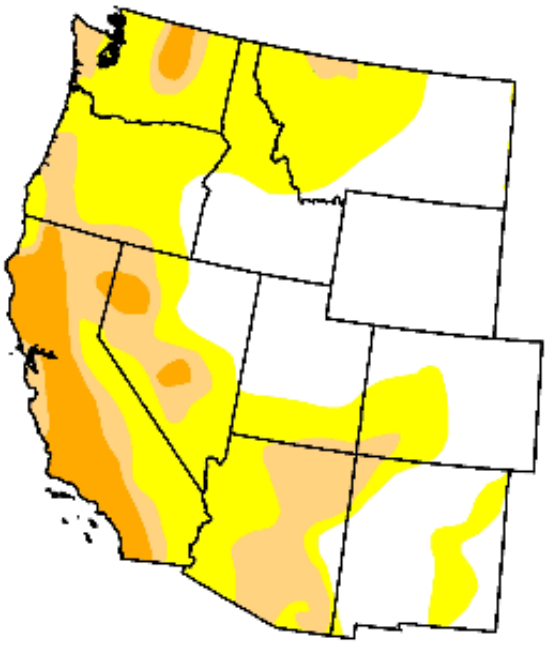
Fig. 3. Current Drought Monitor weekly summary.
Ref: National Drought Mitigation Center (NDMC) - http://www.drought.unl.edu/dm/monitor.html.

U.S. Drought Monitor
West

September 29, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	40.7	59.3	22.8	7.5	0.0	0.0
Last Week (09/22/2009 map)	52.8	47.2	22.4	7.5	0.0	0.0
3 Months Ago (07/07/2009 map)	55.3	44.7	18.4	7.6	0.0	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 (09/30/2008 map)	40.5	59.5	29.2	10.4	0.4	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, October 1, 2009
Author: D. Miskus, JAWF/CPC/NOAA

Fig. 3a. Drought Monitor for the Western States with statistics over various time periods. Regionally, there was a marked increase in D0 during the past week.

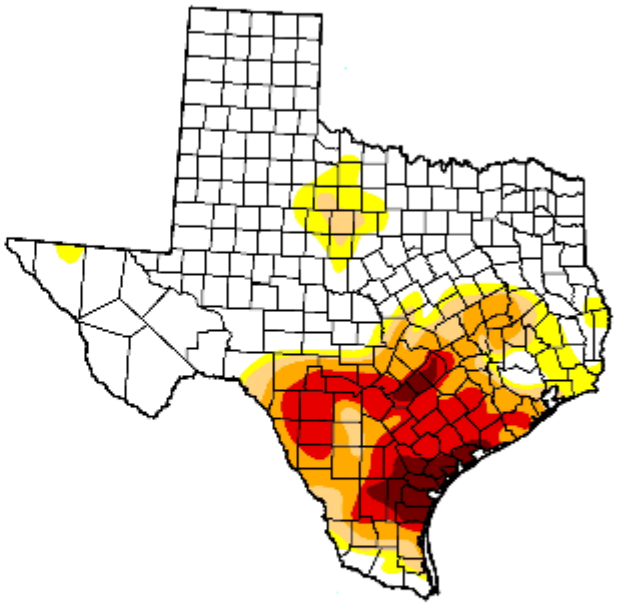
Ref: http://www.drought.unl.edu/dm/DM_west.htm.

U.S. Drought Monitor
Texas

September 29, 2009
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	63.8	36.2	27.8	21.9	12.3	3.1
Last Week (09/22/2009 map)	62.5	37.5	28.5	22.9	15.5	3.8
3 Months Ago (07/07/2009 map)	37.7	62.3	39.4	28.8	22.4	14.1
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 (09/30/2008 map)	67.0	33.0	20.1	9.5	3.6	0.0



Intensity:

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

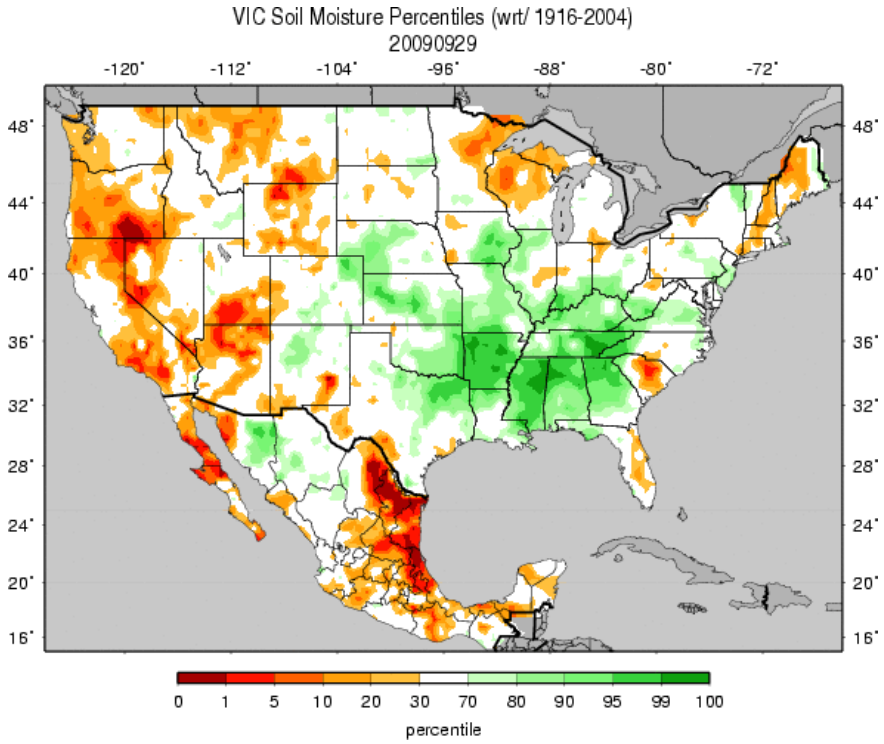
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements

http://drought.unl.edu/dm

USDA National Drought Mitigation Center

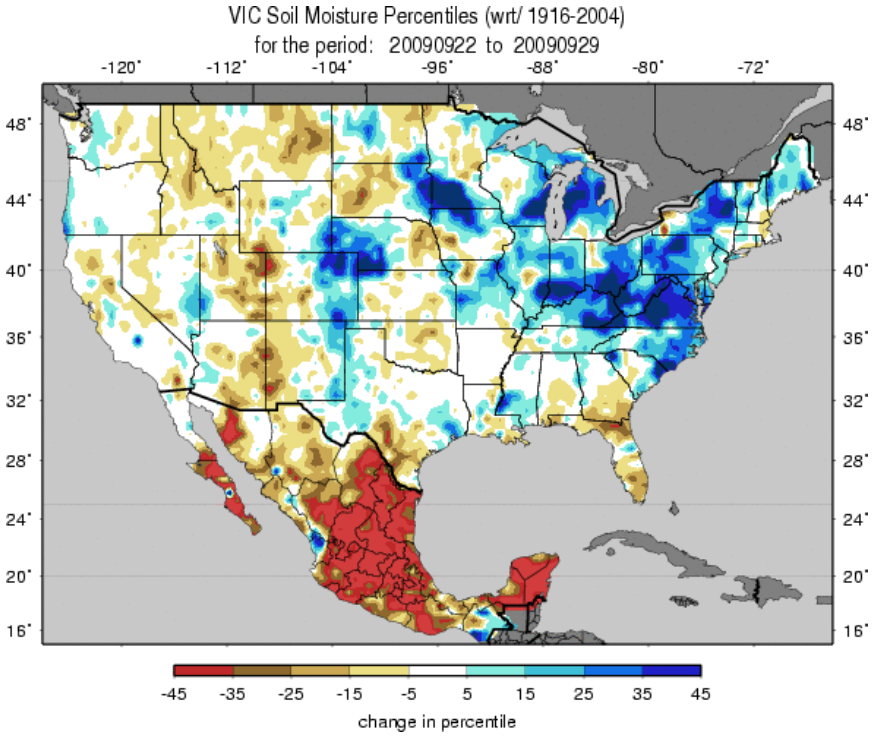
Released Thursday, October 1, 2009
Author: D. Miskus, JAWF/CPC/NOAA

Fig. 3b: **Texas is the only state with D4 drought condition in the US. Note that there was a three percent improvement in D4 conditions since last week.**
. Ref: http://www.drought.unl.edu/dm/DM_state.htm?TX,S.



Figs. 4a: Soil Moisture ranking in percentile based on 1916-2004 climatology as of 29 September. Note that Arkansas to Georgia are the wettest areas while the driest areas are scattered across much of the remainder of the nation especially over Arizona, Utah, West Coast States, and South Carolina.

Ref: 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 this past week. Excessive drying is found over parts of the 4-Corner States and eastern Montana. Excessive moistening is found over much of the eastern third of the nation, southern Minnesota, and the Central High Plains.
http://www.hydro.washington.edu/forecast/monitor/curr/conus.mexico/CONUS.MEXICO.vic.sm_qnt.1wk.gif.

