



NATIONAL DROUGHT
MITIGATION CENTER
UNIVERSITY OF NEBRASKA

DROUGHTSCAPE

QUARTERLY NEWSLETTER

CONTENTS

Drought policy writeshops conclude in Caribbean 2

Drought encroaches on Northern Plains in second quarter 3

Impact tool racks up submissions in second quarter 4

Maps on new website highlight drought effects on ag industry 6

Centers release new flash drought tool: QuickDRI 6

NDMC contributes to EU report on disaster risk management..... 8

Groups earn Climate Adaptation award for work with tribes 9

NDMC, ICPAC director talk collaboration on drought in Greater Horn of Africa 11

Up next in MENA: Drought vulnerability assessments 12

DIRECTOR'S REPORT



Mark Svoboda

I am often asked if summer is the busiest time of the year here at the National Drought Mitigation Center. The truth is there is no downtime at the NDMC as our work covers the entire country and the world; drought is always in season sometime, somewhere! Drought in the winter can be just as impactful as drought in the summer depending on where you live and what you do.

With that in mind, I'd like to highlight just a few feature reads for you from this quarter's DroughtScape:

1) The first is a regular DroughtScape feature and one of my favorite contributions to our quarterly happenings. If you have not taken the time to check out our Drought and Impact summary reports the team puts together, you do not know what you are missing. It regularly answers some commonly-asked questions such as "Where is the worst of the drought right now?"; "How much drought is affecting the country or a particular state?"; or "What drought impacts are we seeing?" Answers often are found in these always informative and thorough write-ups. You can find this issue's summaries on pages 3 to 5; and

2) We were very excited to announce in July the operational launch of the Quick Drought Response Index, or QuickDRI for short. Developed specifically for detecting rapid onset or "flash" droughts, we have had some recent events in 2012 (in the Midwest), 2016 (the Black Hills area and the Southeast), and now in 2017 in the northern Plains to test our product against. The early results and feedback have been quite promising to the accuracy of the tool. Check it out on page 6.

Check back with us later this fall to find out what's new at the NDMC!

About the photo

West Mims wildfire, started by a lightning strike on April 6, 2017, burns on the Okefenokee National Wildlife Refuge in Georgia and onto adjacent lands. The photo was taken April 26, 2017, during a flight over the fire near Soldiers Island.

Photo by Josh O'Connor,
U.S. Fish and Wildlife Service Southeast Region

Drought policy writeshops conclude

BY KELLY HELM SMITH

NATIONAL DROUGHT MITIGATION
CENTER COMMUNICATIONS
COORDINATOR

Drought planners in Caribbean island nations have a potential advantage over their counterparts in many other parts of the world, including the mainland United States: Climate outlooks for the region can exploit the strong connection between wet and dry weather and the El Niño Southern Oscillation, named after warmer and cooler sea surface temperatures off the coast of Peru.

Conversations at May “writeshops” for St. Kitts and Nevis, as well as Antigua and Barbuda, focused in part on how to blend information from outlooks and real-time monitoring to identify different stages of drought.

The National Drought Mitigation Center collaborated on the writeshops with the Caribbean Institute for Meteorology and Hydrology, the Caribbean Disaster Emergency Management Agency, and the Organisation of Eastern Caribbean States. Funded through the United States Agency for International Development’s



Courtesy image

Collaborators from the National Drought Mitigation Center and the Caribbean Institute of Meteorology and Hydrology enjoy a laugh after the workshop.

Programme for Building Regional Climate Capacity in the Caribbean, each writeshop helped national representatives focus on producing documents to help shape policies and practices to reduce vulnerability to drought.

The Caribbean accounts for seven

of the world’s top 36 water-stressed countries, according to the CIMH and the Food and Agriculture Organization of the United Nations. The UN’s Integrated Drought Management Programme encourages nations to implement policies to reduce vulnerability to drought.

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

SUBSCRIBE | ACCESS THE ARCHIVE

[drought.unl.edu/AboutUs/
Publications/
DroughtScape.aspx](http://drought.unl.edu/AboutUs/Publications/DroughtScape.aspx)

SUPPORT US

go.unl.edu/supportndmc

ON THE WEB

drought.unl.edu



Tune in with us on YouTube:
go.unl.edu/droughtfix



Follow us on Twitter:
[@DroughtCenter](https://twitter.com/DroughtCenter)



Find us on Facebook:
[facebook.com/National
DroughtMitigationCenter](https://facebook.com/NationalDroughtMitigationCenter)

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

*The University of Nebraska–Lincoln is an
equal opportunity educator and employer.*

