



Field Notes:
Extreme Weather and Community Resilience

[What Connects an Ear of Corn, a Cow and a River Barge? It May be Playing in Your Hometown.](#)

Hot air is in the news again, and the story line is interesting and unusual. No polar bears, no melting icecaps. Instead the news is the devastating effect of a hot atmosphere on our food supply. Everything from breakfast cereal, to hamburgers, to the Mississippi River barges that transport agricultural commodities from the middle one-third of the U.S has been affected.

The unexpected drought in the 18 primary corn-growing states this year underscores yet another way the extreme weather of recent years is hurting our economy. The weather extremes are breaking historic records. Communities can no longer only rely on steady patterns in historical weather records to evaluate extreme weather risk in the future.

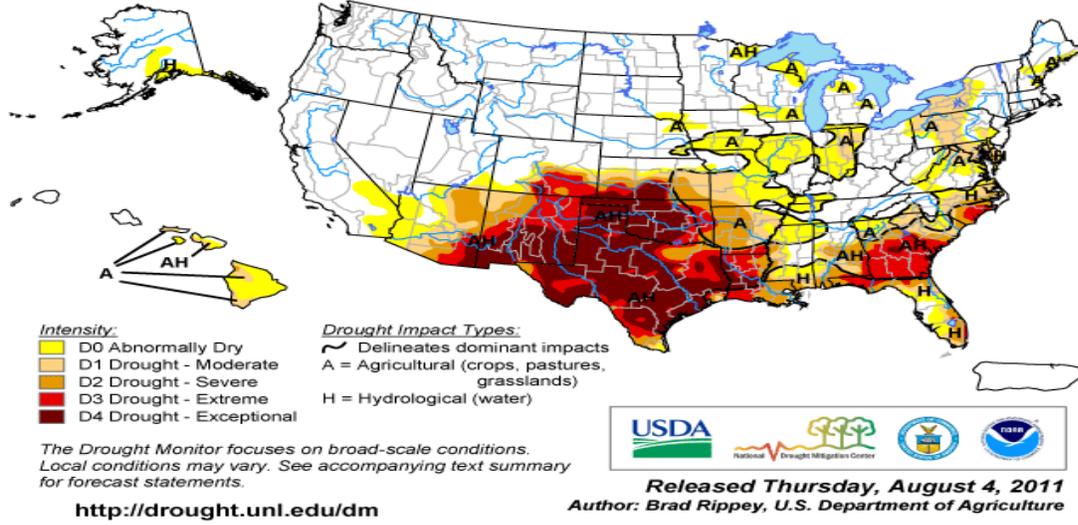
Setting the context is a July 2012 [report](#) released on the National Oceanographic and Atmospheric Administration (NOAA) website. NOAA studied the historic Texas drought of 2011 and concluded a drought of that scale could only be accounted for by atmospheric heating. The report said current heating of the atmosphere made such a drought 20 times more likely than the historical record, alone, would predict.

NOAA's study provides new support for the findings of a 2011 [report](#) by James Hansen, Director of NASA's Goddard Institute for Space Studies, which concluded that such atmospheric heating increases the energy stored in the atmosphere. That stored energy can be tapped by what would otherwise be ordinary droughts or storms of the sizes that are historically familiar, turning them into unpredictable heat-fueled monsters. It doesn't happen every day or perhaps every year, but the frequency is increasing. The Texas drought and 2012's Colorado wildfires illustrate the scale and energy intensity of this new breed of extreme weather. The unpredictability of such events is perhaps most worrying.

Just last year, the worst drought in historical records roasted Texas creating \$ 5.2 billion in [agricultural losses](#). [Texas Forestry](#) estimated the 2011 drought killed 5.6 million urban trees that provided about \$ 280 million annually in economic and environmental values to Texas cities and towns.

