

## MICHAEL J. HAYES

### **PERSONAL**

Work Address: University of Nebraska-Lincoln  
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### **EDUCATION**

Ph.D.	1994	University of Missouri-Columbia	Atmospheric Science
M.S.	1989	University of Missouri-Columbia	Atmospheric Science
B.S.	1986	University of Wisconsin-Madison	Meteorology

### **PRESENT POSITION**

10/2016-current, *Professor*, School of Natural Resources, University of Nebraska-Lincoln  
Current appointment: 64% research/outreach, 34% teaching, and 2% university service.  
Conduct research on drought risk management and climate-related risk and vulnerability, as well as teach courses in Applied Climate Science within the Applied Climate and Spatial Sciences Program Area of SNR.

### **EXPERIENCE AND TRAINING**

7/2011-9/2016, *Professor/Director*, National Drought Mitigation Center, Lincoln, NE  
Appointment: 30% NDMC Director, 35% service/outreach, 23% research, 10% teaching, and 2% university service. Administer the research and outreach programs of the NDMC; conduct research on the impacts of drought and assist with post-drought evaluations; develop new monitoring and impact assessment methodologies; analyze current drought plans and assist local, state, tribal, and federal officials, as well as the private sector, with drought preparedness and drought mitigation issues; and assist in the organization and conduct of workshops and conferences, as well as the preparation of technical and non-technical reports.

8/2007-6/2011, *Associate Professor/Director*, National Drought Mitigation Center, Lincoln, NE  
Appointment: 30% NDMC Director, 35% service/outreach, 23% research, 10% teaching, and 2% university service. See the description above.

4/2006-7/2007, *Research Associate Professor/Associate Director*, National Drought Mitigation Center, Lincoln, NE  
Appointment: 58% research, 40% service/outreach, and 2% university service.  
Researched new drought monitoring, impact assessment, and planning methodologies; assisted local, state, tribal, and federal officials with drought planning and mitigation; helped organize and conduct drought workshops and conferences; and prepared technical and non-technical reports.

7/2003-3/2006, *Research Associate Professor/Climate Impacts Specialist*, National Drought

Mitigation Center, Lincoln, NE  
See position description above.

7/1995-6/2003, *Research Assistant Professor/Climate Impacts Specialist*, National Drought Mitigation Center, Lincoln, NE  
See position description above.

2/1995-7/1995, *Physical Scientist*, AScI Corporation, Columbia, Missouri  
Worked with the National Biological Service in support of the Long-Term Ecological Monitoring Program within the National Park Service. Responsible for developing the protocols for monitoring the climate and weather conditions that impact the populations of two endangered prairie plant species; one in southwest Missouri and one in southwest Minnesota.

1987-1994, *Graduate Research Assistant*, Department of Atmospheric Science, University of Missouri-Columbia  
Responsible for thesis and dissertation research, and interacted with the Food and Agricultural Policy Research Institute (FAPRI) and the NOAA Climate Applications Branch, both located in Columbia, Missouri.

### **AWARDS/HONORS**

2014-2018: Robert B. Daugherty Water for Food Institute Faculty Fellow  
2015: WMO Commission on Agricultural Meteorology Expert Team on Drought  
Irv Omtvedt Innovation Award, 2013: in recognition of exceptional service at the University of Nebraska and the Institute of Agriculture and Natural Resources throughout the drought of 2012.

### **RESEARCH INTERESTS**

Drought risk management strategies and technology; natural hazards and disaster management; drought planning; impacts and vulnerability assessments; climate variability and change; extreme events; adaptation strategies; and water and related socio-economic issues.

### **PROFESSIONAL MEMBERSHIPS**

American Meteorological Society  
American Geophysical Union  
Robert B. Daugherty Water for Food Institute (Faculty Fellow)  
Center for Great Plains Studies (Fellow)

### **CURRENT GRANTS**

INFEWS/T1: Towards Resilient Food-Energy-Water Systems in Response to Drought Impacts And Socioeconomic Shocks: New Mexico. PI: H. Geli. Co-PI: M. Hayes, A. Cibils, J. Peach, and A. Fernald. NSF. \$1,547,959. 9/1/2017 to 8/31/2020.

Improving Water Management, Agricultural Production and Food Security in Drought-Prone Areas. PI: C. M. U. Neale. Co-I: R. Kaur, T. Clemente, M. J. Hayes, D. M. Heeren, M. D.

Svoboda, T. Tadesse, and H. Walia. Indo-U.S. 21st Century Knowledge Initiative. \$171,000. 7/1/2016 to 6/30/2019.

Enhancing Drought Early Warning Capabilities for Agricultural and Tribal Stakeholders in the Missouri River Basin Using Fast Response Drought Indicators. PI. T. Haigh. Co-I: M. Hayes and T. Mucia. NOAA. \$34,607. 7/1/2016 to 6/30/2018.

Development of the MENA Regional Drought Management System. PI: M. Hayes. I: M. Svoboda, C. Neale, B. Wardlow, D. Wilhite and C. Knutson. International Center for Biosaline Agriculture. \$1,025,440. 1/1/2016 to 3/31/2018.

Providing Drought Information Services for the Nation: The National Drought Mitigation Center. PI: M. Hayes. Co-PI: M. Svoboda, C. Knutson, T. Tadesse, D. Bathke, and B. Fuchs. NOAA/SARP, \$2,400,000. 6/1/2015 to 5/31/2018.

Seasonal Prediction of Hydro-Climatic Extremes in the Greater Horn of Africa under Evolving Climate Conditions to Support Adaptation Strategies. PI: T. Tadesse. Co-Is: B. Zaitchik, S. Habib, Chris Funk, G. Senay, T. Dinku, F. Policelli, P. Block, G. Baigorria, S. Beyene, B. Wardlow, and M. Hayes. NASA. \$1,625,032. 01/01/2014 - 2/31/2018.

### **RECENT GRANTS**

Drought Information Services. PI: M. Hayes. I: M. Svoboda and B. Fuchs. USDA-Office of the Chief Economist, \$839,442. 9/30/2015 to 1/29/2017.

Drought Risk Management for the U.S. PI: M. Hayes. Co-PIs: M. Svoboda, C. Knutson, B. Fuchs, T. Tadesse, and D. Bathke. University of Oklahoma, \$693,696. 9/1/2014 to 8/31/2017.

Platte River-High Plains Aquifer LTAR. PIs: T. Awada and B. Wienhold. Co-PIs: T. Arkebauer, R. Ferguson, M. Hayes, M. Shulski, A. Suyker, B. Wardlow, B. Woodbury. Collaborators: G. Baigorria, D. Adams, D. Billesbach, X.-H. Chen, G. Erickson, G. Hergert, S. Irmak, V. Jin, A. Kilic, M. Kuzila, D. Martin, G. Varvel, E. Walter-Shea, W. Schacht, D. Wedin, and A. Zygielbaum. USDA-ARS-Long-term Agroecosystem Research (LTAR) Network, \$0.00. 2/1/2014 to 1/31/2017.

The Quick Drought Response Index (QuickDRI): an Integrated Approach to Maximizing the Use of NASA Data Sets for Rapid Response Drought Monitoring. B. Wardlow, M. Svoboda, M. Hayes (Co-I), T. Tadesse, M. Anderson, M. Rodell, D. Mocko, J. Brown, C. McNutt, M. Brewer, and C. Hain. NASA. \$1,150,701. 8/14/2012 to 8/13/2017.

Drought Monitoring for MENA. PI: M. Hayes. I: M. Svoboda, B. Fuchs, T. Tadesse, and K. Smith. Development Alternatives Inc., \$40,052. 2/11/2015 to 1/29/2016.

Drought Monitoring System for Austrian Agriculture. PI: J. Eitzinger. Co-PIs: S. Thaler, J. Schaumberger, W. Loiskandl, P. Macaigne, G. Bodner, A. Schaumberger, E. Murer, C. Wittman, A. Kann, B. Bica, F. Weidle, M. Trnka, P. Hlavinka, J. Balek, D. Semeradova, Z. Zalud, and M. Hayes. Austrian Climate Research Program, \$394,990. 6/1/13 to 5/31/16.

Drought Early Warning and Policy in the Eastern Caribbean. PI: B. Fuchs. Co-I: M. Hayes, C. Knutson, M. Svoboda, and T. Tadesse. Organization of Eastern Caribbean States. \$49,227. 1/22/2016 to 5/20/2016.

Center for Agricultural and Food Industrial Organization—Policy Research Group (CAFIO-PRG). PI: K. Giannakas. Co-Is: J. Anderson, M. Burbach, P. Calow, L. Fulginiti, M. Hayes, B. Lubben, G. Lynne, R. Perrin, K. Schoengold, E. Thompson, and A. Yiannaka. US Department of Agriculture-NIFA, \$766,166. 4/15/12 to 4/14/16.

Improving U.S. Drought Monitoring. PI: M. Hayes. Co-PIs: M. Svoboda, B. Fuchs, and T. Tadesse. USDA-OCE, \$150,000. 10/31/2014 to 1/31/2016.

Improving U.S. Drought Monitoring – Integrating Soil Moisture Data and Developing a Drought Blends Portal. PI: M. Hayes. Co-PIs: M. Svoboda and B. Fuchs. USDA-OCE, \$240,000. 7/16/2014 to 1/15/2016.

Drought Information Services in Support of the National Integrated Drought Information System. PI: M. Hayes. Co-PIs: M. Svoboda, C. Knutson, B. Fuchs, T. Tadesse, and D. Bathke. NOAA-NIDIS. \$739,803. 10/1/2013 to 9/30/2015.

SBES Medium: Investigating the Role of Distrust in Unauthorized Online Activities Using an Integrated Sociotechnical Approach. PI: L. Pytlik-Zillig. Co-Is: M. Hayes, A. Samal, L.-K. Soh, and A. Tomkins. NSF. \$490,758. 9/1/12 to 8/31/15.

Enhancing Decision Support for Drought Risk in the United States: the Drought Risk Atlas. M. Svoboda, M. Hayes (co-PI), B. Fuchs, M. Shulski, M. Timofeyeva, and M. Brewer. NOAA-OAR-CPO. \$273,822. 8/1/2012 to 7/31/2015.

Drinking Water Utilities. PI: C. Knutson. Co-PIs: M. Svoboda and M. Hayes. Cadmus Group Inc., \$17,072. 9/25/2014 to 6/15/2015.

Climate Masters of Nebraska Revised. PI: M. Hayes. Co-PIs: T. Bernadt, T. Pathak, and N. Umphlett. Nebraska Department of Environmental Quality, \$31,847. 1/1/2014 to 6/30/2015.

Regional Climate Services Support in the High Plains Region. PI: B. Fuchs. Co-PIs: M. Svoboda and M. Hayes. NOAA, \$265,000. 10/1/2013 to 3/31/2015.

NDMC Drought Information Services for Agriculture. PI: M. Hayes. Co-PIs: M. Svoboda and B. Fuchs. U.S. Department of Agriculture. \$200,000. 9/28/2013 to 2/28/2015.

Technical Assistance on Drought Preparedness. PI: M. Hayes. Co-PIs: M. Svoboda, C. Knutson, B. Fuchs, and K. Smith. The World Bank. \$70,000. 10/3/2013 to 6/30/2015.

Implications of Climate Change in Nebraska. Co-PIs: D. Wilhite and M. Shulski. Co-Is: C. Rowe, R. Oglesby, and M. Hayes. IANR, \$20,000. 12/1/2013 to 10/1/2014.

Drought in the Great Plains Symposium. Co-PIs: D. Wilhite and M. Hayes. IANR and Daugherty Water for Food Institute. \$50,000. 7/1/2012 to 6/30/2014.

Transition of an Interactive Drought Management Database for the Identification and Comparison of Drought Mitigation and Response Strategies. C. Knutson, M. Hayes (Investigator), K. Smith, M. Widhalm, J. Nothwehr, and T. Haigh. NOAA Climate Program Office. \$209,685. 9/1/2011 to 8/31/2013.

Forty-first Parallel Agro-Ecosystem Sustainability and Productivity. L. Fulginiti, T. Powers, D. Walters, S. Verma, K. Cassman, R. Perrin, T. Awada, F. E. Harvey, A. Liska, B. Oglesby, and M. Hayes (co-PI). IANR. \$373,720. 7/1/2010 to 6/30/2013.

The Support of a Global Drought Information System Workshop. PI: M. Hayes. NASA, \$29,343. 5/7/12 to 5/6/13.

Regional Climate Service Support in the High Plains Region. M. Shulski, M. Svoboda, M. Hayes, and D. Bathke. NOAA. \$830,000. 9/1/2011 to 3/31/2013.

The Role of Science in the Policy Process: Responding to Drought in Australia and the USA. L. Botterill, D. Wilhite, and M. Hayes (Investigator). The Australian National University. \$62,000. 10/26/2009 to 10/25/2012.

Drought Mitigation, Nebraska. M. Hayes (PI), M. Svoboda, C. Knutson, and B. Wardlow. USDA-CSREES. \$558,401. 8/1/2010 to 7/31/2012.

NIDIS Portal Content Development and Help Desk Support. M. Svoboda and M. Hayes (co-PI). NOAA. \$162,221. 8/15/2009 to 8/14/2012.

Development of a Pilot Drought Information System for National Drought Disaster Reduction. J. Ryu and M. Hayes (Co-PI). Kongju National University in Korea. \$70,000. 10/1/2008 to 12/31/2011.

Hawaii Drought Plan. M. Hayes (Co-PI), M. Svoboda, Y. Ding, K. Smith, S. Scott, and M. Widhalm. Commission on Water Resource Management, State of Hawaii. \$100,000. 6/23/2008 to 6/30/2012.

Drought Mitigation, Nebraska. M. Hayes (PI), M. Svoboda, C. Knutson, and B. Wardlow. USDA-CSREES. \$437,243. 8/1/2009 to 7/31/2011.

Transitioning the Drought Impact Reporter into an Operational System. PI: M. Hayes. Co-PIs: D. Wilhite, M. Svoboda, G. Garfin, C. Knutson, D. Wood, and M. Higgins. NOAA's Transition of Research Applications to Climate Services Program. \$453,523. 8/1/2007 to 7/31/2011.

Estimating the Impacts of Complex Climatic Events: the Economic Costs of Drought in Colorado, Nebraska, and New Mexico. Co-PIs: D. Wilhite, R. Pulwarty, M. Hayes, R. Supalla,

and C. Howe. NOAA Climate Program Office. \$328,971. 8/1/2006 to 7/31/2011.

Drought Mitigation, Nebraska. M. Hayes (PI), M. Svoboda, C. Knutson, and B. Wardlow. USDA-CSREES. \$347,246. 7/15/2008 to 7/14/2011.

Colorado Drought Planning Assistance. M. Hayes (PI), C. Knutson, D. Bathke, and M. Widhalm. Colorado Water Conservation Board. \$12,000. 11/1/2009 to 9/30/2010.

Rangeland and Forage Geospatial Decision Support System for Drought Risk Management. Co-PIs: D.A. Wilhite, K. Hubbard, M. Svoboda, T. Tadesse, J. Brown, M. Hayes, C. Knutson, J. Volesky, and M. Tooze. USDA/RMA. \$1,023,038. 10/1/2005 to 9/30/2010.

Drought Risk, Impact, and Mitigation Information System. Co-PIs: S. Goddard and D. Wilhite. Collaborators: M. Hayes, M. Svoboda, T. Tadesse, C. Knutson, K. Schoengold, and K. Hubbard. USDA/RMA. \$6,407,472. 9/1/2005 to 8/31/2010.

Low Flow Impact Study for the Upper Colorado. M. Hayes (Co-PI), M. Svoboda, C. Knutson, and D. Woudenberg. NOAA. \$87,000. 10/01/2008 to 3/1/2010.

Low Flow Project in the Alabama, Coosa, and Tallapoosa (ACT) River Basins, and the Appalachian, Chattahoochee, and Flint (ACF) River Basins. M. Hayes (Co-PI), M. Svoboda, C. Knutson, D. Woudenberg, M. Widhalm. NWS Southern Region Headquarters. \$24,999. 9/15/2008 to 9/14/2010.

An Assessment of Decadal Drought Information Needs of Stakeholders and Policymakers in the Missouri River Basin for Decision Support. V. Mehta, N. Rosenberg, M. J. Hayes (Co-PI), C. L. Knutson and J. R. Olsen. NOAA. \$294,111. 5/1/2008 to 4/30/2010.

Developing a Drought Preparedness Framework for Tribal Governments: Moving From Crisis to Risk-Based Management. M. J. Hayes (PI), C. L. Knutson and M. D. Svoboda. United States Bureau of Indian Affairs. \$160,000. 10/19/2007 to 10/18/2008.

An Assessment of the Hydrologic Vulnerability of the Missouri River Basin to Climate Variability at Interannual to Decadal Timescales. PIs: V. Mehta and N. Rosenberg. Collaborators: M. Hayes and C. Knutson. Advisor: D. Wilhite. NOAA-OGP. \$300,000. 10/1/2005 – 9/30/2008.

Climate and Soil Risk Information System. Co-PIs: S. Goddard and D. Wilhite. Collaborators: M. Hayes, M. Svoboda, and C. Knutson. USDA/RMA. \$1,212,055. 6/1/2005 to 5/31/2008.

Engaging Agricultural Communities in the Great Plains of the U.S. with the Application and Development of Climate Prediction and Information. PI: Steven Hu. Co-PIs: Gary Lynne, William Waltman, D.A. Wilhite, K.G. Hubbard, M.J. Hayes. NOAA Office of Global Programs. \$432,916. 5/1/02 to 7/31/06.

Sustainable Adaptation to Drought and Climate Variability in Agricultural Production Systems

Across Nebraska. Co-PIs: M. Hayes, C. Knutson, R. Hitchcock, W. Waltman, J. Peake, and M. Kleinschmit. NOAA Office of Global Programs. \$107,909. 7/1/04 to 6/30/06.

Mitigating the Economic Risk of Stock Reduction During Drought: an Adoption Support Tool for Cattle Producers. Co-PIs: T. Buman and R. Buman. Collaborators: J. Ridgely, S. Buman, P. Mitchell, J. Hatfield, C. Knutson, and M. Hayes. USDA/RMA, \$576,136. 9/1/03 to 8/30/06.

National Drought Impacts Tool. Co-PIs: D.A. Wilhite and M.J. Hayes. Office of Global Programs/NOAA. \$24,380. 10/1/04 to 9/30/05.

Risk Assessment and Exposure Analysis on the Agricultural Landscape: A Holistic Approach to Spatio-Temporal Models and Tools for Agricultural Risk Assessment and Exposure Analysis. PIs: S. Goddard, D.A. Wilhite, J. Deogun, M. Hayes, K. Hubbard, H. Jose, S. Reichenbach, W. Waltman, and M. Svoboda. USDA Risk Management Agency, \$1,086,623. 10/1/02 to 3/31/05.

Improving Drought Monitoring through the Integration of Climate and Satellite-Based Data. Co-PIs: D.A. Wilhite, K.G. Hubbard, and M.J. Hayes. USGS, \$241,000. 7/1/02 to 6/30/05.

Improved Hydrologic Data Collection Systems for Drought Monitoring. Co-PIs: D.A. Wilhite, K.G. Hubbard, M.J. Hayes, and M.D. Svoboda. Nebraska Dept. of Natural Resources/Bureau of Reclamation. \$25,000. 2005.

Drought Risks and Mitigation on the Agricultural Landscape: A Series of Risk Analysis, Management, and Mitigation Workshops for Nebraska Farmers and Ranchers. PI: D.A. Wilhite. Co-PIs: M.J. Hayes, H.D. Jose, W.J. Waltman, K.G. Hubbard, Q.S. Hu, and M.D. Svoboda. USDA Risk Management Agency, \$95,198. 10/1/02 to 9/30/04.

Digital Government: A Decision Support System for Drought Risk Management. Co-PIs: S. Reichenbach, S. Goddard, W. Waltman, J. Deogun, D. Wilhite, P. Revesz, K. Hubbard, and M. Hayes. National Science Foundation, \$1,103,643. 5/1/01 to 4/30/04.

### **PENDING GRANTS**

Anticipating Social Unrest Using Integrated Model- and Data-Driver Approaches: the Impact of Socio-Demographic and Environmental Factors in Post-Colonial Nations. PI: L.-K. Soh. Co-PI: R. Werum and A. Samal. Senior Personnel: M. Hayes and L. Fulginiti. Citadel University. \$1,429,620. 1/1/2018 to 12/31/2022.

### **RECENT PUBLICATIONS (2001-Current)**

#### **Journal Articles**

Gim, H.-J., C.-H. Ho, S.-J. