Winter 2013

DroughtScape- Winter 2013

Kelly Smith

Winter 2013

National Drought Mitigation Center

DROUGHTSCAPE

The Newsletter of the National Drought Mitigation Center

DIRECTOR'S REPORT

The heat and dryness across the United States last year gave climatologists a lot to talk about, even "flash drought," a term my colleague Mark Svoboda coined back in 2000. Now we have tremendous concerns related to continuing dryness across much of the U.S. People ask whether anything can be done about it. The answer is "yes." First, this drought provides an opportunity to note what is and is not working in terms of drought monitoring, planning, and mitigation (preventing impacts). Secondly, it is great to see all the materials and programs being established by states, extension organizations, and others. Finally, given the stress on limited water resources that is bound to happen as the year progresses, discussions between water users need to start. The National Drought Forum in Washington, D.C., in December was an excellent example of cooperation at the federal level. I hope that by the end of 2013, the drought will be winding down or over, and we will have clearer ideas for how this country can be better prepared for future droughts.

Michael J. Hayes

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The photo above shows a traffic jam on the middle Mississippi River due to low water levels near St. Louis in late 2012 . U.S. Coast Guard photo courtesy of the U.S. Army Corps of Engineers, Mississippi Valley Division.

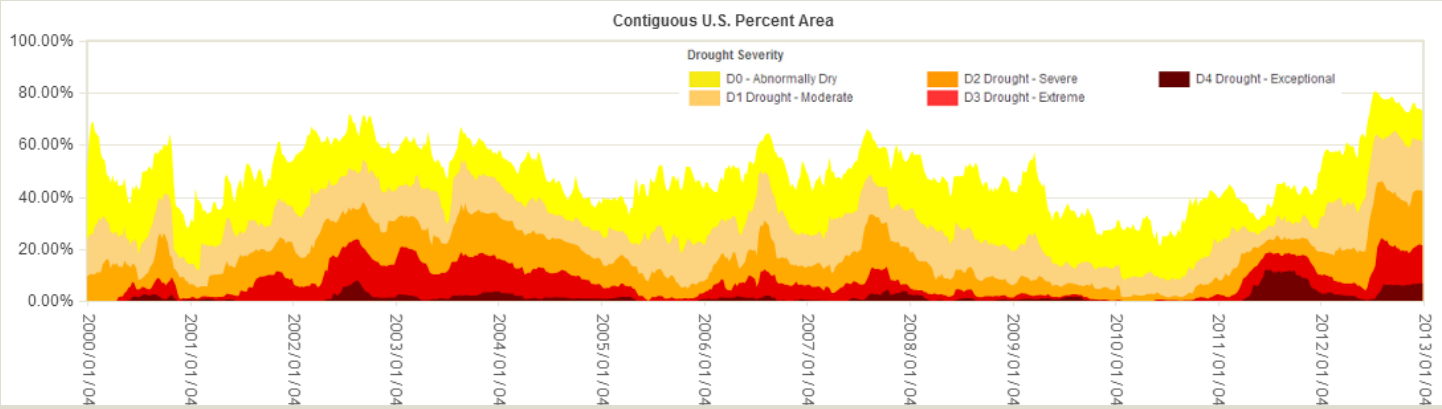
Climatological Review of Drought in 2012

U.S. Drought Monitor Statistical Milestones for 2012 for all 50 states and Puerto Rico		
Milestone	**Percent of Area**	**Date**
Greatest extent of D0-D4	72.38*	July 17, 2012
Greatest extent of D1-D4	54.77*	Sept. 25, 2012
Greatest extent of D3-D4	20.18*	Aug. 7, 2012
Greatest extent of D4	5.62	Dec. 25, 2012
Smallest extent of D0-D4	41.53	Jan. 3, 2012
Smallest extent of D1-D4	26.73	Jan. 3, 2012
Smallest extent of D3-D4	3.29	June 12, 2012
* This was the greatest extent ever shown on the U.S. Drought Monitor map.		

U.S. Drought Monitor Statistical Milestones for 2012 for 48 contiguous states		
Milestone	**Percent of Area**	**Date**
Greatest extent of D0-D4	80.75*	July 10, 2012
Greatest extent of D1-D4	65.45*	Sept. 25, 2012
Greatest extent of D3-D4	24.14*	Aug. 7, 2012
Greatest extent of D4	6.73*	Dec. 25, 2012
Smallest extent of D0-D4	49.59	Jan. 3, 2012
Smallest extent of D1-D4	31.90	Jan. 3, 2012
Smallest extent of D3-D4	3.92	June 12, 2012
* This was the greatest extent ever shown on the U.S. Drought Monitor map.		

By Brian Fuchs, Climatologist, National Drought Mitigation Center

Southeast: At the beginning of 2012, drought was ongoing over much of the Southeast with the epicenter over Georgia. At the end of the year, there was little overall improvement and the situation in Georgia actually intensified. The year started with 45.62 percent of the region in drought and ended with 49.46 percent in drought. Exceptional drought (D4) had been introduced in Georgia and Alabama back in January of 2012 and at the end of the year, 13.53



This graph shows the percent area of the contiguous United States in each category of drought since 2000. It shows a steep increase in the area in drought in 2012, reflecting the sudden-onset, "flash-drought" of 2012. Drought in 2012 set a record for the greatest extent of coverage in the 13 years of U.S. Drought Monitor data.

percent of Georgia was in D4 and 3.68 percent of Alabama was in D4. The amount of drought peaked for the year in May when 69.25 percent of the region was in some level of drought. The smallest extent of drought in the region was 14.51 percent in October.

Precipitation departures from normal for the region in 2012 ranged from 16 to 20 inches below normal for parts of Georgia to a surplus of 8 to12 inches over portions of Florida and Mississippi. The statewide rankings for the year showed Georgia had the 10th driest year on record. Temperatures were above normal for the entire region for 2012. Tennessee had its second warmest year on record, and North and South Carolina had their sixth warmest years.

