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

APRIL 1 - 4, 2014 • LINCOLN, NEBRASKA
2011 and 2012 witnessed two of the worst Great Plains droughts in recent memory, a tragic counterpoint to the damaging floods of 2011 and a return to the stressful times of 1998-2006. Drought is a recurring pattern in this semi-arid region, with severe droughts in the 1890s, 1930s, 1950s and 1980s. Indeed, using tree ring, lake sediment, and dune records, scientists have documented the periodic return of severe droughts. Based on such evidence, some scientists have observed that drought was the dominant feature of climate rather than the exception. Drought has been and will continue to be a normal part of the climate of the Great Plains and may increase in frequency and severity in the future as a result of projected changes in climate.

Drought or the ever-present threat of it has had a pervasive effect on the region and its people. It molded the region’s settlement patterns, agriculture and commerce, stimulated innovation, aroused conflict between agriculturalists and environmentalists, and fueled litigation between states. Drought has shaped how the people of the Great Plains think of themselves and their region and influenced their culture, literature, and art. Today it raises concern about whether the region will have sufficient water for its future.
Concurrent sessions will take place on the Nebraska Union’s second floor and the connected Gaughan Center: Unity 212 (Gaughan Center), Ubuntu 202 (Gaughan Center), Heritage (Union), Regency A, B, or C (Union).
**TUESDAY, APRIL 1**

**5:30 - 7:30 PM**  REGISTRATION AND RECEPTION:
Food and drinks at the Great Plains Art Museum:
View the drought-related artwork in the exhibit “Dry Times” by ceramic artist Jess Benjamin

**1155 Q STREET**

**WEDNESDAY, APRIL 2**

**7 - 8 AM**  REGISTRATION AND BREAKFAST
NEBRASKA UNION  Registration in hallway outside Auditorium
Continental breakfast inside Centennial Room

**8 - 8:30 AM**  WELCOME AND INTRODUCTION
AUDITORIUM  Richard Edwards, Director, Center for Great Plains Studies
Don Wilhite, Symposium Co-Chair, Professor, School of Natural Resources, University of Nebraska-Lincoln

**8:30 - 10 AM**  PLENARY SESSION 1: DROUGHT PAST AND FUTURE
AUDITORIUM  Moderator: Don Wilhite, School of Natural Resources, UNL
Sherilyn Fritz, Earth and Atmospheric Sciences, UNL, “Great Plains Droughts and Megadroughts in Prehistory”
Marty Hoerling, NOAA/Earth Science Research Laboratory, “Preludes to Drought...What Recent Drought Behavior Foretells of the Future”

**10 - 10:30 AM**  BREAK
CENTENNIAL RM  Exhibitors, posters, drought infographic display
10:30 - 12 PM
AUDITORIUM

PLENARY SESSION 2: ADVANCING DROUGHT EARLY WARNING, PREDICTION AND PREPAREDNESS
Moderator: Martha Shulski, School of Natural Resources, UNL

Annarita Mariotti, Climate Program Office, NOAA
Claudia Nierenberg, Climate Assessments and Services, NOAA

“Coordinating Research and Networks to Advance Understanding Monitoring, Prediction of Droughts and Society’s Preparedness”

Mike Hayes and Mark Svoboda, National Drought Mitigation Center, UNL, “The Role of Monitoring, Early Warning and Information Systems and Planning in Managing Future Droughts”

12 - 1:15 PM
BALLROOM

LUNCH SPEAKER: JASON CLAY, SENIOR VICE PRESIDENT, WORLD WILDLIFE FUND

Moderator: Ronnie Green, Vice President and Vice Chancellor, Institute for Agriculture and Natural Resources, UNL

“Global Food Systems and Conservation in an Age of Weather Variability”

1:30 - 3 PM
REGENCY B/C

CONCURRENT SESSIONS

1.) Drought and Climate Change: Impacts on Human and Ecosystem Health
Moderator: Charlie Bicak, Senior Vice Chancellor for Academic and Student Affairs, University of Nebraska at Kearney

Michelle Podgornik, Centers for Disease Control and Prevention, “The Public Health Impact of Drought”

Andrew Jameton, Professor Emeritus, University of Nebraska Medical Center, “Extended Health Effects of Drought in the Central High Plains”

Rick Schneider, Nebraska Game and Parks Commission, “Effects of Climate Change on Wildlife and Ecosystems”
2.) Drought: A Prehistoric Perspective  
Moderator: Sherilyn Fritz, Earth and Atmospheric Sciences, UNL

