SPRING2016

National Drought Mitigation Center

DROUGHTSCAPE

The Newsletter of the National Drought Mitigation Center

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About the photo

Morning arrives on the Eastern Sierra Nevada Mountains. Californians rely on the Sierra snowpack for a third of their water. Though the mountains had more snow this winter than in the last five, drought conditions remain, with state water managers reporting reservoirs are still far below average.

Photo by Rennett Stowe

DIRECTOR'S REPORT

This semester has been especially busy for the NDMC. We just finished hosting two meetings for the National Integrated Drought Information System here in Lincoln at the end of April. The first was a meeting of all the NIDIS working group co-chairs, as well as many of the co-chairs for the Regional Drought Early Warning Systems across the country. The second was a meeting of the NIDIS Engaging Preparedness Communities Working Group. Both meetings went well, and it was great to have all the NIDIS folks in Lincoln.

Michael J. Hayes

The NDMC also was able to celebrate our 20-year anniversary in April. As mentioned in an earlier edition of DroughtScape, we actually passed that milestone last July and were planning to have a celebratory event in December. Unfortunately, NDMC Founding Director Don Wilhite had a mishap, so we postponed it until April. We are glad we did. It was a wonderful event hosted at UNL's International Quilt Museum and Study Center, and we were honored to have in attendance Wilhite, several state senators, university administrators, out-of-state partners, federal and state partners, friends, colleagues and family.

I have always said one of the key elements of the NDMC's success has been its team-oriented culture, which has been strong since the beginning. The recent celebration gave us a reason to quantify the NDMC's legacy over the years. Over the past 20 years, the NDMC has collected more than $30.7 million in grants and contracts. During the same period, the NDMC has produced 170 peer-reviewed journal articles and 125 additional technical publications including book chapters, reports and articles. The NDMC has organized 188 workshops around the world, hosted 670 international visitors from 39 countries, and been interviewed at least 5,000 times by media. Of course, none of this would have been possible without the original vision of Don Wilhite or the strong team focus of everyone here at the NDMC. There are many others at the university and within the Nebraska congressional delegation who have had a major role in these accomplishments over the years. Thank you, everyone, for your contributions to our success.

Michael J. Hayes

NDMC Turning 20

Tonya Bernadt/NDMC Education and Outreach Specialist

The original staff of the National Drought Mitigation Center, from left, Kelly Helm Smith, communications and planning specialist; Deb Wood, publication specialist; Don Wilhite, founder and former director; Mike Hayes, director; and Mark Svoboda, climate-based monitoring program area leader; stand together before the 20th anniversary celebration April 22, 2016, at the International Quilt Study Center and Museum in Lincoln, Nebraska. The center has grown from five to nearly 20 faculty and staff.

CONTACT THE NATIONAL DROUGHT MITIGATION CENTER

CONTACT US

e) ndmc@unl.edu
or Shawna Richter-Ryerson, editor, at shawna@unl.edu

p) (402) 472-6707

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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

University of Nebraska Lincoln

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Drought Summary, January to March 2016

BY BRIAN FUCHS
NATIONAL DROUGHT MITIGATION CENTER CLIMATOLOGIST

Drought classifications are based on the U.S. Drought Monitor. Details on the extent and severity of drought are online: ***droughtmonitor.unl.edu****.*

The outlook integrates existing conditions with forecasts from the National Oceanic and Atmospheric Administration's Climate Prediction Center: ***www.cpc.ncep.noaa.gov.***

Drought

Drought conditions have improved slightly over the United States so far this year with only 12.76 percent of the country in drought compared to 15.70 percent at the start of the year. Severe drought improved from 9.67 to 4.92 percent, extreme drought improved from 5.25 to 3.14 percent, and exceptional drought improved from 2.26 to 1.56 percent. Last year at this time, almost 31 percent of the United States was suffering from drought conditions. There are approximately 13.3 million people affected by drought now compared to approximately 38.2 million at the beginning of the year.

Temperatures

The year started off with above-normal temperatures over most of the United States. A few areas of the central Rocky Mountains and the Great Basin saw temperatures that were slightly below normal. Most of the United States was 2 to 4 degrees above normal while areas of the northern High Plains were 6 to 8 degrees above normal.

Precipitation

Precipitation was abundant over the Pacific Northwest and northern California the first part of the year. Departures were from 3 to 6 inches above normal over most of the region,

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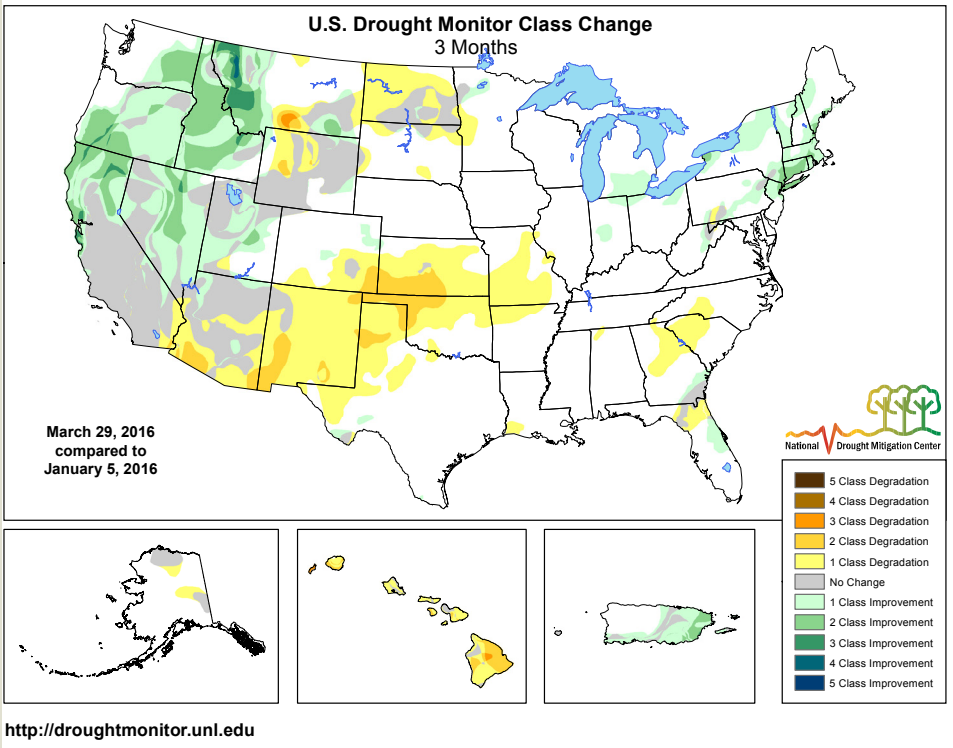
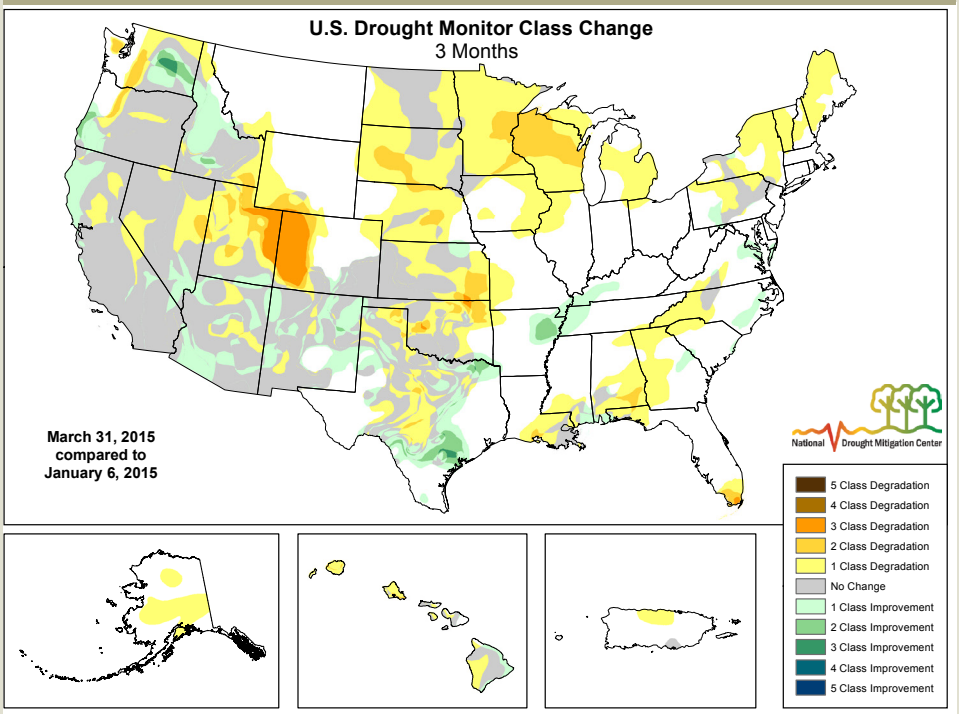
2016