Drought recedes in south, encroaches on Northern Plains

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

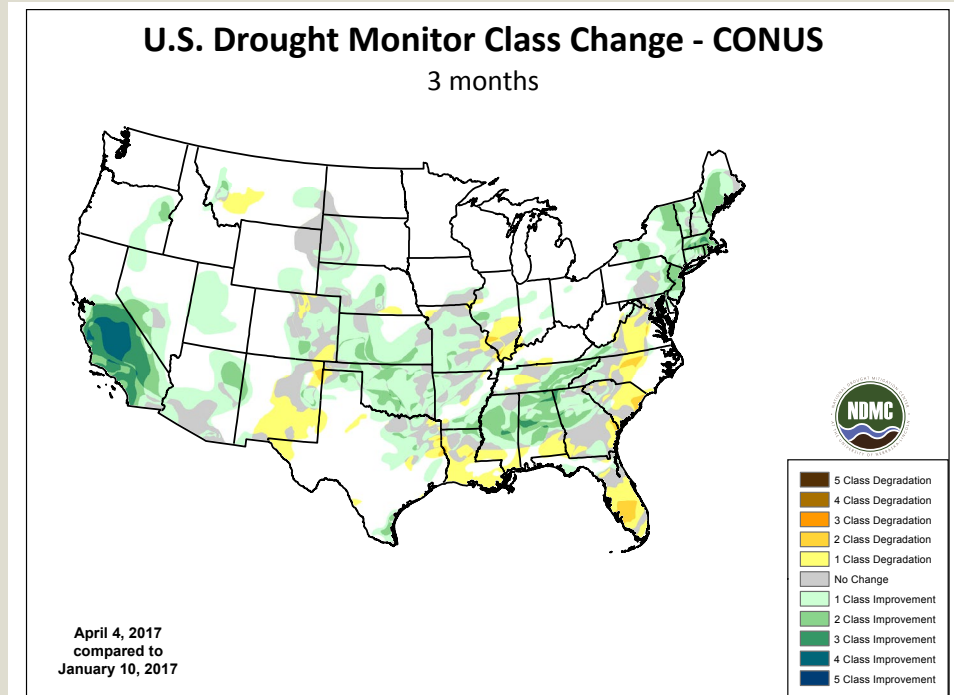
After a warm and dry start to the spring over much of the southern Plains, drought conditions there improved through June. The wetter-than-normal pattern also helped to improve and eliminate all drought in the Southeast, but a drought also rapidly developed in the northern Plains during the quarter.

During the April to June period, overall drought improved from covering 11.91 percent of the United States to 7.75 percent. Severe drought increased slightly from 2.39 to 2.72 percent as it improved in the Southeast but developed in the northern Plains. Extreme drought increased from 0.17 to 0.81 percent with the extreme drought confined to the northern Plains. There was no exceptional drought during the period.

The population affected by drought decreased as the more populated areas of the Southeast improved while the less populated areas of the northern Plains had drought develop. The period started with approximately 77.7 million people being affected by drought and ended with approximately 16.1 million people being affected.

Temperatures

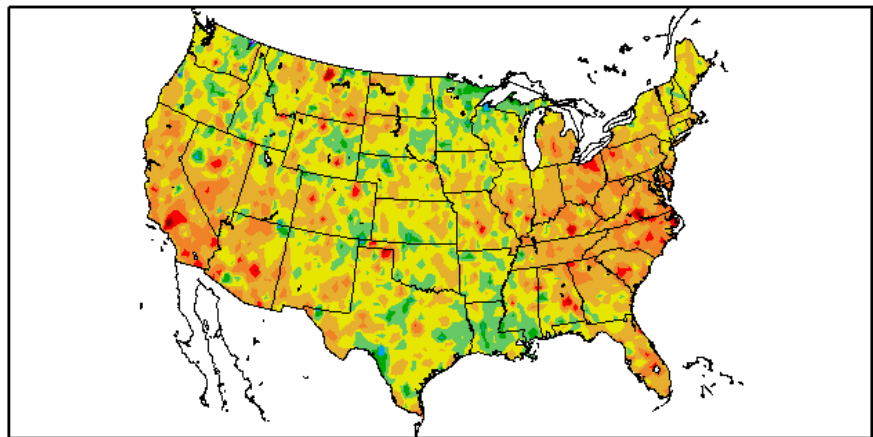
Warmer-than-normal conditions dominated the Midwest, Mid-Atlantic,



droughtmonitor.unl.edu

Departure from Normal Temperature (F)

Jan. 1 to March 31, 2016



Source: High Plains Regional Climate Center

and portions of New England and the Southeast where departures were 2 degrees to 4 degrees above normal. The West Coast and Southwest also were warmer than normal, where temperatures were also 2 degrees to

4 degrees above normal. Most areas were near normal to above normal for the quarter with only small, isolated areas of below-normal temperatures.

