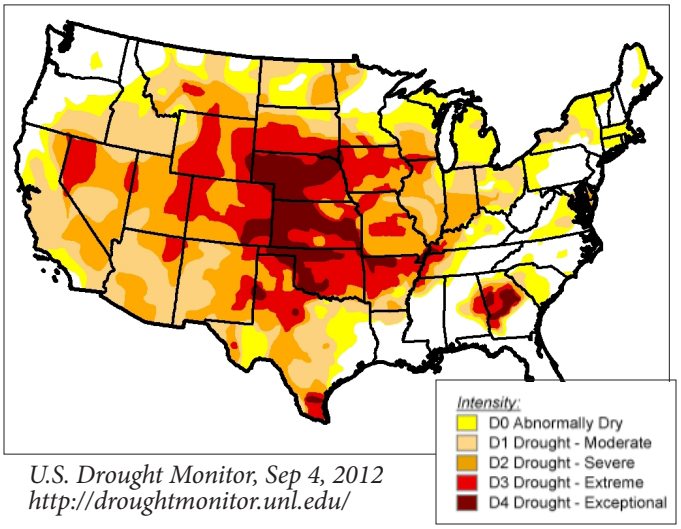
An Interpretation of the Origins of the 2012 Central Great Plains Drought

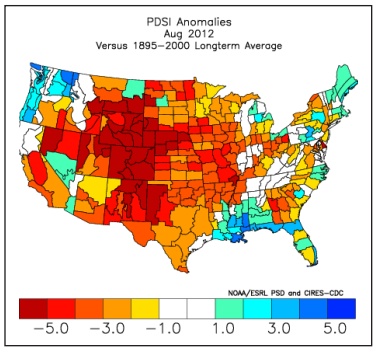
An Assessment Report of the NOAA Drought Task Force Narrative Team

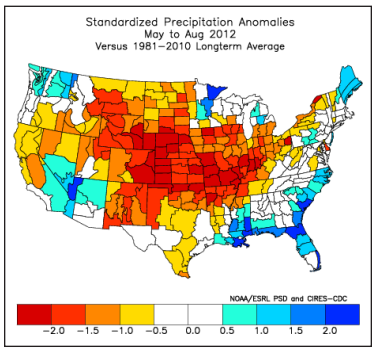
Historical Context - How do 2012 rainfall amounts and high temperatures compare to years past?

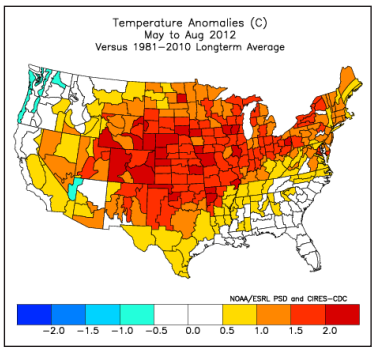
Precipitation deficits for the period May through August 2012 were the most severe since official measurements began in 1895, eclipsing the driest summers of 1934 and 1936 that occurred during the height of the Dust Bowl. This prolonged period of precipitation deficits, along with above normal temperatures, resulted in the largest area of the contiguous United States in drought since the U.S. Drought Monitor began in January 2000. By early September, over three-quarters of the contiguous U.S. was experiencing at least abnormally dry conditions with nearly half of the region (the Central Plains in particular) experiencing unprecedented severe drought.



U.S. Drought Monitor, Sep 4, 2012
http://droughtmonitor.unl.edu/







For a longer-term perspective, the Palmer Drought Severity Index (PDSI) for August 2012 is compared to a long-term PDSI average spanning from 1895 to 2000 (left) and identifies the core region of the drought to be the central Plains region, with the most extreme moisture deficits occurring over the western Plains (consistent with the Drought Monitor map). A central U.S. epicenter for the drought is also affirmed by the May-August standardized rainfall deficits (middle) with -2 standardized departures from the 1981 to 2010 long-term average being widespread from Colorado to Missouri. Much of the dry region also experienced hot temperatures (right). The combination of low rainfall and high temperatures is typically seen during summertime droughts over the central U.S.

What caused the 2012 Central Great Plains Drought?