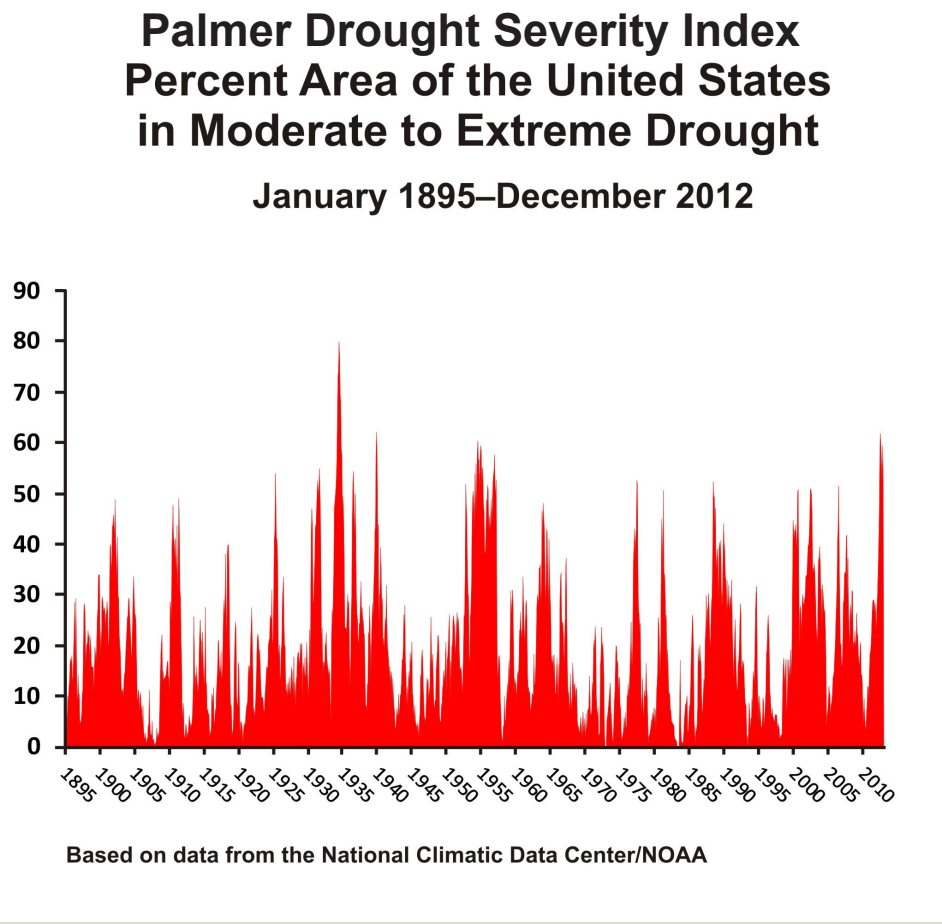
Northeast: Drought was not a great concern for the Northeast in 2012. The year started with the northeast being drought-free and ended the same. Drought conditions peaked for the region in April when 27.68 percent of the area was in drought. The drought areas were limited to the coastal regions from Delaware to Massachusetts and peaked at D2 (severe drought). Drought conditions improved quite rapidly as rains returned to the region and by the end of May, only 4.89 percent of the region was in drought.

Temperatures were well above normal for the region. New York, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New Jersey and Rhode Island all recorded their warmest year on record while Maine had its fourth warmest, Pennsylvania its third and Maryland it's second warmest.

South: Drought conditions that developed in 2010 carried on in the region through 2012. The year started with 69.01 percent of the area in drought and ended with 65.56 percent in drought. The extent of drought peaked in July when 73.67 percent of the region was in drought and the greatest extent of extreme-exceptional drought (D3-D4) came in January when 40.06 percent of the region was affected. At least some portion of Texas has been in drought continuously since May of 2010, and in Oklahoma, some portion of the state has been in drought since June 2010.

Except for Louisiana, most areas ended the year with below-normal precipitation. Deficits ranged from 15 to 20 inches below normal in Oklahoma and Arkansas to 5 inches below in portions of Texas. The yearly rankings for precipitation had Arkansas with its 10th driest year and Oklahoma with its 12th. As with many other locations, the temperatures recorded in 2012 were extreme. Oklahoma and Texas both recorded their warmest years on record, Arkansas had its 2nd warmest, and Louisiana its 6th.

Midwest: The first widespread drought throughout the region



Comparison of drought in 2012 with past droughts, from the National Climatic Data Center's "State of the Climate, Drought, Annual Report," dated Jan. 8, 2013, at http://www.ncdc.noaa.gov/sotc/drought/2012/13

"As seen in the National Drought Overview section, the percent area of the contiguous U.S. experiencing moderate to exceptional drought (based on the USDM) reached 65.5 percent in September, a record in the 13-year USDM history. The percent area of the contiguous U.S. experiencing moderate to extreme drought, based on the Palmer Drought Index (which goes 113 years), peaked at about 61.8 percent in July. This is only slightly larger than the peak percent area values of the 1950s drought decade and is the largest value since December 1939. So, in terms of total area covered by drought, the 2012 drought closely resembles the 1950s droughts."

since 1988 developed in 2012. The year started off with only 13.47 percent of the region in drought and ended with 54.93 percent in drought. The extent peaked in July when 73.69 percent of the region was in drought. The rapidly developing drought came after seeing only 5.80 percent of the region in drought early in May. Not only did the drought develop quickly, but it also intensified quickly. In the middle of June, there was no D3 or D4 drought in the region but by early August, 38.19 percent of the region was in extreme or exceptional drought (D3/D4).

Precipitation deficits for the year were greatest over southern Missouri and southern Illinois, where departures were 20 inches or more below normal. Much of Missouri recorded deficits in the 12 to 16-inch range. For the year, Missouri had the seventh driest year on record, Illinois the 10th driest and Iowa and Indiana the 11th. As in other parts of the country, temperatures along with dryness helped to instigate the development of drought over the region. Illinois, Missouri, and Ohio each had the warmest year on record. Indiana, Iowa and Wisconsin recorded the second warmest year, and Minnesota, Michigan, and Kentucky, the third.

High Plains: Similar to what occurred in the Midwest, the High Plains started the year with very little drought, which would change rapidly during the summer months. As 2012 started, only 18.12 percent of the region was in drought, mainly confined to areas in southern Kansas and Colorado. The year ended with 93.01 percent of the region in drought, with the most intense areas in Nebraska, Kansas and South Dakota. The drought peaked in the region in early October when 99.62 percent of the area was in drought compared to just 19.18 percent the year before. The drought was widespread and intense. In early September, 61.28 percent of the region was in extreme to exceptional drought (D3-D4) and almost 78 percent of Nebraska was in D4. Very little relief has been observed and significant drought continues in the region.

Precipitation deficits and extreme heat were the driving forces behind the rapidly developing drought. Precipitation deficits ranged from 12 to 16 inches below normal in Nebraska and Kansas to 8 to 12 inches below normal in parts of Wyoming and South Dakota. Almost the entire region was below normal for the year. Both Wyoming and Nebraska had their driest and warmest years on record in 2012. Kansas had the seventh driest year on record and Colorado the fourth. South Dakota and Kansas had the warmest year on record. For North Dakota and Colorado, it was the second warmest year on record.

West: As with the Plains and Midwest states, the western United States had a year in which drought development was widespread. After a very good water year in 2010-2011, the 2011-2012 water year was not as good. The region was only 28.05 percent in drought at the beginning of 2012 and ended with 69.42 percent in drought. The drought peaked in spatial extent in September when 77.15 percent of the region was in drought, and extreme to exceptional drought peaked at the end of December, at 18.83 percent.

Precipitation deficits were greatest over the southwest, where in New Mexico, they ranged from 8 to 12 inches below normal and in Montana they were 4 to 8 inches below normal. New Mexico experienced the second driest year on record and Washington recorded its fifth wettest year. As with the rest of the country, temperatures were extreme. New Mexico and Utah recorded the warmest years on record. Nevada had the second warmest year on record, Montana and Idaho the third, and California the fourth.