http://droughtmonitor.unl.edu

2015



http://droughtmonitor.unl.edu

These maps compare this year's drought conditions to last year's. Nearly 24.9 million more people were affected by drought last year at this time.

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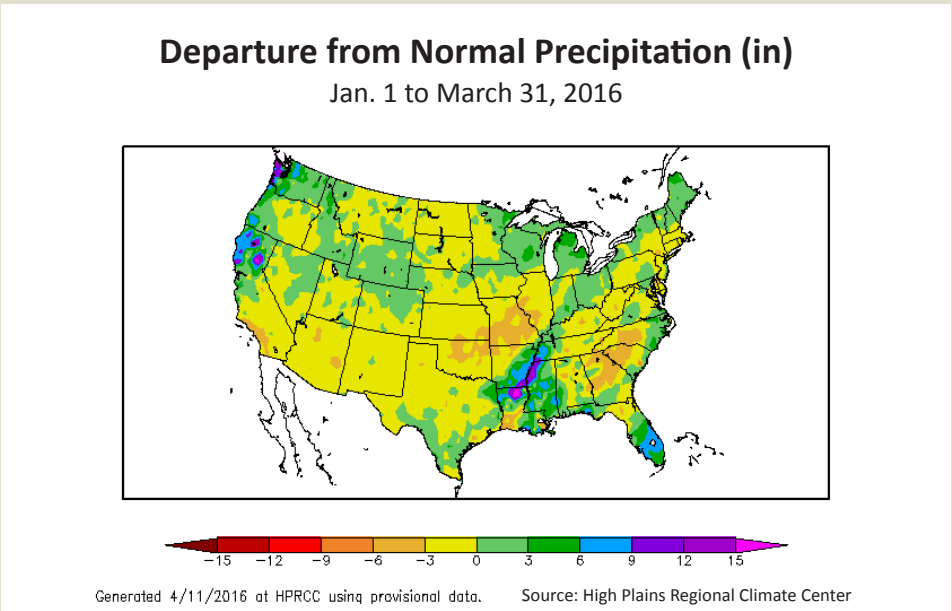
but reaching up to 12 inches above normal over portions of northwest Washington and northern California. The central Rocky Mountains and portions of Idaho and Nevada also were wet with departures of up to 3 inches above normal. It was drier than normal over much of southern California, southern Nevada, Arizona, New Mexico and west Texas to start the year. Most of this area was up to 3 inches below normal with some isolated areas of southern California and Arizona up to 6 inches below normal. In portions of the central Plains and Midwest, conditions were drier than normal with departures of up to 6 inches below normal from central Oklahoma northeastward to western Illinois. It was also drier than normal from Georgia into the Carolinas by as much as 6 inches below normal. The middle and lower Mississippi River Valley was wet, with departures of up to 9 to 12 inches above normal in Louisiana, Mississippi and Arkansas. South Florida also had 6 to 9 inches above-normal precipitation, while the upper Midwest saw 3 to 6 inches above-normal precipitation.

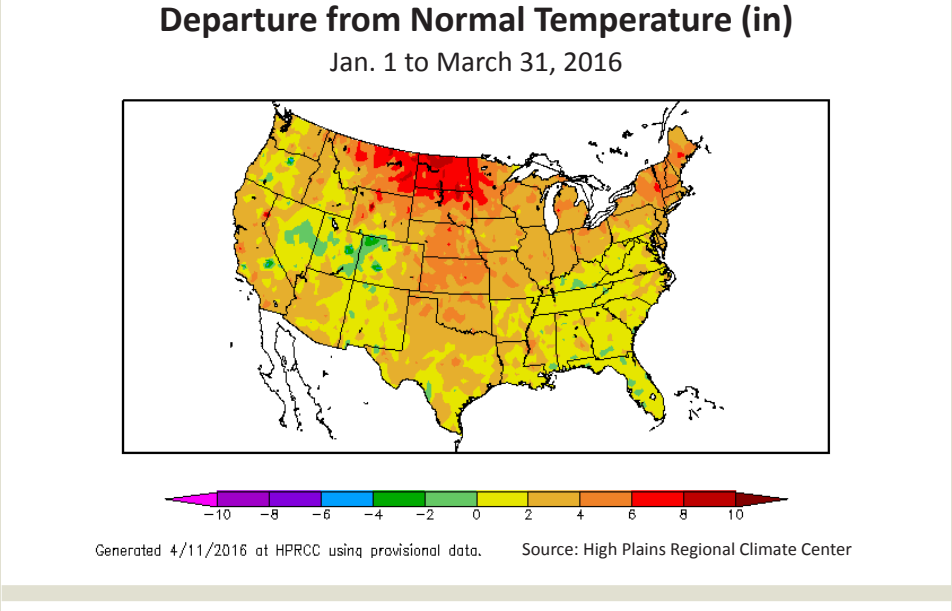
MONTHLY DROUGHT AND IMPACT SUMMARIES

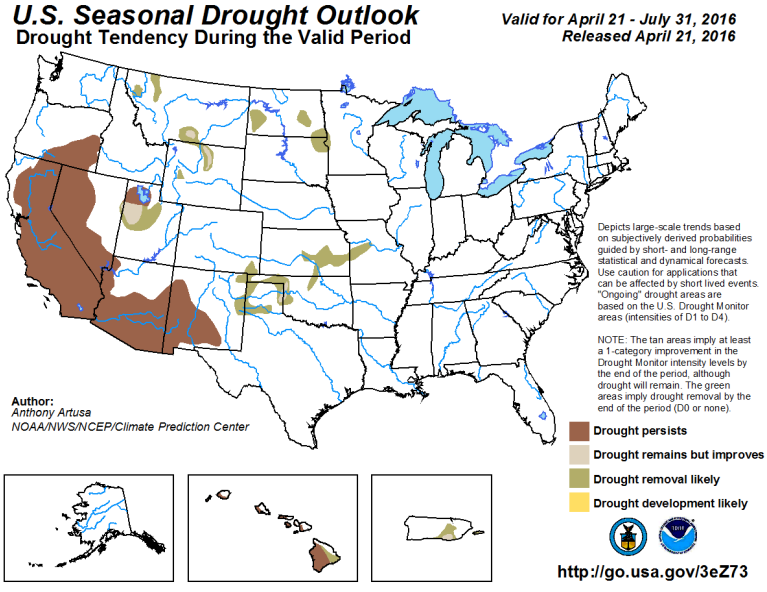
For a more detailed review of conditions, please see the NDMC's Drought and Impact Summaries for January, February and March: **drought.unl.edu/newsoutreach/monthlysummary.aspx**

Outlook

The seasonal drought outlook shows that drought will persist over much of California, Nevada, Arizona, southwestern New Mexico and southern Oregon. Improvements will be possible to the drought conditions in northern Utah. Drought will persist over much of Hawaii while some improvements may be observed over Puerto Rico.



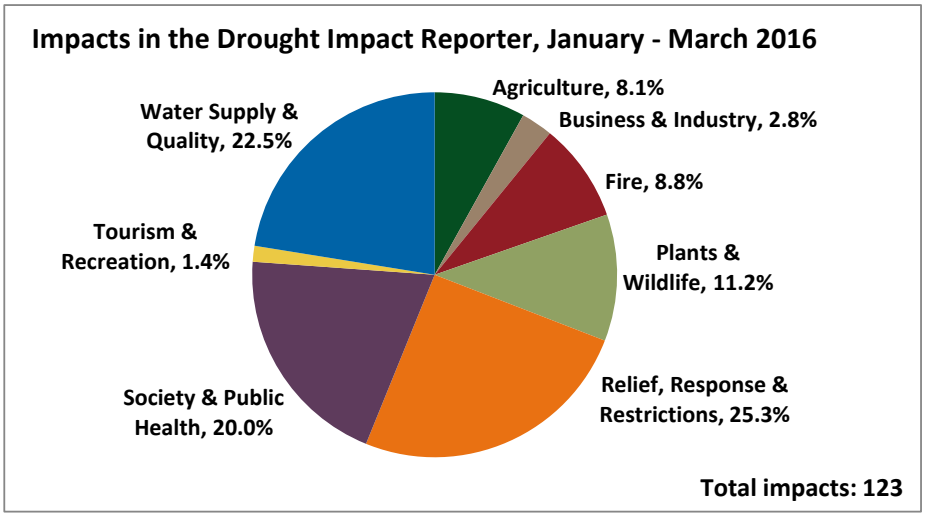


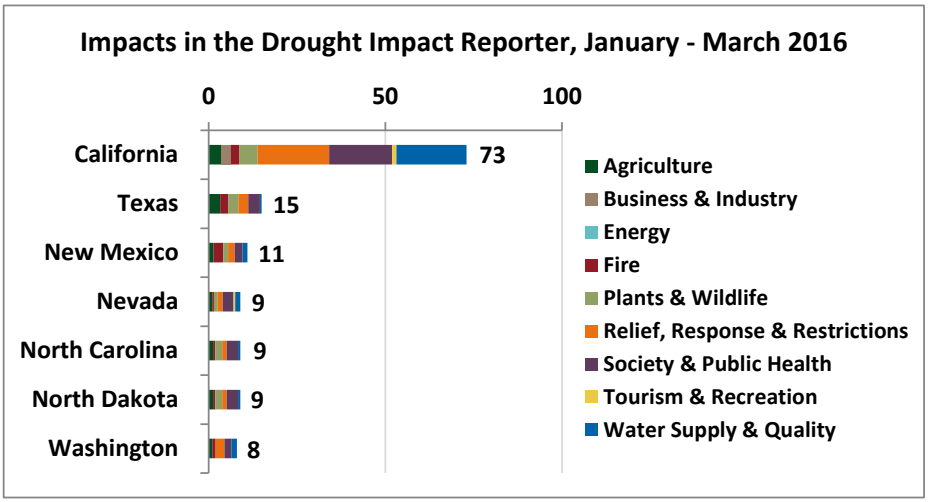


First quarter 2016 drought impact summary: Drought not over in California

BY DENISE GUTZMER
NATIONAL DROUGHT MITIGATION CENTER DROUGHT IMPACT SPECIALIST

As 2016 began, drought gripped California and parts of the western U.S. as it had for more than four years. The strong El Niño was expected to deliver plentiful precipitation, but by the end of March, it was apparent the drought was not over, at least not in southern California. Northern California did get more rain and snow, filling Shasta Reservoir, Lake Oroville and Folsom Lake, but all other reservoirs in the state came up short. Seventy-three California drought impacts were entered in the Drought Impact Reporter to document the water challenges facing the state. Texas had 15 impacts, noting mostly agricultural and societal issues, and New Mexico had 11 impacts describing fire activity and other concerns.





Source: National Drought Mitigation Center

Water conservation in California nearly hit target

To extend water supplies, California Gov. Jerry Brown mandated 25 percent water conservation between June 2015 and February 2016, compared to the same months in 2013, and Californians just missed the target at 23.9 percent. Altogether, the public saved enough water during that time to serve nearly 6 million Californians for a full year. The mandate for a 25 percent reduction in water use has been pushed back to 20 percent.

"Drought-stricken California misses water conservation target," by Scott Smith, The Associated Press, April 4, 2016

Better drought preparation needed at national level

President Obama issued a presidential memorandum and separate action plan on March 21, directing the federal government to devise a more proactive, long-term approach to dealing with drought. Some of the goals the president set forth are to increase sharing of information about drought risks with state, regional, tribal and local authorities and to improve coordination of federal drought-related activities. More bouts of intense drought are expected with climate change, creating a greater need for national drought preparedness.

➲ READ IT

The memorandum is available on the White House website. Access it here: **https://goo.gl/nVhHqc**

"Obama seeks more coordination on dealing with drought," by Associated Press, Las Vegas Sun, March 21, 2016.

http://lasvegassun.com/news/2016/mar/22/obama-seeks-more-coordination-on-dealing-with-drou/

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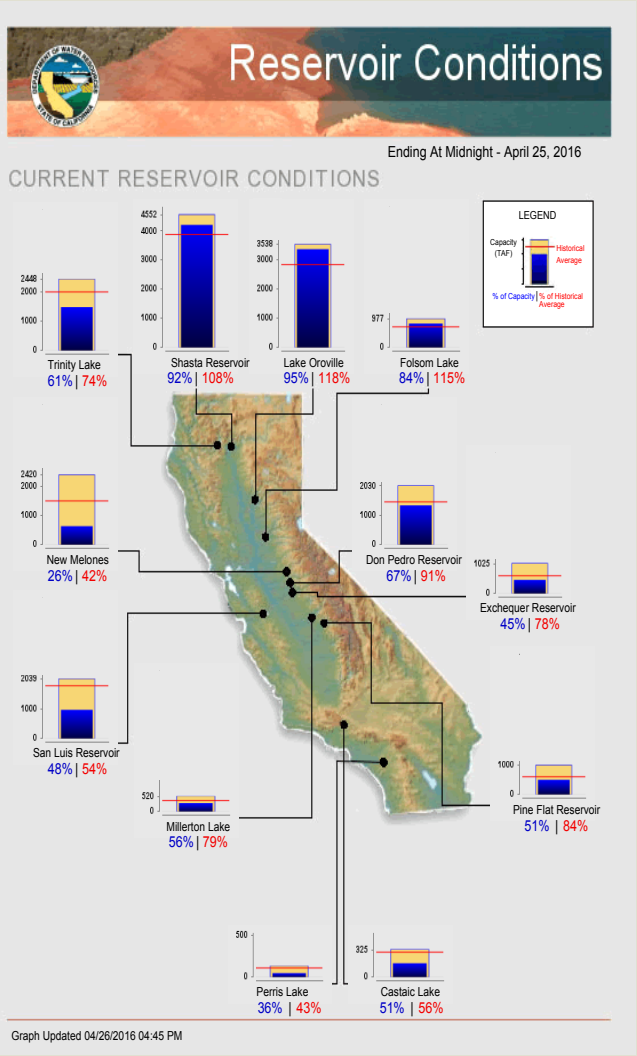

