Winter 2014

DroughtScape- Winter 2014

Kelly Smith

Winter 2014

National Drought Mitigation Center

DROUGHTSCAPE

The Newsletter of the National Drought Mitigation Center

DIRECTOR'S REPORT

Michael J. Hayes

I would like to wish everyone a wonderful New Year. As we head into 2014, all attention appears to be falling on California and its neighbors because of the developing dryness along the West Coast. In fact, the 2013 calendar year was the driest year on record for a substantial part of California. There is still hope that storms can help recover the 2013-14 wet season, but California Gov. Jerry Brown made an emergency drought declaration on Jan. 17. This declaration allows California to look at options involving water transfers, financial assistance, and the suspension of some state and federal regulations. Dryness and drought in the West could be one of the big stories of 2014.

A second story evolving as we begin 2014, which may play a role in California, is the newly-formed federal interagency National Drought Resilience Partnership (NDRP) announced by the U.S. Department of Agriculture, the National Oceanic and Atmospheric Administration and other agencies in November. The NDRP is designed to help communities, businesses, and agricultural producers reduce their drought impacts and better prepare for future droughts by having more access to federal drought resources. One of the most satisfying aspects of this program is seeing the clear footprint of the long-standing efforts of Don Wilhite, NDMC founding director, to promote drought risk management strategies within the United States. The program's objectives are in harmony with the NDMC's 20-year mission to reduce societal vulnerability to drought.

To learn more about the National Drought Resilience Partnership, please visit http://drought.gov/drought/content/ndrp

Michael J. Hayes

About the photo

Above, a dust storm swept through Cimarron County, the westernmost county in Oklahoma, on Sunday, Jan. 12. The area has been in various stages of drought since Dec. 28, 2010, according to the U.S. Drought Monitor. Photo courtesy of the Cimarron County Conservation District in Oklahoma, via Gary McManus, Oklahoma State Climatologist. More photos and detail from the same event are on the NewsOK website.

CONTENTS

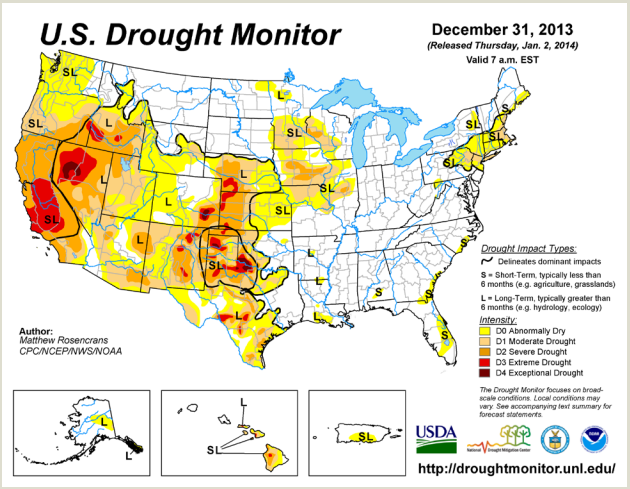
West and Plains likely to stay dry following dry fall months

By Brian Fuchs,
NDMC Climatologist

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/

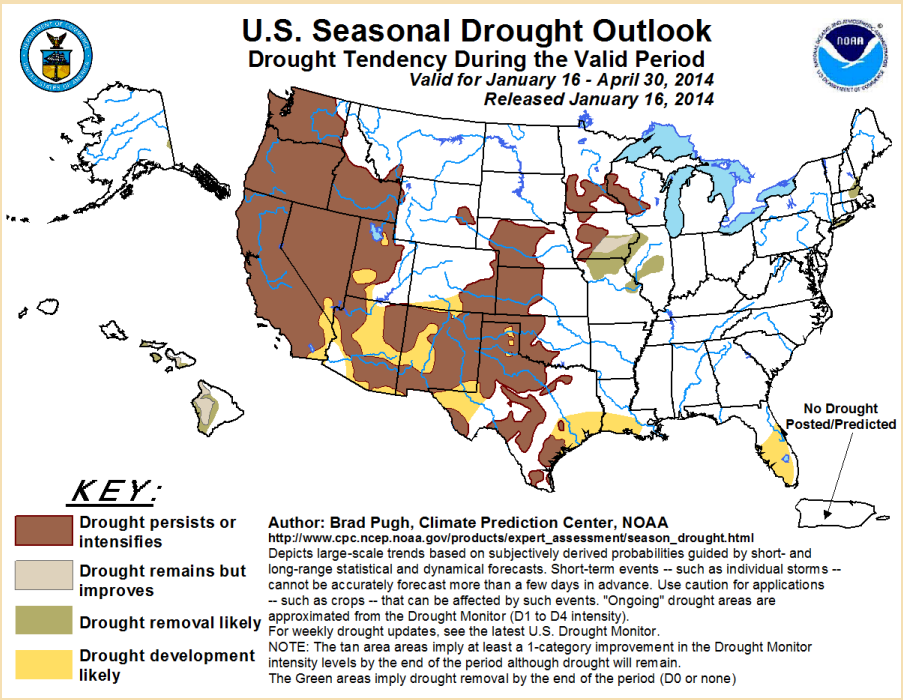
Drought

Drought improved quite a bit in the Midwest and central Rocky Mountains in the final quarter of 2013. According to statistics associated with the U.S. Drought Monitor, the area in drought improved from 41.21 percent of the contiguous 48 states to 30.95 percent during the quarter. Extreme and exceptional drought increased slightly, from 3.06 to 3.96 and 0.29 to 0.37 percent, respectively. Much of the intensification was in the western United States and portions of the southern Plains.



Precipitation

Precipitation was variable throughout the United States. One area that experienced well above-normal precipitation included the Dakotas, Wyoming and eastern Montana, where the quarterly values were 150-200 percent of normal. From the Ohio River Valley into the Mid-Atlantic and New England, precipitation was also on the high side, with most areas recording 100-130 percent of normal. Dryness was prominent over all of the West Coast, with less than 25 percent of normal precipitation recorded for the quarter. Portions of New Mexico, west Texas, western Kansas, eastern Colorado and central Florida all recorded below-normal precipitation as well, with totals of about 50-70 percent of normal.



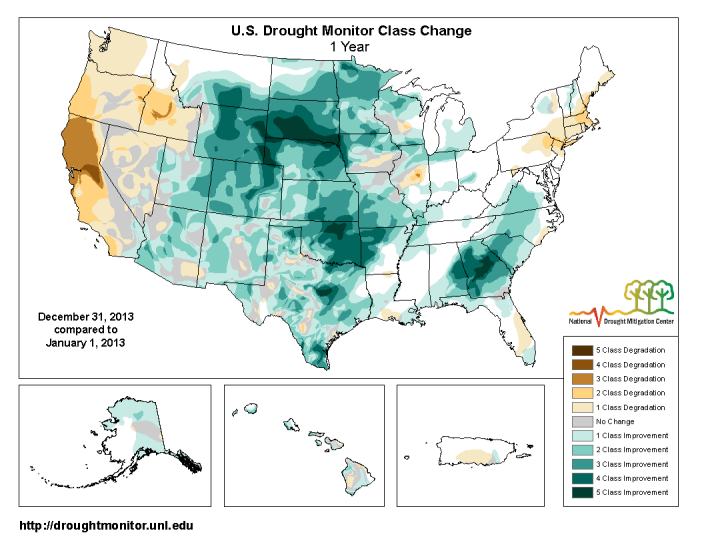
Outlook: The seasonal drought outlook has most of the drought in the Plains and West persisting through the end of April 2014 and expanding in the Southwest. The Midwest should see some improvement, while portions of east Texas and southern Florida that are currently drought-free may see drought develop. Temperatures are expected to be above normal over most of the southern United States from California through the Mid-Atlantic and in northern Alaska. Precipitation is expected to be below normal over California, the Southwest and the Southeast.

Temperature

The period from October through December was quite cool for almost the entire United States. Areas of the Dakotas and upper Midwest were 4-6 degrees Fahrenheit below normal for the quarter while almost all of the rest of the country was 2-4 degrees below normal. The exception was along the California coast and from the Mid-Atlantic south towards Florida. These areas were 2 degrees above normal, and parts of Florida were 2-4 degrees above normal.