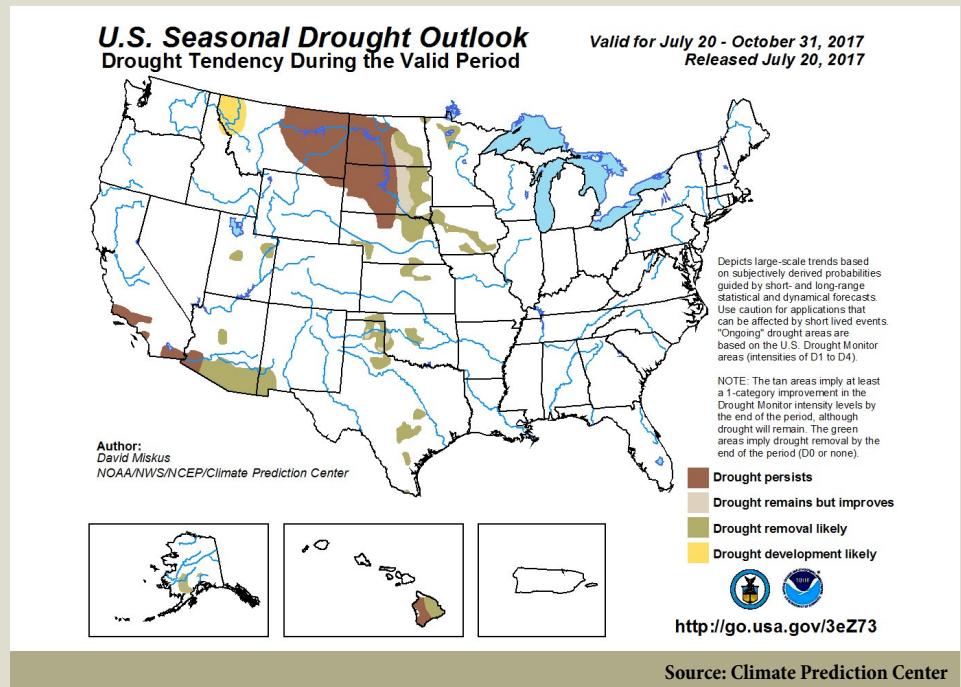
Continued on page 4

Precipitation

The eastern half of the United States was above normal for precipitation during the period with areas along the Gulf Coast recording 15 inches to 20 inches above normal. The central Plains, areas along the Pacific Coast and foothills of the Rocky Mountains also were wetter than normal. There were only a few pockets of dryness during the period with areas of northern Texas, southeast Oklahoma, and small areas of northern Minnesota, eastern Montana, southern South Dakota, and southwest North Dakota where departures were 5 inches to 10 inches below normal.

Outlook

Through the rest of the summer and to the end of October, the drought outlook has improvements taking place over the Plains with most drought being removed from areas from Nebraska to the south. The drought in the Southwest also improves with most



MONTHLY DROUGHT AND IMPACT SUMMARIES



For a more detailed review of conditions, please visit drought.unl.edu/newsoutreach/monthlysummary.aspx

of the drought in Arizona removed. Drought will persist over southern California and in the northern Plains states and may develop over western

Montana. Improvements over Alaska and the Big Island of Hawaii are likely while portions of the Big Island will see drought persist.

DROUGHT IMPACT REPORTER: APRIL TO JUNE SUMMARY

Impact tool racks up submissions as drought hits northern Plains

BY DENISE GUTZMER

NATIONAL DROUGHT MITIGATION CENTER DROUGHT IMPACT SPECIALIST

The second quarter of 2017 was a dynamic one in terms of drought development and abatement. California had a snowy, wet winter, relieving years of below-normal snowfall, and finally broke mostly free of drought. In April and May, Florida dealt with intense drought and rampant wildfire activity. Also in May, dryness and drought emerged in the Northern Plains and turned into a region of flash drought in June.

South Dakota accrued the most impacts in the Drought Impact Reporter, with 86, including 52 impacts from DIR users and the Community Collaborative

Rain, Hail and Snow network. Florida had 84 impacts, including 40 from the CoCoRaHS network. North Dakota had 68, with nearly a third of the state's impacts from users. Nearly all of Montana's 39 impacts came from users and CoCoRaHS sources. This is much greater participation than the Drought Impact Reporter has received in past years.

End to California's winter season: Deep snowpack means plentiful water allocations and wildfires

The final snowpack measurement of the 2016-17 season on May 1 showed a snow-water equivalent (SWE) of 27.8 inches, or 190 percent of the historic average. Electronic measurements revealed the water content of the

statewide snowpack was 42.5 inches, 196 percent of the May 1 average. The SWE of the northern Sierra snowpack was 39.9 inches (199 percent of average); the central and southern Sierra readings were 47.1 inches (202 percent of average) and 37.6 inches (180 percent of average), respectively. The annual precipitation tally begins with the start of the water year on Oct. 1.

The drought-quenching precipitation also brought lush grass growth to California's hillsides as spring turned to summer. With hot temperatures, grasses have cured, and, with millions of dead trees left from the drier years, were fueling massive wildfires across the West and in California. The fire season

Continued on page 5

started early for the Golden State, has been brutal so far and likely will be long.

["Final Survey of 2017 Finds Water-Rich Snowpack,"](#) by Doug Carlson and Ted Thomas, California Department of Water Resources, May 1, 2017

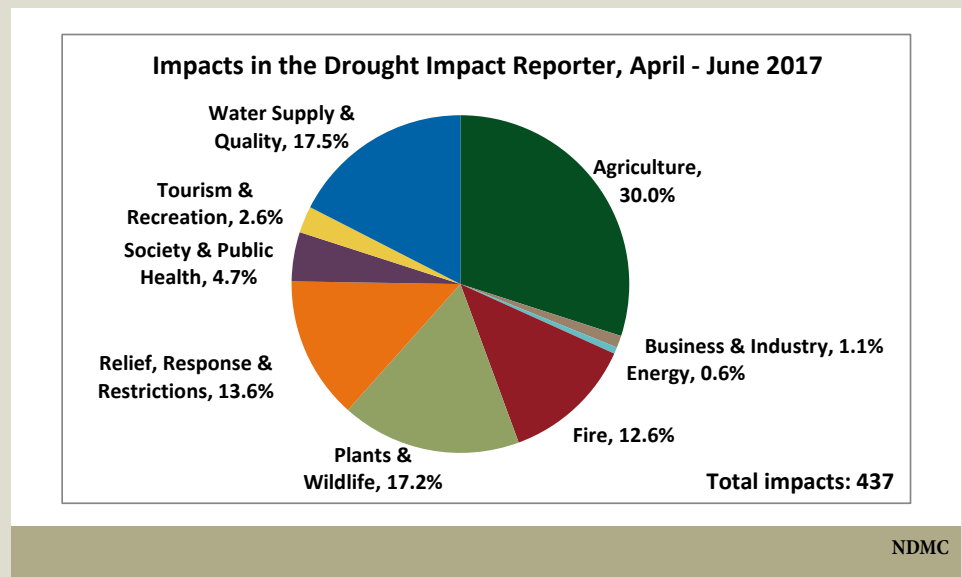
["California fires are early, unpredictable after winter rain,"](#) by Christopher Weber, Associated Press, ABC News, July 12, 2017

Rapid drought development in Northern Plains led to crop damage, cattle sales, federal aid

In the Dakotas and eastern Montana, dryness developed rapidly during May and resulted in unusually high cattle sales as pastures and hay grew little, indicating a challenging growing season of feeding livestock hay or culling herds and selling early. Auctions were busy, moving as many as three to five times the usual number of livestock for June.

