**Weekly Snowpack / Drought Monitor Update**  
May 22, 2014

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**Temperature**

**SNOTEL** and ACIS 7-day temperature anomaly shows temperatures well above normal over the Cascades and southern California. Below normal temperatures prevailed from the eastern slope of the Rockies eastward across the western Great Plains.

Click on most maps in this report to enlarge and see latest available update.
ACIS 7-day average temperature anomalies, ending May 21, show the greatest negative temperature departures over the northwestern Great Plains (<-8°F). The greatest positive temperature departures occurred in scattered areas over the West Coast states, including northern Nevada and southeast Oregon (>+6°F).

Also, see Dashboard and the Westwide Drought Tracker.

During the first three weeks of May 2014, the temperature anomaly map shows a cold pattern over the interior sections of the country, especially over North Dakota (<-10°F). Above normal temperatures dominated the coastal areas of California to Washington and over eastern North Carolina and Virginia (up to +3°F).

Forecasting the start of the spring snowmelt and subsequent runoff depends, in part, on when average temperatures warm to above freezing. Monitoring this type of climate map is a useful way to gauge when this onset is likely to occur.

Note that May average temperatures are finally above freezing everywhere.
Precipitation

The May 22 SNOTEL precipitation percent of normal map shows predominately deficit conditions over much of the interior West, including much of Montana, northern Wyoming, and the Southwest.

Surpluses are noted over the central Cascades, coastal ranges of Oregon, southeastern Wyoming, southwestern Utah, southernmost Idaho, northeastern Nevada, and the western half of Colorado.

Thus far for May, the precipitation anomaly pattern reveals surplus moisture scattered across the nation. Parts of the Lower Mississippi – Tennessee River Valleys and Southwest, including California have seen little or no precipitation. Above normal precipitation dominates Florida, New England, western Nebraska, and the Coastal Ranges in Washington and Oregon.

This preliminary daily PRISM precipitation map contains all available network data, including SNOTEL data, and is updated periodically as additional data become available and are quality controlled.
The ACIS 7-day total precipitation map shows abundant moisture falling over parts of the central Cascades, western Nevada, and northeastern Montana.

Little, if any, precipitation occurred over vast areas of the southern tier of the West, including coastal northern California, and interior Washington, Oregon, and southern Idaho.

As would be expected based on the map above, this map reflects a similar pattern of precipitation that fell across the West. Much of western and northeastern Nevada received unusual rains because of an active upper level low moving through the region early this week.

The May 2014 precipitation map thus far indicates no precipitation has fallen over large regions of western Texas to southern California. Eastern Texas and the western mountains in Oregon and Washington have had the highest totals. Some high totals are also noted over the mid-Atlantic into southern New England.

See Go Hydrology for current and forecast conditions over southern Florida.
For the **2014 Water Year** that began on October 1, 2013, only central Montana, most of Wyoming, and northern Colorado are experiencing surpluses.

Near average conditions dominated the northern half of the Cascades, the northern half of Idaho, northwestern-most Montana, the Lower Bear River in eastern Utah and southeast Idaho, and parts of the southern half of Colorado.

The largest deficits are centered over southern Oregon, western Nevada, southern and eastern Utah, Arizona, and New Mexico.

As the Water Year advances, it becomes more difficult for river basins to change bin categories.

The three-month period (February through April) shows that the eastern half of the nation received precipitation in the range from 5 to greater than 24 inches.

On the other hand, parts of the West received totals less than three inches. The exceptions are over the Rockies, Cascades, and Sierra Nevada, where totals exceeded 24 inches.
Snow

Snow Water Equivalent (SWE) values are generally higher east of the Continental Divide and over the Columbia River drainage. During this time of year, the percent of normal snowpack can increase without additional moisture if the melt is delayed by colder than normal temperatures. It should be noted that although the percent of normal snow water equivalent (SWE) values exceed 100 percent in several river basins over the Washington Cascades and northern panhandle of Idaho, this does not necessarily result in surplus snowmelt. Peak SWE, on average, occurs during the second half of March and into early April for these Northwest Pacific areas, when values were not as high as they are now. However, a slower snowmelt helps resource managers better regulate water conveyance into and out of reservoirs.

The water supply forecasts issued by the National Water and Climate Center for the spring and summer months are now available. See the latest: National Snow Analysis and West-Wide Water Supply Forecast Tables.
Weather and Drought Summary

National Drought Summary – May 20, 2014

The following Weather and Drought Summary is provided by this week’s NDMC Drought Author: Michael J Brewer, NIDIS U.S. Drought Portal Manager, NOAA's National Climatic Data Center.

USDM Map Services: (contains archived maps)

“For the contiguous 48 states, the U.S. Drought Monitor showed 38.12 percent of the area in moderate drought or worse, compared with 38.08 percent a week earlier. D4 increased from 4.46 percent to 4.99 percent this week.

For all 50 U.S. states and Puerto Rico, the U.S. Drought Monitor showed 31.85 percent of the area in moderate drought or worse, compared with 31.81 percent a week earlier.”

Current Drought Monitor weekly summary. The exceptional D4 levels of drought are scattered across CA, NV, CO, TX, OK, and NM.

The latest drought indicator blend and component percentiles spreadsheet is a great resource for climate division drought statistics. This link is for the latest Drought Outlook (forecast). See climatological rankings.

For more drought news, see Drought Impact Reporter. New: ENSO Blog.

Drought Management Resources (†):

* Watch AgDay TV
* Drought Impacts Webinar Series
* Quarterly Climate Summary and Outlooks for the Great Lakes, Midwest and Missouri Basin States
* The Spring 2014 edition of DroughtScape
* U.S. drought conditions stable in April; improvements unlikely in western states and much of plains

See: Latest Drought Impacts during the past week.

“The 49th and 50th States show relatively benign drought conditions. No changes noted for Alaska and Hawaii this week.

A comprehensive narrative describing drought conditions across other parts of the nation can be found toward the end of this document. For drought impacts definitions for the figures that follow, click here.”
U.S. Impacts during the past week

- A look at water-saving measures across the West - May 11, Western U.S.
- Drought creates tinderbox for wildfires in southwest USA - May 16, Southwestern U.S.
- 3 More Counties Seek Emergency Drought Declarations - May 13, Oregon
- Bureau of Reclamation Implements Klamath Project 2014 Drought Plan Measures - May 15, Southern Oregon
- Arizona town near Grand Canyon runs low on water - May 12, Williams, Arizona

CA Drought Information Resources

- Bureau of Reclamation Makes Historic Releases of Water from Friant Dam to the San Joaquin River Exchange Contractors Due to Drought - May 13
- DROUGHT: State will short Castaic instead of shrinking Lake Perris - May 13
- Despite drought, SMUD will not enact hydroelectric rate surcharge - May 13
- 9 wildfires burn across San Diego County - May 14
- Brush fires burn hundreds of acres in San Diego, Santa Barbara counties - May 13
- Valley water users irked by feds’ use of Millerton Lake for west-side farms - May 15
State with D-4 Exceptional Drought
- Texas Drought Website.
- Texas Reservoirs.
- Texas Drought Monitor Coordination Conference Call: on Monday’s 2:00 PM - 3:00 PM CST

- Drought among the worst in Texas in past 500 years - May 15
- City hits Stage 5 - May 16

No appreciable changes occurred during the past week.

Related area news:
- 2014 Kansas Drought Report and Summary
  - Dodge City Cargill plant to shrink workforce - May 14, Dodge City, Kansas.

- Past 30 days precipitation totals
- Past 30 days precipitation percent of normal
- Calendar Year precipitation totals
- Calendar Year precip percent of normal
- Short Crop ET

Oklahoma drought news
- Conservation prevents repeat Dust Bowl - May 12
- North-central Oklahoma and Panhandle face driest spring on record - May 1
- Drought could make Oklahoma wheat harvest worst in decades - May 13
- Parched: A New Dust Bowl Forms in the Heartland

No changes have occurred during this past week.
Changes in Drought Monitor Categories (over various time periods)

Click on any of these maps to enlarge. Note how the conditions over the Rockies and northern Great Plains have improved between 6 to 12 months (middle right to lower left maps). However, also note that since the start of the 2014 Water Year last October, conditions over the middle and southern Great Plains have deteriorated significantly (lower right map).
Soil moisture ranking in percentile as of May 19 shows dryness over central California, southern Arizona, eastern New Mexico, and the south-central Great Plains. Moist soils dominated the southeastern Gulf Coast states, much of the Atlantic Coast States, and from central Montana eastward; especially over the western Great Lakes.

Useful Hydrological Links: Crop Moisture Index; Palmer Drought Severity Index; Standardized Precipitation Index; Surface Water Supply Index; Weekly supplemental maps; Minnesota Climate Working Group; Experimental High Resolution Drought Trigger Tool; NLDAS Drought Monitor; Soil Moisture.

Soil Climate Analysis Network (SCAN)

This NRCS resource shows soil moisture data at the Sidney SCAN site located in eastern Montana. Note the improving soil moisture trend as a result of periodic rains and accelerated snowmelt (precipitation trace not shown).

Useful Agriculture Links: Vegetation Drought Response Index; Evaporative Stress Index; Vegetation Health Index; NDVI Greenness Map; GRACE-Based Surface Soil Moisture; North American Soil Moisture Network; Monthly Wild Fire Forecast Report.
Top Soil and Pasture & Rangeland Conditions

Topsoils are exceptionally poor (top) over Kansas and Oklahoma, values representing more than 40 percent worse than the median for this time of year (bottom panel). Low values over Washington are suspect, considering pasture and rangeland conditions are significantly better (below). Locations such as Georgia and Florida have seen abundant moisture with topsoils exceeding 40 percent above the May 18 median.

Much of the Eastern States, east of the Mississippi River are doing well, as noted below. These conditions also extend across the northern Great Plains and northern Rockies. Pasture and rangelands are stressed over California, the Great Basin, the Southwest, and the southern half of the Great Plains. Conditions have deteriorated in the states denoted in light beige (lower right panel).
Streamflow

Streams are high over southern New England, the upper Ohio Valley, and northern Florida (left maps). Some flooding is occurring over North Dakota, northern Florida, and parts of the upper Mississippi River (lower left map).

National Long Range Outlook

During the next three months, flooding is possible over the Red River Valley in North Dakota, the upper Midwest, and the middle Mississippi River Valley. Currently, 2 gauges have a greater than 50% chance to experience major flooding; 20 gauges for moderate flooding; 119 gauges for minor flooding.

These numbers represent a slight change since last week.
Weekly Snowpack and Drought Monitor Update Report

National Drought Summary for May 20, 2014


Summary
“This US Drought Monitor week was dominated by a weather system that moved across the Southern Plains and Midwest and through the South and Mid-Atlantic. The system brought damaging wind and hail throughout the impacted area and tornadoes in the Southeast and Mid-Atlantic. Widespread areas of three to four inches of precipitation fell while areas of eastern Texas received over seven inches.

Hawaii, Alaska and Puerto Rico
A lack of trade winds has kept windward sections of the Big Island of Hawaii drier than normal. The existing area of Abnormal Dryness (D0) expanded eastward on the island and a new area of Abnormal Dryness (D0) was added near Hilo because of those rainfall deficits. No changes were made in Puerto Rico or Alaska.

The Midwest
Areas of Moderate Drought (D1) and Abnormal Dryness (D0) continue to impact the Midwest. No changes were made to the area this week.

The Northeast and Mid-Atlantic
A strong system moved through the area on the 15th and following, dumping rain as it went. Locally heavy rain exceeded four inches in locations throughout western Maryland, West Virginia, and Virginia. This greatly decreased the area of Abnormal Dryness (D0) along the Appalachian Mountains in that area.

The Plains
Locally heavy rain came to the South early in the Drought Monitor week. Areas of Texas, Louisiana and Arkansas benefitted. Areas of Abnormal Dryness (D0) were removed from southern and eastern Texas, northern Louisiana into southern Arkansas, and northern Arkansas into southern Missouri. Mounting deficits saw degradation of drought conditions in western and central Texas. Areas of Exceptional Drought (D4) expanded in central Texas where lake and stream levels are exceptionally low, water supplies are dwindling, and water restrictions are the norm. With some places going months without appreciable precipitation, degradation was in line in most locations in Oklahoma, with the exception of the extreme southeast part of the state. Areas of Exceptional (D4), Extreme (D3), Severe (D2), and Moderate Drought (D1) and Abnormal Dryness (D0) expanded eastward this week in Oklahoma.

The West
Conditions remain very dry across the West as much of the West moves into its dry season. Areas of Extreme Drought (D3) expanded in western and eastern New Mexico, as did Exceptional Drought (D4) in eastern New Mexico as precipitation deficits mount. The state overall experienced its seventh driest Year-to-Date (January to April) and 12th driest Water Year (October 2013 – April 2014) on record. The rest of the West remained unchanged.

Wildfires remain a problem in parts of the West. According to the US Forest Service, the current large incidents are all in California, Arizona, and New Mexico. The fires around San Diego, CA resulted in at least one death, approximately 125,000 evacuees, and millions of dollars in property damage. So far this year nationwide, there have been 22,863 fires that have burned 471,875 acres which is below the 10-year average (2004 – 2014 average, year to date, is 27,895 fires and 1,053,217 acres according to the National Interagency Fire Center).

Looking Ahead
During the May 21-26, 2014 time period, precipitation is expected across the Plains, from South Dakota to northern Texas, and into eastern Colorado and Wyoming. Additional precipitation is expected around the Great Lakes and into the Mid-Atlantic and Northeast. Precipitation is estimated to approach two inches in select locations during this time period. At the same time, below normal temperatures are expected in the Southwest, east of the Rockies and into the Southern Plains. Above normal temperatures are expected along the West Coast, through the Central US, and into the Southeast.

For the ensuing 5 days (May 27-31, 2014), the odds favor normal to above-normal temperatures across the entire contiguous US and southern Alaska, with the exception of the western Gulf Coast. Below-normal temperatures are favored in northern Alaska and along the aforementioned area around the Gulf of Mexico. Above-normal precipitation is likely across the Eastern half of the US and in the far Northern Plains and northern Alaska. Below-normal precipitation is expected in the Southern Plains, the Pacific Northwest, as well as in southern Alaska.”
State Activities

State government drought activities can be tracked through their drought plans. NRCS Snow Survey and Water Supply Forecasting (SSWSF) Program State Office personnel are participating in state drought committee meetings and providing the committees and media with appropriate SSWSF information. Additional information describing the tools available from the Drought Monitor can also be found at the U.S. Drought Portal.

More Information

The National Water and Climate Center (NWCC) Homepage provides the latest available snowpack and water supply information. This document is available weekly. CONUS Snowpack and Drought Reports from 2007 are available online. Reports from 2001-2006 are available on request.

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

/s/
David W. Smith
Acting Deputy Chief, Soil Science and Resource Assessment

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Drought is expected to persist over much of the West and southern Great Plains. Improvements are expected from the Southwest to the central Great Plains.

Also see: National Significant Wildland Fire Potential Outlook (updated on the first of each month) contains a content summary of the previous month’s conditions.

Additional Maps
U.S. Maps PowerPoint presentation can be found at: http://dmcommunity.unl.edu/maps/US-Maps.ppt.

The regional zooms of ACIS station data percent-of-normal precipitation can be found at: http://dmcommunity.unl.edu/maps/All-CONUS-ACIS-PNP.pptx.

Supplemental Drought-Agriculture News
Download archived “U.S. Crops in Drought” files

Refer to the USDA Drought Assistance website and National Sustainable Agriculture Information Service.

Read about the new USDA Regional Climate Hubs.

New useful resource: NASS Quick Stats
The following is a collection of drought-related news stories from the past seven days or so. Impact information from these articles is entered into the Drought Impact Reporter. A number of these articles will also be posted on the Drought Headlines page at the NDMC website. The list is compiled by Denise D. Gutzmer, Drought Impact Specialist, and National Drought Mitigation Center.

**California wildfires**

“Numerous Santa Ana wind-driven wildfires were burning in Southern California, leading to thousands of evacuations and numerous homes and structures lost. A couple of teenagers were arrested after being observed lighting fires.

The fire chief of Carlsbad, California said, “This is May, this is unbelievable. This is something we should see in October. I haven’t seen it this hot, this dry, this long in May.”

For up to date fire information, see Cal Fire Current Fire Information at http://cdfdata.fire.ca.gov/incidents/incidents_current

From the Active Fire Mapping Program at http://activefiremaps.fs.fed.us/

**Bureau of Reclamation uses water from Millerton Lake to meet obligation**

The U.S. Bureau of Reclamation began releasing more water from Friant Dam (Millerton Lake) near Fresno into the drought-stricken San Joaquin River to supply as much water as was contracted to the San Joaquin River Exchange Contractors Water Authority on the west side of the San Joaquin Valley. The water release will be increased from 200 cubic feet per second to 1,200 cfs.

**Castaic Lake, Lake Perris in SoCal**

The Metropolitan Water District is rerouting 30,000 acre-feet that was intended for Castaic Lake in Los Angeles County and sending it to Lake Perris in Riverside County. Both lakes are popular with boaters and anglers, and were intended to store drinking water moved via the State Water Project.

**California hydropower production down**

Three years of drought have hurt hydropower production in the Upper American River Project for the Sacramento Municipal Utility District. The utility is short on hydropower and must purchase about $35 million worth of electricity.

**Beef prices inch higher**

A pound of beef sold for an average retail price of $5.72 in March, a record high, according to the U.S. Department of Agriculture. Drought, little forage, low water supplies and high feed prices have reduced the national cattle herd to its smallest in 63 years.

**Stage 5 Drought Catastrophe in Wichita Falls, Texas**

Wichita Falls officially moves into Stage 5 Drought Catastrophe on May 17 after the combined levels of lakes Arrowhead and Kickapoo fell to 24.8 percent of capacity, just below the stage 5 trigger of 25 percent. The more stringent water restrictions bring double the surcharges that accompany stage 4 restrictions when customers use more water than the monthly allowable usage rate.

*This is the community that is awaiting permission from the Texas Department of Environmental Quality before it can begin to treat its wastewater and drink it.*
Water shortage for Klamath Project in southern Oregon, northern California
The Bureau of Reclamation released the 2014 Drought Plan for the Klamath Project because available water supplies were inadequate to satisfy the demands of all Klamath Project contractors during the 2014 spring/summer irrigation season. Drought and insufficient participation in the Klamath Water and Power Agency's Water Users Mitigation Program have brought about the need for Reclamation to formally allocate available water Project supply from Upper Klamath Lake and the Klamath River.

Oklahoma wheat
Drought, freeze and heat damaged the wheat crop in Oklahoma, leading the U.S. Department of Agriculture to estimate the harvest to be 62.7 million bushels, which would be 40 percent less than 2013. Oklahoma farmers planted 5.6 million acres of wheat, but are expected to harvest about 3.3 million acres at about 19 bushels per acre.

Packing plant in Dodge City, Kansas reducing its workforce
Cargill Meat Solutions announced plans to cut the workforce at the Dodge City packing plant as drought whittles away the nation’s cattle herd, which was at its smallest in 63 years. The plant will reduce its workforce from roughly 2,700 employees to around 2,400 employees.

See the Drought Impact Reporter for more drought information.