Drought and climate 2013, by region

By Brian Fuchs, NDMC Climatologist



This map from the NDMC shows changes in the U.S. Drought Monitor for the 52 weeks that ended Dec. 31, 2013. It shows recovery from the drought of 2012 in the central states, but deterioration in the westernmost states.

Southeast

At the beginning of 2013, ongoing drought was still a concern in the Southeastern United States. As the year started, 45.65 percent of the area was in drought, with just over 9.50 percent in extreme or exceptional drought. The most intense drought was lingering over most of Georgia and eastern Alabama. By the end of the year, the region had no drought and just a little over 8 percent was even considered abnormally dry. Georgia ended up with its third wettest year on record (out of 119 years), South Carolina with the seventh wettest on record, North Carolina, the ninth wettest, and Alabama, the 11th wettest.

Northeast

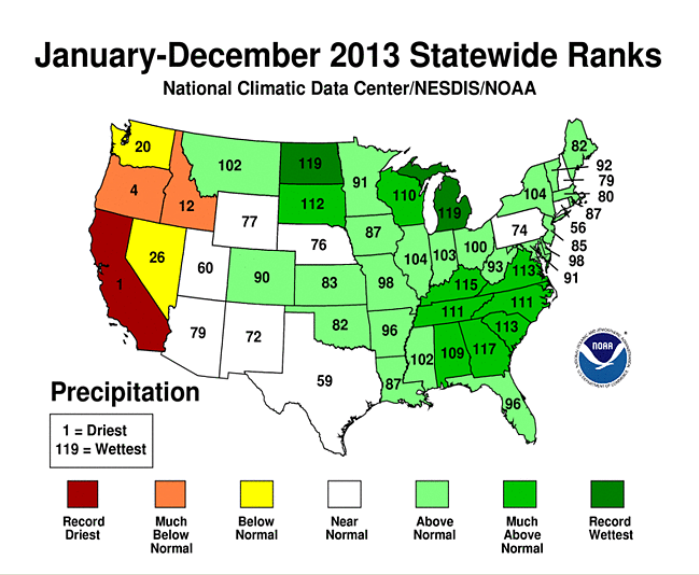
As was the case in the year before, 2013 was not a year for much concern over drought in the Northeastern states, as it was a fairly normal year for precipitation, statistically speaking. The region ended the year with just 6.76 percent of the area in drought, which peaked in late November at just under 8 percent. Most of the drought during the year was isolated along the coasts of New Jersey, New York, Massachusetts, Connecticut, New Hampshire and Maine.

South

The region that includes Texas, Oklahoma, Louisiana, Arkansas, Mississippi and Tennessee has seen varying degrees of drought since mid-2010. It intensified in autumn of 2010 and is ongoing in Texas and Oklahoma. At the beginning of 2013, 63.69 percent of the region was in drought and almost 11 percent in exceptional drought. Most of the extreme and exceptional drought at the beginning of the year, 32.80 percent of the region, was in Texas and Oklahoma. Precipitation for 2013 was near normal to slightly above normal for the entire region, so extreme and exceptional drought, the worst categories, decreased from their high point at the start of the year. All drought coverage peaked in the region in mid-September 2013, with more than 65 percent of the area in drought. Although some areas returned to normal, portions of west Texas and Oklahoma were having a hard time eliminating the drought. The year ended with 27.23 percent of the region still in drought.

Midwest

The intense drought of 2012 carried over into 2013 for much of the Midwest. Although precipitation for most states in the region was well above normal in 2013, the region was slow to recover. Michigan had its wettest year on record and Wisconsin had the 10th wettest on record. The year started with almost 55 percent of the region in drought, with lingering extreme drought in portions of Iowa and Minnesota. Drought peaked at the start of the year and steadily improved until a dry autumn allowed for drought to develop and spread again. By the end of the year,



This map from the National Climatic Data Center shows that California had its driest year on record, and that Oregon had its fourth-driest, while other parts of the country were wet.

2013 climate and drought overview, continued

only 17.70 percent of the area was in drought, with just under 3 percent in severe drought, isolated in Iowa.

High Plains

The High Plains also saw drought from 2012 linger into 2013. The year started with the epicenter of drought from 2012 over the region. In January, most of Nebraska and portions of Kansas, Colorado, Wyoming and South Dakota were in exceptional drought, with 93.01 percent of the region in drought, and almost 27 percent in exceptional drought. By the end of the year, just under 21 percent of the region was in drought and only a few small areas of extreme and exceptional drought were left in portions of Nebraska, Kansas, and Colorado. The drought peaked in the winter months in both intensity and spatial extent and improved steadily as the year progressed, as cooler temperatures and near-normal precipitation returned. North Dakota had its wettest year on record, while South Dakota had the eighth wettest.

West

As the Rocky Mountain region saw drought recovery during the year, drought developed along the West Coast. The year started with almost 70 percent of the region in drought, and ended with just over 51 percent in drought. Coverage peaked in August when almost 78 percent of the region was in drought. The next month brought damaging floods to Colorado, putting a substantial dent in drought. Thanks to a strong and persistent seasonal monsoon, the drought situation in Arizona and New Mexico improved greatly, pushing precipitation into portions of Utah and Colorado as well. As the states in the Southwest and Rocky Mountains recorded normal to slightly above-normal precipitation for the year, the states along the West Coast were not as fortunate. California had its driest year on record, while Oregon had its fourth driest and Idaho its 12th driest in 119 years of records.

U.S. Drought Monitor statistical milestones for 2013 for the 48 continguous states

Milestone	*% of Area*	*Date*
Greatest extent of D0-D4	72.78	Jan. 1, 2013
Greatest extent of D1-D4	61.09	Jan. 1, 2013
Greatest extent of D3-D4	21.31	Jan. 1, 2013
Greatest extent of D4	6.85	Feb. 5, 2013
Smallest extent of D0-D4	50.89	July 2, 2013
Smallest extent of D1-D4	30.28	Dec. 10, 2013
Smallest extent of D3-D4	2.75	Oct. 15, 2013

Alaska

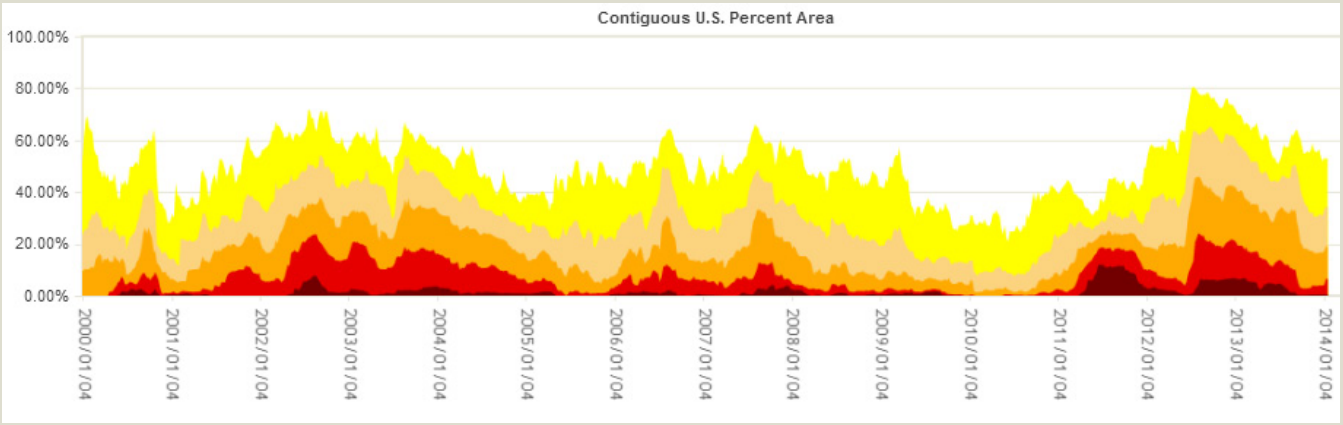
A dry and warm year in Alaska saw the greatest extent of drought in the state ever on the U.S. Drought Monitor (which goes back to 1999) and also the first time severe drought was introduced in the state. Drought peaked at 27.66 percent of the state in August with almost 7 percent of the state in severe drought.

