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Looking back on 2018, I had some time to assess the impact we are having. Being a very applied shop by nature, it is gratifying to see how our team is helping translate and transport the science of all things drought to the public, the media, and policy and decision makers, not only here in Nebraska, but around the country and around the world. In fact, that common thread motivated us to run with this year’s annual report theme of “Putting Science in Your Hands.” In essence, this has always been what the National Drought Mitigation Center has been about. In addition, our “Where we were” map (pages 8–9) illustrates that the NDMC is front and center as an international drought resource for users worldwide.

The interdisciplinary nature of our staff and work means that we have the opportunity and ability to engage with partners and projects at a variety of scales. The impact our team has in working with many of you reading this is presented in an expanding circle of influence, by looking at the work done and services provided over the past year through partnerships close to home here in Nebraska, with tribes across the Midwest and Plains, with agencies from many states and from the federal government, and through global projects and other engagement efforts. I hope you will find the time to browse through the associated feature stories in this year’s report.

It can be quite challenging to capture these interactions quantitatively, but our “By the Numbers” factoids attempt to do just that. For a look at what I’m talking about, please see pages 6–7. Other internal and collaborative works from our team are captured well in our Publication Highlights (pages 13–15) and via a “nexus of partnerships” figure on page 16, which illustrates well the multitude of ties between the NDMC and our partners near and far who are working in the areas of monitoring, planning, impacts and engagement/outreach activities.

For those of you who have worked with us since our beginnings back in 1995, you know the NDMC has always been a strong advocate for drought impact data collection. Impact data (or a lack thereof) are a key piece of all three pillars (monitoring, vulnerability assessment and mitigation/planning) and thus are critical in informing many aspects of the drought risk management process. Our work in this area (including with several partners here and abroad) over the years has seen this process evolve as we take advantage of citizen science, mobile technology and apps and online networks. In 2018, we implemented a new, easier-to-use web-based interface for drought condition monitoring. The story on page 10 contains the full scoop on what this Survey123 method is all about. You can find this information, as well as our legacy database collection of drought impacts, at droughtreporter.unl.edu.

Please stay in touch and check us out any time at drought.unl.edu, throughout the year via our quarterly DroughtScape and monthly Dry Horizons online publications, and on Facebook or Twitter for weekly or more frequent updates! ☺

Mark Svoboda, Ph.D., Director
Emergency managers and community planners now have guidance on how to use the Federal Emergency Management Agency’s Threat and Hazard Identification and Risk Assessment process to prepare for drought. Developers of a new online multi-media Drought THIRA Toolkit introduced it via webinar on November 29. The toolkit provides guidance and examples for designing and using a THIRA in any community that experiences drought.

National Drought Mitigation Center staff were part of a team led by Denise Bulling, disaster and behavioral health expert with the University of Nebraska Public Policy Center, that worked with emergency managers and planners in the Platte River Basin as a pilot region to customize the THIRA process for the drought hazard. The Platte River basin provides an ideal environment for the application of a THIRA to drought planning because of its importance to communities throughout the state, and its historic vulnerabilities to drought.

The NDMC and the High Plains Regional Climate Center provided detailed data on the extent and effects of drought in the basin.

“We worked with emergency managers and decision-makers to make sure that the information we’re presenting makes sense to them,” said Deborah Bathke, drought center climatologist and education coordinator, and co-investigator on the project. “The scenarios we created helped everyone picture effects of drought they hadn’t thought of before.”

The National Oceanic and Atmospheric Administration’s Sectoral Applications Research Program (SARP) provided funding for the two-year project.

PERUSE THE TOOLKIT @

perusethetoolkit@droughtthira.unl.edu
Partnerships produce vulnerability assessments for tribes

Collaboration produced resources that will help several tribes be better prepared for drought conditions in the future.

In 2018, the National Drought Mitigation Center (NDMC) assisted in finalizing drought vulnerability assessments for the Rosebud Sioux, Oglala Sioux, Standing Rock Sioux and Flandreau Santee Sioux tribes in South Dakota and North Dakota. The center also helped the project team develop a climate guidebook for each of the tribes to assist future tribal planners in conducting similar climate and drought vulnerability assessments.

