National Drought Summary

Summary: A weather pattern change brought badly-needed, widespread showers and thunderstorms across the eastern half of the Nation, right after abnormal dryness (D0) developed in many areas of the Midwest and south-central Plains last week. This occurred after a wet May had alleviated many areas of drought - which was abruptly followed by dry and warm weather starting in late May into early June, a critical time for crop growth and development. In addition, heavy showers fell along the eastern Gulf Coast, providing additional improvement to Florida and southern Georgia. Unfortunately, little or no rain fell on most of the northern third of the High Plains and southern Plains, drying out conditions in Texas and Oklahoma and worsening the flash drought in eastern Montana and the western Dakotas. In the Southwest, although June is climatologically dry and warm, extreme heat late in the period, subnormal precipitation during the past 60-days, and some impacts was enough to expand D0 in Utah, central Arizona, and southern New Mexico. On Hawaii’s Big Island, some deterioration was made as field reports indicated worse conditions than expected while scattered showers in southwestern Alaska were not enough to improve low stream flow levels, thus D0 and D1 was slightly expanded there.

Northeast: Scattered showers and thunderstorms (1-3 inches) associated with a cold front finally fell on the last day of the period after a relatively dry and warm June 13-18. This effectively put potential developing dryness (D0) on hiatus for at least another week in New England and most of the mid-Atlantic as enough rain fell to push 30-day precipitation percentages close to normal. A few areas, however, missed out on the moderate to heavy rains, with only 0.3-1 inch falling on central Maryland and south-central Pennsylvania, creating 30-day deficits of 2-3 inches. USGS average stream flows at 7- and 14-days were also below normal (10-24th percentile) in this area. The shortage, when combined with the week’s abnormal warmth and low stream flows, was enough for D0(S) to develop there. In northern West Virginia, spotty showers around Morgantown has left a 1.81 inch deficit for June to date, thus the D0 in southern Ohio from last week was extended eastward. The rest of the Northeast was somewhat wetter over the 30-day period, but will need to be watched for D0 development if dry weather persists during the rest of June, especially Maine.

Southeast: The summer rainy season continued across Florida and southern Georgia, and was enhanced by a slow-moving cold front and developing tropical disturbance in the Gulf of Mexico (which became Tropical Storm Cindy Tuesday afternoon) late in the week. Most locations in Florida and southern Georgia saw 2 inches or more rain during the week, with up to a foot in south-central Florida. A few areas in central Florida and southern Georgia, however, only saw 1-2 inches of rain, thus improvements were limited to 1-category, and with lingering long-term (6-12 months) indices at D1-D2 in the region, a few small areas of D1(L) were left in southern Georgia, along with D0(L) in central Florida and southern Georgia. According to the USDA/NASS as of June 18, most crop, pasture, and soil moisture conditions were rated either good or adequate in both states. In the rest of Georgia, scattered showers mostly missed the D0-D1 area in central sections (minor changes) while D1(L) was erased in northern Georgia as the indicators were similar to the surrounding area. In northeastern Mississippi and northwestern Alabama, moderate to heavy (2-3 inches) rains along the southern edges of the D0-D1 area were enough to trim away some of the drought and dryness; however, northern sections recorded under an inch, and D0 slightly expanded into extreme southern Tennessee with 60-day deficiencies of 2-4 inches.
**South:** A mostly dry and warm week, along with increased summer evapotranspiration and a climatologic wet time of year, led to a general decline of moisture conditions in Oklahoma and Texas. Some areas in the South did see moderate to heavy (1.5-4 inches) rains (eastern sections of Kansas and Oklahoma, northeastern Texas, southern and central Mississippi, and west-central Tennessee), and this resulted in some D0 removal in southeastern Kansas, northeastern and southeastern Oklahoma, and northeastern Texas. The remainder of the changes this week, however, included D0 and D1 expansion, namely in southern, west-central, and Panhandle of Texas, in central and eastern Panhandle of Oklahoma where Oklahoma City has measured only 1.19 inches of rain during May 1-June 20, normally the wettest stretch of weather here (normal about 8 inches). According to the June 18 USDA/NASS report, statewide topsoil moisture rated short to very short rose 14 and 29 points from last week to 49 and 50% in Texas and Oklahoma, respectively, although crop and pasture conditions were still mostly fair to good. With the heat building, this area is primed for rapid deterioration unless rain falls soon.