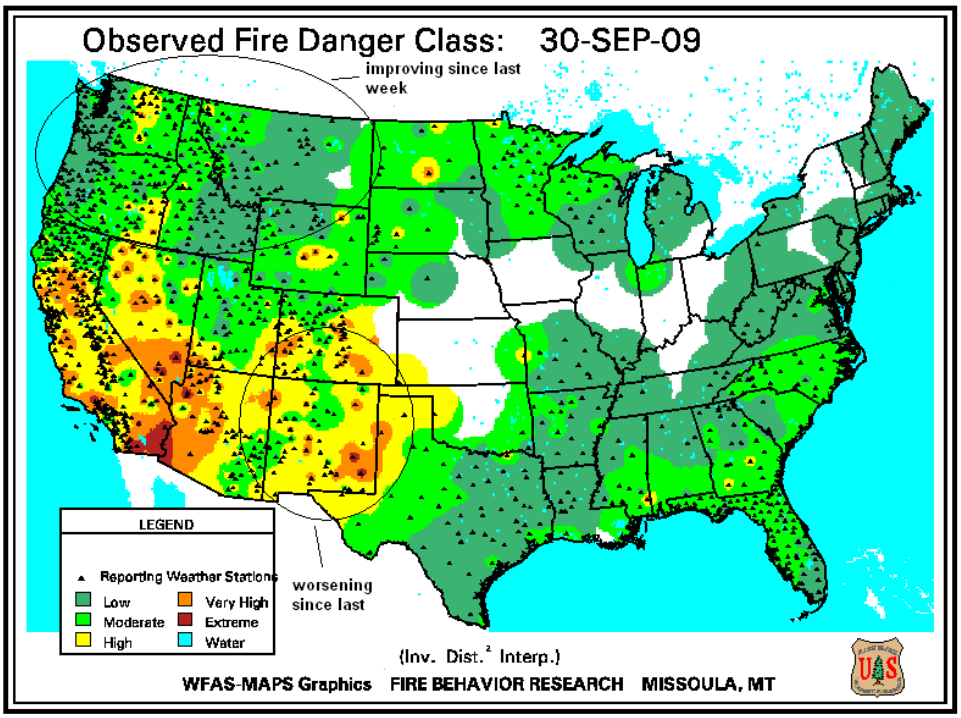


Fig. 5a. Observed Fire Danger Class. Conditions over southern California have deteriorated significantly this week.
Ref: http://www.wfas.net/images/firedanger/fd_class.gif.