Cody Knutson, social scientist and planning coordinator with the drought center, said that he and Crystal Stiles of the High Plains Regional Climate Center worked with a consulting company and tribal interns to complete the documents, and that they have been provided to tribal leaders for final review.

The two-year project resulted in training for the tribes on how to conduct drought vulnerability assessments and development of quarterly climate summaries. Along with NDMC and the High Plains Regional Climate Center, partners on the project included the Great Plains Tribal Water Alliance; Louis Berger, an engineering company; the National Oceanic and Atmospheric Administration and the National Integrated Drought Information System; South Dakota State University and the South Dakota School of Mines and Technology.

This past year, the National Drought Mitigation Center also wrote a letter in support of the Eastern Shoshone and Northern Arapahoe tribes, which sought to develop a drought plan for the Wind River Reservation in Wyoming. The project has begun, and Nicole Wall, outreach and research specialist with NDMC, said a workshop in early April 2019 will include team members from the Tribal Water Engineer’s Office and Water Board. The workshop will address drought impacts, vulnerabilities and management action, and Wall said it will also begin the process of creating a reservation-wide drought plan. Funding for the Wind River Reservation project was approved by the Bureau of Indian Affairs’ Tribal Climate Resilience Program and is being supported by the National Integrated Drought Information System. The advisory team includes Wall and Knutson of the NDMC and Stiles of the HPRCC.
enhancements to the U.S. Drought Monitor have provided Weather Forecast Offices and River Forecast Centers with readily tweetable maps that are tailored to their service area boundaries. The new products enable 121 WFOs and 12 RFCs covered by the U.S. Drought Monitor to provide a current depiction of drought for regions that typically encompass several counties, and may cross state boundaries as well.

The new maps, and accompanying statistics and time series graphs, provide an assessment of broadscale conditions and round out a suite of existing products that include national, state and river basin maps of drought conditions. The variety of scales of depiction allows the National Weather Service to better meet the needs of decision makers working on local, regional or national projects that may be affected by drought.

The U.S. Drought Monitor and associated products are hosted and maintained by the National Drought Mitigation Center at the University of Nebraska-Lincoln. Enhancements such as the new WFO and RFC area maps are supported by the Drought Risk Management Research Center, a partnership between the drought center and the National Integrated Drought Information System.

The new area maps were developed in response to requests from Weather Service staff.

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See the maps at

droughtmonitor.unl.edu

http://droughtmonitor.unl.edu/

Drought Monitor maps & stats localized for NWS offices
Producer workshops focus on latest drought management tools

To reach the increasing numbers of new U.S. Drought Monitor users and long-time users interested in new drought tools, NDMC staff offered a series of outreach workshops in 2018, in conjunction with agencies serving agricultural producers in the central Plains and Southwest. On April 5, a one-day training session was offered in Amarillo, Texas; NDMC climatologist Brian Fuchs and NDMC director Mark Svoboda gave presentations on the history and making of the USDM, drought impact tools and resources, and the USDM Livestock Forage Program tool and other data.

Fuchs and NDMC climatologist Deborah Bathke, staff from U.S. Department of Agriculture Climate Hubs and other agencies that serve ag producers gathered near Des Moines, Iowa, in June to exchange information about monitoring tools available online through the USDM and share the latest climate stats and outlooks. Fuchs and Bathke gave presentations on how the USDM methodology for depicting drought developed, and continues to evolve as NDMC researches new ways of synthesizing, analyzing and displaying drought data. Fuchs also provided an overview of the drought impact tools produced by the NDMC, and Bathke demonstrated how to use the USDM’s Livestock Forage Disaster Program Eligibility Tool. The Des Moines event was one in a series of outreach workshops that Fuchs and other NDMC staff coordinated with agencies serving ag producers affected by drought in 2018 in the central Plains and Southwest. The workshops serve a dual purpose of orienting users to the latest drought impact and monitoring resources available from NDMC and giving NDMC staff the opportunity to learn from state and local agencies how they use the USDM to serve their constituents.