Hawaii, Alaska and Puerto Rico: Drought was ongoing on many of the Hawaiian Islands in 2012. The year started off with 47.37 percent of the state in drought and ended with 63.34 percent in drought. The greatest extent of drought in Hawaii came during early December when 73.23 percent was in drought. There was no exceptional drought on the islands during the year, but in 2012, extreme drought affected the Big Island, Maui, Molokai, and Lanai, peaking at 11.01 percent of the state in October. The last time the Hawaiian Islands were drought-free was in April 2008. There was no drought in Alaska or Puerto Rico during 2011.

How hot was it?

2012 was the hottest year on record for the lower 48 states, and it beat the previous record by a whole degree Fahrenheit, which is quite a leap in context of average temperatures. The annual average temperature for 2012 was 55.3 degrees F, a full degree warmer than the previous record warm year of 1998.

See NCDC's State of the Climate National Overview Annual 2012, Jan. 8, 2018, http://www.ncdc.noaa.gov/sotc/national/2012/13

Drought, October-December 2012, and Outlook

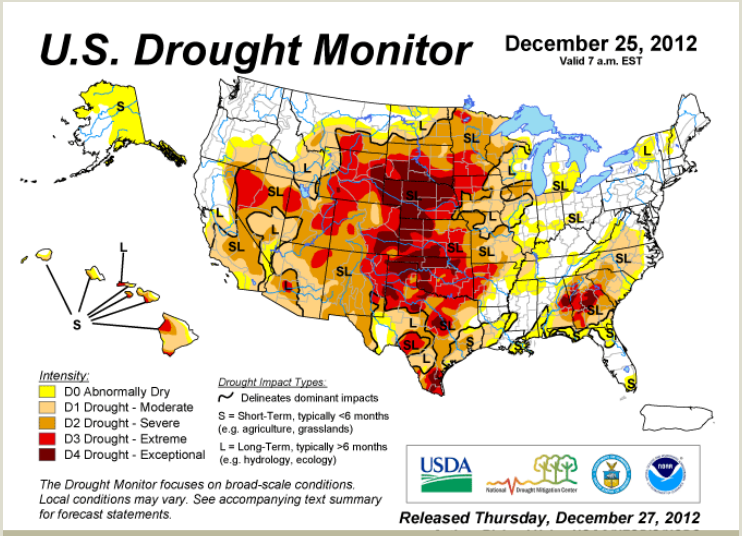
By Brian Fuchs, Climatologist, National Drought Mitigation Center

Drought classifications are based on the U.S. Drought Monitor. Details on the extent and severity of drought are online at http://droughtmonitor.unl.edu/archive.html. The outlook integrates existing conditions with forecasts from the National Oceanic and Atmospheric Administration's Climate Prediction Center: http://www.cpc.ncep.noaa.gov/

October: A break in the persistent heat observed over the last several months finally came for much of the central United States in October, but the cooler weather didn't bring more rain to the Plains where it was needed most. Drought eased during October, with 50.35 percent of the country in drought at the end of the month compared to 54.04 percent at the beginning. But as drought eased over the eastern Corn Belt, it developed and intensified over parts of the West. Temperatures were 2 to 4 degrees Fahrenheit below normal from Montana into the southern U.S., although areas of the Great Basin and Southwest were above normal. Portions of New England also recorded temperatures above normal. Much of the country recorded well below-normal precipitation for the month and the drought areas of the central plains saw little relief. But areas from the Pacific Northwest to Idaho, Montana and North Dakota recorded up to 200 percent of normal precipitation for the month. Also recording more than 100 percent of normal precipitation for the month were Iowa, Illinois, Wisconsin, Michigan, Ohio, Pennsylvania, West Virginia, Maryland, New Jersey, New York, Vermont, and New Hampshire.

November: The easing of drought observed during October did not persist into November. By the end of November, the proportion of the United States that was in drought had increased to 52.44 percent. This is more than double the amount of drought at the end of November 2011, when 24.61 percent of the United States was in some level of drought. Most of the country had below normal precipitation for the month, with only areas of the northern Rocky Mountains and the Pacific Northwest above-normal. Above-normal temperatures returned for almost all areas west of the Mississippi River. Parts of Wyoming had temperatures 6 to 8 degrees Fahrenheit above normal. East of the Mississippi River, temperatures were cooler, with areas along the southeastern coast recording temperatures 4 to 6 degrees Fahrenheit below normal.

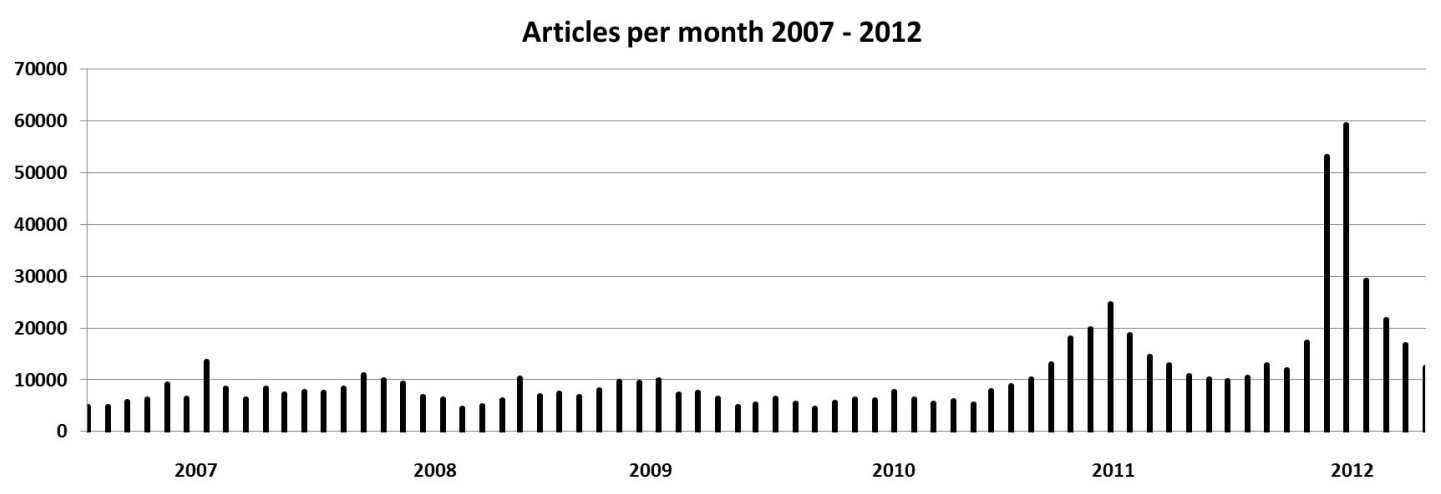
December: Drought continued its hold through December with only minimal reduction in the extent. December ended with over half of the United States still in drought, 51.76 percent at the end of the month compared to 52.44 percent at the beginning. Temperatures were again well above-normal for most of the country, especially in the Midwest, with departures 6 to 8 degrees Fahrenheit above normal. Much of the central and southern Plains had below-normal precipitation, which maintained the historical drought conditions in the region. At the end of the year, 77.46 percent of Nebraska was in exceptional drought (D4), 37 percent of Oklahoma was in D4, 36 percent of Kansas was in D4, and 31 percent of South Dakota was in D4. Portions of Oklahoma, Kansas, New Mexico and Texas are in a multi-year drought, with compounding impacts reflecting the prolonged dryness.