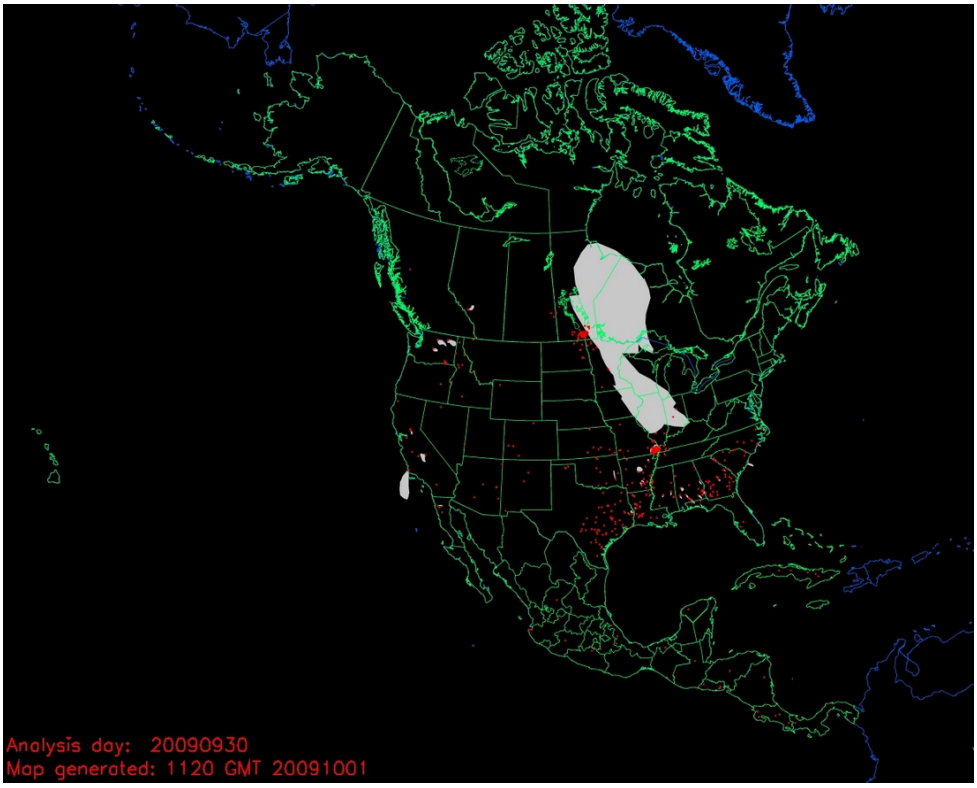


Fig. 5b. Hazard Mapping System Fire and Smoke shows the analysis for 9/30/2009 with fires shown as red dots. Smoke is noted over much of the Upper Midwest while a lot of fires are noted over the South. Smoke, when detected by the analyst, is in gray.
Ref: http://www.osdpd.noaa.gov/ml/land/hms.html.

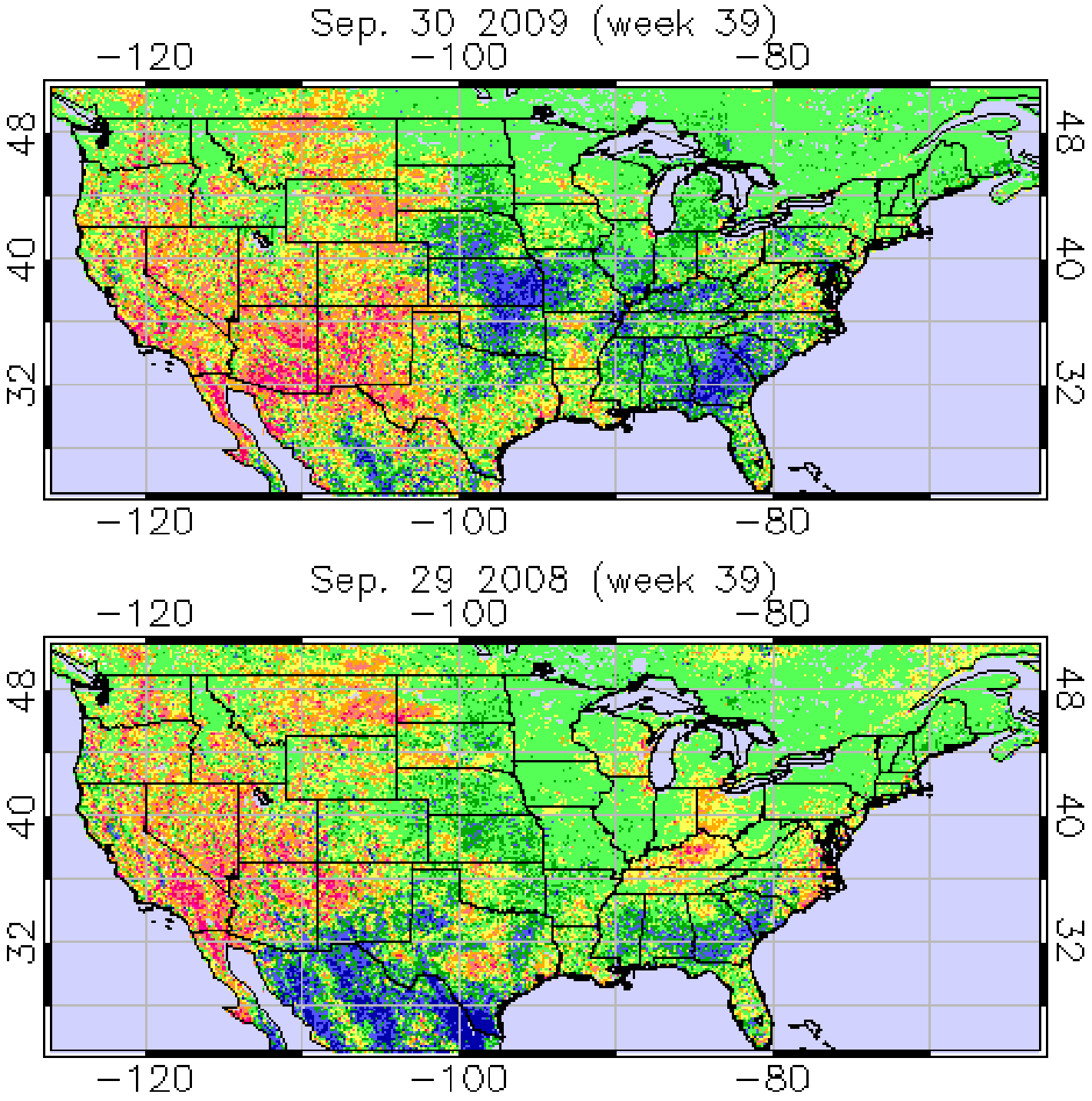


Fig. 6. Vegetation Drought Response Index: Note the comparison to last year. The Central Plains show very favorable conditions while Arizona shows very stressed condition this week. Last year, much of the Gulf Coast States showed favorable conditions.
Ref: http://www.star.nesdis.noaa.gov/smcd/emb/vci/VH/vh_currentImage.php.