Hawaii

The drought in Hawaii continued. The current drought started in 2008, making it by far the longest stretch in drought for any of the United States. The year began with 63.34 percent of the state in drought and ended with 49.62 percent in drought. The drought peaked in early November with just under 68 percent of the state in drought.

Puerto Rico

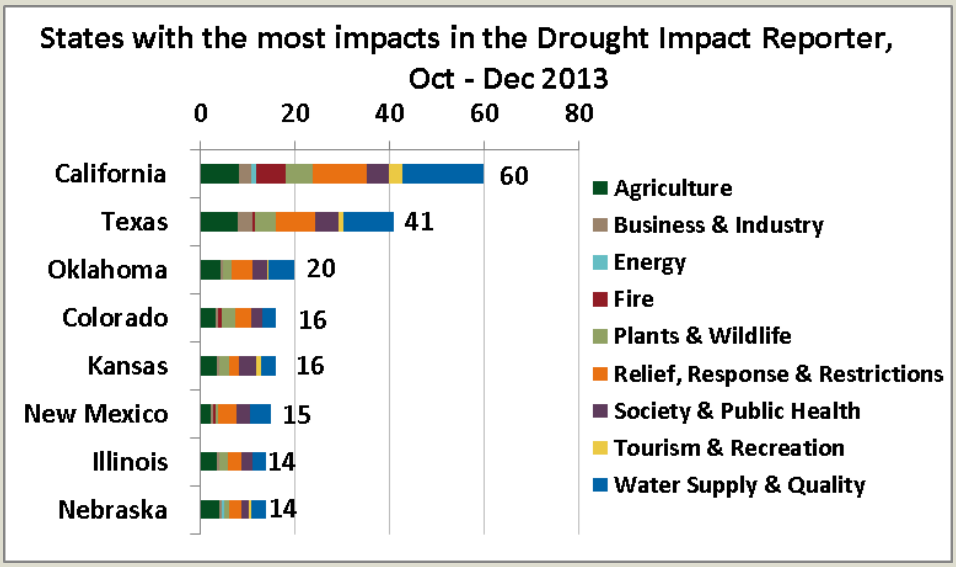
Puerto Rico had no drought this year. Early in the spring, there was dryness being reported on the island and by mid-April, almost half of the island was abnormally dry. By May the dryness was eliminated, only to reestablish again by autumn. By the end of the year, just over 25 percent of the island was abnormally dry.



This chart shows the proportion of the contiguous 48 states in different degrees of drought, Jan. 1, 2000-Jan. 21, 2014.

October – December 2013 impact summary
Persistent drought in West making a dry start to water year

by Denise Gutzmer, NDMC Drought Impact Specialist



The Drought Impact Reporter logged 190 impacts for the fourth quarter of 2013, as drought continued in the West, which has been relatively dry since late 2011. Snowpack was below normal for much of the West, with associated water supplies especially low in Oregon, California, Nevada and parts of Idaho and New Mexico. There is still time for abundant snowfall to bolster water supplies, but a persistent high pressure system off the West Coast has prevented winter storms from coming through thus far.

The effects of recent dry years in the West are compounded by an unprecedented 14-year drought in the Colorado River Basin, the source of water for lakes Powell and Mead. In 2014, the Bureau of Reclamation, which manages the basin, will for the first time reduce water released from Lake Powell to Lake Mead, which supplies water for urban and agricultural use across much of the west.

"Colorado River drought forces a painful reckoning for states," by Michael Wines, *New York Times*, Jan. 5, 2014.

California

Water supply

Water concerns in California were paramount in the minds of many as reservoirs around the state were extremely low, and a blocking high pressure system was diverting winter storms around the state. Californians, and particularly water purveyors, the agricultural sector and municipalities are very concerned after the state experienced its driest year on record in 2013 and so far is having its third consecutive dry winter. Dozens of California lawmakers lobbied for an emergency drought declaration in December that came in mid-January, paving the way for water transfers and urging water conservation of 20 percent. Of the 59 impacts recorded in the Drought Impact Reporter for California, 32 related to water supply, with 22 about relief, response and restrictions. Nearly half of the nation's fruits, nuts and vegetables are grown in California, according to the California Department of Food and Agriculture.

"California lawmakers call for drought declaration; Lake Oroville only 39 percent full," AP and staff reports, *Chico Enterprise Record,* Dec. 11, 2013.

"Gov. Jerry Brown declares drought emergency in California," by Anthony York, *Los Angeles Times*, Jan. 17, 2014.

In October, California farmers were warned by state and federal water providers to expect no water in the spring of 2014 and possibly no water for the entire growing season, and the forecast has not improved much since then. The California Department of Water Resources in November

Reservoir Storage as Percent of Capacity for January 1st, Water Year 2014

(Data are provisional and subject to change)

Capacity of Reservoirs Reported in 1000s of Acre-Feet									
*	5444	14365	37079	704	8320	3337	3910	2470	5290
*	49%	50%	70%	11%	22%	28%	48%	50%	49%
*	55%	61%	67%	42%	43%	46%	61%	64%	57%
AZ	CO	ID	MT	NV	NM	OR	UT	WA	WY
0 of 4	70 of 74	24 of 24	43 of 45	6 of 7	13 of 13	28 of 31	28 of 28	6 of 13	13 of 13
Number of Reservoirs Reported									

Select here for the Reservoir Dataset for this Period

Storage is Below Average (% of Capacity)
Storage is At or Above Average (% of Capacity)
Average Storage as % of Capacity
* = Data are not available for this state.

From the U.S. Department of Agriculture's Natural Resources Conservation Service

4th quarter impacts, continued

announced initial allocations of 5 percent of contracted amounts. This is not a workable solution for farmers with permanent crops, such as vineyards, orchards and groves. Without water, the crops could die, at an enormous cost to farmers.

"Looming 2014 California water crisis strikes fear in farmers," by Harry Cline, Farm Press Blog, Oct. 8, 2013.

"'Dire prediction for state water allocation," by Michael Cabanatuan, SFGate, Nov. 20, 2013.

Pastures, rangeland

Poor spring and fall rains have left California pastures brown in many areas, putting ranchers in a tight spot as far as feeding their livestock. Livestock usually feed on winter pastures, but producers turned to supplemental feeding to sustain cattle this winter. Ranchers were also opting to sell cattle because feeding costs add up quickly. Stock ponds were very low, forcing producers to consider hauling water if needed.

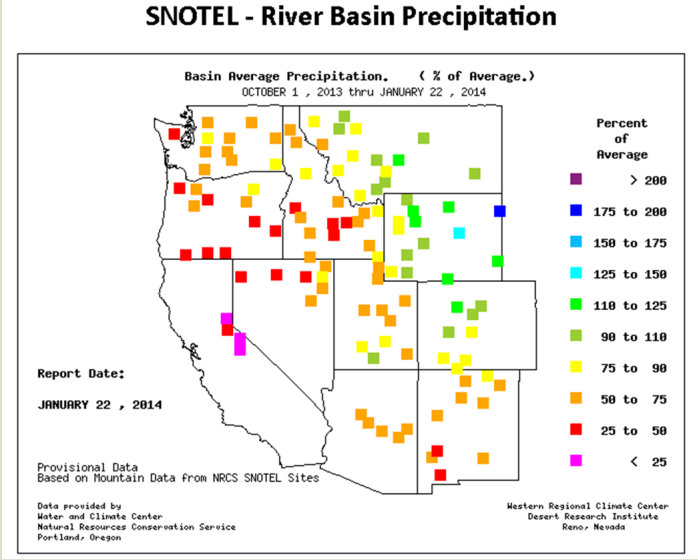
"California ranchers weigh options as dry spell lingers," by Ching Lee, *Central Valley Business Times* (Stockton), Dec. 4, 2013.

Wildfires

Above-normal fire activity has kept California firefighters busy through the latter part of 2013, past the normal end of the fire season as dry conditions kept the wildfires burning. Aerial firefighters and other staffers remained on alert, although they are not usually needed late in the year. Additional firefighting equipment also remained at the ready. The California Department of Forestry and Fire Protection suspended burn permits in central coastal California on Dec. 30, due to dry conditions and a high number of wildfires for this time of year. Cal Fire's strategy is to get a handle on fires before they grow into massive conflagrations that could easily occur with abundant dry fuels and low humidity.

"Cal Fire suspends burn permits due to dry weather," by the Associated Press, *The San Mateo Daily Journal*, Dec. 31, 2013.

"Dry weather prompts Cal Fire to increase staff," by Calvin Men, *Santa Cruz Sentinel*, Dec. 28, 2013.



SNOTEL measures the amount of water in snowpack. From the Western Regional Climate Center, Desert Research Institute in Reno, Nevada

Bears foraging near humans

The warm, dry winter has drawn bears out from hibernation as evidenced by a video taken of a bear crossing a ski slope surrounded by stunned skiers at Heavenly Mountain Resort near Lake Tahoe. Warm temperatures made it feel like spring, and the dry landscape did not produce as much food for the bears as usual, driving the bruins to trash cans for an easy meal. Experts warned Californians to be on the lookout for black bears this winter.

"Experts warn California drought bringing black bears out of hibernation early," CBS 13, Jan. 21, 2014.

"Video: Bear mingles with skiers at Tahoe's Heavenly," AP, Jan. 13, 2014

Salmon

Low flows in the Sacramento River killed thousands of Chinook salmon eggs and newly hatched salmon in late 2013. Low flows were due to lower water releases from Shasta and Keswick dams and little contribution from the river's tributaries. An environmental scientist with the California Department of Fish and Wildlife stated that 20 to 40 percent of the salmon nests were exposed when the river level fell in early November. Salmon suffered in numerous other California rivers,

such as the American, San Lorenzo, Eel and Russian rivers.

"Drought kills thousands of salmon eggs in the Sacramento River," by Damon Arthur, *Redding Record Searchlight*, Dec. 13, 2013.

Bay Area air quality

Dry weather, fires and low winds allowed concentrations of soot, dust and other particulate matter in the Bay Area to climb above the federal health standard of 35 micrograms per cubic meter. The Bay Area Air Quality Management District issued the 11th consecutive "Spare the Air" alert on Dec. 18, setting a record for consecutive days with poor air quality.

"Air pollution soars across Bay Area as fires, dry weather create perfect storm of smog," by Paul Rogers, *San Jose Mercury News*, Dec. 17, 2013.

Texas

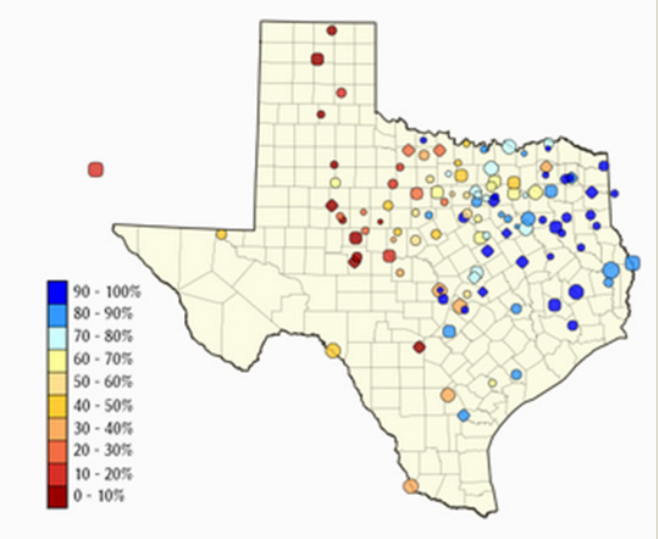
Water supply

Drought eased in parts of Texas, but reservoir levels have not fully recovered, in part due to the time lag in replenishing hydrologic systems. The Lower Colorado River Authority board approved a plan that would allow them to keep more water in the Highland Lakes before sharing water with downstream users. Previously, Lake Buchanan and Lake Travis had to contain at least 850,000 acre-feet, or 42 percent of capacity, before water would be released, but persistent drought made the board realize that the lakes needed additional time to recover from drought. It seemed unlikely the lakes would fill enough to allow rice farmers to receive irrigation water, making 2014 the third consecutive year without water.

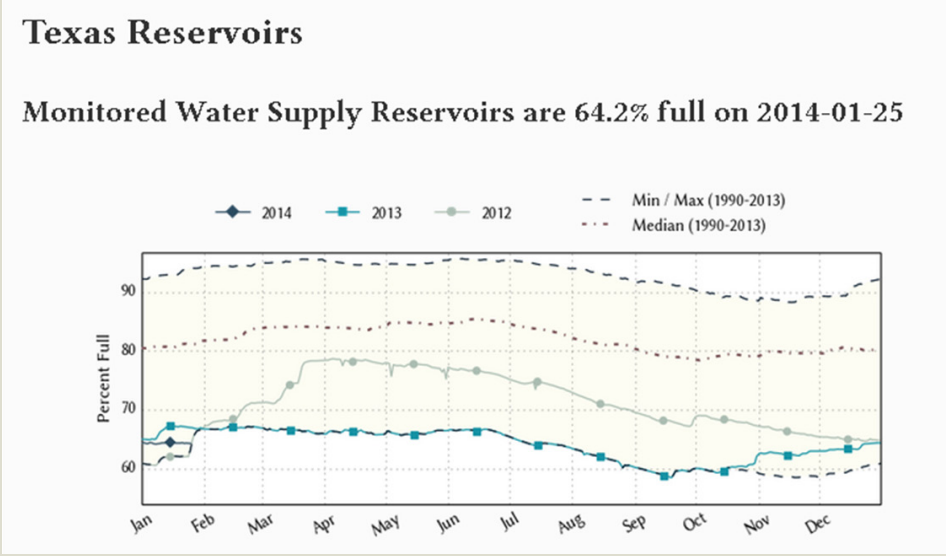
"Rice farmers face third year without water," by Matthew Tresangne, *Houston Chronicle*, Nov. 17, 2013.

Thirty-two cities or water suppliers in the Rio Grande Valley were under voluntary or mandatory water restrictions, due to low reservoirs. Restrictions were in effect for seven public water suppliers In Cameron County, 13 in Hidalgo County, six in Starr County, four in Zapata County and two in Willacy County. There are emergency restrictions in three public water systems, indicating a water supply that could be exhausted in 45 to 180 days.

"Some drought effects declining," by Mark Reagan, *The Brownsville Herald* (Texas), Dec. 15, 2013.



This interactive graphic is updated daily on The Texas Tribune *website. Hovering over a reservoir shows its level. Data App: Track Texas Reservoir Levels, by Ryan Murphy and Kate Galbraith,* The Texas Tribune*, Jan. 15, 2014 -- http://www.texastribune.org/library/data/texas-reservoir-levels/*



At the end of December 2013 and the start of January 2014, monitored reservoirs in the state were at 64.2 percent of capacity, according to the Texas Water Development Board, which was considerably lower than the 1990-2013 median of about 80 percent of capacity.

Salinity affecting oysters

The lack of freshwater runoff allowed the salinity of several Texas bays to climb to unhealthy levels, harming oysters and other wildlife. Fishermen caught fewer oysters and shrimp, affecting seafood shops and processing along the Gulf Coast. Apalachicola Bay in Florida had the same problems.

"How LCRA river restrictions are affecting oyster harvesters in Matagorda Bay," by Ryan Poppe, (San Antonio) Texas Public Radio, Nov. 20, 2013.

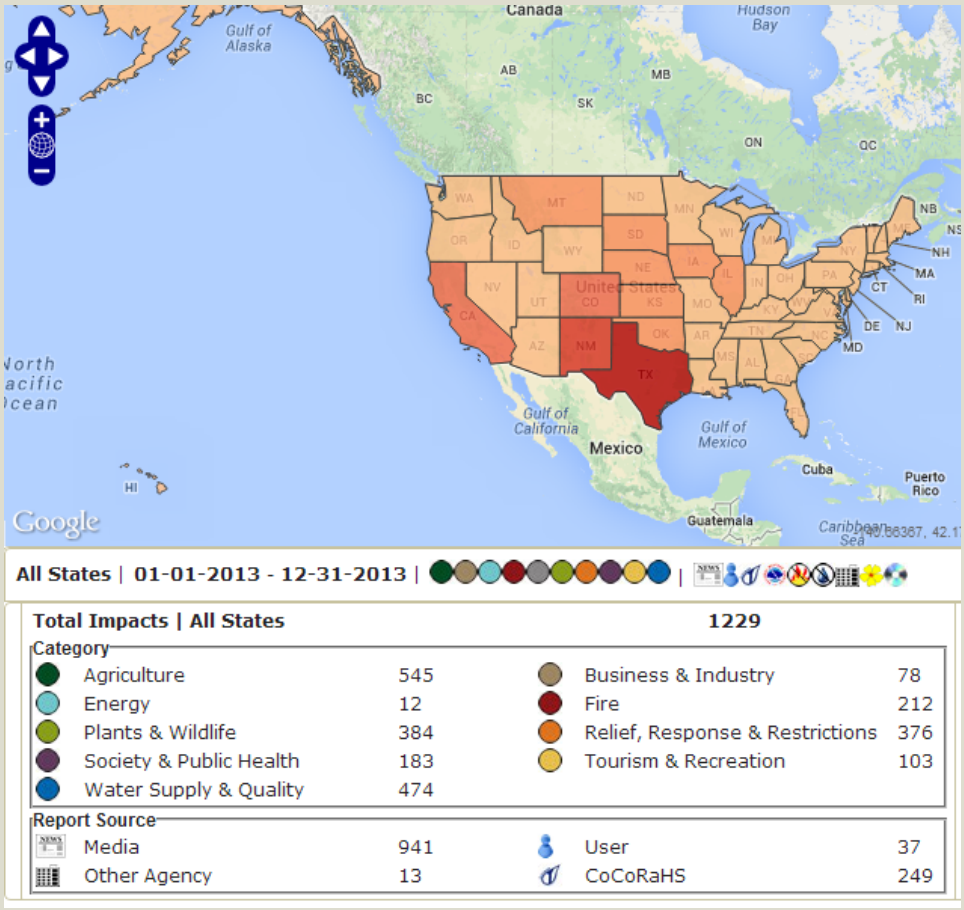
"FWC closes Apalachicola Bay to weekend oyster harvesting," by Bruce Ritchie, *The (Tallahassee) Florida Current,* Nov. 22, 2013.

2013: Central states improving but drought intensifies in West

by Denise Gutzmer, NDMC
Drought Impact Specialist

The 2012 Midwestern drought was intense, leaving the agricultural sector and related enterprises reeling, making 2013 a challenging year for many places and industries until moisture returned and the corn shortage eased. The Midwest remained in drought at the start of 2013, but the drought's eastern edge was moving westward as winter brought snowstorms and badly needed precipitation. Corn prices were exceptionally high as 2013 began, and barge travel on the Mississippi River between St. Louis and Cairo, Ill., was threatened by low water levels and rock pinnacles on the riverbed. Drought expanded in the western U.S. during the year. California experienced its driest year on record in 2013, while Oregon had its fourth driest.

Please see the quarterly impact summary, pages 7-9, for more on Texas and California.



The drought information entered in the Drought Impact Reporter in 2013 included a high proportion of impacts related to Agriculture and to Water Supply & Quality. The states with the most drought impacts entered in the DIR in 2013 were Texas, New Mexico, Colorado and California.

2013 crops

Crops did not suffer much from the late-summer Midwestern drought, although farmers were understandably jittery after the blistering Midwest drought in 2012. Final crop harvests amounted to 13.92 billion bushels of corn, 38 percent higher than in 2012, and about 3.29 billion bushels of soybeans, which was 260 million more bushels than the year before.

"USDA report confirms larger corn, soybean crops," by Kent Thiesse, MinnStart Bank, Farm & Ranch Guide, Jan. 15, 2014.

Wildfire

In the spring of 2013, the upcoming fire season looked ominous, given the extent of drought in the West and the drought outlook, leading federal agencies to urge communities to take precautionary measures. Fortunately, the fire season was less active than expected. Drought in the West curtailed the growth of vegetation that would have been fuel for fires, and the usual hot, dry Santa Ana winds did not blow. Through Dec. 9, acres burned by wildfires reached 4.15 million acres, far less than the 10-year average of 6.8 million acres by that point in the year.

"Fire season tamer than expected; U.S. burn acreage far below average," by Bettina Boxall, *Los Angeles Times*, Dec. 9, 2013.

New Mexico

Unrelenting drought in New Mexico left reservoirs depleted on the Pecos River in the east, putting up and downstream water users in competition for meager supplies. The Carlsbad Irrigation District issued a priority call on the Pecos River to reduce water use upstream near Roswell. A priority call means that water rights holders with the oldest rights would get water, while those with more recent water rights would be left high and dry.

"New Mexico farmers seek 'priority call' as drought persists," by Felicity Barringer, *The New York Times*, March 26, 2013.

Depleted reservoirs led to fewer visitors to state parks over Memorial Day weekend, with 12 state lakes being closed to motorized boating, a slight improvement from 2012 when 13 lakes were off-limits.

Historic rainfall in September brought a deluge of water which

filled up reservoirs on the Pecos River, but only blessed the Rio Grande River with a small increase.

Irrigators supplied by the Rio Grande saw some of the smallest irrigation water allocations ever at 6 inches per acre-foot and a shortened irrigation season. Agriculture suffered as farmers chose not to plant or used well water that was too salty for the crops.

"The heat's on state parks," by Milan Simonich, *El Paso Times* (Texas), June 14, 2013.

"As temperatures rise, Rio Grande irrigation season starts today," by Diana Washington Valdez, *El Paso Times*, June 7, 2013.

"Drought watch: Lower Rio Grande irrigation shutting down," by John Fleck, *ABQJournal Online* (New Mexico), July 9, 2013.

Hefty snowpack was needed this winter to bolster water supplies for the Elephant Butte Reservoir, which was was at 15.6 percent of capacity on Jan. 27, holding 307,221 acre-feet of water, according to the reservoir status tracker kept by the Texas Water Development Board. Without abundant snowfall, this will be another dry year for water supplies from the Rio Grande River.

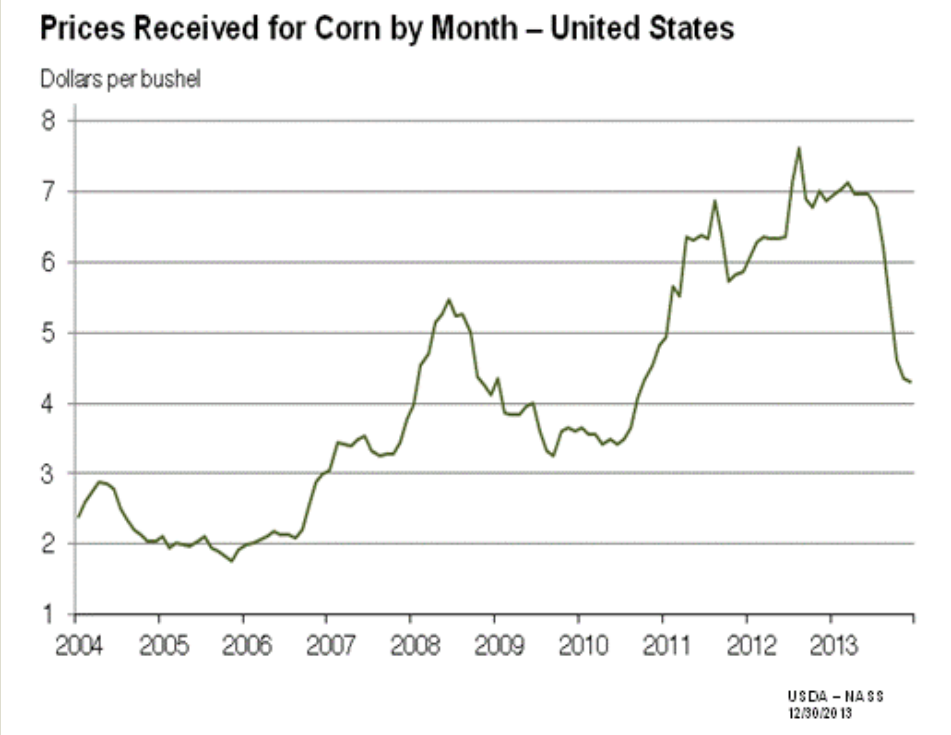
"Data app: track Texas reservoir levels," by Ryan Murphy and Kate Galbraith, *The Texas Tribune*, Jan. 15, 2014.

Colorado

Thin snowpack caused anxiety in the West during the spring of 2013. Denver and other communities in Colorado enacted water restrictions to extend supplies. A snowy April brought relief, allowing Denver and other cities to ease water restrictions in June as water conservation efforts, along with the needed snowfall, boosted supplies. In September, heavy rains brought historic flooding to the Front Range and greatly reduced drought in the area.

"Colorado drought expected to persist through spring," by Bob Berwyn, *Summit County Citizens Voice*, March 27, 2013.

"Antero Reservoir won't be drained," *Pueblo Chieftain*, April 28, 2013.



This chart from the U.S. Department of Agriculture's National Agricultural Statistics Service shows corn prices spiking in 2012, when drought cut into the nation's harvest. Prices fell in 2013 after a good crop.

"Denver, Thornton ease watering restrictions," by Bruce Finley, *The Denver Post*, June 26, 2013.

Recovering from 2012

Ethanol production in 2013

Livestock producers and processors dependent on corn were hard pressed to find adequate corn supplies through much of 2013 until the new crop was harvested in the fall. In early 2013, ethanol makers closed plants because corn was too expensive.

Ethanol production in the last week of January 2013 fell to 770,000 gallons per day, the smallest amount produced since June 2010. Drought that hampered corn production in 2012 forced 20 of the 211 ethanol plants in the country to close in late 2012 and 2013 as corn supplies dwindled, according to the Renewable Fuels Association. Some ethanol plants resumed production in April as corn prices eased slightly in anticipation of better corn production in 2013.

In August, newly harvested corn from Arkansas and Louisiana was shipped north up the Mississippi River to ethanol plants in the Midwest. Buyers in the U.S. were also taking the unusual step of importing corn from countries such as Brazil and Canada.

"U.S. farm economy flowing in reverse as drought impacts persist," Reuters, Aug. 19, 2013.

Ethanol production finally gained steam in mid-October 2013 with lower-priced corn and rich supplies.

"Easing corn prices give relief to the ethanol industry," by David Shaffer, *Minneapolis Star Tribune*, Oct. 28, 2013.

"Abundant 2013 corn harvest boosts ethanol production," Dec. 13, 2013, U.S. Energy Information Administration.

Help us keep on top of drought impacts in your area by sharing your observations via the Drought Impact Reporter's Submit a Report page: http://public.droughtreporter.unl.edu/submitreport/

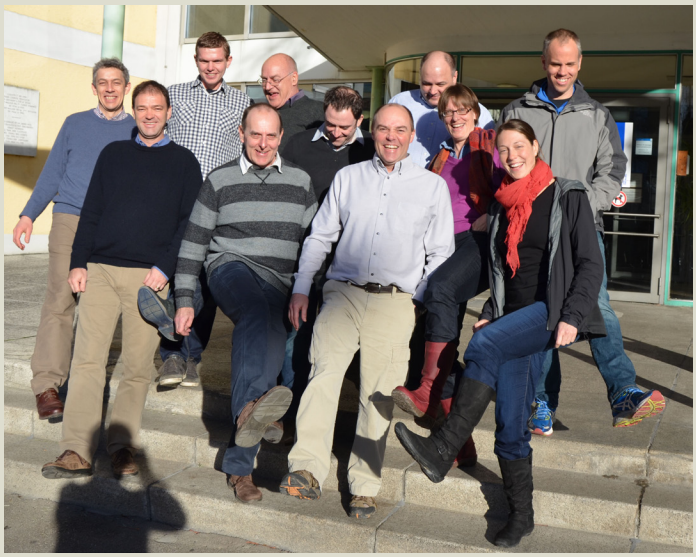
NDMC part of Belmont Forum project on indicators, impacts

The National Drought Mitigation Center at the University of Nebraska-Lincoln is part of an international project to improve understanding of how drought affects communities, the environment and the economy, and what people can do to prepare. The project is one of the first supported by a recently formed international consortium of agencies that fund environmental change research.

Researchers from the NDMC, the Hydrology department at the University of Freiburg, the Centre for Ecology and Hydrology in Wallingford, England, the Open University in Milton Keyes, England, and the Commonwealth Scientific and Industrial Research Organization in Australia jointly received one of the inaugural grants in 2013 from the Belmont Forum. They met in Freiburg, Germany, in January 2014, officially kicking off the DrIVER project, which stands for Drought Impacts: Vulnerability thresholds in monitoring and Early-warning Research.

The Forum, established in 2009 at a meeting in Maryland, represents a collaborative effort by the world's major funders of global change research to "provide knowledge that can be used to confront the most significant challenges society faces in managing an increasingly congested and resource-hungry world," according to an article by its founders in the July 10, 2012 edition of *EOS*. The forum includes the main funders of scientific research in many countries, including the U.S. National Science Foundation. The Belmont funders specifically look for projects that incorporate both physical and social sciences.

NDMC investigators are Cody Knutson, who leads the NDMC's Planning and Social Science program area, and Mark Svoboda, who heads the NDMC's Monitoring program area. The drought center will receive about half a million dollars over three years for its portion of the project.



The multinational DrIVER project funded under the Belmont Forum's Freshwater Security scheme was kicked-off in early January. The goal of DriVER is to improve drought monitoring and early warning systems through linking hydro-meteorological drought indicators with drought impacts to develop new practices enabling communities to build capacity for resilience to drought.

"We have been talking about exploring the relationship between impacts and indicators for a long time," Svoboda said. "In fact, one of our initial motivations in developing the Drought Impact Reporter and its database in 2005 was to one day use it for this type of research and application. Nearly ten years later, it is exciting to embark on this project with our partners from three continents. It is really long overdue and to date hasn't been investigated to the extent we're proposing."

The researchers in the U.S., Australia and the European Union will compare indicators of physical drought with data on drought impacts to inform the development of enhanced drought monitoring and early warning systems. They will also use scenario-based "drought games" at workshops in selected locations to analyze decision-making, including use of monitoring and early warning systems, related to drought. The workshops will focus on water supply security, conflicts and trade-offs between human and environmental use, and will involve major water suppliers, regulators and other interest groups. Conducting similar workshops on three different continents will help researchers identify general principals as well as specific considerations that may apply under different circumstances.

"During the project, the team will investigate linkages between drought indicators and its impacts for a range of sectors," Knutson said. "The workshops will allow us to investigate public water suppliers as case studies. Building on the past successes of similar strategy games in the U.K. and 'drought tournaments' in the U.S. and Canada, the project team will use the best of both approaches to assess the use of drought monitoring and early warning information and other drought management strategies by water managers."

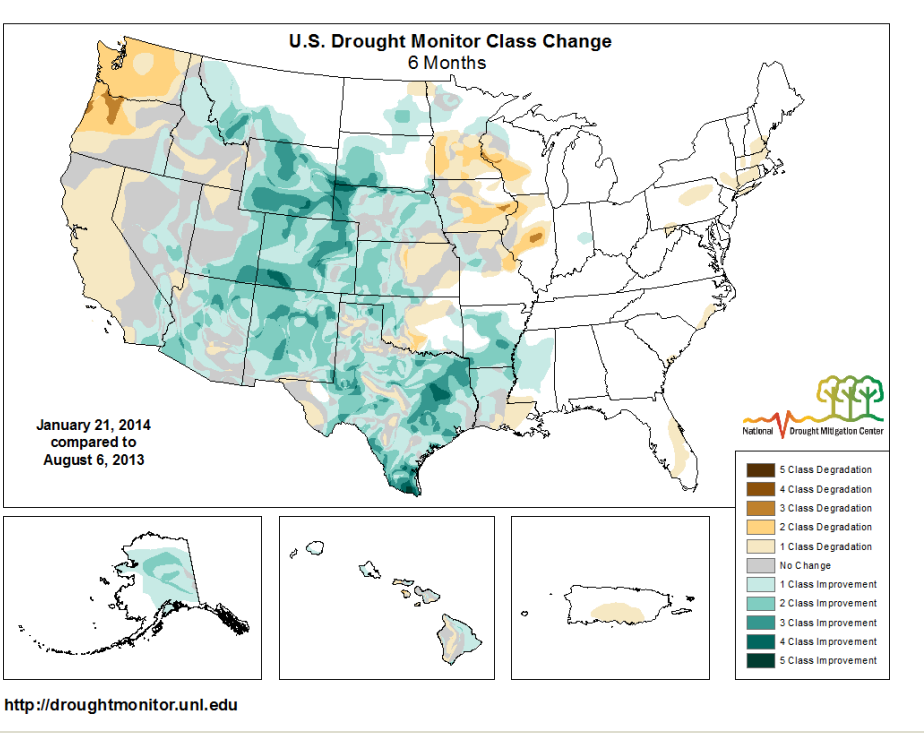
Change maps simplify comparisons

Maps showing where and how much drought has changed became part of the suite of automatically generated weekly U.S. Drought Monitor information as of December 2013.

"We wanted to be able to automate the process," said Mark Svoboda, NDMC Monitoring Program area leader. "It's generated now with the weekly stats."

Change maps are part of the U.S. Drought Monitor website now -- http://droughtmonitor.unl.edu/DataArchive/ChangeMaps.aspx. They show areas getting worse ("degradations") in shades of tan and brown, and improvements in shades of blue green. Change maps compare U.S. Drought Monitor status for any week with maps from 1, 4, 8, 12, 24 and 52 weeks ago, as well as with the map from the start of the calendar year and the start of the water year.

"This is of huge benefit to decision-makers," said Michael J. Hayes, NDMC director.



This change map shows that in the six months ending Jan. 21, 2014, drought intensified in California, Oregon and Washington, and in Iowa, Minnesota, Wisconsin and Illinois, and improved in a swath from Montana through Texas and Arkansas.

The NDMC added the maps as an enhancement to the U.S. Drought Monitor website as part of its mission in support of the National Integrated Drought Information System. "The feedback so far has been resoundingly positive," Svoboda said.

CONTACT THE NATIONAL DROUGHT MITIGATION CENTER

P.O. Box 830988
Lincoln, NE 68583-0988
USA

819 Hardin Hall
3310 Holdrege St.
School of Natural Resources
University of Nebraska–Lincoln
East Campus

email: ndmc@unl.edu
phone: (402) 472-6707
fax: (402) 472-2946

Contact the editor of DroughtScape, Kelly Helm Smith: ksmith2@unl.edu

Peruse the DroughtScape archive or subscribe: http://drought.unl.edu/AboutUs/Publications/DroughtScape.aspx

Visit our website: http://drought.unl.edu

Find us on Facebook
http://www.facebook.com/NationalDroughtMitigationCenter

Follow us on Twitter @DroughtCenter

NDMC helps UN with drought plan training for Central Asia

The National Drought Mitigation Center worked with the Food and Agriculture Organization of the United Nations, the World Meteorological Organization, and the United Nations Convention to Combat Desertification to present a regional drought planning workshop in November 2013 in Izmir, Turkey.

"Capacity Development to Support National Drought Management Policies in Central Asia" included about 30 delegates from the countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan and Uzbekistan, with expertise in fields such as meteorology, agriculture, the environment and water.

Cody Knutson, NDMC Planning and Social Science program area leader, served as the keynote speaker and one of three expert trainers providing lectures on drought risk management, impact and vulnerability assessment, and drought planning. "The workshop went very well with a great deal of interest expressed in continuing efforts to develop or enhance national drought plans when participants return to their respective countries," said Knutson.

Organizers and delegates from Kazakhstan, Kyrgyzstan, Tajikistan, Turkey, Turkmenistan and Uzbekistan gathered for three days in November 2013 at the International Agricultural Research and Training Centre in Izmir, Turkey, for a UN-sponsored workshop on "Capacity Development to Support National Drought Management Policies in Central Asia." Cody Knutson, leader of the NDMC's Planning and Social Science area, is third from the right in the back row.

The workshop provided an opportunity for participating countries to assess the regional and national status of drought management in Central Asia, familiarize themselves with a set of guiding elements for the development of risk-based national drought management policies and work towards an action plan. Mohammed Bazza, FAO senior officer, said, "It is hoped that the process started during the regional workshop will constitute the nucleus for full-fledged national drought management strategies and action plans" that will benefit each country and the region of Central Asia as a whole.

> ***"The workshop went very well, with a great deal of interest expressed in continuing efforts to develop or enhance national drought plans when participants return to their respective countries."***

The regional workshop is one of several regional follow-ups to the High Level Meeting on National Drought Policy, held in Geneva in March 2013, which issued a statement urging all governments around the world to develop and implement national drought management policies. It was requested that the FAO, the UNCCD and the WMO assist member countries in achieving this goal by 2020.

Additional drought capacity-buiding workshops were in Romania in July for Eastern and Central Europe and in Brazil in December for South America, and will be in Vietnam in May for Asia, and in Africa in late summer or early fall.

Lake Region RC&D in Kansas kicks off drought planning

The Lake Region Resource Conservation and Development organization, based in Ottawa, Kansas, hosted a meeting Nov. 5 for about 20 local and regional stakeholders to learn about the Drought Ready Communities planning process. Don Stottlemire, president of the Lake Region RC&D board and also of the statewide association of RC&Ds, and Heather McPeek, Lake Region RC&D program manager, persuaded a diverse group of stakeholders to attend, including RC&D board members, county health and emergency managers, city officials, a Corps of Engineers representative and an Extension educator. Brian Fuchs and Kelly Helm Smith from the NDMC presented information on drought science and planning to the group as part of the NDMC's work for the National Integrated Drought Information System Missouri River Basin pilot project.

Kelly Helm Smith and Brian Fuchs from the National Drought Mitigation Center facilitate a discussion of what has and has not worked in drought and water planning in the Lake Region RC&D.

Recordings of the main presentations are available on the web, courtesy of Cleon Rickel, KOFO News in Ottawa, Kansas:

Drought: A Flood of Ideas, Kelly Helm Smith on Drought-Ready Communities
http://tindeck.com/listen/tbps

Drought: Natural Disaster in Slow Motion, Brian Fuchs on the science of drought and drought monitoring
http://tindeck.com/listen/fkpr

Researchers find state drought plans need defined goals

A team of researchers studied 44 state drought plans and found that "state drought plans typically address emergency responses well, while they are generally weak in establishing strong goals, mitigation and adaptation, public involvement, plan updates and implementation." The researchers, including Mark Svoboda at the National Drought Mitigation Center, and Xinyu Fu and Zhenghong Tang in Community and Regional Planning, University of Nebraska-Lincoln, published their findings in the *Journal of Natural Hazards* in December 2013.

The researchers analyzed the content of state plans based on a previously established framework for what elements plans should contain. Elements included aspects of hazard analysis (monitoring), vulnerability analysis, and risk management. They found the states with the most proactive drought plans were Colorado, Hawaii, California, Arizona, New York, Texas, Idaho, Montana, Rhode Island, Missouri and Nebraska.

Recommended improvements were to establish strong goals and objectives, such as numeric targets for conservation; focus more on mitigation and adaptation actions that reduce vulnerability; involve the public; specify the frequency of plan updates and learn from past experiences; and provide for implementation reports.

Reference

Fu, X., Svoboda, M., Tang, Z., Dai, Z., & Wu, J. (2013). An overview of US state drought plans: Crisis or risk management? *Natural Hazards*, 69(3), 1607-1627. doi:10.1007/s11069-013-0766-z

Webinar on Drought for Planners

Join us for a free webinar at 1 Central, Wednesday, Feb. 12, on the American Planning Association's newly released Planning Advisory Service report on planning for drought. Jim Schwab, manager of the APA Hazards Planning Research Center, will give an overview of this guide and highlight how it can be used to help mitigate drought in communities.

Registration is free but necessary for access to the webinar:

http://drought.unl.edu/registration.aspx?eventid=240

To access archived webinars previously presented by the Engaging Preparedness Communities working group of the National Integrated Drought Information System, please visit:

http://drought.unl.edu/AboutUs/CurrentResearch/EngagingPreparednessCommunities.aspx

Soil moisture networks focus of November workshop

Soil moisture can be a key indicator in determining whether a recent dry spell or heat wave has resulted in drought, but soil moisture monitoring networks are fragmented, say U.S. Drought Monitor authors and others. "Developing a Coordinated National Soil Moisture Network" was the topic of a workshop in November 2013 at the National Weather Service training facility outside Kansas City, Missouri, sponsored by the National Integrated Drought Information System.

About 50 representatives from various federal and state agencies that maintain soil moisture networks attended, said Mark Svoboda, head of the NDMC's Monitoring program area, who helped organize and participated in the workshop.

The report from the workshop is one of the deliverables promised in a Memorandum of Understanding between the Department of Commerce (the parent agency of the National Oceanic and Atmospheric Administration and NIDIS) and the U.S. Department of Agriculture, and in the President's Climate Action Plan.

Right, Deborah S. Harms, a soil scientist with the National Resources Conservation Service, presents information. Left, Robin Webb, NIDIS program office, makes a point during discussion. In the background, Roger Pulwarty, NIDIS program office, and Ken Hubbard, right, University of Nebraska-Lincoln, share information.

Farm and ranch planning workshop in Garden City, Kansas, now online

The National Drought Mitigation Center teamed up with Kansas State University, the National Integrated Drought Information System and the North Central Region SARE Professional Development Program to present a full-day "Managing Extended and Extreme Drought on the Farm and Ranch" workshop on Jan. 9 in Garden City, Kansas. More than 100 rangeland managers, irrigated crop producers, agricultural advisors, and agency representatives participated.

Participants said they learned:

- "To plan for drought. If it doesn't happen, great, if it does, you are ready. Also, you preserve your resources in good and bad years with a drought plan."
- The process of planning is just as important as the content of the plan.
- "The importance of goal and vision setting."
- "We need to prepare for change. We need to get ready for reduced water."

Presentations by ranchers Ted Alexander of Kansas, Jim Faulstich of South Dakota, and John Maddux of Nebraska, and by farmers Dale Mauch of Colorado, and Mike Deaver and Henry Nightengale of Kansas, were well-received. One participant said, "I immensely enjoyed the producers' contribution to the day."

Links to the workshop agenda, presentations and archived recordings are online:
http://drought.unl.edu/ranchplan/Overview/Resources/ExtendedExtremeDroughtWorkshop.aspx

$500 grants for communities to develop drought response leadership

Grants of $500 are available for up to five communities that would like to pilot the Community Capacity-Building Program for Drought Response, a project of the Extension Disaster Education Network (EDEN) and National Voluntary Organizations Active in Disasters (VOAD). This guide is designed to help a community's volunteer sector develop a drought response team. That team will have the tools to assess their communities' specific vulnerabilities to drought. To learn more about the program, please contact Steve Cain (cain@purdue.edu, 765-494-8410), Indiana VOAD and chair of the National VOAD Drought Task Force.

For a copy of the guide, please visit the EDEN Resource page:
http://eden.lsu.edu/EDENCourses/CCBPDR/Pages/default.aspx

Dry wells spur student interest in drought

Rural wells running dry for two summers in a row have sharply increased drought awareness in and around the communities of Dwight, Valparaiso and Brainard, Nebraska. Debate is underway on irrigation restrictions proposed by the Lower Platte South Natural Resources District. Meanwhile, the next generation of drought planners is taking matters into their own hands.

"Brainard had numerous rural families who were out of water this last summer and the future of the town's water supply is questionable," said Jodi Chapek, High Ability Learners coach for East Butler Elementary School in Brainard. "East Butler's students have researched droughts and invented a solution."

While conversation at cafes focused on the right balance of irrigation and other water uses, the students focused on what they and their families could do.

"The elementary HAL (High Ability Learners) group feels that it's all about awareness of water usage," Chapek said. Participating in the First Lego League, a robotics competition that encourages 9- to 14-year-olds to create solutions to real-world problems, students came up with a prototype for a real-time water consumption monitor that could be installed on faucets, showers, dishwashers, washing machines and hoses. "These on-demand digital monitors would show how much water is being used at that source and for the household on a whole," Chapek said. "This would help bring a consciousness about the value of water into each household of our community."

Working within the 2013 First Lego League theme, Nature's Fury, the team noted differences between drought and other hazards. "The group programmed a robot to interact with different obstacles, all revolving around planning, staying safe and rebuilding after the storm," Chapek said. "Drought didn't fit the mold of other natural disasters. It creeps up on a community over years and years, but the students know that our community needs to make changes now, in order to save water." According to the students, more awareness of water usage is what's needed, and their out-in-the-open water monitor will make members of the community more conscientious about water usage.

"The students presented to the village board and the fire department in order to spread awareness about our town's issues," Chapek said. "They brought in guest speakers as well as interviewed numerous adults." Students learned that the town and its community members are aware of the problems the drought is causing, but that solving the problems isn't easy.

Nicole Wall and Tonya Bernadt, National Drought Mitigation Center, traveled the short distance to Brainard in November 2013 to talk to students at the East Butler Elementary High Ability Learners group. "We were pleasantly surprised to find a bright group of kids that had really done their homework about drought and were very knowledgeable and concerned about the subject," Bernadt said. "Not only were they knowledgeable but they were able to talk to us about impacts of the recent droughts."

Students present their "Wheel of Drought" game show skit. They had to answer questions about how drought affects their community until a "commercial" cut in to advertise their water-flow display, which attaches to each household faucet to help homeowners be more aware of water usage.

A judge watched two highly focused team members position their robot at the start of the competition.

DROUGHT

in the Life, Cultures, and Landscapes of the Great Plains

Drought or the ever-present threat of it has had a pervasive effect on the region and its people. It molded the region's settlement patterns, agriculture and commerce, stimulated innovation, aroused conflict between agriculturalists and environmentalists, and fueled litigation between states. Drought shaped how the people of the Great Plains think of themselves and their region and influenced their culture, literature, and art. Today it raises concern about whether the region will have sufficient water for its future.

Scientists and scholars from across the full spectrum of disciplines are invited to share their expertise and perspectives as the symposium explores all aspects, causes, impacts, projections, social and cultural consequences, and ramifications of drought.

The Symposium is a collaboration of the:

Center for Great Plains Studies
University of Nebraska | www.unl.edu/plains

National Drought Mitigation Center

Water for Food
ROBERT B. DAUGHERTY INSTITUTE

Support for the Symposium is provided by UNL leadership: Vice Chancellor of the Institute for Agriculture and Natural Resources, Senior Vice Chancellor for Academic Affairs, Vice Chancellor for Research, CESU (Cooperative Ecosystems Studies Unit)

Corporate sponsors:

LINDSAY CORPORATION

MONSANTO

40th Annual Great Plains Symposium:

April 1-4, 2014 | Lincoln, Nebraska

REGISTRATION OPEN NOW AT:
www.unl.edu/plains

The symposium features more than 40 distinguished speakers including:

Ian Frazier of The New Yorker

Richard Hornbeck, Harvard University

Erwin Denys and **Nathan Engle**
World Bank

NOAA: **Tom Karl**, National Climatic Data Center;
Marty Hoerling, Earth System Research Laboratory

Sonny Ramaswamy
National Institute of Food and Agriculture

Theib Oweis
International Center for Agricultural Research in the Dry Areas

Jason Clay, World Wildlife Fund

Topics include:

Global context for drought in similar environments

Drought and mental health

Impacts on livestock, drought risk management

The enduring impact of the Dust Bowl

Drought in literature

Changing climate and climate extremes