The Dec. 25, 2012, U.S. Drought Monitor set a record for the proportion of D4 in the contiguous states in the 12 years of Drought Monitor data.

Outlook

For much of the Plains and Rocky Mountain states, the established dry and warm pattern that contributed to record-breaking drought in 2012 is likely to continue into 2013. The prospects of widespread improvement to the drought status of the United States are minimal over the winter months.



Widespread drought in 2012 brought a surge in media interest, notably in July and August. The NDMC uses an electronic clipping service to cull media articles on drought each day for the Drought Impact Reporter, online at http://droughtreporter.unl.edu

Drought of 2012 affected ag, water supplies and more

by Denise Gutzmer,
Drought Impact Specialist

Agriculture

Drought spread rapidly through the Corn Belt in early summer 2012, reducing yields and raising prices, which affected livestock producers, ethanol manufacturers and prices at the grocery store. The USDA's Risk Management Agency reported Jan. 15 that insurance claims for all crops in 2012 had reached $11.581 billion, the highest ever.

Corn production for 2012 is estimated at 10.8 billion bushels, 13 percent below 2011, the U.S. Department of Agriculture reported Jan. 11. Corn futures reached a new record at $8.49 per bushel in August on the Chicago Mercantile Exchange.

Drought will continue to squeeze the beef industry in coming months, as feed prices remain high. The number of cattle placements onto feedlots slipped in July and August and fell by 19 percent in September, compared with September 2011, according to the USDA. At the end of October, 54 percent of the nation's pastures were in very poor to poor condition, pushing producers to purchase expensive feed or sell livestock.

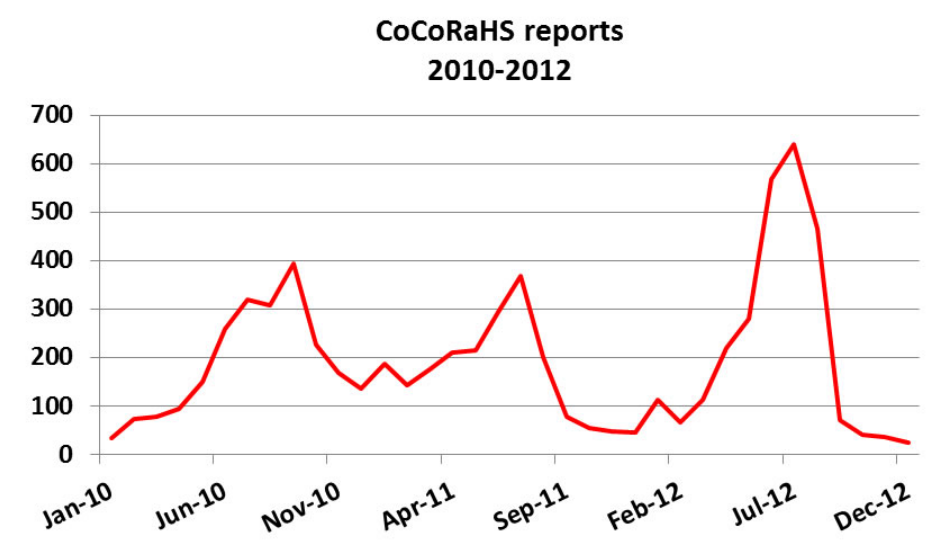
U.S. pork production reached an all-time high in October when 10.86 million head were slaughtered, according to the USDA. The October figure was 10 percent higher than the slaughter count from October 2011. Drought drove feed prices to new highs, forcing pork producers to liquidate herds rather than purchase expensive feed. Pork production was 2.21 billion pounds or 9 percent higher than last year.

Ethanol

Ethanol production fell by 20 percent in Iowa and by 30 percent in Nebraska in 2012 as high corn prices combined with reduced corn production from drought and heat raised concerns over the amount of corn used in ethanol production (Huffington Post, Aug. 3, 2012). Numerous ethanol plants closed throughout the summer and fall as high corn prices made ethanol production unprofitable.

Processors and ethanol producers in Illinois imported corn from North Dakota, which had a record corn crop, while drought limited corn production in Illinois. The North Dakota corn was also in demand because it was free of aflatoxin, unlike some of the corn grown in drought-stricken states. Ethanol producers sell leftovers for cattle feed. Corn from North Dakota was even shipped to Oklahoma and Texas, while corn from southern states, such as Louisiana and Mississippi, was making its way upriver. Traders say that shipping patterns occasionally vary, but never to the degree that it has this year with huge volumes of corn coming into the Corn Belt rather than leaving it (Reuters, Oct. 29, 2012).

Limited corn supplies spurred governors of at least ten states, including Arkansas, North Carolina, New Mexico, Georgia, Texas, Virginia, Maryland, Delaware, Utah, and Wyoming, to request a waiver on ethanol production from the Environmental Protection Agency because the exorbitant cost of corn-based feed hurt the pocketbooks of livestock producers. The EPA refused to waive the mandate requiring the production of 13.2 billion gallons of fuel this year, saying that a waiver would not decrease corn prices much and that there was not sufficient evidence of "severe



Since the Drought Impact Reporter established a partnership with the CoCoRaHS network of weather observers, we've seen what appear to be seasonal peaks in reports from observers.

CoCoRaHS Report, Illinois, 9/11/2012:

"... Many cottonwood trees along the woods line have lost their leaves. Only the cottonwoods right along and in the creek remain green. Most box elder leaves are shriveled on the branch and brown in some cases. The maple trees are just beginning to drop green leaves, with the exception of the Amur maple, which seems healthy. The oaks look pretty good but have small acorns that are falling by the bushel. The squirrels are jammin'. ..."

economic harm" to any state or region of the U.S., warranting a change in the mandate.

Ethanol producers in the U.S. were losing $0.36 per gallon produced, compared to a profit of $0.24 per gallon a year ago, according to a November estimate made by Bloomberg, based on assessment of federal data, December corn and ethanol contracts posted to the Chicago Board of Trade (Sioux Falls Argus Leader, Nov. 11, 2012). The majority of ethanol producing plants are located in the Midwest.

Winter Wheat

The status of winter wheat in the parched Midwest was at its lowest point for the end of October since the USDA began tracking crop conditions in 1985. On Oct. 28, roughly 40 percent of the winter wheat was in good to excellent condition, while 15 percent was in poor to very poor condition. At the same time last year, 46 percent of the crop received the top rankings. By late November, 26 percent of the winter wheat crop was in poor to very poor condition.