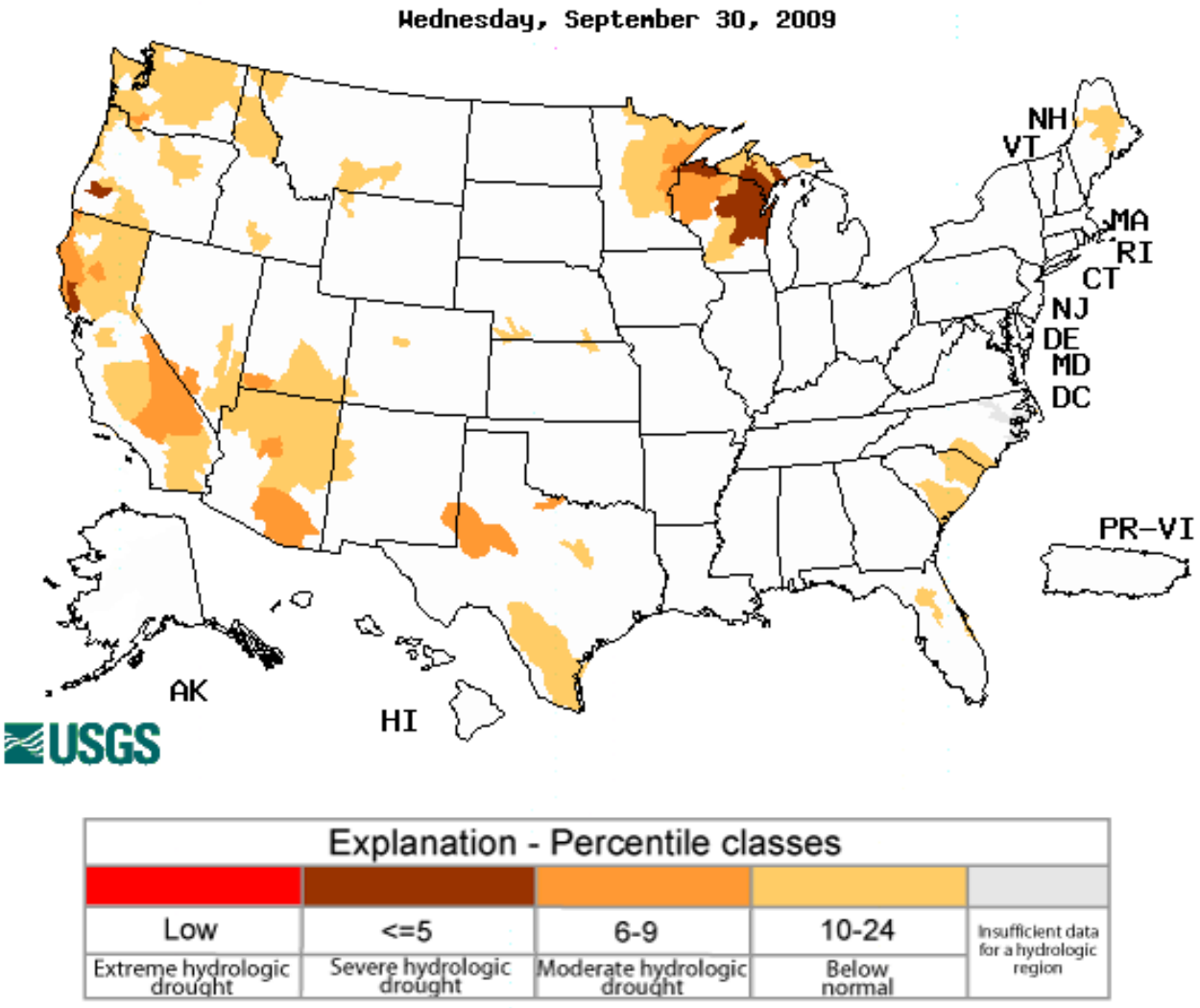


Fig. 7. Map of below normal 7-day average streamflow compared to historical streamflow for the day of year. Conditions are severe over Wisconsin-the Upper Michigan Peninsula, and over parts of north coastal California and southwest Oregon.