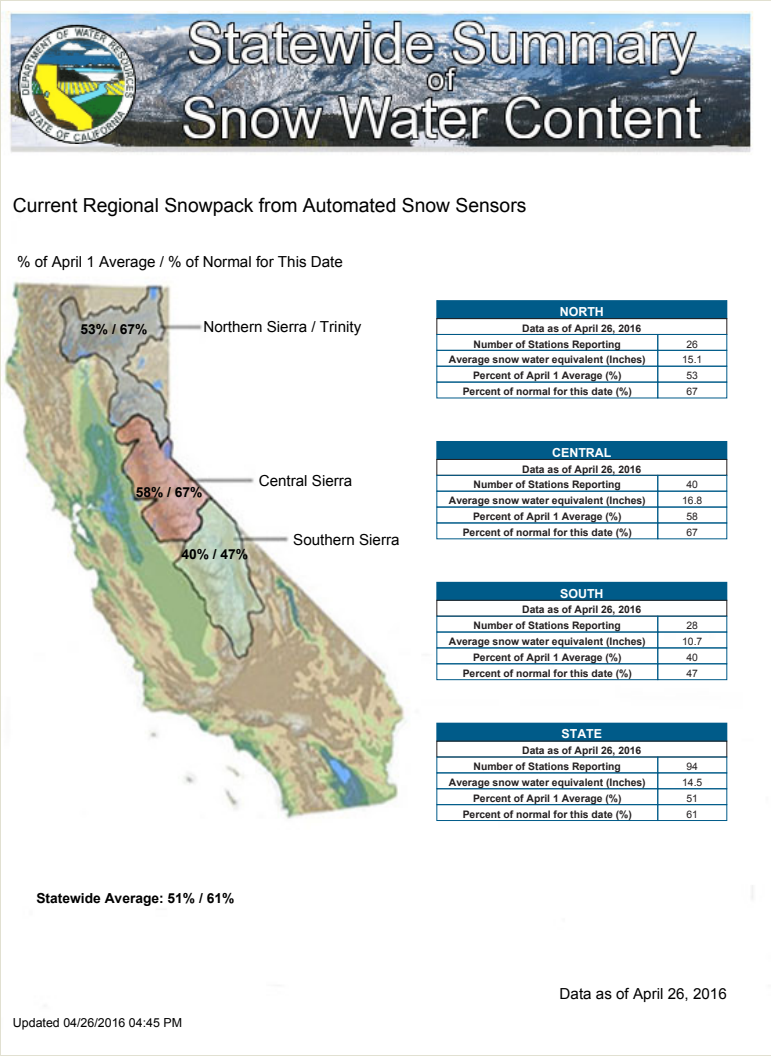

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Water allocations for California's state, federal projects

The California Department of Water Resources announced it will deliver 60 percent of water in 2016 after rains increased reservoir levels. This recent announcement was a dramatic improvement over the December estimate of just 10 percent. In 2015, the State Water Project delivered 20 percent of full allotments, and, in 2014, delivered just 5 percent.

The U.S. Bureau of Reclamation offered an allocation of 50 percent of the Class 1 water supply for the Friant Division in the Central Valley Project. The division's water customers will also get some of the "uncontrolled season" supply. The Bureau of Reclamation may update their estimates if needed. (See chart above.)

"California loosens water cutbacks in drought," by Associated Press, Orange County Register (Santa Ana, Calif.), April 21, 2016

READ IT

Improving the Federal Response to Western Drought was released and is available at **www.ppic.org/content/pubs/report/R_216JMR.pdf**

"California officials expect 10 percent deliveries from State Water Project," by Dale Kasler and Phillip Reese, The Sacramento Bee (Calif.), Dec. 1, 2015

"More state water allotted to California farmers," by Todd Fitchette, Western Farm Press, April 21, 2016

California's Sierra Nevada snowpack deteriorating

The March 30 manual snow survey near Echo Summit found that snow water content was slightly below normal at 97 percent of average. (See chart above.)

April 1 is the time of year when snow is typically at its deepest, making this a crucial predictor of snow water runoff for the summer. Electronic readings of northern Sierra Nevada snow conditions found 28.1

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Drought Risk Management Research Center

Mission statement

The Drought Risk Management Research Center, a partnership between NOAA's National Integrated Drought Information System and the National Drought Mitigation Center, provides innovations in research and information delivery to improve drought risk management and resilience across the United States.

The DRMRC will develop better information delivery tools and enhanced capacity for planning for long-term drought resilience. Regions and sectors will have increased capacity to plan, adapt, change, and recover in the face of drought conditions and water stresses.

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inches of water content for 97 percent of average, 25.2 inches in the central region for 88 percent of average and 19.3 inches in the southern region for 72 percent of average. Statewide, the average snow water content was 24.4 inches, or 87 percent. With the snowpack being just below average, water conservation was expected to continue.

DROUGHT IMPACT REPORTER

For more detailed reports, please see the NDMC's Drought Impact Reporter for January, February and March:
droughtreporter.unl.edu

"Sierra Nevada snowpack grew during first half of March, but dry spell leaves water content still below average," by California Department of Water Resources, Sacramento, March 30, 2016

"Average snowpack could prolong California water conservation," by Scott Smith, Associated Press, Record Searchlight (Redding, Calif.), March 30, 2016.

http://www.ocregister.com/articles/water-713111-california-state.html

http://www.sacbee.com/news/state/california/water-and-drought/article47430055.html

http://westernfarmpress.com/irrigation/more-state-water-allotted-california-farmers

http://www.water.ca.gov/news/newsreleases/2016/033016.pdf

http://www.redding.com/news/373950021.xhtml

Kenyan agency leader dedicated to preventing drought-related deaths

KELLY HELM SMITH
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS AND PLANNING SPECIALIST

Photo by Chris MacFarlane

The Honorable Agnes Ndetei, chair of the board of Kenya's National Drought Management Agency (right), spent a week at the National Drought Mitigation Center, with Dr. Tsegaye Tadesse (left), serving as her main host. Tadesse, a climatologist, is leading a multi-institution, NASA-funded project to improve drought early warning and reduce vulnerability to drought in the Greater Horn of Africa.

The Honorable Agnes Ndetei, a Kenyan politician working to reduce the effects of drought, came to the U.S. National Drought Mitigation Center for a week in March to learn about state-of-the-art drought monitoring and to share her experiences.

"America is way ahead of everyone else in monitoring the weather," she said. "You're collecting weather data for the whole world." (U.S. satellites are a main source of weather information for many places.)

Ndetei is chair of the board of Kenya's National Drought Management Authority (NDMA), established in 2011. "Our mandate is to keep drought from turning into an emergency," Ndetei said. "We are providing safety nets for the people so they don't die."

People reliant on subsistence agriculture are at risk for food insecurity or famine during drought. Kenya's drought authority works with the governments of the country's 23 arid or semi-arid counties as well as international donors to ensure that relief arrives in time to save lives.

In addition to monitoring drought, Kenya's NDMA monitors the health and nutrition of villagers in remote areas. The agency deploys observers, who fan out into villages to collect data on food availability and whether people are getting enough to eat. The authority has a hunger safety net project in four counties, which currently takes care of 100,000 families on a regular basis and increases during drought, often working through the women.

"Women can use very little to bring up the family," Ndetei said. "Women are the ones carrying the burden of the world on their shoulders. The woman is going to take care of children and the elderly." She noted that in some Kenyan cultures, men are less likely than women to spend money on the family's well-being.

A more diversified economy and wealth can help buffer people from the effects of drought, but one of the challenges Ndetei's agency faces is that some of the people she is helping have not been exposed to a "money culture," so part of the authority's work is finding ways to introduce cash that gets used to feed families.

The agency is using various development projects to reduce vulnerability to drought. One means is by having villagers identify what would help them most, and then helping them implement the idea, such as a communal catchment pond. "People dig it with their hands," she said. "They create their own asset. Then we pay them a salary."