As the situation grew dire, governors began declaring statewide emergencies to ease the burden on producers. On June 22, North Dakota Gov. Doug Burgum declared a drought emergency, allowing the State Water Commission to activate a program to offer water supply assistance for livestock producers in 26 counties in central and western parts of the state. Days later, he also announced a statewide fire and drought emergency and ordered state agencies to "maintain high levels of readiness." Farmers and ranchers were allowed to harvest the grass from highways and ditches for their livestock. Similar measures were taken in South Dakota and Montana to help producers.

Federal relief arrived on June 23 when the U.S. Department of Agriculture authorized the use of Conservation Reserve Program land for emergency grazing for some counties in the Dakotas and Montana. Given the severity of the lack of pasture and hay, the USDA expanded emergency grazing on CRP land, authorizing grazing in the Dakotas and Montana in any county whose border lies within 150 miles of



NDMC

a county in severe drought. On July 10, the U.S. Department of Agriculture gave authorization for early haying of Conservation Reserve Program acres beginning on July 16 to help farmers and ranchers in the Dakotas and Montana.

["Drought conditions lead to herd trimming across region,"](#) by Jenny Schlecht, Grand Forks Herald (N.D.), June 8, 2017

["Drought takes toll: Drastic increase in cattle sales at Stockmen's Livestock Exchange,"](#) by Ellie Potter, The Dickinson Press (N.D.), June 8, 2017

["North Dakota governor declares drought emergency,"](#) by Amy Dalrymple, The Bismarck Tribune (N.D.), June 22, 2017

["Burgum declares statewide fire, drought emergency,"](#) by Amy Dalrymple, The Bismarck Tribune (N.D.), June 26, 2017

["NDDOT changes mowing practices on state highways due to drought conditions,"](#) by North Dakota Department of Transportation, June 14, 2017

["SD Governor Declares Statewide Drought Emergency,"](#) by Gary Ellenbolt, South Dakota Public Broadcasting (Vermillion, S.D.), June 16, 2017

["Drought emergency declared in 19 Montana counties, 2 reservations,"](#) Great Falls Tribune (Mont.), June 23, 2017

["USDA expands emergency grazing in drought states,"](#) The Associated Press, The Bismarck Tribune (N.D.), June 29, 2017

["Drought stricken ranchers can hay conservation lands early,"](#) by Jessica Holdman, The Bismarck Tribune (N.D.), July 10, 2017

Florida's historic dry season: Bout with wildfires, state of emergency

Southwest Florida endured its driest dry season in 103 years, racking

up an 11-inch precipitation deficit between October 2016 and May 2017, and the rest of the state did not fare so well either. St. Johns River, Florida's longest river, had several stretches in Central Florida where the river was not flowing due to drought and low rainfall. East of Orlando, wind reversed the river's direction periodically. Spring flows in central Florida were weakening, according to the U.S. Geological Survey. The springs come from the Floridan Aquifer, which is rain fed.

Gov. Rick Scott declared a state of emergency for Florida on April 11 due to the multitude of wildfires burning in the parched state. Flames had scorched 250 percent more land in the first three months of 2017 than during the same time in 2016. On May 22, 125 active wildfires were burning statewide, while 2,273 wildfires had burned more than 171,000 acres of land since the start of 2017.

["District Tightens Water Restrictions throughout 16-County Region,"](#) by Southwest Florida Water Management District, May 23, 2017

["Orlando's drought worse than any in past century,"](#) by Kevin Spear, Orlando (Fla.) Sentinel, May 11, 2017

["Florida brush fires, wildfires lead to emergency declaration,"](#) by Brian Ballou, Fort Lauderdale Sun-Sentinel & SouthFlorida.com, April 11, 2017

["Hot, Dry Weather Elevates Tampa Bay's Weekend Fire Concerns,"](#) by Sherri Lonon, Pinellas Beaches Patch (Fla.), April 28, 2017

["125 Wildfires Burn Across Florida Despite Rain,"](#) by Sherri Lonon, Sarasota Patch (Fla.), May 22, 2017

New maps, new website highlight effects on ag

Maps highlighting the effects of drought on six agricultural commodities across the continental U.S. became available in late May on a website hosted by the National Drought Mitigation Center at the University of Nebraska-Lincoln. The maps are a collaboration between the U.S. Department of Agriculture's Office of the Chief Economist and the drought center.

The maps, produced at the drought center in cooperation with the USDA World Agriculture Outlook Board and OCE meteorologists, are based on the weekly U.S. Drought Monitor and show the locations and percentages of drought-affected areas that produce crops or livestock. They are released Thursdays and can be found [here](#). In addition to the maps, the website offers data tables, time series graphs and animations.

The new maps show drought's effects on cattle, hogs and pigs, sheep and lambs, hay, and alfalfa. In the near future, the partners will make available six field crop maps, one each for corn, cotton, soybeans, winter wheat, spring wheat and durum wheat.