Paul Hanson, School of Natural Resources, UNL,  
“Records of Prehistoric Droughts from Sand Dunes in the Central Great Plains”

Rolfe Mandel, University of Kansas, “The Past 10,000 Years: Evidence for Periods of Aridity from Rivers of the Central Great Plains”

Connie Woodhouse, University of Arizona,  
“Great Plains Drought in a Long-Term Context: The Tree-Ring Perspective”

3.) The Dust Bowl Revisited, Part 1  
Moderator: John Wunder, Emeritus Professor, History, UNL

W. Brett Anderson, Eastern Illinois University,  
“The Grapes of Wrath and the Oklahoma Dust Bowl”

Stephen Behrendt, English, UNL, “One Man’s Dust Bowl: Recounting 1936 with Don Hartwell, Inavale, Neb.”

Donald Berg, South Dakota State University,  
“Dusting Off the Dust Bowl: 1930s Northern Plains Historical Geography”

4.) Drought Monitoring, Early Warning and Impacts  
Moderator: Mark Svoboda,  
National Drought Mitigation Center, UNL

Jesslyn Brown, Earth Resources Observation and Science, USGS, “Assessment of Recent Drought Impacts on Great Plains Land Cover”

Tegenu Engda, University of Wyoming,  
“Soil Water Dynamics and Soil Water Based Drought Analysis of Wyoming Rangelands”

Doug Kluck, Central Region Climate Services Director, NOAA,  
“Developing a Drought Early Warning Information System in the Missouri River Basin”
3 - 3:30 PM  BREAK
CENTENNIAL RM  Exhibitors, posters, drought infographic display

3:30 - 5 PM  CONCURRENT SESSIONS

UNITY

1.) The Dust Bowl Revisited, Part 2
Moderator: John Wunder, Emeritus Professor, History, UNL

Drew Folk, Oklahoma State University, “Burglaries, Bank Robberies and Booze: The Social Impact of Crime Caused by Drought and Economic Depression in Nebraska Sandhills’ Communities during the 1930s”

Douglas Sheflin, Colorado State University, “Working in the Dust: Migrant Labor and the Dust Bowl in Colorado”

Steve Potts, Hibbing Community College, “So Far from Paradise: Drought, Depression and Migration in a Prairie Town”

REGENCY A

2.) Drought Preparedness in the Yellowstone River Basin: A Citizen-Based Effort
Moderator: Crystal Bergman, Natural Resources graduate student, UNL

Susan Gilbertz, Montana State University-Billings, Damon Hall, St. Louis University, Luke Ward, Rocky Mountain College, Matt Anderson, Montana State University-Billings, and Alyson Rode, Montana State University-Billings, “Building Local Capacities to Deal with Drought via Citizen Councils”

“Using Q Sort to Illuminate Conflicting Visions”

“Beneficial Use as a Modality of Dispossession: The Role of the ‘Imaginary Collective’ in the Politics of Water Rights in Montana’s Yellowstone River Basin”

“Unraveling Citizen Council Challenges: The Yellowstone Basin Advisory Council and its Dilemmas”

concurrent sessions continued on next page >
3:30 - 5 PM

CONCURRENT SESSIONS CONTINUED

REGENCY B/C

3.) Drought and Water Management:
Native American Perspectives
Moderator: Dennis Smith, History, University of Nebraska at Omaha

Micaela Young, Montana State University,  
“Negotiating the Non-negotiable: Water Infrastructure and Social Issues in Montana”

Richard Thomas, University of Oklahoma, “Using Historical Sources to Reconstruct 19th Century Climate in Indian Territory”

Alan Neville and Alyssa Kaye Anderson, Northern State University, “Water Quality Challenges and Initiatives Impacting South Dakota’s Nine Reservations”

UBUNTU

4.) Water Management, Conservation, and Law
Moderator: Sandi Zellmer, College of Law, Water for Food Institute, UNL

Charlie Bicak, Sr. Vice Chancellor for Academic and Student Affairs, University of Nebraska at Kearney and Peter Longo, Economics, University of Nebraska at Kearney,  
“Nebraska’s Natural Resource Districts: Dealing with Drought on the Great Plains”

Stephen Gasteyer, Michigan State University,  
“Shifting Intermediaries: Tracing the Land Grant Role in Water Management”

Ken Baake, Texas Tech University,  
“Attitudes Toward Water Conservation in West Texas: A Literary Example”