Overall Economic Impact

Drought pulled down economic growth in the U.S. by 0.17 points in the second quarter of 2012 and by 0.42 points from July through September, according to the U.S. Bureau of Economic Analysis. The Bureau's analysis did not include reduced exports (Washington Post, Oct. 26, 2012).

Food Banks

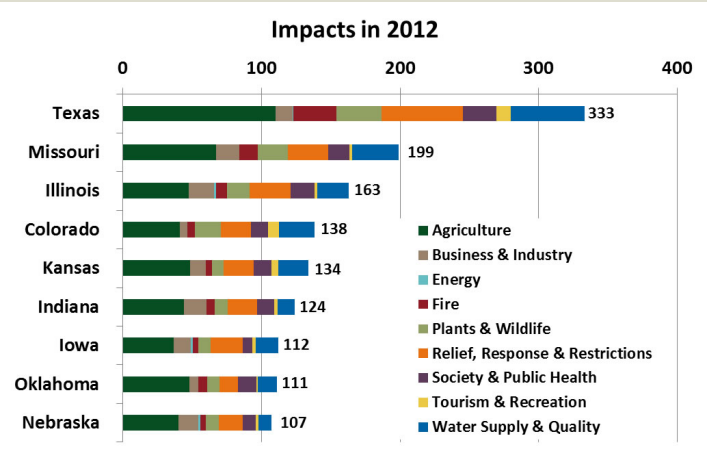
Food banks across the U.S. were struggling to provide food for roughly 50 million people seeking assistance. The government made $352.5 million in food purchases through The Emergency Food Assistance Program (TEFAP) in the fiscal year that ended on Sept. 30, 2012, but the amount of commodities purchased this year was less than half of the $723.7 million in food purchased three years ago. TEFAP aims to support agricultural prices and alleviate surpluses through its purchases, which wasn't needed so much this year as in other years. Food purchased through the TEFAP is also used to provide food banks with needed supplies, but there is much less to go around lately, leaving food bank shelves bare, despite increased need (Reuters, Nov. 21, 2012).

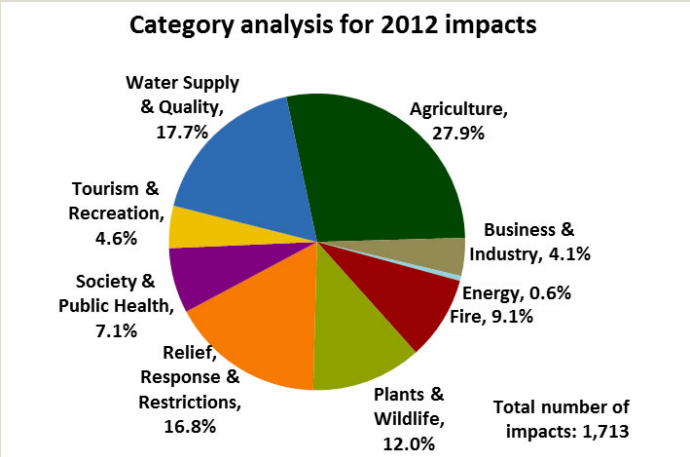
Disaster declarations

The USDA had announced secretarial drought designations for 2012 for 2,324 counties through Jan. 9, 2013, as drought baked the nation. The USDA deployed several programs to help ease the effects of drought, including extending emergency grazing on Conservation Reserve Program acres; buying $170 million of pork, lamb, chicken and catfish for federal assistance programs and to help livestock producers; and reducing the emergency loan rate; and simplifying the drought disaster declaration process by tying it more closely to the U.S. Drought Monitor.

Hay and thefts

Hay thefts occurred in Oklahoma, Texas, New Mexico, Colorado, Missouri and California as drought drove hay prices higher. In many cases, bales of hay were stolen, while in other instances, cattle found their way into pastures that did not belong to the cattle's owner. Some farmers in Missouri have taken to painting hay bales vibrant colors to deter hay thieves. In Butler County, Kansas, the sheriff and some farmers used deer cameras to watch for





In 2012, the Drought Impact Reporter recorded 1,469 impacts. Texas, which has been in drought since 2010 and is a large state with a large population, had the most of any state. The single largest sector affected was agriculture, followed by water supply. Impacts also related to government responses to drought, the environment, wildfire, public health and businesses.

hay thieves. In Tillman County, Oklahoma, the sheriff planted a GPS unit in a bale of hay located in a field where hay rustlers had already struck, hoping that they would strike again, and managed to catch the thieves red-handed. A Wagoner, Oklahoma, man was shot in a dispute over hay bales.

State Ag Losses:

Nebraska

Drought reduced Nebraska's corn production by 18 to 22 percent in 2012, stated the director of research for the Nebraska Corn Board, for a loss of roughly $240 million. The state produced 1.4 to 1.5 million bushels on average over the last ten years, he said, but expected to harvest about 1.3 million bushels this year. Dryland farmers found that their efforts did not yield much with the drought and heat. A dryland farmer in southwestern Nebraska said his corn was a total loss. Another dryland farmer northeast of Lincoln said his yield was 90 bushels per acre, which was a little more than half of the usual yield. Ninety-one to 92 percent of the corn crop was harvested in 2012, in comparison with an average harvest of 97 percent of the acres planted (*Grand Island Independent*, Dec. 5, 2012).

Oklahoma

Oklahoma State University researchers tallied the state's losses from drought in 2012 -- including crops, livestock, wildfire property losses and costs to municipalities -- at $426 million. The losses for crops, including hay, alfalfa, soybeans, cotton and grain sorghum were $239,299,520; livestock losses, including lost pasture production and fewer winter stockers, were $157,109,000; wildfire property losses amounted to $27,299,000; and drought cost municipalities $2,418,000 (KOSU-FM Oklahoma Public Radio, Dec. 5, 2012).

Kansas

All Kansas counties were in a drought emergency with crop losses estimated at $1.5 billion (KSCB / KLDG, Liberal, Kansas, July 26, 2012).

The Kansas dairy commissioner said that 16 dairymen statewide had to dump milk since Sept. 11 because the level of aflatoxin in the milk was too high from the cattle eating aflatoxin-tainted corn. A dairyman in Reno County dumped about $5,000 worth of "hot milk" on his alfalfa for one week in October because the level of aflatoxin was too high for the milk processing plant to accept it. Since changing his cows' feed ration from corn to milo and wheat, the cows were not getting adequate energy from the feed and were producing less milk (*The Hutchinson News*, Oct. 19, 2012).

Arkansas

Drought cost Arkansas beef cattle producers about $128 million, according to a survey done by the University of Arkansas System Division of Agriculture. Because the estimate does not include economic impacts at a community level, the loss estimate is considered to be conservative. The loss amounts to $141 per cow in the state. Most Arkansas

A WWII minesweeper surfaced in the Mississippi River as water levels receded. U.S. Coast Guard photo courtesy of the U.S. Army Corps of Engineers, Mississippi Valley Division.

ranches have roughly 36 head of cattle, amounting to an average loss of $5,000 for each producer (KTHV-TV CBS 11 Little Rock, Arkansas, Sept. 27, 2012).