"The Agriculture in Drought website is dynamic in nature, enabling users to interactively explore how

Agriculture in Drought for May 30, 2017	
<i>All values listed below are percentages.</i>	
Alfalfa Hay acreage	6
Cattle inventory	5
Hay acreage	5
Hogs and Pigs inventory	0
Milk Cows inventory	2
Sheep and Lambs inventory	3

drought is impacting agriculture across the United States," said Harlan Shannon, OCE meteorologist. "Significantly, behind the scenes, NDMC's geospatial and database capabilities have enabled USDA to more quickly and efficiently estimate — for select agricultural commodities — the percent of acreage or inventory located in drought."

The Ag in Drought maps are created by overlaying the most recent U.S. Drought Monitor on maps of major crop and livestock producing

areas, based on the most current Ag Census data from the National Agricultural Statistics Service. The result highlights agricultural areas affected by any level of drought.

The U.S. Drought Monitor, produced weekly since 1999, is a collaborative effort among federal and academic partners, including the drought center, USDA and the National Oceanic and Atmospheric Administration. The drought center also hosts the [monitor](#).

— NDMC

New weekly warning system identifies flash drought quickly

SHAWNA RICHTER-RYERSON
NDMC COMMUNICATIONS ASSOCIATE

Agricultural crops can wither in a flash when the days turn hot, the air dries, the rain stops and moisture evaporates quickly from the soil. A new early warning system developed by two nationally recognized centers at the University of Nebraska-Lincoln, along with the U.S. Geological Service, can help alert stakeholders as drought

begins to happen.

The Quick Drought Response Index, or QuickDRI, is a weekly alarm sensitive to early-stage drought conditions and rapidly evolving drought events. Developed by the Center for Advanced Land Technology Information Systems and the National Drought Mitigation Center, both part of the university's School of Natural Resources, and in coordination with USGS, the index combines and

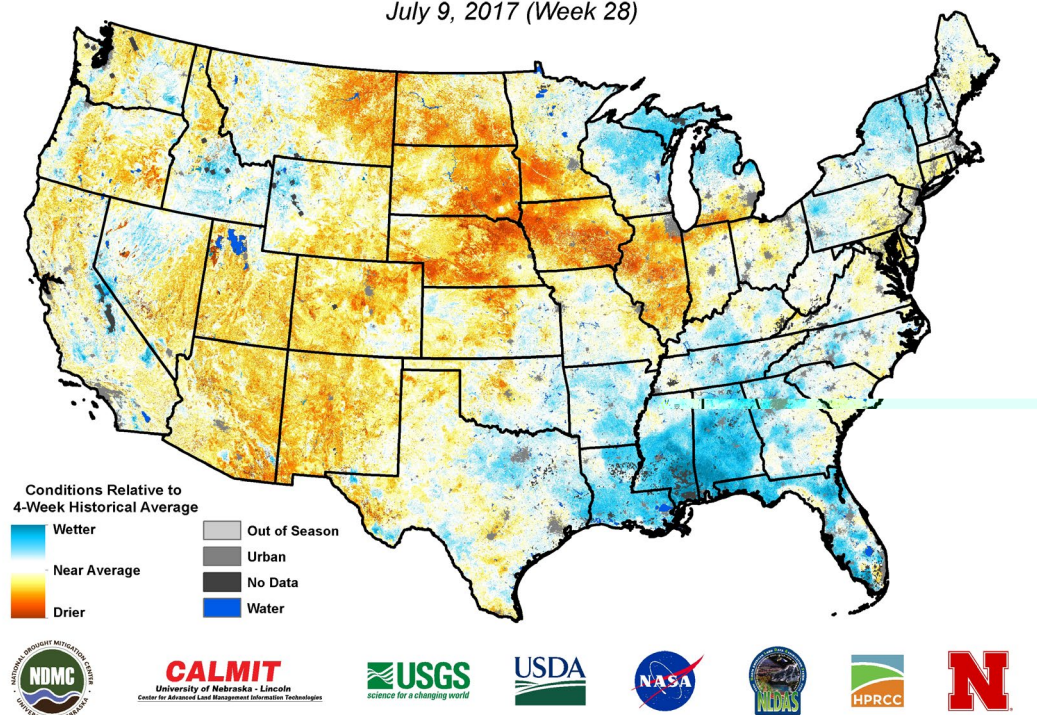
analyzes four drought indicators — precipitation, soil moisture, vegetation health and evaporative moisture loss from plants — all at once to better "see" drought conditions emerge before traditional drought monitoring tools.

"Most traditional drought indicators focus on a single environmental characteristic such as soil moisture, whereas QuickDRI represents a

Continued on page 7

Quick Drought Response Index (QuickDRI)

July 9, 2017 (Week 28)



Continued from page 6

collective dryness of variables in a given location,” said Brian Wardlow, QuickDRI project co-lead and director of CALMIT. “Our preliminary assessment shows QuickDRI is able to consistently detect short-term dryness patterns across the United States.”

Jesslyn Brown, lead for QuickDRI operations at USGS, added, “QuickDRI fills a gap in drought monitoring because of its sensitivity to short-term changes. We expect it to be especially helpful for decisions related to irrigation and fire management.”

Fire managers with the Bureau of Land Management and other government agencies, but also farmers and rangeland owners, will be able to rely on QuickDRI as periods of hot, dry weather add to vegetation stress. Yet the index’s most important function may be as an asset for the U.S. Drought Monitor, a weekly summary of drought conditions produced through a partnership among the National Drought Mitigation Center, U.S. Department of Agriculture and

National Oceanic and Atmospheric Administration.

“One of the motivating factors for this research and application was to strengthen the U.S. Drought Monitor, particularly in better handling rapid onset, or flash droughts,” said Mark Svoboda, co-lead on the project and director of the drought center. “Next generation tools like QuickDRI are being developed to help bring better drought early warning capacity to the weekly USDM map.”