HERITAGE

5.) Drought Impacts on Settlement and Population in the Great Plains
Moderator: Jacob Friefeld, History graduate student, UNL

David Wishart, Geography/School of Natural Resources, UNL,  
“Climatic and Human Dimensions of the 1893-1896 Drought on the Western High Plains”

Barbara Mayes Boustead, National Weather Service, NOAA,  
“Little Drought on the Prairie”

Kevin Gallo, NOAA/National Environmental Satellite, Data, and Information Service, and Eric Wood, USGS,  
“Historical Drought Episodes Recorded by Native Americans”
7 - 9 PM
EMBASSY SUITES HOTEL

DINNER SPEAKER: MICHAEL FORSBERG, WILDLIFE PHOTOGRAPHER

Moderator: Roberto Lenton, Executive Director, Robert B. Daugherty Water For Food Institute

“Pulse of the Plains: A Photographer’s Journey Connecting Water, Wildlife and Landscape in the Heart of the Continent”

THURSDAY, APRIL 3

7 - 8 AM
REGISTRATION AND BREAKFAST

Registration in hallway outside Auditorium
Continental breakfast inside Centennial Room

8 - 9 AM
AUDITORIUM

PLENARY SESSION 3: ADAPTATION TO DROUGHT IN THE GREAT PLAINS

Moderator: Lilyan Fulginiti, Agricultural Economics, UNL

Richard Hornbeck, Dept. of Economics, Harvard University,
“Economic Adaptation to the Environment:
Lessons from the Dust Bowl and the Ogallala Aquifer”

9 - 10:15 AM
AUDITORIUM

PLENARY SESSION 4: THE GLOBAL CONTEXT FOR DROUGHT IN SIMILAR ENVIRONMENTS, CASE STUDIES

Moderator: Mike Hayes, Director, National Drought Mitigation Center, University of Nebraska

Northeast Brazil: Erwin De Nys and Nathan Engle, World Bank, “Institutionalizing Proactive Drought Policy and Management in Brazil”


10:15-10:45 AM
CENTENNIAL RM

BREAK

Exhibitors, posters, drought infographic display
10:45 - 12 PM  
PLENARY SESSION 5: AGRICULTURAL DROUGHT MANAGEMENT: COPING WITH CHANGING CLIMATE EXTREMES  
Moderator: Christopher Neale, Director for Research, Robert B. Daugherty Water for Food Institute  

Theib Oweis, ICARDA, “Coping with Increasing Water Scarcity: From Efficiency to Productivity”  

P. Stephan Baenziger, Agronomy and Horticulture, UNL, “The Importance of Genetics During Drought”

12 - 1:15 PM  
LUNCH SPEAKER: IAN FRAZIER, THE NEW YORKER  
Moderator: Ellen Weissinger, Senior Vice Chancellor for Academic Affairs, UNL  

“American Desert or Garden in the Grasslands: The Nervousness of Not Knowing”

1:30 - 3 PM  
CONCURRENT SESSIONS  
1.) Drought and Ecosystem Health  
Moderator: John Carroll, Director, School of Natural Resources, UNL  

David Wedin, School of Natural Resources, UNL  
Walter Schacht, Agronomy/Horticulture, UNL  
Jerry Volesky, West Central Research & Extension Center, UNL, “Grassland Resilience, Drought and the Stability of the Nebraska Sandhills”  

Elaine Wheaton, Saskatchewan Research Council, “Dust Storms of the Canadian Prairies: A Dustier and Muddier Outlook”  

Larkin Powell, School of Natural Resources, UNL, “Born of Crisis: Drought Delivered Conservation Programs to Private Lands”

concurrent sessions continued on next page >
2.) Drought in Literature: Indigenous and Settler Perspectives  
*Moderator: Tom Lynch, English, UNL*

**Tom Gannon**, English, UNL “The Blue Man and the Great American Desert: Climatic Tropes in Great Plains Literature”

**Fran Kaye**, English, UNL “Osage Dustbowl: ‘a hell of a thing that a depression would come along durin’ such hard times’”

**Tom Lynch**, English, UNL “Climate, Literature, and the Limits of the Settler-Colonial Agrarian Imaginary on the Great Plains and Australian Outback”

3.) Mental Health and Farm Crises  
*Moderator: Alan Tomkins, University of Nebraska Public Policy Center*

**Alan Tomkins**, University of Nebraska Public Policy Center

**Denise Bulling**, University of Nebraska Public Policy Center

**Marilyn Mecham**, Executive Director, Mentors Foundation

4.) Climate, Drought, and Risk  
*Moderator: Peter Longo, Economics, University of Nebraska at Kearney*

**Chad McNutt**, NOAA, National Integrated Drought Information System, “Tribal Engagement on Climate and Weather Extremes in the Upper Great Plains”


**Gabriela Burian**, Monsanto, “Towards Sustainable Agriculture Landscapes: Global Commitments and Global Partnerships”

3 - 3:30 PM  
**BREAK**

**CENTENNIAL RM**  
Exhibitors, posters, drought infographic display
CONCURRENT SESSIONS

UBUNTU

1.) Drought and Fire: Its Role on Ecosystem Management
Moderator: Gary Willson, Editor, Great Plains Research, Center for Great Plains Studies, University of Nebraska-Lincoln

Scott Josiah, State Forester and Director, Nebraska State Forest Service, “The Impacts of Recent Megafires on Nebraska’s Coniferous Forest Ecosystems”

Dirac Twidwell, Agronomy and Horticulture, UNL, “Opportunistic Management with Fire During Drought”

Rich Guyette, University of Missouri, “A Great Plains Story of Fire and Climate”

REGENCY A

2.) Climate Variability, Climate Change and Management
Moderator: Cody Knutson, National Drought Mitigation Center, UNL

Tucker Hamilton, University of Wyoming, “Climate Change and Variation: Management Implications for Cattle Producers”

Nicole Wall, National Drought Mitigation Center, “Exploring Perceptions of Bias in Climate Change Survey Measures”

Shawn Salley, Alan Knapp, Patrick Martin, and Gene Kelly, Colorado State University, “Great Plains Soil Moisture: Contemporary Record and Climate Change Forecasts”
3:30 - 5 PM  
CONCURRENT SESSIONS CONTINUED

HERITAGE

3.) How Do Droughts Make Place?
Moderator: David Wishart, Geography/School of Natural Resources, UNL

Joshua Ewalt and Julia Moore, Communications, UNL, “Dust, Drought, and Dreams Gone Dry: Using Dust Bowl Memories as Resources for Contemporary Message Construction”

Kent Fricke, Chris Helzer, Larkin Powell, School of Natural Resources, UNL and Nebraska Nature Conservancy, “Effects of Drought on Biodiversity in the Great Plains”

Jason Hertz, English, UNL, “Rethinking ‘Drought’ for a Sustainable Prairie Discourse”

Aubrey Streit Krug, English, UNL, “Just Dust: Native and Settler Poetics of Drought”

REGENCY B/C

4.) Drought, Grasslands, and Community Preparedness
Moderator: Jerry Volesky, Agronomy and Horticulture, UNL

Benjamin Rashford, University of Wyoming, “Climate in the Northern Great Plains”


Milan Wall, Heartland Center for Leadership Development, “Using Community Capitals as a Tool to Prepare Drought Ready Communities”

UNITY

5.) Drought and Public Health
Moderator: Andrew Jameton, professor emeritus, UNMC

Michelle Podgornik, Centers for Disease Control and Prevention

Bryan Buss, U.S. Public Health Service Commander, CDC field officer, Nebraska Department of Health and Human Services

Ellen Yard, Epidemiologist, Centers for Disease Control and Prevention

Dinner on your own
FRIDAY, APRIL 4

7 - 8 AM  REGISTRATION AND BREAKFAST
Registration in hallway outside Auditorium
Continental breakfast inside Regency Room

8 - 10 AM  PLENARY SESSION 6: DROUGHT IMPACT SECTORS
AUDITORIUM
Moderator: Mike Hayes, Director, National Drought Mitigation Center, UNL

Water: Chad McNutt, NOAA, National Integrated Drought Information System, “Drought in the Great Plains: Are We Closer to an Early Warning System?”