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

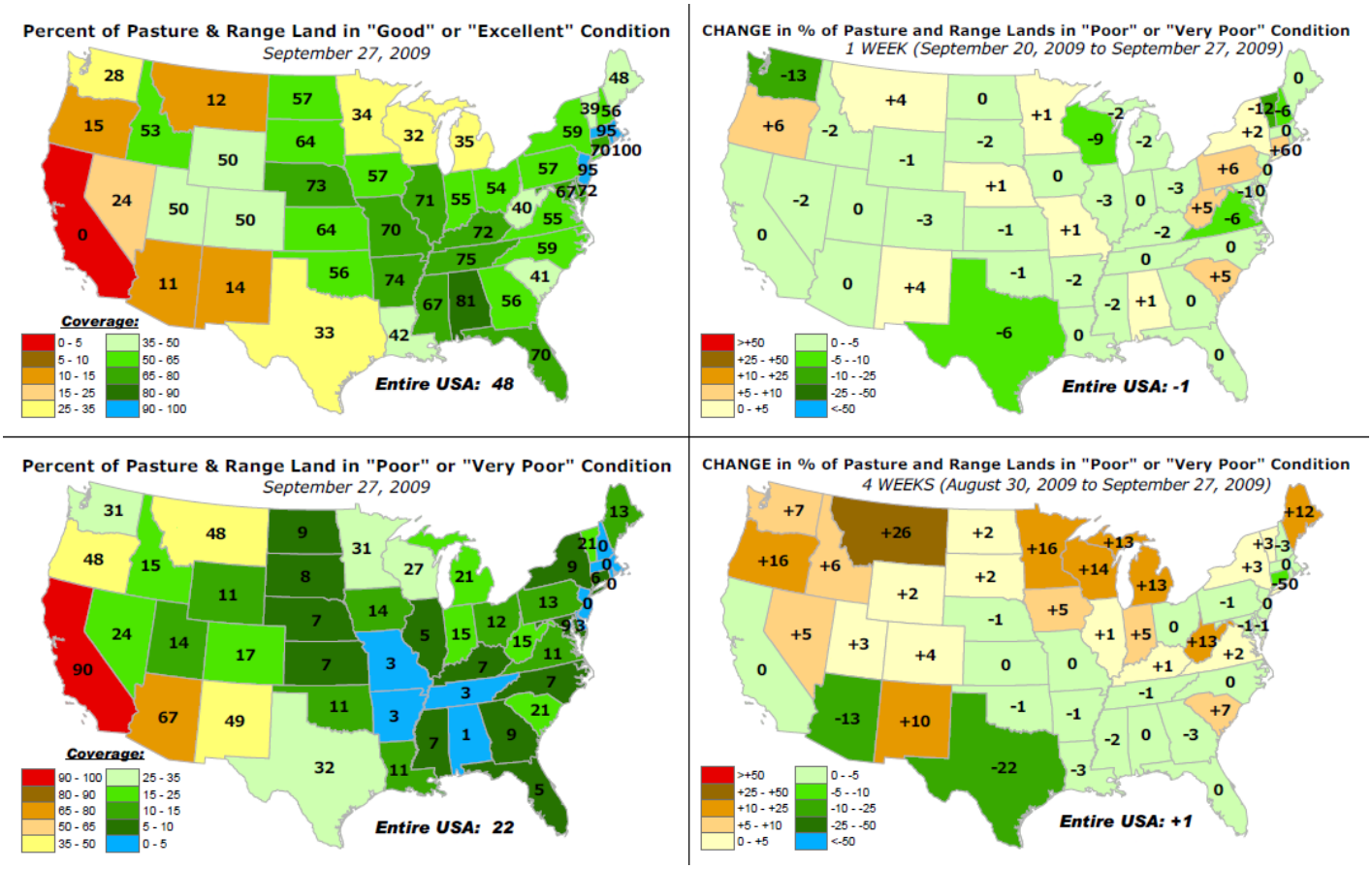


Fig. 8. Current Pasture and Range Land conditions and changes over the last week and last month.
Ref: http://www.cpc.ncep.noaa.gov/products/predictions/experimental/edb/pasture-range-statewide-conditions.pdf.

National Drought Summary -- September 29, 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/.

Early in the week (Sep. 22-28), a nearly-stationary cold front, embedded with several waves of low pressure, slowly tracked from the central U.S. toward the East Coast, bringing wet weather to much of the eastern half of the Nation. The front finally moved off the Southeast coast by late Sunday, while a second system quickly moved from the northern Plains on Sunday to the East Coast by Monday night. High pressure prevailed over much of the Far West, Rockies, and High Plains, producing dry and warm weather, although a weak Pacific system entered the Northwest late in the period. Mostly dry weather occurred across Hawaii, except for a few locally moderate to heavy windward showers. In contrast, Alaska remained stormy, wet, and cool, with heavy rains along the southern and southeastern coasts and light to moderate precipitation further inland to the north.

Atlantic Coast States and Eastern Ohio Valley: A very dry September came to an abrupt end for most of the lower eastern Ohio Valley, Appalachians, mid-Atlantic, and Carolinas, although a few areas missed out on the widespread, moderate to heavy rains. The slow-moving frontal system dropped 2 to 4 inches of rain on southern Indiana, southern and eastern Ohio, southern and central Appalachians, Virginia and Carolina Piedmonts, and along coastal Carolina. Fortunately, the rains fell over a prolonged period of time, soaking into the ground and recharging most rivers (which rebounded back to near-normal values at the 7- and 14-days averages ending Sep. 29). Accordingly, short-term D0 was erased in the Virginia Piedmont, eastern Ohio, the western D0-edge in the Carolinas, and coastal North Carolina, with a D1 to D0 improvement in eastern West Virginia, south-central North Carolina, and along coastal Carolina. An expansion of short-term dryness (D0A) into the eastern Great Lakes region and interior New England was also halted by this rainfall. For example, Buffalo, NY, went virtually rainless for the first 25-26 days of September, then received about an inch of rain Saturday night into Sunday from the front, and then was hit with tremendous lake-effect rains yesterday (3.55 inches, the fifth greatest daily total ever). So in a few days, Buffalo went from one of the driest Septembers on record (through Sep. 26) to the ninth wettest September as of Wednesday (Sep. 30) morning.

In contrast, the moderate to heavy rains missed northwestern sections of the eastern Ohio Valley (0.1 to 0.5 inches), parts of the central Carolinas and east-central North Carolina (0 to 0.6 inches), and coastal Georgia (0 to 0.1 inches). In response, the D0 area shifted northward across northern Indiana, extreme southern Michigan, and northwest Ohio, and the D1 expanded northeastward toward Ohio's Sandusky Bay. Not surprisingly, many USGS average stream flows were still in the lower tenth percentile at 14- and 28-days in these areas. The impacts, however, were favorable for agriculture as maturation, dry down, harvesting, and fieldwork activities were only slightly delayed. Rain totals were also somewhat lower in the central Appalachians (0.5 to 1.5 inches), preventing further deterioration but not enough to make improvements.

Southern Plains and Gulf Coast Region: Rains early and late in the period brought more welcome precipitation to the southern Great Plains and eastward into the lower Delta. A general 0.5 to 2 inches of rain fell across the southern third of Texas, with locally 3-6 inches

in the lower Rio Grande Valley, parts of the Texas D3 area, and in southern and eastern Louisiana. Long-term deficits still remain across much of south-central Texas going out to 12-, 18- and 24-months, but short-term moisture conditions have definitely improved. The core D4(H) region remained along the western Gulf, stretching from near Alice northeastward to Victoria. A general 1-category improvement was made where 1.5 to 2.5 inches fell in south-central Texas (near Austin, Georgetown, and Killeen) and eastward toward Palestine, and in portions of the lower Rio Grande Valley. Even with September's above-normal beneficial rains, both Corpus Christi (6.27 inches) and Victoria (6.44 inches) have only measured 10.37 inches and 14.90 inches, respectively, since January 1, with year-to-date deficits of 14.30 and 15.66 inches. Similarly in the lower Delta, moderate to heavy rains (2 to 4 inches) trimmed away the southern and northern D0 edges, but long-term departures still remained across south-central Louisiana. For example, Hammond, LA, year-to-date rainfall is 31.9 inches, but the normal total is 49.9 inches. An exception to this improvement or stability was in north-central Texas where little or no rain fell, slightly increasing the D0 and D1 area.

Upper Midwest: Similar to the eastern Ohio Valley and Atlantic Coast States, the slow-moving frontal system dropped light to moderate rains (0.2 to 1 inches) on most of the upper Midwest; however, locally heavier amounts (2 to 3 inches) were observed in a swath from northeastern Missouri northwest into southwestern Minnesota, in southern Wisconsin, and along parts of the upper Great Lakes region. Accordingly, a 1-category improvement was made in southwestern Minnesota and northern Iowa where growing season (April 1 to September 28) precipitation edged closer to normal and deficits were reduced to 3 inches or less. Abnormal dryness was also alleviated in southern Wisconsin, northwestern Michigan, and parts of the UP of Michigan near Lake Superior.