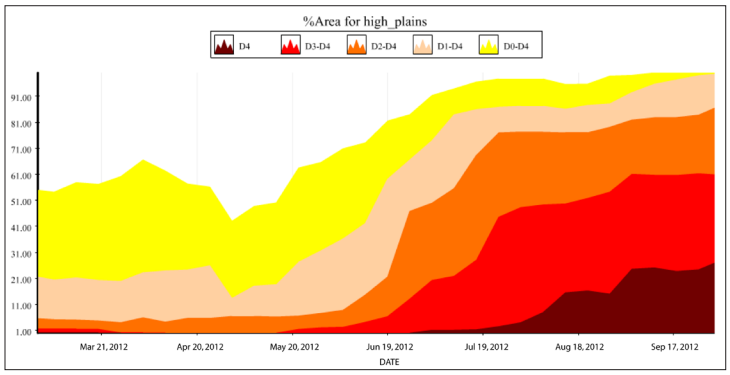
The central Great Plains drought during May-August of 2012 resulted mostly from natural variations in weather.

- Moist Gulf of Mexico air failed to stream northward in late spring as cyclone and frontal activity were shunted unusually northward.
- Summertime thunderstorms were infrequent and when they did occur produced little rainfall.
- Neither ocean states nor human-induced climate change, factors that can provide long-lead predictability, appeared to play significant roles in causing severe rainfall deficits over the major corn producing regions of central Great Plains.

Contacts: Marty Hoerling (martin.hoerling@noaa.gov)
Annarita Mariotti (annarita.mariotti@noaa.gov)

The full report can be downloaded from:
http://www.drought.gov/drought/content/resources/reports

The timing of the 2012 Central Great Plains Drought: Was it a "flash drought?"



This figure was created using the drought monitor graphic tool at http://www.drought.gov/drought/content/tools/drought-monitor-graphics

The 2012 Central Great Plains drought developed suddenly, and did not appear to be just a progression or a continuation of the prior year's record drought event that occurred over the southern Great Plains, but appeared to be a discrete extreme event that developed over the Central U.S. The figure to the left shows the rapid expansion of abnormally dry to exceptional drought conditions during June 2012 for the High Plains (Wyoming, Colorado, Kansas, Nebraska, South Dakota and North Dakota), an example of a flash drought. The x-axis extends from Mar 1, 2012 through Sep 30, 2012.

Impacts of the Central Great Plains Drought

Along with the rapid development of the drought, impacts emerged quite swiftly. Loss estimates by the end of July 2012, before drought severity peaked, were $12B. It remains to be seen if the economic effects of the 2012 drought will approach prior events, including the 1988 drought that inflicted $78 billion in losses and the 1980 event that caused $56 billion in losses (adjusted for inflation to 2012 dollars). Broad sectors were affected, and continue to be affected, by the 2012 drought. Notable for the swiftness of impacts was the reduction in crop yields caused by lack of timely rains. Also, curtailment of commerce on major river systems occurred owing to reduced water flow. It is expected that water supply reductions in the semi-arid western portions of the drought where reservoir storage was depleted by lack of rains will also have long-term impacts, as will livestock health and its long-term effect on herd stocks. Preliminary USDA estimates of farm and food impacts of the 2012 drought indicate corn yield (per acre of planted crop) was about 123 bushels. This is 26% below the 166 bushel yield expectation that the USDA had at the commencement of the growing season.

Was the extent and severity of this drought predicted?

Official seasonal forecasts issued in April 2012 did not anticipate this widespread severe drought. Above normal temperatures were, however, anticipated in climate models, though not the extreme heat wave that occurred and which was driven primarily by the absence of rain.

Report Details

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Assessment Report
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Composed by the Narrative Team of the NOAA Drought Task Force
Lead: M. Hoerling
Co-Leads: S. Schubert and K. Mo
A. AghaKouchak , H. Berbery, J. Dong, M. Hoerling, A. Kumar, V. Lakshmi, R. Leung, J. Li, X. Liang, L. Luo, B. Lyon, D. Miskus, K. Mo, X. Quan, S. Schubert, R. Seager, S. Sorooshian, H. Wang, Y. Xia, N. Zeng

The NOAA Drought Task Force is organized by the Modeling, Analysis, Predictions and Projections Program (MAPP) of OAR/Climate Program Office
http://cpo.noaa.gov/ClimatePrograms/ModelingAnalysisPredictionsandProjections/MAPPTaskForces/DroughtTaskForce.aspx

This report was produced in partnership with the National Integrated Drought Information System (NIDIS)

Contacts: Marty Hoerling (martin.hoerling@noaa.gov)
Annarita Mariotti (annarita.mariotti@noaa.gov)

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