Livestock: John Paterson, National Cattlemen’s Beef Association, “The Impacts of Recent Droughts on the Beef Industry”

10 - 10:30 AM  BREAK: REGENCY ROOM

10:30 - 12 PM  PLENARY SESSION 7: RESEARCH AND POLICY CHALLENGES FOR A SUSTAINABLE FUTURE FOR THE GREAT PLAINS IN THE CONTEXT OF A CHANGING CLIMATE
AUDITORIUM
Moderator: Prem Paul, Vice Chancellor for Research and Economic Development, UNL

Ronnie Green, Vice President and Vice Chancellor Institute of Agriculture and Natural Resources, UNL, “The Role of Land Grant Universities and the Rural Futures Institute”

Roberto Lenton, Executive Director, Water for Food Institute, UNL, “The Role of Science and Technological Innovation”

Mark Rosegrant, Director of the Environment and Production Technology Division, International Food Policy Research Institute

Chuck Schroeder, Executive Director, Rural Futures Institute

CLOSING REMARKS from Richard Edwards, Director, Center for Great Plains Studies, UNL, and symposium co-chair Don Wilhite, School of Natural Resources, UNL

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POSTER SESSION PARTICIPANTS

See the posters inside the Centennial Room at the Nebraska Union Wednesday and Thursday during the Symposium

Crystal J. Bergman, Natural Resource Sciences, UNL
Improving Drought Management for Transboundary River Basins in the United States

Shuwei Dai, Natural Resource Sciences, UNL
Growing Season Climate Change in the Midwest U.S. from 1981 to 2012

Denise D. Gutzmer, National Drought Mitigation Center, UNL
Far-Reaching Impacts of the 2012 Midwestern Corn Production Shortfall

Tonya Haigh, National Drought Mitigation Center, UNL
Managing Drought Risk on the Ranch: Perspectives on Planning and Impacts

Tonya Haigh, National Drought Mitigation Center, UNL
Stuart Carlton, Purdue University
The Effect of the 2012 Drought on Agricultural Climate Risk Perceptions

Toni Klemm, South Central Climate Science Center
Improving Seasonal Climate Projections for Agricultural Producers

Susan Knight
Photographic Documentation of “Watered Down”
An Installation About Groundwater

Joseph Robine, Natural Resource Sciences, UNL
Developing a Drought Resiliency Index

Jamie Royer, Texas State University
The Timber Culture Act and the Great Plains in U.S. Land Policy

Brock Ternes, University of Kansas
A Study of Domestic Water Conservation among Kansans
SPECIAL THANKS TO

The Center for Great Plains Studies staff, especially Gretchen Walker and Katie Nieland, who expertly organized all the many particulars of the Symposium.

Dana Ludvik (Water for Food) and Kelly Helm Smith (National Drought Mitigation Center) for help in promotions.

Jacki Loomis at UNL’s Maps and More Store for handling online registration.

STUDENT ART DISPLAY, CENTENNIAL ROOM

A UNL advanced graphic design class’ semester-long project to develop water- and food-related infographics is displayed in the Centennial Room April 2 and 3 during the conference. This course is a collaborative design research project with advanced graphic design students from University of Nebraska–Lincoln and San Francisco State University taught by Stacy Asher and Joshua Singer respectively.

The course investigates the systemic connections between these two regions within the framework of water for food. How are they connected? What forces and agents affect the other? How can these be visualized and communicated?

EXHIBITORS IN THE CENTENNIAL ROOM

Robert B. Daugherty Water For Food Institute
National Drought Mitigation Center
Center for Great Plains Studies
Visit the Prairie ecotourism campaign
UNL School of Natural Resources
World Wildlife Fund
University of Nebraska Bookstore
Michael Forsberg Photography

Explore Evolution exhibit: This exhibit describes the work of Professor Sherilyn Fritz on the evolution of the Yellowstone diatom. It was funded by a grant from the National Science Foundation to Professor Judy Diamond. The entire Explore Evolution gallery is on display at the University of Nebraska State Museum.
PLENARY BIOGRAPHIES

KRISTIN AVERYT

Averyt is the associate director for science at the Cooperative Institute for Research in Environmental Sciences at the University of Colorado, and the director of the NOAA-funded Western Water Assessment. Averyt received a Ph.D. in geological and environmental sciences from Stanford University. She has earned several honors, including a Fulbright Fellowship to New Zealand, and a NOAA Congressional Fellowship, during which she worked with the U.S. Senate. As the staff scientist for Working Group I of the Intergovernmental Panel on Climate Change, she was one of the many scientists who received the 2007 Nobel Peace Prize. She is a lead author for the current National Climate Assessment. Her research revolves around climate variability and change, with a particular focus on the interplay between climate mitigation and adaptation, including the energy-water nexus.

P. STEPHAN BAENZIGER

Baenziger earned degrees from Harvard and Purdue Universities. Before joining the faculty at the University of Nebraska, he worked eight years for the USDA-ARS, and three years with the Monsanto Corporation. His research focuses on improving the agronomic performance and winter hardiness of small grains and on developing new breeding methods. He has co-released 44 cultivars and 36 germplasm lines or populations. His teaching and service activities emphasize graduate education and outreach in plant breeding and genetics, as well as leadership roles in numerous scientific societies and initiatives.