Mississippi River

Navigation on the Mississippi River was threatened by the dry summer and reduced water releases from the Missouri River in late November, causing navigation difficulties between St. Louis and Cairo, Illinois. Governors, politicians and businesses protested the reduced water releases and asked President Obama for an emergency declaration because lower water releases might have stopped barge traffic on the Mississippi River between St. Louis and Cairo, wreaking havoc on the regional economy. The estimated end to movement on the river was initially set for mid-December, but has been pushed to February. The Army Corps of Engineers hastened the removal of rock pinnacles that impeded barge movement and were optimistic that barge traffic could continue to move on the river.

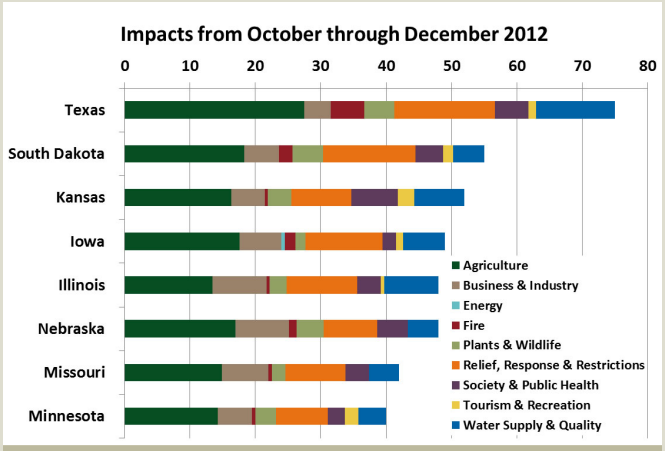
Dust

Dry conditions led to dust storms in the southern Great Plains since there was little precipitation to tamp down the dust. Storms blew across Colorado, Kansas, Oklahoma, Texas, New Mexico and Arizona, reminiscent of the Dust Bowl Years. Blowing dust and poor visibility caused multi-vehicle accidents in Texas and Oklahoma. An enormous dust storm in northern Oklahoma caused a multi-car accident involving three dozen vehicles, including tractor-trailers, on Interstate 35. Nine people were hurt, but fortunately, there were no fatalities. A captain with the Oklahoma Highway Patrol said that visibility was less than ten feet during the storm (WHBF, Oct. 18, 2012). Without rainfall to remove dust and particulate matter from the air, allergies were worse than usual from Wyoming to Texas to Indiana and began earlier than usual.

Wildlife

Fish kills were common throughout the Midwest during the summer because warm water holds less dissolved oxygen for the fish.

Many deer died in Midwestern states as epizootic hemorrhagic disease killed at least 700 deer in Illinois, more than 100 whitetail deer in southern Butte County, South Dakota, more than 8,000 whitetail deer in Michigan, about 400 deer in Kansas, 700 to 1,000 deer in southeastern South Dakota and nearly 6,000 deer in Nebraska. When more deer congregate around fewer water sources, there is greater potential for the disease to spread easily.



Drought Impact Reporter moderators added 138 impacts in the final quarter of 2012.

Wildfire

The blistering summer of 2012 contributed to the unusually high number of acres in the United States burned by wildfires last year. Through Nov. 9, there were 9,101,461 acres burned, according to the National Interagency Fire Center. The spokesman for the National Interagency Fire Center in Boise said, "Since 1960, when we began keeping good records, surpassing 9 million acres burned has only happened three times: this year, 2006 and 2007" (*USA Today*, Nov. 12, 2012).

Contracting soils

The 2012 drought has likely been the worst for home foundations since the late 1950s drought, stated a board member of the Basement Health Association, a Dayton, Ohio-based trade group for basement and foundation repair businesses. Homes from the Dakotas through Louisiana were faring the worst, but damage to foundations from drought has been reported in 40 of the contiguous states. Experts estimate that drought damage to houses could reach $1 billion or more (*U.S. News and World Report*, Aug. 31, 2012).

Water main breaks due to drought have been reported across the country in areas with soil types, such as clay, that contract in drought. Cities where a high number of breaks were reported included Topeka and Salina, Kansas; Columbia, Missouri; Omaha, Nebraska; Kansas City, Missouri; and Houston, Texas.

Municipal supplies

Drought depleted water supplies throughout the Midwest, leading to voluntary and mandatory water conservation measures in Nebraska, Kansas, Colorado, Iowa, Illinois, Indiana, Missouri, Oklahoma and Texas. More recently, the low level of the Mississippi River was jeopardizing water supplies for communities along its banks.

Hydropower

Waning water supplies decreased hydropower production in Iowa, Illinois and Louisiana.

Webinar series for ranch advisors highlights drought planning

A winter/spring webinar series will provide drought planning information and tools to advisors seeking to help Great Plains ranchers better prepare for and respond to drought. The SARE-supported webinars are scheduled from January through May 2013, on the last Wednesday of each month.

"What happens from January through May will be really critical," said Lynn Myers, a Sandhills rancher who will be one of the January presenters. "For example, it could determine whether there are cattle in the western Sandhills in 2013."

Each one-hour webinar will start at 10 a.m. central time with a briefing on current drought status and what to expect in the foreseeable future, followed by a session on a specific topic or tool related to drought planning, and question-and-answer time. The webinars, organized by the NDMC, will be led by ranchers and advisors with hands-on experience in drought planning and range management.

Jerry Volesky, a range and forage specialist at the UNL West Central Research and Extension Center in North Platte, Nebraska, will introduce the series by talking about why ranchers need drought plans: "It leads to earlier and more effective management decisions that can have positive economic benefits," he said. "Additionally, ranchers that have well-developed plans indicate that their plans have made the drought event less stressful and it gives them a sense of confidence."

Dates, topics and presenters in the series are:

January 30: Managing Drought Risk on the Ranch: The Planning Process, by Jerry Volesky, range and forage specialist at the UNL West Central Research and Extension Center in North Platte, Nebraska, and Lynn Myers, owner of Tippets-Myers Ranch in western Nebraska.

February 27: Avoiding Analysis Paralysis: Monitoring and Setting Critical Dates for Decision Making During Drought, by Dwayne Rice, rangeland management specialist, NRCS, Kansas; Ted Alexander, owner of Alexander Ranch in south-central Kansas; and Cal Adams, owner of Adams Ranch in north-central Kansas.

March 27: The New Cumulative Forage Reduction (CFR) Index: Assessing Drought Impacts and Planning a Grazing Strategy, by Pat Reece, owner and senior consultant of Prairie Montane Enterprises and Professor Emeritus of the University of Nebraska–Lincoln.

April 24: Using a Drought Calculator to Assist Stocking Decisions, Stan Boltz, state range management specialist, NRCS, South Dakota.