The drought monitor, used by policymakers, media and researchers alike, has become such an integral part of mapping drought across the United States that it is used in the allocation of USDA Farm Service Agency drought relief. Since 2011, the drought monitor has triggered more than \$6 billion in relief dollars through the Farm Bill Livestock Forage Disaster Program. NOAA ranks drought second in terms of national weather-related economic impacts behind hurricanes, with annual losses nearing \$9 billion in the United States.

Brian Fuchs, a U.S. Drought Monitor

author from the drought center, said, “With the weekly updates provided by QuickDRI, the U.S. Drought Monitor authors now have the ability to see changes even more quickly, allowing us to make more accurate and timely changes to the drought monitor map.”

Though the tool became operational in June 2017, archived maps have been created dating back to January 2000 to provide a resource for assessing abnormal vegetation and climate conditions over a longer historical period. Decades of satellite data housed at the USGS Earth Resources Observation and Science, or EROS, Center made those maps possible.

QuickDRI was funded through a \$1.3 million grant from NASA’s Applied Sciences for Water Resources program and had additional support from the USGS Land Remote Sensing Program.

To learn more about QuickDRI, go to the [NDMC QuickDRI website](#) or the [USGS Drought Monitoring website](#).

— STEVE YOUNG, USGS Earth Resources Observation and Science Center, contributed to this report

Hayes, Svoboda contribute to EU report on disaster risk management

SHAWNA RICHTER-RYERSON
NDMC COMMUNICATIONS ASSOCIATE

Knowing that natural and manmade disasters threaten millions of people each year and cost billions of dollars, the European Union has made disaster management a priority. A recent report, “Science for disaster risk management 2017: Knowing better and losing less,” hopes to illustrate what scientists know about these disasters, but also harness that knowledge to save lives and money through prevention.

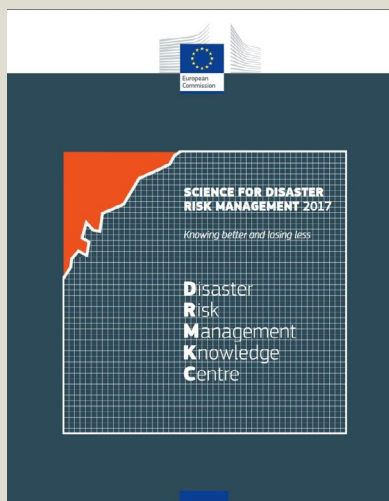
National Drought Mitigation Center former director Mike Hayes and Director Mark Svoboda, both at the University of Nebraska-Lincoln School of Natural Resources, contributed to the chapter dedicated to drought.

“To my memory, I have never seen as complete a document of disaster risk management as this one,” Hayes said. “It covers many disaster types — geophysical, hydrological, meteorological, climatological, biological and technological — but it also has chapters covering management frameworks and methodologies, communication, and future challenges of drought risk management.”

The report is the flagship science report from the Disaster Risk Management Knowledge Centre and was compiled by the European Commission’s Science and Knowledge Service. It is available in final proof form [here](#) and will be available in hardcopy later this summer.

Contributions came from 273 scientists from 26 countries and 172 organizations, all mostly in Europe, and was made possible through the collaboration among 11 services of the European Commission. The report was publicly presented in late May at the Global Platform for Disaster Risk Reduction in Cancun, Mexico.

“I wish to express special thanks to all contributors,” said Karmen



Poljansek, scientific and technical project officer with the Joint Research Center Disaster Risk Management Unit, in an email to contributors. “Without your expertise, experience and huge commitment to a cause this report could never have been completed on time. This report is the first in a series. We treasure your contributions, and we look forward to future collaborations with you in the next one.”

The report takes a holistic approach to understand disaster risk, exposure and vulnerability, as well as disaster management. It aims to strengthen the science-policy and science-operation interface, according to the knowledge center.

The drought chapter examines types of drought, but also looks at past trends and future projections (drought is expected to increase across much of southern and eastern Europe), as well as impacts of drought on society, the environment and public health; determining drought risk; and how to manage drought. Hayes and Svoboda contributed to the drought risk management section of the chapter, but the footprint of the NDMC is sprinkled throughout.

“This report illustrates the reach that Nebraska’s drought work has had globally,” said Hayes. “A lot of times the work that is done here (by the drought

center) has local impact, but it also has a global one.”

Much of the research on drought conducted in the past 20 years, in Europe, the U.S. and other locales, is based on definitions, methods, processes and impact areas put in place by Don Wilhite, founder of the NDMC, during his peak research years, and many countries and regions have improved their drought monitoring capabilities.

Drought monitoring and forecasting systems provide essential information to decisionmakers in prevention and management, the report states, with the end goal of reducing vulnerabilities to drought and thereby reducing future impacts and effects of drought. The mantra is to prevent, plan and mitigate rather than react.

As drought planning and management improves, the report continues, it drives the need for improved, more specific drought monitoring, a cycle that will continue into the future as policy adapts to the latest science available. The report encourages continued new research to address multi-risk impacts of natural and human-induced hazards as well as the cascading effects into other areas of industry and society so the information can be part of an overall risk assessment.

About participating in the report’s development, Svoboda said, “We jumped at the invitation given that the messaging was so in-tune with the core mission of the NDMC aimed at reducing society’s risk to drought through a proactive drought risk management approach. The fact that it involved so many other colleagues from around the world illustrates that we’re all in this together.”

For more information on the report, [click here](#).

— [The EU Science Hub](#) contributed to this report.