U.S. Drought Monitor

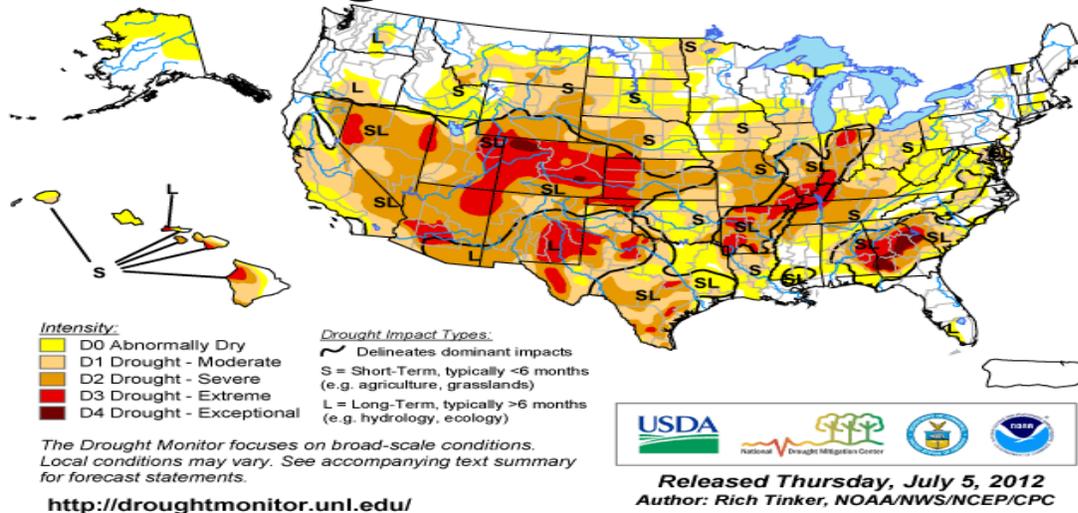
August 2, 2011
Valid 8 a.m. EDT



This year the drought focus has bounced from Texas to the Midwest, Plains, and the Intermountain West. On July 18, 2012, [U.S. Agricultural Secretary Tom Vilsack](#) designated 1,297 counties in the U.S. as agricultural disaster areas. On August 1, 2012, Secretary Vilsack [added 218 counties](#), bringing the total drought disaster count up to 1,515 counties, or 50.3% of all U.S. counties. They are being scorched by a drought that came literally out of the blue, i.e. the atmosphere. Just 4 or 5 months ago, during spring planting, farmers in the region anticipated a bumper corn year and planted 92% of last year's corn acreage. The U.S. Department of Agriculture (USDA) [Weekly Weather and Crop Bulletin](#) issued July 31, 2012 further reduced its forecast for the crop yield in the 18 primary corn states. The USDA described the condition of 48% of 2012 corn acreage in the 18 key states as Very Poor or Poor due to drought. Just a year ago, that 2011 figure was 14%.

U.S. Drought Monitor

July 3, 2012
Valid 7 a.m. EDT



In a normal year, the U.S. is the world's largest corn producer—about 40 percent of the world's supply. This year, however, high temperatures and the failure of expected rain are causing the corn to fail in pollination, the crucial step for creating kernels on the ears. The hardest hit areas have become arid landscapes of stunted stalks and missing or damaged corn ears. The final loss will not be calculated until late summer harvest time.

Field corn is a foundation crop in this region. It supplies feed for dairy and beef cattle, pigs and poultry; and yields corn meal and syrup for consumers. The higher prices from this drought will begin to affect consumers gradually, peaking in 2013 as supplies bottom out, according to Richard Volpe, an economist with the USDA's Economic Research Service, in a [CNN interview](#). But the impacts on local communities throughout the 18 corn-growing states will be more immediate. Bruce Clevenger, an Ohio State University Extension educator, commenting in a [Toledo Blade article](#) on the drought in northwest Ohio, probably spoke for hundreds of rural towns in the region:

The national economy has had its challenges. Production agriculture has been holding up many of our rural communities. And it's not going to be able to hold up as well in 2012. There's not going to be money flowing into rural communities, because we don't have the crops to sell.

The emerging unpredictability of extreme weather isn't limited to droughts and wildfires. At this time in 2011 the Mississippi River was a raging torrent as flood stage water levels burst from the Missouri and Ohio Rivers. Due to the drought this year, the Mississippi flow is now so low that transport barge traffic has been halted at times and locations. Barge operators are carrying smaller, lighter loads that can float over shallow reaches of the river and into newly-shallow river ports. This means that many products from agriculture and manufacturing from the middle one-half of the nation, are being erratically curtailed from economical transport to export markets.

The Take-Away For Community Resilience

Extreme weather can hammer local economies directly, as in a drought killing crops, or indirectly, as in cutting supply or distribution linkages such as the barge traffic. All the major climate models project an increase in these extreme weather events. What is so striking is the scale by which recent events have varied increasingly from the historical weather records of the last-half of the 20th century. For communities working to adapt to new levels of extreme weather, or the multi-decade changes in climate now occurring, this emerging difficult-to-predict quality of weather is a critical challenge.

As a case in point, FEMA's Multi-hazard Mitigation Planning methods, which are extensively used by jurisdictions all across the nation, involve risk assessments of when specific types of extreme weather are likely to reoccur. Many urban centers and some states can afford quite sophisticated models, regularly updated, for estimating return rates.

But smaller jurisdictions often use the simpler calculation of the last-20 or 30-year average return rate for extreme weather in their risk assessments. If it proves to be the case that reoccurrence rates are changing, or worse fluctuating erratically, in response to changes in atmospheric heating, these jurisdictions unknowingly run much greater risk. Their reliance on increasingly unrepresentative historical data creates an unrecognized structural flaw in their risk analyses. In this sense the unpredictability of extreme weather is, itself, becoming a new risk factor that should be independently reviewed when preparing extreme weather risk assessments.

Communities that use the FEMA Multi-hazard Mitigation Plan process should review the emerging irregularity in return rates for extreme weather during their next plan update. Now may be the time for smaller communities to secure better assessments of extreme weather return rates, or probability of return, from state and federal weather agencies.

How to Get Involved

RRI would like to hear from you. If you have questions, comments, or concerns, please contact us at:

Resource Renewal Institute
187 East Blithedale Avenue
Mill Valley, CA 94941
415.928.3774
info@RRI.org

Resource Renewal Institute is a non-profit, non-partisan organization. It focuses exclusively on improving U.S. adaptive management and planning to achieve quality human and natural environments.