May 29: Economic Factors to Weigh in Making Decisions during Drought, by Matt Stockton, agricultural economist at the UNL West Central Research and Extension Center in North Platte, Nebraska.

The sessions are free and open to the public. Registration is required to receive the Adobe Connect webinar link. To register, go to http://go.unl.edu/uwk.

UNL honors NDMC for "exceptional service" during drought in 2012

Michael Hayes and the National Drought Mitigation Center received the "Omtvedt Innovation Award" Jan. 17 in recognition of exceptional service at the University of Nebraska and the Institute of Agriculture and Natural Resources.

Hayes, director of the NDMC and faculty member in the School of Natural Resources, credited the award to "the team attitude" at the drought center, which has been a resource for media and policymakers as drought conditions gripped a vast portion of the United States last summer and fall. In addition to providing analysis and commentary for media, the NDMC is the lead academic partner on the U.S. Drought Monitor and hosts the website, held producer-oriented workshops around the region, briefed members of Congress, and helped organize a National Drought Forum in December in Washington, D.C.

"It is an honor to receive this particular award, and I am very excited to see the entire NDMC team recognized for its national outreach efforts," Hayes said.

Report: Integrate drought into other planning processes

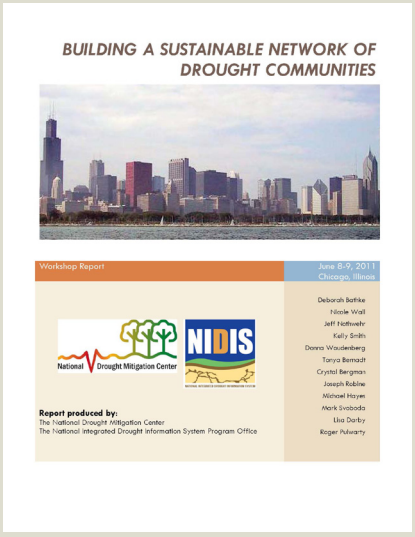
As many parts of the country prepare to enter a second or third year of drought, decision-makers may benefit from the collection of drought planning experiences in the newly released report from Building a Sustainable Network of Drought Communities, a workshop held in June 2011 in Chicago. The workshop was organized by the Engaging Preparedness Communities working group of the National Integrated Drought Information System.

A key theme was the need to integrate drought planning into other planning processes at all levels of government. Findings included:

1) Drought plans should be vertically integrated from state to basin or local jurisdictions.

2) Drought planning should be incorporated into many other planning processes and policy decisions. The American Planning Association is leading an effort to integrate drought planning practices into other municipal planning processes, such as comprehensive planning, capital improvement and infrastructure planning, and water supply planning. This effort builds on a previous APA-FEMA project to incorporate multi-hazard planning into urban planning. Other plans workshop attendees mentioned that should incorporate consideration of drought include climate change plans and emergency plans.

3) ICLEI-Local Governments for Sustainability found a perceived conflict between climate change planning and other priorities, so they recommended that the vast majority of communities should not do separate climate change mitigation and adaptation plans, but should incorporate the related principles into existing planning processes. ICLEI also found that an expert climate science provider such as a university, RISA program or state climatologist is critical.



4) Simulated drought exercises can help organizations and their stakeholders test and refine plans, train staff and update stakeholders. It's a good idea to use actual historic data on drought conditions, but not too much, because virtual drought exercises are a chance to practice decision-making under uncertainty. The Interstate Commission of the Potomac River Basin has been holding an annual drought exercise for more than 20 years. More recently, Agriculture and Agri-Food Canada have pioneered the Canada Invitational Drought Tournament, and the State of Colorado conducted a similar exercise.

5) Vulnerability tools need to be refined and standardized for use at the local level. That was one of many findings from AMEC, a consulting company that worked with the Colorado Water Conservation Board to develop a municipal drought management plan guidance document.

6) The State of Texas found that the original five-year planning cycle was too long, so they changed it to one year. Five years is likely to bring new laws, organizational structures, staff, agency roles, and shifting resources. The shorter cycle helps keeps individuals and agencies engaged and involved.

7) In communicating with the public and stakeholder groups, create fact sheets, web sites, press releases and information tailored for each group's knowledge level.

For more insights on drought planning and the emerging drought planning community of practice, please refer to the full report, http://www.drought.unl.edu/NewsOutreach/Outreach/Workshops/BuildingaSustainableNetwork,Chicago.aspx

Join Feb. 6 webinar on drought simulations

The Engaging Preparedness Communities working group of the National Integrated Drought Information System is offering a free webinar at noon CST on Feb. 6, "Using Simulations to Plan and Prepare for Drought." Canada, the state of Colorado and the Delaware River Basin Commission have all used various drought simulations to improve drought preparedness. The webinar will also include an update from the NIDIS program office. The webinar link and specific directions will be emailed to you after registration. If you have any questions, please contact Nicole Wall, NDMC public participation specialist, nwall2@unl.edu, 402-472-6776. Webinar registration link:

http://go.unl.edu/v7c

Climate Masters of Nebraska creating informed activists

Citizen volunteers taking the Climate Masters of Nebraska course early this year will learn how they and their neighbors can work to reduce climate change. Besides the basics of climate change, class sessions will focus on home energy audits, green building, renewables, transportation, water conservation and drought, consumption and waste, and yards and food, with field trips to a nearby landfill and to EcoStores Nebraska.

Tonya Bernadt, NDMC education and outreach specialist, is coordinating Climate Masters, working with Natalie Umphlett, regional climatologist at the High Plains Regional Climate Center, and with Tapan Pathak, University of Nebraska-Lincoln climate extension educator. All are based in UNL's School of Natural Resources. Climate Masters is made possible by a grant from the Environmental Protection Agency. Cleaner Greener Lincoln is the local partner.

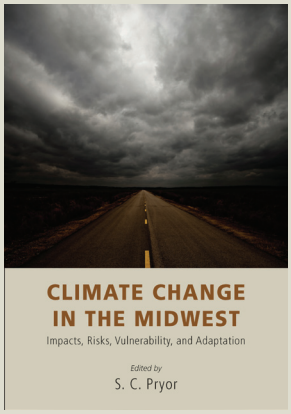
After completing the free course, taught by a variety of experts from the Lincoln community, the volunteers will provide 30 hours of climate education in community settings of their choosing, Bernadt said. For example, after the first Climate Masters course in Lincoln last year, participants formed a local chapter of the Climate Citizens Lobby and regularly sponsor educational events. Opportunities for this year's participants include doing waste assessments for businesses and facilitating discussions on choices related to sustainable living.

For more information, please visit climatemasters.unl.edu

At community events such as Lincoln's Earth Day celebration, the 2012 Climate Masters of Nebraska volunteers taught others about individual actions to reduce greenhouse gas emissions.