Presentations and documents from the NDMC workshop in Amarillo, Texas, are online: https://drought.unl.edu/PostEvent.aspx?id=905.
2018 BY THE NUMBERS

35 VISITORS
FROM 5 COUNTRIES

70 EVENTS
IN 9 COUNTRIES

20 WORKSHOPS

21 PROJECTS

1,430 MEDIA MENTIONS*

18,100 MEDIA MENTIONS**

VISITORS

DOMESTIC INTERNATIONAL TOTAL

5 10 15 20 25 30 35

PROJECTS

ONGOING COMPLETE NEW

5 10 15 20 25 30 35

PUBLICATIONS

72 Total publications
43 Refereed articles
6 Non-peer reviewed articles
5 Book chapters
18 Other reports

WEB STATISTICS

5.7M PAGEVIEWS of the U.S. Drought Monitor
1.42M USERS of all NDMC websites
40.7% MOBILE TRAFFIC on the U.S. Drought Monitor
229K FILE DOWNLOADS across all websites

MONETARY IMPACT

$160.8 MILLION
Total Livestock Forage Disaster Program payments triggered by the USDM through August 2018

$5.3 MILLION
Ad Value Equivalence of U.S. Drought Monitor mentions in the media*

$56.4 MILLION
Ad Value Equivalence of drought center mentions in the media*

$5.9 MILLION
Ad value Equivalence of U.S. Drought Monitor at University of Nebraska

$1.8 MILLION
Ad Value Equivalence of U.S. Drought Monitor

PUBLICATIONS

72 Total publications
43 Refereed articles
6 Non-peer reviewed articles
5 Book chapters
18 Other reports

SOCIAL MEDIA FOLLOWERS

6,392 FACULTY & STAFF
19.66% SINCE 2017

1,868 GRADUATE STUDENTS & INTERNS
16.9% SINCE 2017

* of NDMC
** of U.S. Drought Monitor

Media statistics from Meltwater
key component of the National Drought Mitigation Center’s mission is to collaborate with national and international organizations. In 2018, NDMC faculty and staff traveled to six continents to present, learn and collaborate. These are some of the international conferences and events that involved the NDMC team.

Dark blue indicates countries where we worked in 2018, and the lighter blue indicates countries where we worked in the past. Green circles highlight our top international projects for the year; descriptions are below.

1. United Nations Convention to Combat Desertification Science-Policy Interface Meeting
   Location: Bonn, Germany
   NDMC Director Mark Svoboda was an invited expert and traveled to Bonn in February to collaborate with other SPI members in an effort to translate current scientific research into key policy recommendations. He returned in October to continue work on the project.

2. Second “What on Earth” Colloquium
   Location: Wellington, New Zealand
   Svoboda was invited to speak at the national geospatial conference in March, during which experts discussed how Earth observation technology can impact New Zealand in terms of industry, environment and climate. Svoboda also met with government officials and private sector parties during the visit.

3. World Water Forum 8
   Location: Brasilia, Brazil
   Svoboda attended the 2018 World Water Forum, a gathering for water experts, water managers and organizations from around the world that are involved with water issues. “Among other aspects, water as a human right to life was discussed, as well as investments in technology and water security, adaptation actions to climate change, water use in agriculture and energy consumption,” according to a WWF recap of the March event.

   Location: Calgary, Canada
   NDMC staff, including Mark Svoboda, Deborah Bathke, Brian Fuchs, Tsegaye Tadesse and Curtis Kjartan, attended the spring meeting, which focused on international advances in the North American Drought Monitor.

5. GlobeDrought Stakeholder Workshop
   Location: Bonn, Germany
   Assistant Director Kelly Helm Smith represented the NDMC at the GlobeDrought workshop for stakeholders taking place in Bonn, Germany, in May. The GlobeDrought project aims to develop, test and implement a global drought information system for comprehensively characterizing drought events and their impact on water resources, crop productivity, food trade and the need for international food aid. It is one of 12 projects funded under “Global Resource Water (GROW),” part of the German Federal Ministry for Education and Research.

6. International Drought Forum
   Location: Daegwon, South Korea
   Svoboda gave a keynote talk at the International Asian Drought Forum, which was held during the grand opening of the Korean National Drought Information and Analysis Center. Svoboda and Jae-Young Park of Korea Water Resources Corporation signed a memorandum of understanding between the National Drought Mitigation Center and K-water following the event. Additionally, Svoboda gave a day-long training workshop on drought early warning and risk management to K-Water staff.