Ndetei is also focused on the special challenges faced by rural

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> ***"AMERICA IS WAY AHEAD OF EVERYONE ELSE IN MONITORING THE WEATHER. YOU'RE COLLECTING WEATHER DATA FOR THE WHOLE WORLD."***
>
> **Agnes Ndetei**,
> *chair of the board of Kenya's National Drought Management Agency*

DrIVER keeps eye on drought forecasting and preparation

SHAWNA RICHTER-RYERSON
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS ASSOCIATE

International experts gathered at SA Water in Adelaide, Australia, in March to talk about drought forecasting and preparation, part of the larger Drought Impacts: Vulnerability thresholds in monitoring and Early-warning Research, or DrIVER, project funded by the Belmont Forum.

Representatives of the water, agriculture, ecosystem and health sectors focused on what indicators of drought they use, what impacts are being recorded and which ones should be recorded and used in the future. NDMC representatives were Mark Svoboda, head of the monitoring program area, and Nicole Wall, public participation specialist.

The goal is to link the impact of droughts on communities, regions and industries with the traditional indicators of drought such as rainfall and soil moisture. The outcome: Better forecasting and preparation for when droughts do hit. This was the third workshop in a series, with the first in December 2014 in the United States and the second in March 2015 in the United Kingdom.

NDMC

Part of the Belmont DrIVER team visits a winery in the Adelaide, Australia, area. Drought has had a huge impact on local wineries. Participants are from left: Neville Crossman with AU CSIRO; Nicole Wall and Mark Svoboda with NDMC; a doctoral student for CSIRO; Kerstin Stahl, project PI, University of Freiberg; Jamie Hannaford from U.K. CEH; and Kevin Collins from U.K. Open University.

Workshop participants saw firsthand the impacts Australia's 13-year drought (1997-2010) had on wineries in the Adelaide area, and they learned what steps those farmers took to strengthen their crops against severe water shortages, current and future.

GET MORE INFO

DrIVER project: **drought.unl.edu/AboutUs/CurrentResearch/DrIVERproject.aspx** | Belmont Forum: **belmontforum.org** | The Conversation: **go.unl.edu/theconversation**

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populations with traditions of goat herding, and she is working on ways to help some groups switch to irrigated agriculture. In cultures where animals are status symbols, herders may be reluctant to sell animals, and may need to drive their herds many miles to find pasture, leaving women and children with scant food supplies. Cultures that initiate young men by sending them to raid neighboring groups' herds to restock their own herds compound vulnerability and lead to violence.

Gender roles are sometimes surprising. Ndetei said she learned on a recent trip to a village in Kenya that "the women are the pillars of cattle rustling. They encourage their men to rustle cattle so they can become heroes. If women wanted to, they could finish cattle rustling overnight."

With seed money from Kenya's NDMA, cattle rustlers in some of these communities are beginning to undergo rehabilitation programs and engage in various types of businesses for food and education for other family members. Ndetei also used her time in the U.S. to learn more about irrigation, adding, "Water would help these communities lead a more settled life."

Ndetei also met with Christopher Neale, director of research for the University of Nebraska's Robert B. Daugherty Water for Food Institute.

Visit the National Drought Management Agency's website: **www.ndma.go.ke**.

Water providers, NRD staff and others discussed drought responses during a scenario exercise in Tecumseh, Nebraska.

Nemaha NRD drought scenario exercise a step toward addressing competing water uses

KELLY HELM SMITH
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS AND PLANNING SPECIALIST

Water providers, NRD staff and others discussed drought responses during a scenario exercise in Tecumseh, Nebraska.

Nebraska's Nemaha Natural Resources District held a drought scenario workshop in March 2016, walking stakeholders through progressively more intense stages of drought to anticipate impacts, envision responses, find gaps and identify mitigation measures.

The NRD can "work with public water suppliers and irrigators so that they have more advanced information to make decisions before it is too late," said Bob Hilske, Nemaha NRD general manager.

Nebraska's 23 NRDs, which are governed by local, elected boards, are authorized by law to regulate groundwater in the state, but as one participant noted, they can't just tell people to stop pumping. During drought in 2012 in some parts of the state, the water table fell too low to use some domestic and municipal wells, while surrounding irrigators continued to pump water.

The need to balance water use between villages and irrigators contributed to the decision to hold a drought scenario exercise, Hilske said. He added that the event went well, but he would have liked a few irrigators to attend.

Participants included NRD personnel, water system managers, Farm Service Agency representatives and more. At each stage of a hypothetical but realistic drought, the organizers asked participants to consider certain questions. The NRD worked with JEO Consulting Group to organize the exercise.

At Stage 1, pre-drought, when the U.S. Drought Monitor showed abnormally dry conditions for the Nemaha NRD in December, organizers asked how each organization's internal drought protocols would be activated, whether the organization communicates with the NRD, and what information would be used for decision making at that stage.

At Stage 2, Moderate Drought the following June, the questions were similar but more extensive: What is your organization's typical response, what other groups are you coordinating with, are there any political considerations, what kind of communication is taking place with key audiences, and what information are you using for decision making? As conditions grew more extreme in subsequent stages, participants were asked the same questions, and the

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exercise progressed until participants had run through their entire spectrum of responses.

Water providers agreed that little action would be required during abnormally dry conditions, but that first steps to take would include issuing a water watch, increasing conservation education and messaging through a variety of means, and keeping an eye on the water table to see whether it was dropping. As dryness progressed to drought, water suppliers would be keeping a closer eye on water table levels, and perhaps coordinating with large industrial users or others to manage peak demand by, for example, filling tanks in the evening rather than during the day. Conservation messaging would intensify.

As drought intensified, water suppliers anticipated needing to field inquiries from homeowners being told they need to cut back on watering, while farmers outside town are widely irrigating. Farmers' wells are typically deeper than municipal wells, and economic and regulatory considerations are different for farmers and for municipalities.

THE NRD CAN "WORK WITH PUBLIC WATER SUPPLIERS AND IRRIGATORS SO THAT THEY HAVE MORE ADVANCED INFORMATION TO MAKE DECISIONS BEFORE IT IS TOO LATE."

Bob Hilske,
Nemaha NRD general manager

Farm Service Agency personnel said they would begin documenting dry conditions as soon as they were detected, to avoid having to reconstruct it week by week later on if dryness became drought. Once drought actually set in, FSA staff would be busy documenting weather and its impacts on soil moisture, pasture and livestock, and submitting that information to the National Agricultural Statistics Service. As it progressed, they would implement the Livestock Forage Program, consider releasing Conservation Reserve Program lands for haying and grazing, remind producers to submit claims to their insurance companies, and gear up with additional staff if possible and traveling teams to process agricultural producers' requests for assistance.

An emergency manager who attended said that he wouldn't necessarily have a large role to play unless there was an official disaster declaration, but that emergency managers could help communicate water conservation messages. He noted that the FSA or the state Department of Agriculture can also request emergency funds from the governor.

Hilske said the NRD will continue to work with villages to help them protect their water supplies during future droughts. The NRD staff provides technical expertise to villages in various ways, including helping villages monitor water levels so they can determine whether they need to switch to backup wells, and helping them decide when they need to install an additional well.

CONGRATULATIONS ARE IN ORDER

The National Drought Mitigation Center congratulates Claire Shirle and Jake Petr on completion of their honors theses and Undergraduate Creative Activity and Research at UNL projects in spring 2016. From left, the students and their project advisors are Deborah Bathke, NDMC climatologist; Jake Petr, meteorology, climatology and global studies major; Claire Schirle, meteorology, climatology and mathematics major; and Tsegaye Tadesse, NDMC climatologist. Schirle's topic was "A Comparison of the Vegetative Response Index and Vapor Pressure Deficit for Monitoring Drought in California," and Petr's was "Assessing Climate Change Impacts in the Greater Horn of Africa Using the Community Capitals Framework."

Nebraska's Lower Platte South Natural Resources District recognized for drought tournament

KELLY HELM SMITH
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS AND PLANNING SPECIALIST

Nebraska's Lower Platte South Natural Resources District jump-started drought planning with an innovative drought tournament in February 2015, and that effort won a Public Outreach Award from the Nebraska Chapter of the American Planning Association at its annual meeting in March 2016.

This marked the first time that a drought tournament has been based on historic events in an actual watershed. The concept of drought tournaments was developed in 2011 in Canada, with the idea of tapping into participants' competitive energies by dividing them into teams with assigned roles for each player, and judging each team's response to a hypothetical drought. Since then, Colorado and Oklahoma have also held drought tournaments. As noted in the award nomination, before the LPS NRD's tournament, these were all state-level tournaments, focused on hypothetical locations and events.

The goals of the LPS NRD Drought Tournament were to bring together agricultural producers and municipal water providers in a "low-stress, no fault environment" to talk about issues that could arise in drought, and to learn about what management practices are already in place for drought response, the nomination said. Themes that emerged in discussion included the need for year-round education and outreach related to water conservation, and the need for consistent, coordinated messaging to the public.

The nomination stressed that Nebraska's NRDs are well-positioned to coordinate and manage water-related issues, and the tournament helped the LPS NRD "to be the first NRD in the state to develop a plan specifically geared towards managing drought events within their district." The plan recommends creating a drought management committee.

> ***"THE PARTICIPATION BY A BROAD GROUP OF STAKEHOLDERS FROM WATER SUPPLIERS AND WATER USERS IN THE ACTUAL TOURNAMENT SETTING EXCEEDED OUR EXPECTATIONS AND THE INTERACTION BETWEEN THE PARTICIPANTS WAS VERY ACTIVE AND CANDID. AS WE MOVE FORWARD WITH DEVELOPING A DISTRICT PLAN THE INPUT RECEIVED AT THE DROUGHT TOURNAMENT WILL BE INVALUABLE."***
>
> **Glenn Johnson,**
> *general manager of LPS NRD*

The drought plan is partly a result of the LPS NRD's voluntary Integrated Management Plan (IMP), adopted in 2014, which addresses long-term ground and surface-water sustainability in the district. The IMP said the district needed a plan for what to do during drought, as well as long-term measures to reduce drought vulnerability.

Consultants helped the district orchestrate the drought tournament. The district hired HDR to help implement the recommendations of its IMP, and HDR brought in JEO as a drought management subject matter expert.

Glenn Johnson, general manager of the LPS NRD, said "District staff was initially skeptical of this approach, but warmed to it with further discussion and today are excited and pleased with the results. The participation by a broad group of stakeholders from water suppliers and water users in the actual tournament setting exceeded our expectations and the interaction between the participants was very active and candid. As we move forward with developing a District Plan the input received at the Drought Tournament will be invaluable."

The LPS NRD's website also credits JEO, saying that they are sharing the award.

Drought tournaments as a form of scenario planning have been conducted at a variety of scales, with NDMC representatives contributing and observing in various capacities. As noted in an award recommendation letter from the NDMC, the competitive element was less overt in the LPS NRD tournament, with instead a prevailing tone of courtesy and appreciation for the chance to get to know counterparts in related organizations.

In addition to interest from other NRDs in Nebraska, the U.S. Army Corps of Engineers' Institute for Water Resources is developing the drought tournament concept. It teamed up with the San Antonio River Authority, which hosted a tournament in September 2015, and another tournament in Iowa is in the works for summer 2016.

EPA releases Drought Response, Recovery Guide for Water Utilities

Recent droughts have affected operations at a large number of water utilities nationwide. With a changing climate and shifting weather patterns, these drought impacts are likely to continue for years to come.

The U.S. Environmental Protection Agency's Drought Response and Recovery Guide for Water Utilities is an innovative interactive tool designed to assist small- to medium-sized water utilities with responding to drought. The guide, which includes best practices and customizable worksheets, focuses on short-term/emergency drought mitigation actions that also build long-term resilience to drought.

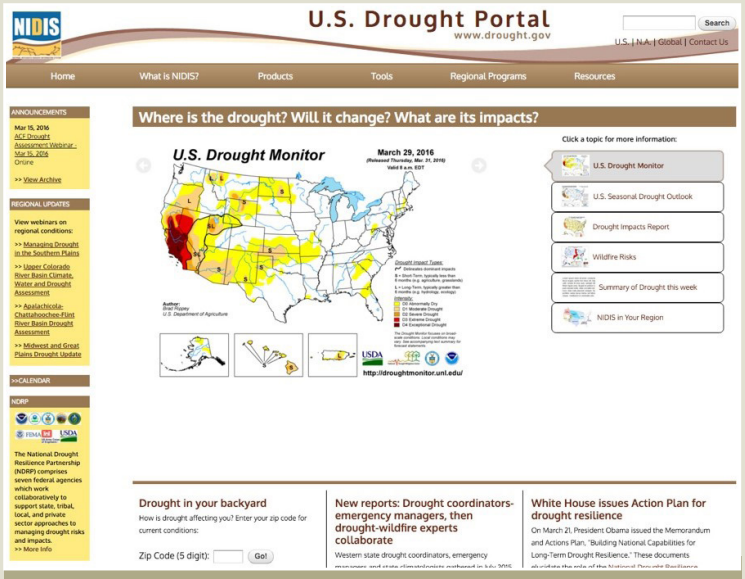
Accompanying the guide is an interactive drought case study map, a multimedia GeoPlatform documenting the unique stories of seven utilities in California, Texas, Georgia, New Mexico, Kansas and Oklahoma that have responded successfully to extreme drought conditions.

The case studies map GeoPlatform also features three videos describing how utilities addressed specific drought challenges, including reducing customer demand, managing water supplies and partnerships.

Explore the Drought Response and Recovery Guide at **www.epa.gov/waterutilityresponse/drought-response-and-recovery-water-utilities**.

You also can find the guide and other useful information in the National Drought Mitigation Center's Drought Management Database at **drought.unl.edu/droughtmanagement/StrategyInfo.aspx?str=379.**

Before



After

National Integrated Drought Information System recast the U.S. Drought Portal, adding features to increase usability.

New navigation, new look, new content for drought.gov

NIDIS has recast the U.S. Drought Portal, **drought.gov**, with new navigation, new design and more content.

Goals of the redesign have been to:

- make content easily accessible for all audiences, from general public to technician
- highlight regional information through pages customized for NIDIS regional Drought Early Warning Systems
- give Research and Webinar links a higher profile on the site
- develop a rich calendar of events and announcements related to drought
- refresh the look and create a responsive design that will adjust to various screen sizes
- continue to offer pathways to the latest in drought monitoring data and information, research and other resources

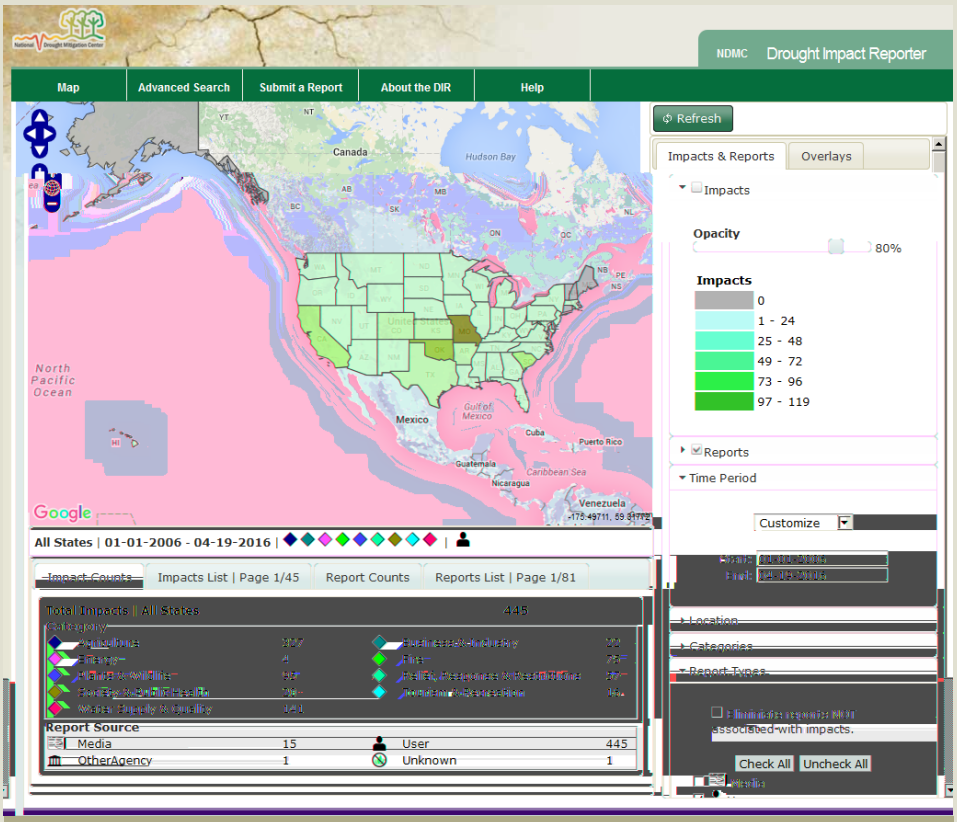
NIDIS will be updating content as we move forward and using feedback to continue to refine the site.

For more information, contact NIDIS Communications Specialist Kathy Bogan at **kathleen.bogan@noaa.gov**.

— *NIDIS*

Missouri state climatologist cultivates network of drought observers

KELLY HELM SMITH
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS AND PLANNING SPECIALIST



The image above from the Drought Impact Reporter shows user reports. Note that Missouri has more than any other state. The 148 Missouri user reports represent some but not all of the reports that Guinan has shared over the U.S. Drought Monitor listserv (due to NDMC staffing constraints).

U.S. Drought Monitor authors say that they appreciate the timely, detailed reports they get from Missouri areas that may be going into or coming out of drought. The information comes from a network in the most traditional sense – people who know and trust each other and who share a common interest.

The state climatologist, Pat Guinan, extension specialist at the University of Missouri, says:

"My system for receiving real-time info is pretty basic. I send emails to Extension specialists around the state requesting impact info and to send pictures if they can. They're mostly extension agronomists or livestock and horticulture specialists. I think the key to getting a response is to personalize the message, so I send individual emails. It may be time consuming but it's worth the effort. The response rate is extremely good, and the information is valuable."

Guinan says he sends anywhere from two to seven emails to any of the state's eight extension districts when he sees the need for more information, and the response rate is generally 100 percent. "I'm more likely to send emails when I perceive on the ground conditions/impacts are not necessarily reflecting what the Drought Monitor map depicts," Guinan said. "I also tend to ramp up my request for local impact information and conditions most notably during growing season flash drought situations."

Guinan, one of the 350 local experts across the country who help ground-truth the U.S. Drought Monitor each week, sends the information that he collects to the U.S. Drought Monitor listserv so that it can be weighed along with other evidence in determining the drought status for Missouri that week.

"Missouri has very strong working relations between the various Federal, State, and University partners. Pat has not just tapped into it – he is actively engaged!" said David Baker, assistant dean emeritus, Ag & Natural Resources Extension, University of Missouri. "As state climatologist and state extension specialist, Pat has built a system based on his expertise, respect and responsiveness. He has a very good relationship with the campus and field faculty and developed the network of weather stations. He is making presentations at county extension meetings, field days, and commodity group meetings, and is working with MU Extension Communications to do news releases and respond to media requests. He is taking an active role on various state agency and university committees and teams, has developed relationships with the key players in the state, and has the respect and support of the administration."

Among the organizations that Guinan connects with are the U.S. Department of Agriculture's Farm Services Agency and Natural Resources Conservation Service, Soil and Water Conservation Districts, state Department of Natural Resources commodity groups, and the Missouri Department of Agriculture.

Guinan also works with the

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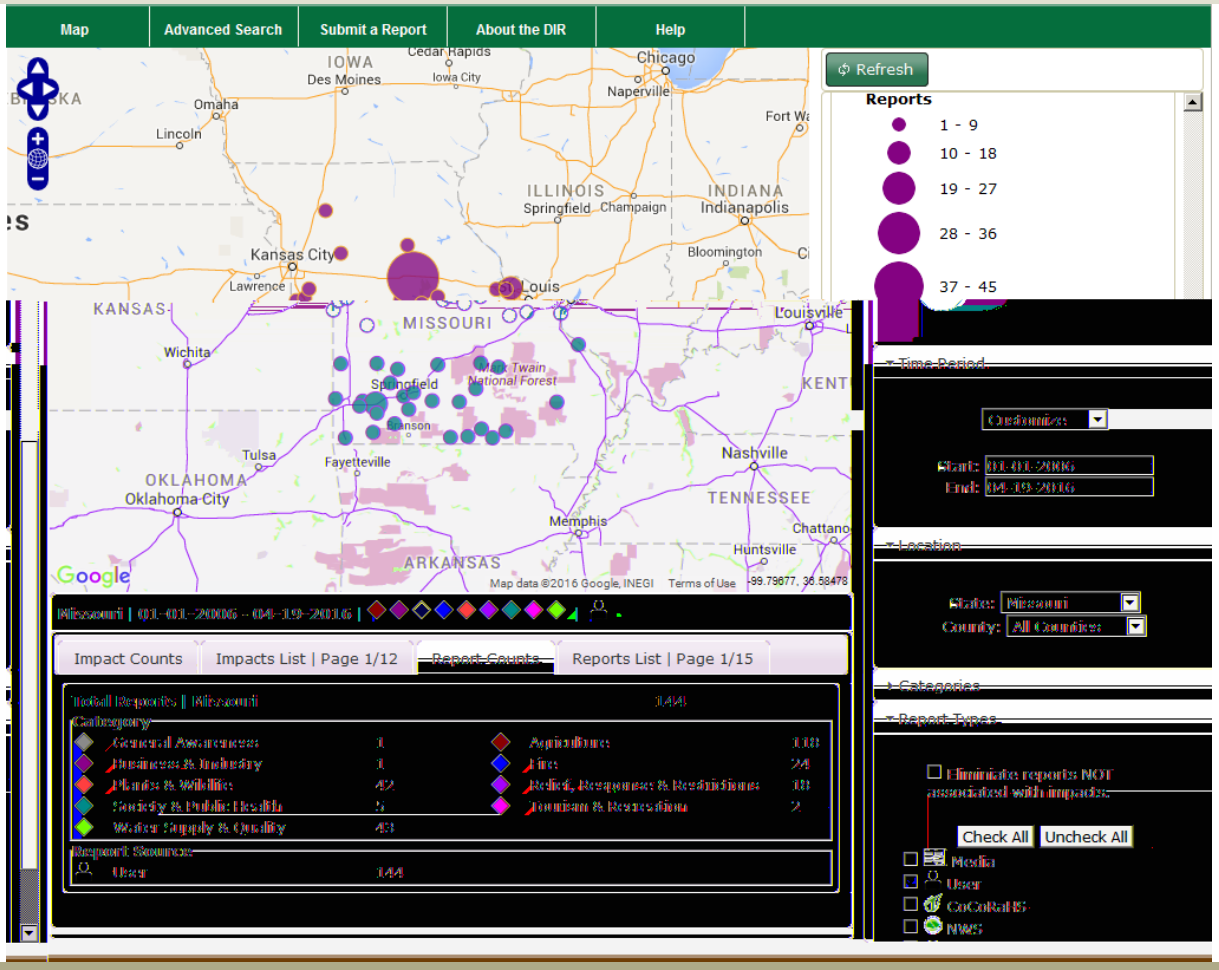

This image shows the distribution of Missouri user reports.

Continued from **page 14**

Extension media specialists to increase awareness and publicize the need for drought impact reporting when conditions are dry or droughty, and media have come to anticipate the scientifically grounded information, Baker said.

"It is a team effort, based on relationships, respect, commitment to their clientele, and good, sound teamwork," he added.

To view observations from the Missouri network, go to the Drought Impact Reporter (**droughtreporter.unl.edu**), either the map or the advanced search, and select Missouri as the location and "user" as the report type, and then click on "Refresh" on the map or "Submit" on the advanced search.

Missouri drought condition report examples, via the U.S. Drought Monitor listserv

Oct. 7, 2015, St. Charles and Warren counties: It is abnormally dry, since mid-August in most areas. Some very spotty rains, but mostly very dry. Fence building with front end loader requires bucket to bang T posts into ground rather than a smooth push. Pastures are not recovering from grazing. No dew at all at night means harvesting all night long.

Cover crops and winter wheat sown in early September has not germed yet. My drilled research plots will be a loss again this year due to being too dry to germ.

Feb. 11, 2015, McDonald County: We have low stream levels and pond levels have lowered some. The thing most noticeable to me is how low the springs are now. I do not remember seeing the springs this time of the year being at such a low flow rate.

Webster County: I've wondered why we haven't made the drought map sooner. Several ponds I've seen in Webster County are low, but others are okay. Judging from a windshield survey of the condition of pastures across the counties you mentioned, I don't see a lot of animal hoof damage like we normally do in a wet year. There is some topsoil moisture to about 6" deep, but the subsoil is much drier. The James River in the southwest part of Webster County is abnormally low for this time of year. Most livestock producers are glad to see a mild winter so they don't have to feed so much of the low-quality hay they baled last summer. I'm not seeing any greening of pastures yet like I would expect by now.

Caribbean nations use "writeshops" to advance drought preparedness

KELLY HELM SMITH
NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS AND PLANNING SPECIALIST

From left, Brian Fuchs, Roché Mahon and Mike Hayes explored Saint Lucia after the day's writeshop concluded.

Three "writeshops" in early 2016 helped Caribbean island nations take next steps in drought preparedness. Participants focused on creating and refining policy and planning documents that advanced drought preparedness in each territory.

The writeshop was organized by The Organization of Eastern Caribbean States Commission in collaboration with The Caribbean Institute for Meteorology and Hydrology, with the U.S. National Drought Mitigation Center providing expertise in drought monitoring and planning.

The writeshop idea has been used in various contexts in international development in recent years, all of which have in common a focus on producing a document. In contrast, a traditional scientific meeting focuses more on presentations and discussion.

"The term basically came about from the desire to have documents commenced or drafted, rather than make presentations, discuss and seek a way forward," said Adrian Trotman, CIMH Chief of Applied Meteorology and Climatology, and one of the organizers. "When you come into the workshop knowing that one of the main deliverables is a document, you start working on that document — hence writeshop."

Writeshops conducted January through March 2016 in Saint Lucia, Antigua and Barbuda and St. Kitts and Nevis each drew about 30 participants with drought-related responsibilities, such as water providers, agricultural stakeholders, emergency responders and other

Lester Arnold, OECS, set the stage at the Saint Lucia workshop, with Adrian Trotman, CIMH, far right, listening.

sectors. In the case of the latter writeshops, representatives from neighboring Eastern Caribbean islands including Dominica, Grenada, St. Vincent and the Grenadines, Anguilla, the British Virgin Islands and Montserrat, as well as a contingent of local officials were in attendance. The four-day writeshops began with presentations on Caribbean drought monitoring and forecasting products and on best practices in drought planning, including talks by National Drought Mitigation Center staff on drought monitoring and planning.

In preparation for the writeshops, each country team first identified and then assessed the gaps in the existing legislation, policies, plans and other documents that pertained to drought preparedness, such as multi-hazard plans, and plans related to water, development, environment or land use. For the last two days of the writeshop, participants updated and drafted documents that they

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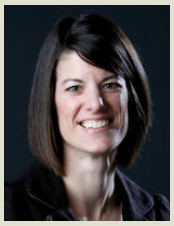
NDMC adds communications associate to staff

SHAWNA RICHTER-RYERSON
NDMC COMMUNICATIONS ASSOCIATE

Hello, I'm Shawna Richter-Ryerson, a new communications associate with the National Drought Mitigation Center, UNL School of Natural Resources and the Nebraska State Climate Office. Among other things, I'll be the one gathering and editing stories and laying out your quarterly edition of DroughtScape.

My background is in journalism. I got my sea legs writing obituaries, which to this day is one of my favorite roles. I'd often lament the loss of the person I was writing about, knowing each person left his or her mark on the world, even if just in a small way.

I later transitioned to the general assignment beat and finally to the copy desk, where I edited stories and laid out pages, most recently for the Lincoln Journal Star and Lincoln's Regional Design Center.



Shawna Richter-Ryerson

My shift to NDMC is a welcome one. My goal in life has always been one thing: Change the world. NDMC and you, dear reader, do this every day. In big ways and small ways. And it is my goal to help contribute and thereby serve as an example for my two children, Lydia, 2, and Eli, 7 months.

But life isn't just about the work we do each day. It's also about the things we love to do in our down time.

I love to read to my children and play with all the toys in the toy box. I love to create beautiful things, be it written words or home crafts, quilts or graphic designs. I love going boating or swimming with my husband and our kiddos, and I love taking long walks through a nearby historic district with our shiba inu, Boji.

But most of all, I love cultivating the close-knits ties I have to family, near and far. Though I live 482 miles from my hometown of Trenton, Illinois, where 85 percent of my extended family still lives, I will always be a small-town girl at heart. One who values hard work and who collects stories like pennies in a Mason jar.

Continued from **page 16**

prioritized would be critical to take each territory's preparedness to the next step. They also strategized on best ways to present documents and recommendations to decision-makers for ratification and implementation.

Severe drought in the Caribbean in 2015 continued into 2016 on some islands, with water rationing affecting homes and businesses. Infrastructure and conservation practices vary from one island to another, partly due to differences in terrain.

Saint Lucia's stakeholders focused on enhancing the country's national Disaster Management Policy Framework document and the Water and Sewerage Company's Water Management Plan for Drought Conditions document to better reflect drought considerations, in addition to further refining the roles and responsibilities outlined in the existing Flood and Drought Management Committee's Terms of Reference.

Roché Mahon, a social scientist at CIMH (at left), led a small group session focusing on updating a drought and flood preparedness plan for St. Kitts and Nevis, assisted by Theresa Jedd, a political scientist and NDMC post-doctoral researcher (second from left).

Antigua and Barbuda stakeholders worked on a draft institutional and legislative framework review, and a draft Terms of Reference for a new National Drought Management Committee.

Stakeholders representing St. Kitts and Nevis assessed their national and sectoral drought policies and plans; initiated work on a new draft Water Services Drought Management Plan, and developed a draft Terms of Reference for a new Drought Management Committee.

St. Kitts and Nevis hosted another meeting in April to complete the work started at the writeshop, and other islands are continuing to refine their drafts.