Unfortunately, the heaviest rains missed the core D2-D3 areas of east-central Minnesota and northern Wisconsin, with a general 0.4 to 1 inches falling, and a few locales tallying between 1 and 1.5 inches. Nevertheless, the rains were welcome and prevented further deterioration, but did not warrant any improvement. Long-term deficits at 6-months were still 6 to 12 inches, and 12 to 18 inches at 12-months. In addition, USGS 1-, 7-, 14-, and 28-day averaged stream flows remained near or at record low values as of Sep. 29, especially in northeastern Wisconsin and southwestern UP Michigan. In north-central Minnesota, another dry week increased growing season deficiencies to more than 8 inches, and D2 was added. Fortunately, the cool summer counterbalanced the precipitation deficits, leading to a relative lack of negative impacts.

Northern and Central Plains: Little or no rain was observed in the northern Plains, southeastern Nebraska, and northwestern Oklahoma. But with abnormally cool conditions (average temperatures 4 to 8 degrees F below normal) accompanying the mostly dry weather in the latter two areas, status-quo was maintained. Farther north, however, unseasonable warmth (temperatures averaging 2 to 6 degrees F above normal) and short-term dryness (out to 90-days) allowed for expansion of the D0 into southwestern North Dakota and extreme eastern Montana. The warm and dry weather, however, was favorable for any late harvesting of spring grains and fieldwork.

The West: Until a weak frontal system brought light precipitation (0.1 to 0.3 inches, locally to 0.7 near Quillayute, WA) to the Pacific Northwest on the last day of the period, high pressure had kept nearly the entire West bone dry and warm. September is typically dry for the Southwest, but farther north, precipitation normally starts to increase in the early fall, with a rapid onset to the wet season during October and continuing into the winter months in the Northwest. This September, precipitation had been close to or slightly above-normal for northwestern Oregon and western Washington, but relatively dry elsewhere. As a result, 30-day shortages (0.5 to 2 inches) have accumulated across northern California, eastern

Washington, and most of Oregon, Idaho, and Montana. The dryness has also increased the fire danger classification to high and very high across this region, with several new large wildfires reported on Sep. 29 in western Montana, south-central Oregon, and northwestern Wyoming. With the sluggish start to the fall precipitation and unseasonable warmth, abnormal dryness was expanded to include most of Oregon, eastern Washington, northern Idaho, and western Montana.

Hawaii and Alaska: In Hawaii, mostly dry weather prevailed during the week, although a couple of days recorded light to moderate (0.1 to 0.5 inches) showers at windward locations, and a few isolated stations measured over 3 inches during a 24-hour period ending 8:45 am HST Saturday, September 26 (Mt. Waialeale, Kauai, 3.61 inches; Oahu Forest NWR, Oahu, 3.02 inches). The overall precipitation trend for the islands, however, was subnormal rainfall. Accordingly, D0 was expanded throughout Oahu and Kauai as pastures in the latter island are drying out again after recovering from D1 drought in August. On the Big Island, the FSA reported worsening pasture conditions in southern sections, thus D3(A) was added.

In Alaska, another stormy, wet, and cool week brought widespread moderate to heavy precipitation (2 to 6 inches) to southern and southeastern sections, and light to moderate amounts (0.4 to 0.8 inches) farther north. The continuation of wet and cool September weather in southern Alaska called for a slight trimming of the southern edge of the D0 north of Anchorage, and status-quo elsewhere as totals (0 to 0.3 inches) were lower.

Looking Ahead: During the next 5 days (October 1-5), a system will slowly track eastward from the northern Rockies to New England, dropping significant precipitation on the northern thirds of the Rockies and Plains, northern Corn Belt, Great Lakes region, and Northeast. Moderate to heavy rains are also forecast for the western and central Gulf Coast and Delta, possibly bringing additional drought relief to parts of Texas. Drier weather is expected in the Southwest, south-central Rockies and Plains, lower Ohio and Tennessee Valleys, south-central Appalachians, and mid-Atlantic. Near to subnormal temperatures should envelop most of the lower 48 States, with unseasonably cold weather in the West, North-Central States, and Corn Belt.

The CPC 6-10 day forecast (October 6-10) calls for above-normal precipitation in the middle third of the Nation, with greatest odds in the south-central Plains, and across southern Alaska. Subnormal precipitation will be limited to the eastern Gulf and southern Atlantic Coasts, and Pacific Northwest. Subnormal readings are forecast for the Great Basin, Southwest, Rockies and Plains, and upper Midwest, with unseasonable warmth expected in the Southeast, along the Pacific Northwest coast, and throughout Alaska.

Author: David Miskus, JAWF/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 October 1, 2009