7. Caribbean Ecological Drought Workshop
   Location: San Juan, Puerto Rico
   NDMC Climatologist Deborah Bathke and Assistant Director Kelly Helm Smith represented the center at this workshop to identify critical drought impacts to island systems. The workshop was co-sponsored by the U.S. Geological Survey’s National Climate Change and Wildlife Science Center, the Department of the Interior’s Southeast Climate Science Center, and the USDA’s Agricultural and U.S. Agency for International Development Workshop.

8. International Center for Baseline Agriculture and U.S. Agency for International Development Workshop
   Location: Daejeon, South Korea
   Assistant Director Kelly Helm Smith represented the NDMC at the GlobeDrought Stakeholder Workshop, a gathering for water experts, water managers and organizations from around the world that are involved with water issues. “Among other aspects, water as a human right to life was discussed, as well as investments in technology and water security, adaptation actions to climate change, water use in agriculture and energy consumption,” according to a WWF recap of the March event.

9. World Water Week
   Location: Stockholm, Sweden
   Svoboda attended the August event, and participated as part of the center’s USAID Middle East North Africa (MENA) project. The theme for the event, organized by the Stockholm International Water Institute (SIWI), was “Water, Ecosystems and Human Development.”

10. Ethiopian Space Science & Technology Institute Meetings
    Location: Addis Ababa, Ethiopia
    NDMC’s Tsegaye Tadesse, a climatologist and remote-sensing expert, traveled to Addis Ababa to lead training sessions and participate in the Ethiopian Space Science & Technology Institute’s research scintillant program meetings in September.
The National Drought Mitigation Center (NDMC) in January 2019 switched to a streamlined method for reporting local drought conditions, and is working with state agencies and other partners across the country to promote use of the new form.

Since 2005, the center has maintained the Drought Impact Reporter (DIR), a nationwide database of information from a variety of sources, including media and volunteer observers. Those responses are collected and mapped, offering information-rich updates on how drought is affecting different regions of the U.S.

After testing in 2018, the NDMC replaced its form for collecting observations. The new form, available at droughtreporter.unl.edu/submitreport, asks users to rank conditions from severely dry to severely wet. Observers can provide additional information on how conditions affected various local concerns, from crop and livestock production to tourism and fire threats. Observers can also upload photos showing drought conditions they are seeing, along with photo captions. See pages 18–20 for examples of photos submitted in 2018.

Data from the updated form, created with Survey123 for ArcGIS, is presented on a U.S. map, accessible from the DIR Submit a Report page. Users of the 2019 map will be able to filter mapped observations to find specific types of events, such as dry wells or reduced crop yields. Survey responses will show up immediately on the map, and uploaded photos will be available soon after submission.

Tabs on the map show how dry or wet observers said it was at each point, the location of observations about impact sectors and specific impacts within those sectors, and the location of observations that include photos. The mapped archive of observations from 2018 is currently accessible via the DIR Submit a Report page and will continue to be accessible via the DIR.

The DIR was developed with funding from the National Oceanic and Atmospheric Administration and U.S. Department of Agriculture’s Risk Management Agency. The new DIR form is supported by NOAA’s Sectoral Applications Research Program and the National Integrated Drought Information System, and in collaboration with NIDIS Drought Early Warning System regions and USDA Climate Hubs.
Five states began drought plan updates in 2018

The number of states with drought plans, or plans for coping with drought included in other plans, has steadily increased since the drought center was established in 1995. Many of those plans have been around a while; of the 45 state drought plans in the drought center’s database, 25 are more than 10 years old.

At least five U.S. states began drought plan updates in 2018. Federal hazard planning requirements and economic losses from recent prolonged droughts have prompted Colorado, Minnesota, New Mexico, Oklahoma and Utah to undertake plan updates.

Utah and Colorado are conducting sector-based economic impact assessments for the 2018 droughts. In Utah, a multi-state workshop helped start the process. Candice Hasenyager, assistant director of the Utah Division of Water Resources, oversaw the state’s Drought Response Plan Workshop in July 2018. She said that although the state only faces drought every seven years, they are meeting once or twice a year so that drought does not catch them off guard. Ideally, planning documents would keep pace with the changing climate, said Taryn Finnessey, senior climate change specialist with the Colorado Water Conservation Board. The drought center also recommends that updates account for changes in water use and vulnerability.