Climate Change in the Midwest includes chapter on drought

Mike Hayes, NDMC director, has a chapter, "The Drought Risk Management Paradigm in the Context of Climate Change," in a newly published book, *Climate Change in the Midwest: Impacts, Risks and Vulnerabilities*, edited by S.C. Pryor and published by Indiana University Press. According to the publisher's description, the research presented in this volume focuses on identifying and quantifying the major vulnerabilities to climate change in the Midwestern United States. By providing state-of-the-art spatially disaggregated information regarding the historical, current, and possible future climate within the region, the contributors assess the risks and susceptibility of the critical socio-economic and environmental systems. Key sectors discussed are agriculture, human health, water, energy and infrastructure, and the vulnerabilities that may be amplified under current climate trajectories. The book also considers the challenges and opportunities to develop local and regional strategies for addressing the risks posed by climate change in the context of developing an integrative policy for the region.



Novel perspectives on drought of 2012

The record-making drought of 2012 yielded a bumper crop of media coverage (see page 6) including some video efforts that took fresh angles on the topic.

The Drone Journalism Lab at the University of Nebraska-Lincoln used an unmanned aerial vehicle to capture video of the Platte River during drought in 2012. They combined that video with traditional interviews and reporting to produce a strong piece that was enhanced rather than dominated by the distinctive aerial images. See http://www.youtube.com/watch?v=HV0iKlF9AdA

The BBC's Newsnight visited the NDMC, the Robert B. Daugherty Water for Food Institute, Memorial Stadium at the University of Nebraska-Lincoln during the 2012 homecoming game, and several other sites in southeast Nebraska. The resulting 10-minute video aired in October 2012 and explored drought, water and the global food supply against a backdrop of Husker culture. It includes unique bird's eye footage from up high in the stadium. See http://www.bbc.co.uk/news/world-us-canada-19986655

U.S. Drought Monitor Forum 2013 to look at drought in tropics

http://drought.unl.edu/Home/USDMForum.aspx

This year's U.S. Drought Monitor Forum will be April 16-18 in West Palm Beach, Florida, hosted by the South Florida Water Management District, and organized by the National Drought Mitigation Center, based at the University of Nebraska-Lincoln, with sponsorship from the National Integrated Drought Information System.

The forum is a chance for U.S. Drought Monitor authors to learn from local and regional stakeholders. Holding the forum in Florida, which has had significant drought impacts in recent years, will help answer the question, "What is drought in a tropical environment?" said Mark Svoboda, one of the authors and leader of the National Drought Mitigation Center's Monitoring Program Area. "This is us going into their backyard to learn what drought means to them, and how do we depict that on a national map."

The third day of the forum will have an international emphasis, focusing on the transferability of the U.S. Drought Monitor, Drought Impact Reporter and other tools to the Caribbean and Central America.

Brian Fuchs, NDMC climatologist, is the lead organizer. Contact him with questions at bfuchs2@unl.edu or 402-472-6775.

The forum is free but registration is required. For updates and registration, please visit http://drought.unl.edu/Home/USDMForum.aspx

NDMC to help UN focus on national drought policies

Don Wilhite, founding director of the National Drought Mitigation Center, is helping United Nations agencies plan a global conference about growing drought policy concerns facing nations across the planet.

The "High-Level Meeting on National Drought Policy: Toward More Drought Resilient Societies" will be March 11-15, in Geneva, Switzerland.

Wilhite will give the keynote address at the conference. Michael Hayes, director of the NDMC, and Mark Svoboda, leader of the NDMC's Monitoring Program Area, are also invited speakers.

The World Meteorological Organization, the Secretariat of the United Nations Convention to Combat Desertification and the Food and Agriculture Organization of the United Nations are among the organizations that recommend that countries should have drought policies.

"Climate change is projected to increase the frequency, intensity, and duration of droughts, with impacts on many sectors, in particular food, water, and energy," WMO Secretary-General Michel Jarraud said in a press release. "We need to move away from a piecemeal, crisis-driven approach and develop integrated risk-based national drought policies."

"The 2010 drought-induced famine in the Greater Horn of Africa, the ongoing crisis in the Sahel region and the extensive drought in the USA show that developing and developed countries alike are vulnerable," said Luc Gnacadja, executive secretary of the UN Convention to Combat Desertification (UNCCD). "Effective long-term solutions to mitigate the effects of drought, and address desertification and land degradation urgently need to be mainstreamed in national development plans and policies."

"The 2010 drought-induced famine in the Greater Horn of Africa, the ongoing crisis in the Sahel region and the extensive drought in the USA show that developing and developed countries alike are vulnerable."
– Luc Gnacadja, Executive Secretary of the UN Convention to Combat Desertification (UNCCD).

Goals for national drought policies, according to the meeting's website, are:

1. Proactive mitigation and planning measures, risk management, public outreach and resource stewardship as key elements of effective national drought policy.
2. Greater collaboration to enhance the national/ regional/ global observation networks and information delivery systems to improve public understanding of, and preparedness for, drought.
3. Incorporation of comprehensive governmental and private insurance and financial strategies into drought preparedness plans.
4. Recognition of a safety net of emergency relief based on sound stewardship of natural resources and self-help at diverse governance levels.
5. Coordination of drought programs and response in an effective, efficient and customer-oriented manner.

More information is on the meeting website: http://www.hmndp.org/

Find background on the World Meteorological Organization's website: http://www.wmo.int/pages/prog/wcp/drought/hmndp/

Related reading:

Towards a Compendium on National Drought Policy – Proceedings of an Expert Team Meeting. Sivakumar, Mannava V.K., Raymond P. Motha, Donald A. Wilhite and John J. Qu (Eds.). 2011. Proceedings of an Expert Meeting on the Preparation of a Compendium on National Drought Policy, 14–15 July 2011, Washington DC, USA: Geneva, Switzerland: World Meteorological Organization. AGM-12; WAOB-2011. 135 pp.

NDMC, UNL Partnerships Span Globe

Above, Manoj Khanna with the Indian Agricultural Research Institute and a local producer showing the cellphone technology that IARI is using as part of their World Bank climate change adaptation project.

Scientists at the Indian Agricultural Research Institute are interested in working with the NDMC to develop a drought early warning system for agriculture based on the U.S. Drought Monitor model. A University of Nebraska-Lincoln delegation to India in November 2012 included, from left to right, Derek Heeren, Biological Systems Engineering; Marc Andreini, Robert B. Daugherty Water for Food Institute; Harkamal Walia, Agronomy; Roberto Lenton, Water for Food; and Mike Hayes, National Drought Mitigation Center. The visitors helped develop a research agenda and Memorandum of Understanding.

The NDMC is involved in two major projects in central Europe: InterDrought with the Czech scientists at Mendel University in Brno, and a newly-funded project with the University of Natural Resources and Life Sciences in Vienna, Austria, to develop a drought monitoring system for agriculture. A Czech delegation visited the NDMC for a week in December. Meeting were, from left, Petr Hlavinka, Karin Callahan, Tsegaye Tadesse, Brian Wardlow, UNL's Center for Advanced Land Management Information Technologies, Mike Hayes, Martin Mozny, Mirek Trnka, Daniela Semeradova, and Zdenek Zalud.