**Midwest:** A slow-moving, occasionally stationary cold front brought welcome, widespread showers and thunderstorms, some with severe weather and copious rainfall, across much of the region. Northeastern Missouri, east-central Illinois, and most of central Indiana recorded 3-6 inches of rain, while most of the remainder of the region saw 1-3 inches of rain, effectively ending concerns of a Midwest flash drought. With the moderate to heavy amounts, D1 was improved to D0 in northern Missouri, D0 was erased across much of the northern half of Missouri, eastern Iowa, northern and southern Illinois, northwestern and southwestern Indiana, southwestern Michigan, and parts of southern Ohio. Moderate to heavy rains (1.5-3 inches) also fell on northern Minnesota (see High Plains), improving some of the D0-D1 by 1-category as April 1-June 20 precipitation was close to or above normal in all but the northwestern section. In contrast, a few areas missed out on the rains, including northwestern and south-central Iowa, central Illinois, near southern Lake Michigan, southeastern Michigan, and parts of northern and south-central Ohio. As a result, D0 remained from the previous week, or developed (e.g. northwestern Iowa, southeastern Michigan) due to short-term (at 30- to 60-days) dryness. June 18 corn, soybean, and winter wheat conditions somewhat improved from last week’s USDA/NASS ratings, but another week of growth with this moisture should show even better conditions. Topsoil moisture, however, did show improvement as percent rated short to very short dropped 15, 13, 11, 19, 21, and 19 points from last week to 15,27, 8, 22, 16, and 30 percent in Missouri, Iowa, Minnesota, Illinois, Indiana, and Michigan, respectively.

**High Plains:** While significant rains (1.5-3 inches) fell across northern and eastern North Dakota, northeastern South Dakota, and northern Minnesota (see Midwest) and provided some relief, little or no rain worsened conditions across eastern Montana, western and southern North Dakota, and the western half of South Dakota. Dry conditions during the past 30-days also allowed for a D0 expansion into central and southeastern Montana, northeastern Wyoming, and central and northeastern Nebraska (and into northwestern Iowa – see Midwest). Fortunately, cooler air finally filtered into the northern Plains as highs in the 90s and 100s degF during the previous week were replaced with 70s and 80s degF this period. With May-July normally the wettest time of the year in the northern High Plains (some areas typically receive half to two-thirds of their ANNUAL precipitation), a lack of adequate late spring and early summer rainfall can impact the region for the rest of the year.

In northeastern Montana, most locations in nearly 20 counties have experienced 5-25% of normal precipitation since the end of April. Numerous locations have reported near- or record low precipitation since April 1, while temperatures for the past 30-days have averaged 1 to 4 degF above normal. The
March-May period was the 14th warmest such period since 1895 for Montana, according to NCEI. While river flows remain normal across the state, northeast and eastern Montana are driven by dry land farming. The subnormal rainfall has been evaporated due to high winds and temperatures, with the Evaporative Stress Index at very high values for northeastern Montana. As for surface and root zone soil moisture, 95-98% of all Mays since 1948 have been wetter than this year in northeastern Montana, with percentiles dropping below the tenth percentile for wetness. The flash drought has quickly deteriorated crop conditions, with the June 9 forecast for winter wheat down 26% from the 105.35 million bushels produced last year, while June 18 USDA/NASS reported 37% of the spring wheat and 26% of pastures were in poor or very poor condition. Numerous field reports indicated poor or even no spring wheat emergence, and the ones that did emerge are stunted and badly need moisture. There has been little growth in pastures and ranges, and many were brown (dormant) with little or no dryland hay cut expected, impacting livestock feed and grazing. Accordingly, D3(S) was added to the driest areas where 2- and 3-month SPIs were D4, departures were greatest, and where impacts were the bleakest. D2 was expanded southward into southern Garfield County, while D1 was expanded westward and southward.

In the Dakotas, western areas typically receive over two-thirds their annual precipitation during April-July, so a lack of adequate late spring and early summer rains are critical to dryland farming and livestock grazing and cuttings of pasture and range grasses. Similar to northeastern Montana, southwestern North Dakota and northern South Dakota have seen the lowest precipitation as compared to normal since April, with deficits of 3-6 inches at 60-days and 4-8 inches at 6-months. Temperatures have also averaged well above normal the past few weeks, and combined with strong winds, have evaporated much of the soil moisture much quicker than expected. Where recent rains have fallen (mainly in the eastern sections), some recovery of the crops and pastures have occurred, but winter wheat fields and other small grains that were planted early are much drier than corn, soybean, or later planted fields. The long fall (or late freeze) the Dakotas had last year contributed to the depletion of soil moisture this spring as the depth of the frozen ground was much shallower than usual and thawed much earlier and quicker this spring. In addition, many of the current drought areas were in drought last year, had exhibited short-term recovery over the winter, but the deficits were never fully erased, thus the soil moisture profile was susceptible to rapid drying this spring. In the June 18 USDA/NASS report, South Dakota crops rated poor or very poor included: 64% spring wheat; 17% corn; 16% soybeans; 34% sorghum; winter wheat 50%; oats 36%; and pastures 49%. For North Dakota, it was: 24% spring wheat; 10% corn; 11% soybeans; 20% barley; 30% oats; and 54% pastures. Topsoil (and subsoil) moisture rated short to very short was 55% (55%) and 43% (38%) for South Dakota and North Dakota, respectively. Based upon the numerous tools at varying time periods (30-, 60-, 90-, and 180-days) and reported impacts, the D2 was extended westward into western North Dakota and southward in South Dakota, with D3 areas drawn for the worst indicators over the varying time periods. D0 was also extended southward into Nebraska as the past 30-days were very dry and warm which could lead to rapid soil moisture depletion if the weather doesn’t improve.