Luigi Romolo, Minnesota’s state climatologist, recognized a need to update the state’s plan to include more information about how drought affects all sectors of the state’s economy. Romolo has taken the lead to move forward with a plan update before the next drought disaster strikes.

Mark Shafer, associate state climatologist at the Oklahoma Climatological Survey, emphasized that new monitoring capacity, including the U.S. Drought Monitor, has been developed since his state’s drought plan was created in 1997 and will need to be incorporated into a new plan. Shafer notes that regional and national planning initiatives such as the NOAA Regional Integrated Sciences and Assessments (RISA) program will help provide expertise in drought policies and management.

In New Mexico, which has had some degree of drought nearly continuously for the past 20 years, the Office of the State Engineer’s Water Use and Conservation Bureau was directed to update the drought plan. As of October 2018, the state was working on a revision of the New Mexico Drought Plan as well as an economic impact assessment of the 2018 drought, according to Molly Magnuson, Water Use and Conservation Bureau chief.

VISIT THE NDMC’S COLLECTION OF DROUGHT PLANS @ drought.unl.edu/droughtplanning/InfobyState.aspx
ith assistance from the National Drought Mitigation Center and USAID, Jordan, Lebanon, Morocco and Tunisia undertook a project to develop drought monitoring and management systems for their respective homelands in the Middle East and North Africa.

NDMC staff began working with the MENA Regional Drought Management System development project team in 2016 to assess regional drought monitoring and management needs and gaps, and to develop a regional Composite Drought Index monitoring tool. In the second stage of the project, each country began assessments of their national resources for drought monitoring and management.

In the final phase of the project, partners and stakeholders from the four participating countries utilized assessment results to develop drought risk management plans for their area. They met in late June at the International Center for Biosaline Agriculture in Dubai to review each team’s progress on validating the CDI, and to discuss how vulnerability and impact assessment results could be used in policy and planning development for each country. Policymakers from the four nations joined the consultants from each nation at an international policy workshop in Dubai in September. The workshop was organized by the United States Agency for International Development, the International Center for Biosaline Agriculture, and the NDMC. The consultants gave final reports on their progress, and participants discussed drought monitoring development and validation of results, vulnerability and impact assessment results and how they could be used in policy development and planning, and ideas for planning and policy-making.

In addition to NDMC, USAID and ICBA, partners on the MENARDMS project included 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 impact of persistent drought throughout the early 2000s stayed with many of the residents of McCook, Nebraska, for the years that followed. Rather than cope with the next one, they would be prepared for it. The extent to which those preparations paid off in McCook was the subject of a case study conducted in part by a team of National Drought Mitigation Center scientists published in *Weather, Climate, and Society*. “Some residents of McCook did not realize how severe the drought was in 2012,” lead author Theresa Jedd of the NDMC wrote. “Rather than a monitoring failure or a lack of public awareness campaigns, we see this as a planning success.”

As the nearby Republican River’s water levels dropped in the summer of 2012, McCook enacted voluntary, and then mandatory afternoon water restrictions. City leaders were not the only ones to take steps to reduce the impact of the drought. From McCook’s YMCA staff shutting off sprinklers and watering the lawn at night to school district officials declaring “heat days,” the authors cataloged a community-wide effort.

“We attribute the city’s resilience to the ability to draw upon prior experience with droughts, having a formal municipal plan, and strong human and social capital to coordinate individual knowledge and expertise across agencies,” the study reports. “We suggest that droughts have served a catalytic function, prompting the community to transform land-use practices, water conservation planning, and built infrastructure in lasting ways.”

Drought planning often overlooks the non-human impacts of drought. In a study published in the March 2018 edition of *Resources*, researchers with the National Drought Mitigation Center examined five southwestern Montana drought plans and the ecological impacts they did and did not take into account.

“Despite these criticisms, our findings suggest that the drought plans from southwestern Montana provide a starting point to account for the ecological impacts of drought, monitor for ecological impacts, and identify who manages ecologically available water,” the study’s authors write.

The NDMC joined researchers from Montana State University, the University of Nebraska-Lincoln, the U.S. Geological Survey and the Nature Conservancy to conduct research and publish the study. Support came from USGS and from the the Science for Nature and People Partnership (SNAPP).
The National Drought Mitigation Center traveled to Addis Ababa, Ethiopia, in October 2017 to lead a workshop where participants discussed strategic approaches to improve drought early warning and food security systems in the Greater Horn of Africa. A report on the workshop was published in the Bulletin of the American Meteorological Society in 2018.

The report, titled “Improving National and Regional Drought Early Warning Systems in the Greater Horn of Africa,” chronicled the events of the workshop, and recommendations for future collaboration.

“The key factors for future operations include pathways for better data sharing, formal collaborations, and communication that involves more stakeholder engagement,” the report states. “Building more human capital in drought risk management was mentioned as key to future operations related to this DEWS (drought early warning systems) effort.”

The workshop was supported by the University of Nebraska-Lincoln, and NASA funded the project.

**DESIGNING BETTER METHODS TO MONITOR ETHIOPIAN DROUGHT**

Bayissa, Yared A.; Tsegaye Tadesse; Mark Svoboda; Brian Wardlow; Calvin Poulsen; John Swigart; & Schalk Jan Van Andel (2018) Developing a satellite-based combined drought indicator to monitor agricultural drought: a case study for Ethiopia, GIScience & Remote Sensing, DOI: 10.1080/15481603.2018.1552508

In Ethiopia, a country that is extremely susceptible to drought, there has been a lack of a drought monitoring system to help citizens there recognize emerging drought. The National Drought Mitigation Center in 2018 addressed that challenge by developing a grid-based combined drought indicator (CDI-E) and testing its efficacy. The results of the study, published in GIScience & Remote Sensing, showed the system has promise.

“The CDI-E generally mapped the spatial and temporal patterns of historic drought and non-drought years and hence the CDI-E could potentially be used to develop an agricultural drought monitoring and early warning system in Ethiopia,” the study states. “Moreover, decision makers and donors may potentially use CDI-E to more accurately monitor crop yields across the food-insecure regions in Ethiopia.”

The study was titled “Developing a satellite-based combined drought indicator to monitor agricultural drought: a case study for Ethiopia.”

**MAPPING VEGETATION STRESS IN SOUTH KOREA**


South Korea has recently experienced several severe droughts, and the National Drought Mitigation Center in 2018 worked to provide a more precise means of mapping vegetation stress caused by drought.

“The objective of this study was to develop a satellite-based hybrid drought index called the vegetation drought response index for South Korea (VegDRI-SKorea) that could improve the spatial resolution of agricultural drought monitoring on a national scale,” the authors wrote in the study, published in the Journal of Remote Sensing.

The study showed the VegDRI-SKorea tool “would be valuable for local-scale drought monitoring to depict and provide a more timely indication of the improvement of drought conditions than the station-based drought indices” that South Korean officials have traditionally relied upon.

Support was from Korea’s Ministry of Agriculture, Food and Rural Affairs and from NASA.
When it comes to detecting drought, instrumental data doesn't always tell the whole story. Researchers surveyed agricultural producers about their perceptions and experiences of drought in the High Plains in 2016. They found “evidence that qualitative reports of drought impacts obtained via written surveys provide valuable information that can be used to assess the accuracy of high-resolution drought monitoring datasets.”

Jason Otkin at UW-Madison’s Cooperative Institute for Meteorological Satellite Studies, Space Science and Engineering Center led the study, working with Tonya Haigh and Anthony Mucia, NDMC, and with researchers at USDA-ARS and NASA, with support from NOAA/SARP.


Tingting Liu, NDMC environmental economist, conducted an extensive literature review on factors that can influence farmers’ decisions to adopt best management practices (BMPs) in both developed and developing countries that could impact the critical problem of water resource degradation.

After reviewing multiple existing BMP adoption studies, a conceptual framework for BMP adoption decisions was created. The study examined an array of factors, both micro and macro, that influence farmers, from oft-studied financial incentives to more abstract concepts, such as peer pressure. The study, published in Sustainability and titled “Factors Influencing Farmers’ Adoption of Best Management Practices: A Review and Synthesis,” could provide direction for future research on this topic.