JASON CLAY

Clay is the senior vice president of market transformation for the World Wildlife Fund. Clay ran a family farm, taught at Harvard and Yale, worked at the U.S. Department of Agriculture, and spent more than 25 years working with human rights and environmental organizations before joining WWF in 1999. Clay’s degrees include a Ph.D. in anthropology and international agriculture (Cornell University), a master’s in anthropology (Cornell University), and a bachelor’s in anthropology (Harvard). His areas of expertise include indigenous people, corporate social responsibility to reduce social and environmental risks, agriculture and aquaculture, impact assessments of large-scale development projects, and analysis on the impact of biofuels, agriculture and aquaculture, and animal protein consumption. In 2010, Clay appeared on the influential TED Talks, speaking about how big brands can help save biodiversity.
NATHAN ENGLE

Engle is the climate change adaptation specialist at the World Bank in Washington, D.C. He is helping lead projects on drought policy and management, climate change, and water resources in the Latin American and Caribbean regions (mainly Brazil). Engle completed his Ph.D. at the University of Michigan’s School of Natural Resources and Environment, and also earned master’s degrees at the University of Michigan in public policy and natural resources and environment. He was recently policy advisor and AAAS congressional fellow in the office of Senate Majority Leader Harry Reid and has published regularly on climate change resilience, drought preparedness, and water policy and governance.

MICHAEL FORSBERG

Forsberg is a conservation photographer and Nebraska native who has focused much of his work in North America’s Great Plains. He is the award-winning author of *On Ancient Wings – The Sandhill Cranes of North America* and *Great Plains – America’s Lingering Wild*. A documentary film based on the Great Plains book, produced by NET Television in 2012, was released to a national audience on PBS in 2013. Forsberg serves as faculty at UNL’s Institute of Agriculture and Natural Resources where is he co-founder and co-director of the Platte Basin Time Lapse Project. Forsberg is a contributing editor of *NEBRASKAland Magazine* and is a fellow with the International League of Conservation Photographers, the University of Nebraska’s Center for Great Plains Studies, and the Water for Food Institute. He owns and operates Michael Forsberg Gallery in Lincoln, Neb.

IAN FRAZIER

RONNIE GREEN

Green is the University of Nebraska Vice President and Harlan Vice Chancellor of the Institute of Agriculture and Natural Resources (IANR) at the University of Nebraska – Lincoln. IANR innovation in research, teaching, and extension education places Nebraska on the leading edge of food production, environmental stewardship, human nutrition, business development, and youth engagement. A native of southwestern Virginia, Ronnie most recently was with Pfizer Animal Health where he oversaw global technical services for animal genetics. Prior to that role, Ronnie served as the national program leader for animal production research with the USDA’s Agricultural Research Service, and on the animal science faculties of Texas Tech University and Colorado State University. He received B.S. and M.S. degrees in animal science from Virginia Tech and Colorado State University, respectively. His Ph.D. program was completed jointly at the University of Nebraska and the USDA U.S. Meat Animal Research Center in animal breeding in 1988.

MICHAEL HAYES

Hayes is currently the director for the National Drought Mitigation Center (NDMC) located within the School of Natural Resources at the University of Nebraska-Lincoln. He became the NDMC’s director in August 2007 and has worked at the NDMC since its formation in 1995. The NDMC now has 16 faculty and staff working on local, tribal, state, national, and international drought-, climate-, and water-related issues. Hayes’ main interests focus on drought risk management strategies. Hayes received his academic degrees from the University of Wisconsin-Madison and the University of Missouri-Columbia.
HARVEY HILL

Hill is the lead of the Climate Decision Support and Adaptation Unit, National Agro-Climate Information Service at Agriculture and Agri-Food Canada. His unit concentrates on linking climate information to decision-making at a wide range of scales in the agricultural sector, both temporally and spatially. His current projects include developing: a) A simulation adaptation tool known as the Invitational Drought Tournament, which allows stakeholders to consider proactive and alternative drought responses in a team game format; b) The Landscape Infrastructure and Resiliency Assessment vulnerability and adaptation cost benefit analysis tool to support disaster risk reduction from flooding on agricultural landscapes; c) Exploring how to better integrate climate with crop models to improve decision support at the farm level; d) Linking interpolated climate data to natural oscillations and decision making issues influenced by oscillations and trends; and e) An on-farm tool (CANPARTAKE) to help producers estimate their vulnerability to climate-related hazards in the context of their farming system.

MARTIN HOERLING

Hoerling is a research meteorologist, specializing in climate dynamics in NOAA’s Earth System Research Laboratory located in Boulder, Colo. He recently served as convening lead author for the Southwest U.S. Assessment Report, a contribution to the National Climate Assessment. He is currently co-editor of the Special Supplement to the Bulletin of the American Meteorological Society on Explaining Extreme Events from a Climate Perspective. Hoerling has published more than 70 scientific papers dealing with climate variability and change. In a 2013 study, he examined the question of whether a transition to semi-permanent drought conditions is imminent in the U.S. Great Plains due to human-induced climate change.

RICHARD HORNBECK

Hornbeck is the Dunwalke Associate Professor of American History in the economics department at Harvard University. His research and teaching focuses on economic history, environmental economics, and development economics. Research topics include adaptation to the environment; impacts of property rights and labor scarcity on economic development; local economic spillover impacts from agriculture and manufacturing; rigidities in urban development; and impacts of market integration on development. Hornbeck received his Ph.D. in economics from MIT in 2009, and a B.A. in economics from the University of Chicago in 2004.
ROBERTO LENTON

Lenton is the founding executive director of the Robert B. Daugherty Water for Food Institute at the University of Nebraska and professor of biological systems engineering at the University of Nebraska-Lincoln. A specialist in water resources and sustainable development with 40 years of international experience in the field, Lenton earned a civil engineering degree from the University of Buenos Aires and a Ph.D. from the Massachusetts Institute of Technology (MIT). He has served as chair of the Water Supply and Sanitation Collaborative Council and of the Technical Committee of the Global Water Partnership, and is a coauthor of *Applied Water Resources Systems*, a coeditor of *Integrated Water Resources Management in Practice*, and a lead author of the final report of the United Nations Millennium Project Task Force on Water and Sanitation, which he co-chaired. Lenton was formerly the chair of the Inspection Panel of the World Bank. Earlier, he was senior advisor at the Earth Institute at Columbia University, director of the Sustainable Energy and Environment Division of the United Nations Development Programme in New York, director general of the International Water Management Institute in Sri Lanka, and program officer in the Rural Poverty and Resources program of the Ford Foundation in New Delhi and New York.

ANNARITA MARIOTTI

Mariotti leads the NOAA Climate Program Office, Modeling, Analysis, Predictions and Projections (MAPP) Program, a mission-driven research program to advance NOAA’s capabilities to understand and predict natural variability and changes in Earth’s climate system. In this role, Mariotti has spearheaded efforts to engage and organize the scientific community on research topics of high-relevance to NOAA. These include research to advance North America’s drought monitoring and prediction capabilities in support of NIDIS, better understanding of regional long-term outlooks in support of assessments, and the development of advanced climate prediction systems such as the National Multi-Model Ensemble system. Before joining NOAA, Mariotti was a research scientist at ENEA, a research laboratory in Italy, and then at the Earth System Science Interdisciplinary Center of the University of Maryland, College Park. As a research scientist, Mariotti investigated water cycle – climate linkages in an interdisciplinary Earth system framework considering the broad range of processes and impacts relevant to the water cycle. Her studies have focused on understanding climate and water cycle variability and predictability on seasonal to centennial time-scales, and on the representation of regional climate in global models.
CHAD MCNUTT

McNutt is a member of the National Integrated Drought Information System (NIDIS) Program Office housed at NOAA’s Earth System Research Laboratory in Boulder, Colo. McNutt has been involved in working with federal, state, and local governments, as well as individuals to improve capacity for responding to drought. McNutt and other colleagues at the NIDIS Program Office have been working to draw on the personnel, accumulated experiences, and networks to develop regional drought early warning systems around the U.S. He served as a John A. Knauss Marine Policy Fellow in Washington D.C. and also as a policy advisor and executive director of NOAA’s office of the assistant secretary where he primarily worked on climate science policy related to NOAA and the U.S. Climate Change Science Program. He received a Ph.D. from the University of Houston in biology and biochemistry and a bachelor’s from Texas A&M University.