**West:** With June a normally dry and warm month in the Southwest, it was not surprising that most of the region was rain free this week. But after a very wet winter season this year across the West (nearly every NRCS SNOTEL basin average precipitation since October 1, 2016 is above or much above normal), the past 3 months (March-May) have been drier than normal. The sudden end to the wet season, combined with a recent heat wave, has started to dry out the landscape quicker than usual now that the snow has mostly melted. Based upon ground observations of low stream flows, low SPIs, and increasing wild fires, D0 was added in central Arizona in eastern Yavapai and southeastern Coconino Counties. In Utah, short-
term (60-days) SPIs were quite low in west-central and northeastern sections, leading to some D0 expansion in those two areas of the state. In southeastern New Mexico (similar to west Texas), short-term dryness and recent warmth has led to small deficits at 30- and 60-days, thus D0 was added where rainfall amounts were lower during the past 30-days. Additional areas will be monitored as the recent heat wave (June 20 highs reaching 92F in Flagstaff, 113F in Las Vegas, 115F in Tucson, 118F in Phoenix, and 125F in Death Valley) will quicken the drying of the Southwest. In contrast, the Northwest has been wet recently, with no dryness there. No other changes were made in the West.

**Alaska, Hawaii, and Puerto Rico:** In Hawaii, recent field observations and rancher input from the FSA indicated that parts of the Big Island are worse than expected. Trade wind showers have been more erratic than usual for this time of year. Due to very poor pasture conditions along a small leeward section of South Kohala District, D2(S) was added. A portion of the Hamakua Coast from Waimea to Honokaa that was D0 last week was worse than thought (pasture impacts) and was made D1. Trade wind rainfall over the South Hilo and North Hilo Districts have mainly fallen on lower elevations with the upper slopes getting less, thus the existing D0 was extended eastward to encompass the upper windward slopes of the Big Island. Conditions remained the same in Maui, and the western half of the state is better with decent rainfall the past few weeks.

In Alaska, scattered light showers (0.2-1 inch) fell across the southern half of the state, with heavier totals (2-4 inches) limited to the extreme southeastern Panhandle. Little or no precipitation fell on western and northern sections. 7-day temperatures averaged close to normal (anomalies of -3 to +3 degF) across the state. With 1-, 7-, 14-, and 28-day average USGS stream flows at near-record low levels in southwestern Alaska, D1 was expanded southward where little or no rain fell and river gauges were lowest, and D0 now included Kodiak Island and the Aleutian Range. There is no dryness or drought in Puerto Rico.

**Looking Ahead:** During the next five days (June 22-26), the NHC guidance indicated that Tropical Storm Cindy (located in the northwestern Gulf of Mexico at 1 pm EDT Wed) will track north, then northeast, then eastward into southwestern Virginia by 7 am EDT Saturday. The WPC’s 5-day QPF forecasts the heaviest rains over and to the east of Cindy’s center, with 2-5 inches of rain expected in the lower Mississippi and Tennessee Valleys into the central Appalachians. Decent rains (2-3 inches) are also expected in the Texas Panhandle and across Wisconsin and Michigan. Little or no precipitation is expected in the northern Plains and from the Rockies westward, and only light amounts in the western Corn Belt, coastal New England, and parts of Florida. 5-day temperatures should average below-normal from east of the Rockies to the Appalachians, above-normal in the Far West, and near-normal along the East Coast.

For the ensuing five-day period (June 27-July 1), odds favor above-median precipitation in western Alaska, the southern Plains, along the Gulf and southern Atlantic Coasts, and in the Great Lakes region and New England, with sub-median rainfall in eastern Alaska, the Northwest, and the Tennessee Valley. Chances favor subnormal temperatures in the eastern half of the Nation while above-normal readings are likely in southern Florida, west of the Rockies, and in Alaska.

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