The study was supported in part by an appointment at the Research Participation Program at the Office of Research and Development, administered by the Oak Ridge Institute for Science and Education through an interagency agreement between the U.S Department of Energy and the EPA.
Here we show the many partnerships with international, federal, Nebraska, academic and other agencies and organizations that make our work possible. For detail, please see p. 17.
Our team

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Assistant director
& communication coordinator
Dr. Deborah Bathke
Education coordinator
Brian Fuchs
Monitoring coordinator
Dr. Cody L. Knutson
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Brendon Orr
Web graphics designer
Chris Poulson
GIS manager
Curtis Riganti
Climatologist
Claire Shield
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Outreach and research specialist
Deborah Wood
Publication specialist

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Dr. Getachew Demisse
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Graduate research assistant
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Graduate research assistant
Elliot Wickham
Graduate research assistant
Beichen Zhang
Graduate research assistant

Our team

Partnerships

INTERNATIONAL
• Global Water Partnership
• International Center for Biosaline Agriculture
• U.S. Agency for International Development
• Korea Water Resources Corporation
• Queensland Drought Mitigation Centre: University of Southern Queensland
• Convention to Combat Desertification
• Environment Program
• Food and Agriculture Organization
• World Meteorological Organization

FEDERAL
• NASA
• Jet Propulsion Lab
• Goddard and Marshall Space Flight Centers
• National Science Foundation
• U.S. Department of Agriculture
• Agricultural Research Service
• Office of the Chief Economist
• World Agriculture Outlook Board (USDA Chief Meteorologist)
• Foreign Agriculture Service, Borlaug Fellowship Program
• Climate Hubs
• Natural Resources Conservation Service
• Forest Service
• Risk Management Agency
• U.S. Department of Interior
• Bureau of Indian Affairs
• U.S. Fish & Wildlife Service
• U.S. Bureau of Reclamation
• U.S. Geological Survey
• Earth Resources Observation and Science (EROS) System
• U.S. Department of Commerce
• National Integrated Drought Information System
• National Centers for Environmental Information
• National Weather Service
• River Forecast Centers
• NOAA Office of Atmospheric Research
• NOAA Climate Program Office
• Sectoral Applications Research Program
• Modeling, Analysis, Predictions and Projections
• National Water Center
• Federal Emergency Management Association
• U.S. Environmental Protection Agency
• Office of Research and Development (ORD)
• U.S.A.C.E.

ACADEMIC
• University of Nebraska
• Extension
• Public Policy Center
• Daugherty Water for Food Global Institute
• High Plains Regional Climate Center
• State Climate Office
• School of Natural Resources
• Colorado State University
• Southern Climate Impacts Planning Program
• Carolinas Integrated Sciences and Assessment
• Desert Research Institute, University of Nevada, Reno
• University of Rhode Island
• Department of Environmental and Natural Resource Economics
• Department of Statistics
• University of Wisconsin Cooperative Institute for Meteorological Satellite Studies
• North Central Climate Collaborative (NC3)
• University of North Dakota Extension
• Iowa State University Extension
• University of Maryland Earth System Science Interdisciplinary Center
• Oklahoma State University
• Kansas State University
• Extension Disaster Education Network
• University of Nebraska Medical Center

STATE OF NEBRASKA
• Nebraska Governor’s Climate Assessment and Response Committee
  • Water Availability and Outlook Committee
• Nebraska Health & Human Services, vector-borne disease surveillance
• Nebraska Emergency Management Association

OTHER ORGANIZATIONS
• Center for Research on the Changing Earth System
• Community Collaborative Rain, Hail & Snow Network
• Great Plains Tribal Water Alliance
• American Planning Association
• Iowa Wine Growers Association
• Iowa Hops Growers
• Wisconsin Potato and Vegetable Growers Association
• Wisconsin Cranberries Growers
Observer-submitted photo of dead largemouth bass which died along with hundreds of other bass, bluegill, and grass carp in a 2-acre pond in Missouri in 2018. The pond was lower than 2012. The low water and hot temperatures caused oxygen levels in the water to drop, killing every fish in the pond.
Observer-submitted photo of dangerously low stock tank with poor quality water about two miles north of Graham, Texas in 2018.
Observer-submitted photo of fire in northwest Utah, September 2018.