CLAUDIA NIERENBERG

Nierenberg is director of NOAA’s Climate and Societal Interactions Program. She has worked for the past 20 years in global change research, focusing on the development of research and related activities to support climate risk management. In recent years, her focus has been on adaptation, collaborative research networks, and federal coordination in adaptation science. Nierenberg holds a bachelor’s in English literature from the University of Virginia, and a master’s in international affairs from Columbia University.

ERWIN DE NYS

De Nys is a senior irrigation and water resources specialist at the World Bank in the sustainable development department of the Latin America and Caribbean Region. He obtained his master’s in water resources management from the International Centre for Higher Education in Agricultural Sciences (Montpellier, France) and his Ph.D. in irrigation management from the University of Leuven – KU Leuven, Belgium. De Nys is currently coordinating the World Bank’s portfolio in Brazil related to investment projects and analytical work in the field of water resources management, irrigation management, and adaptation to climate change. Prior to joining the World Bank in 2005, he served as food security officer for the European Commission.
THEIB OWEIS

Oweis is the director of the Integrated Water and Land Management Program of the International Center for Agricultural Research in the Dry Areas (ICARDA), Amman, Jordan. Earlier he joined the University of Jordan in Amman as an assistant professor and Dar Al Handash Consultants (Shaer and Partners) as an irrigation specialist. Oweis received M.Sc. and Ph.D. degrees in agricultural and irrigation engineering from Utah State University. He has more than 40 years of experience in research and education, development and human capacity building, and in management of water and agriculture related issues, especially in the dry environments. Oweis has published more than 200 refereed journal, books/book chapters and conference proceedings in the areas of supplemental irrigation, water harvesting, agricultural water productivity, deficit irrigation, salinity, and the management of scarce water resources.

JOHN PATERSON

Paterson serves as the Executive Director of Producer Education for the National Cattlemen’s Association. This team is part of a group focused on education and innovation in the beef industry. Specifically, educational programs are aimed at areas of animal welfare, sustainability, beef safety, increased production efficiencies, beef quality assurance, and consistently delivering a high quality product to our domestic and global consumers. Paterson received his Ph.D. in beef cattle nutrition from the University of Nebraska, and from 1979 to 1993 was on the faculty of the Animal Science Department at the University of Missouri. He was a beef extension specialist at Montana State University from 1996 to 2012. Among the numerous industry awards Paterson has received are the Pfizer Animal Health National Extension Award from the American Society of Animal Science and the Distinguished Service Award from the Western Section of the American Society of Animal Science. He was recently named a Fellow in Extension from the American Society of Animal Science and an Emeritus Professor.
MARK ROSEGRANT

Rosegrant is the director of the Environment and Production Technology Division at the International Food Policy Research Institute (IFPRI) in Washington, D.C. With a Ph.D. in public policy from the University of Michigan, he has extensive experience in research and policy analysis in agriculture and economic development, with an emphasis on water resources and other natural resource and agricultural policy issues as they impact food security, rural livelihoods, and environmental sustainability. He currently directs research on climate change, water resources, sustainable land management, genetic resources and biotechnology, and agriculture and energy. He is the author or editor of seven books and more than 100 refereed papers in agricultural economics, water resources, and food policy analysis.

CHARLES SCHROEDER

Schroeder is a native of western Nebraska ranch country and the founding executive director of the Rural Futures Institute at the University of Nebraska. Schroeder also served as president and executive director of the National Cowboy & Western Heritage Museum in Oklahoma City. Prior to that, he held other leadership positions in the public, private, and nonprofit sectors, including serving as founding CEO of the National Cattlemen’s Beef Association. Schroeder also served as executive vice president and director of development at the University of Nebraska Foundation and director of the Nebraska Department of Agriculture. Schroeder was with his family’s company, the Schroeder Cattle Company, for about 30 years, the last 10 as owner and president. Chuck is a graduate of the University of Nebraska with a degree in animal science.

MARK SVOBODA

Svoboda has been with the National Drought Mitigation Center since its formation in 1995. As the NDMC’s monitoring program area leader, his duties include overseeing the center’s operational drought monitoring activities and in providing expertise on climate and water management issues. Mark co-founded the development of the U.S. Drought Monitor in 1999 and currently sits on the American Meteorological Society’s Applied Climate Committee as well as the National Integrated Drought Information System Implementation Team. In addition, he has extensive experience working with the international drought, water, and climate community via project collaboration and consultation with more than 50 countries and international organizations. Mark earned his bachelor’s in geography specializing in climatology and a master’s in geography with a specialization in remote sensing, climatology, and GIS from the University of Nebraska-Lincoln.
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