Drought, regional climate centers receive Climate Adaptation honorable mention

SHAWNA RICHTER-RYERSON
NDMC COMMUNICATIONS ASSOCIATE

The Wind River Reservation Drought Preparedness Team recently earned an Honorable Mention Climate Adaptation Leadership Award for its leadership in reducing climate-related threats and promoting adaptation of the nation's natural resources.

The project combines the expertise of researchers, scientists and other professionals at 15 university-, tribal-, regional- and federal-level organizations, including the National Drought Mitigation Center and the High Plains Regional Climate Center, both at the University of Nebraska-Lincoln, School of Natural Resources.

Recipients were selected from 27 nominations representing activities from individuals and federal, tribal, state, local and non-governmental organizations from around the country. The Climate Award Leadership Award ceremony was part of a National Adaptation Forum on May 9 to 11 in St. Paul, Minnesota.

"Today we recognize individuals and agencies who are developing and using innovative methods to safeguard the nation's living natural resources from a rapidly changing world," said Kevin Hunting, Chief Deputy Director of the California Department of Fish and Wildlife and co-chair of the Joint Implementation Working Group of the National Fish, Wildlife, and Plants Climate Adaptation Strategy. "Their leadership is a source of inspiration for additional efforts to advance climate-smart resource conservation and management with lasting positive impacts on the nation's communities and economy."

The project is a collaboration with the Eastern Shoshone and Northern Arapaho tribes to reduce the effects of drought and other climate variability



Courtesy image

Crystal Stiles, (second from left) with both the National Drought Mitigation Center and the High Plains Regional Climate Center, accepts the Climate Adaptation award on behalf of the two centers.

on the Wind River Indian Reservation. Over the past two years, the 15 partners have worked closely with the Office of the Tribal Water Engineer and the Wind River Water Resources and Control Board, who are the leadership and decision-making authority on water management on the reservation, to co-produce actionable science for drought preparedness.

They have conducted a tribal-driven social-ecological vulnerability assessment; co-produced drought and climate change-related information and decision-support tools; and engaged the community, including youth, on drought and climate science.

Cody Knutson, a research associate professor and social scientist with the NDMC, is leading the work with Shannon McNeeley of Colorado State University and the North Central Climate Science Center. Crystal Stiles, assistant geoscientist and applied climatologist with the HPRCC, helped train the Eastern Shoshone and Northern Arapaho tribes to produce the climate summaries, a valuable

tool in recording long-term climate effects, including available water, on the reservation.

The ultimate goal is that information produced by the project will be used to inform the creation of a drought management plan for the reservation.

"It was an honor to help accept an award for a project that is near and dear to my heart," Stiles said after accepting the award for the partnership. "The development of climate summaries for the Wind River Reservation was the first major task assigned to me after starting my position as a postdoc with the HPRCC. It has been a rewarding experience to be a part of the great work that has been done by the tribes and project partners during the past 2 1/2 to 3 years."

Other partners on the project include: the National Integrated Drought Information System; US Fish and Wildlife Service; the Bureau of Indian Affairs; Colorado State University; University of Wyoming

Continued on **page 10**

Continued from page 9

EPSCoR; Wyoming State Climate Office; Western Water Assessment at CU-Boulder; Montana State University; Great Northern Landscape Conservation Cooperative; and USDA Northern Plains Climate Hub.

Other co-investigators include Mitch Cottenoir, of the Office of the Tribal Water Engineer; Jennifer Wellman, with the Wyoming Experimental Program to Stimulate Competitive Research; and Mark Svoboda at the National Drought Mitigation Center. Nicole Wall, Tonya Bernadt, Tonya Haigh, Kelly Smith and Brian Fuchs, all of the drought center, also have provided technical and administrative assistance during the project.

The Climate Adaptation Leadership

Award was established in 2016 to recognize outstanding leadership by individuals, organizations, businesses and agencies to support the resilience of America's vital natural resources and the many people, businesses and communities that depend on them.

Natural resources provide important benefits and services to Americans every day, including jobs, income, food, clean water and air, building materials, storm protection, tourism and recreation. For example, hunting, fishing and other wildlife-related recreation contribute an estimated \$120 billion to our nation's economy every year, and marine ecosystems sustain a U.S. seafood industry that supports more than 1.8 million jobs and \$214 billion in economic activity annually.

The Award is sponsored by the

National Fish, Wildlife, and Plant Climate Adaptation Strategy's Joint Implementation Working Group in partnership with the Natural Resources Conservation Service, National Oceanic and Atmospheric Administration, U.S. Forest Service, and the Association of Fish and Wildlife Agencies.

For more information about the 2017 Climate Adaptation Leadership Awards for Natural Resources, including the eight recipients, honorable mentions, and all 27 nominees, please visit the [Climate Adaptation Leadership Award page](#).

— THE NATIONAL FISH, WILDLIFE AND PLANTS CLIMATE ADAPTATION STRATEGY CONTRIBUTED TO THIS REPORT.

GREAT PLAINS TRIBAL ALLIANCE CLIMATE TRAINING WORKSHOP



Shawna Richter-Ryerson/National Drought Mitigation Center

NDMC Director Mark Svoboda helps train participants from four Sioux Tribes from South Dakota to use the US Drought Monitor and other drought monitoring tools to track climate conditions and effects related to drought on their reservations. The training was part of a two-day workshop, the Great Plains Tribal Alliance Climate Training Workshop, co-led by the High Plains Regional Climate Office and the drought center. Learning to use the tools will help the four tribes write their own climate reports, a tool that can be used to better plan for changes in climate at the local level. Up next: Climate vulnerability assessments to take place in the fall.



NDMC

From left, Mark Svoboda, National Drought Mitigation Center director; Gulied Artan, Intergovernmental Authority on Development Climate Prediction & Application Center director; and Tsegaye Tadesse, geospatial coordinator with the drought center, pose after a day teaching and learning about available drought monitoring tools for the Greater Horn of Africa.

Reconnecting to improve drought preparedness in Africa

BY SUZANNE PLASS

NATIONAL DROUGHT MITIGATION CENTER COMMUNICATIONS SPECIALIST

Taking the scenic route from Sioux Falls, South Dakota, to visit his homeland in Africa, recently allowed climate scientist Gulied Artan to reconnect with colleague and friend Tsegaye Tadesse of the National Drought Mitigation Center, while also becoming acquainted with the latest drought monitoring tools available to the scientists and decision makers.

The visit with Tadesse, the drought center's geospatial coordinator, who first met Artan over a decade ago when he had a project through the

USGS-Earth Resources Observation and Science Center in Sioux Falls, revolved around meetings with drought center staff to explore collaboration opportunities between the center and Dr. Artan and his colleagues at the Intergovernmental Authority on Development Climate Prediction & Application Center based in Nairobi, Kenya.

ICPAC, where Artan serves as director, is a specialized unit of the intergovernmental alliance, which was derived from a 1986 United Nations initiative to bring together heads of state and government from countries in the Greater Horn of Africa to jointly address impacts of drought and

natural disasters in the region.

Though ICPAC began as a drought monitoring center for IGAD, they now also provide 10-day, monthly and seasonal climate and weather bulletins for regional decision makers as part of ICPAC's mission to enhance community resilience in the Greater Horn of Africa. ICPAC has had several precipitation forecasting tools for producing their bulletins, "Climate Watch" and other online resources for the region, but Artan believed their capacity could be developed.

"I sensed we weren't up to date," he said, "and saw how ICPAC and

Continued on page 12

Continued from page 11

NDMC could further collaboration and exchange views. From what I've seen today, it was really worthwhile coming here."

Approximately 230 million people live in the eight IGAD member countries of Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda; and non-member countries — Burundi, Rwanda and Tanzania — who also benefit from the alliance. "As a drought is a slow-moving event, there is a critical time when, if by that time actions are not taken, people will start dying," Artan said. "So the earlier we can mobilize — the earlier we can inform decision makers — the better."

Food scarcity that results from consecutive droughts is one of the primary concerns for decision makers

in the region. "People have a coping mechanism for one drought, even for two," Artan said. It is the cumulative impact of small sequential droughts which often put the population in dire straits.

"Seven percent of the region is basically rangeland, where the most dominant form of livelihood is actually livestock," he added. "Livestock restocking usually takes between 5 and 6 years. So the last major drought was '10-'11. And then '15-'16 there's another major drought. You can imagine, as soon as the guy (who has lost cattle) is getting back to his feet ..."

Artan and Tadesse will meet next in Nairobi, at a NASA-funded workshop being organized by Artan and his colleagues at ICPAC, The National Drought Management Agency of Kenya, and the Kenyan

Meteorological Department in conjunction with the NDMC and other U.S.-based partners. According to Tadesse, the October workshops will be an opportunity for the drought center and other U.S. institutes to explore further opportunities for collaboration with organizations in the Greater Horn of Africa.

Artan sees great potential in a collaboration that allows ICPAC to put the monitoring tools created by NDMC, particularly the new Vegetation Outlook (VegOut) model for the Greater Horn of Africa, into ongoing use for forecasting. "For us it is a win-win, from Tsegaye's point of view and the Center, taking (tools) from research to application. After all, you have to show the benefit, and for us, it is within our mandate. The decision makers want to make an impact."

NDMC provides drought vulnerability assessment training in the MENA region

In May, Cody Knutson and Michael Hayes provided drought vulnerability assessment training to representatives from Morocco, Tunisia and Jordan in Dubai, UAE, as part of an ongoing research project to facilitate development of the Middle East and North Africa Regional Drought Management System.

The training was carried out in collaboration with the Dubai-based International Center for Biosaline Agriculture. Knutson is the drought planning coordinator with the National Drought Mitigation Center, and Hayes, an affiliated member of the drought center, is a climatologist and professor at the School of Natural Resources, both at the University of Nebraska-Lincoln.

The overall goal of the USAID-funded project is to empower MENA decision makers to plan for and

manage the effects of droughts on food and water security under current and future climate conditions. Other partners on the project include the Center for Advanced Land Management Information Technologies at the University of Nebraska-Lincoln and the Robert B. Daugherty Water for Food Global Institute at the University of Nebraska.

The vulnerability assessment training is part of the second stage of the three-year project. The first stage focused on assessing needs and gaps related to drought monitoring and management in the region, and developing a regional Composite Drought Index monitoring tool. Stage two includes assessments for Morocco, Tunisia, Jordan and Lebanon and will transition to the final stage of the project, where project partners and stakeholders from the four participating

countries will utilize assessment results to develop drought risk management plans.

During the May session, a two-day training, Knutson and Hayes presented lectures about the vulnerability assessment process, which was followed by facilitated break-out sessions to discuss components of the process.

"The training provided a great opportunity to sit down and discuss how each of the countries are vulnerable to drought, options for conducting a more detailed vulnerability assessment and a plan for moving the assessments forward in each country," Knutson said.

Consultants now are being hired to work collaboratively with the NDMC and ICBA in assisting project teams in each country with vulnerability assessments. All assessments are expected to be completed in 2018.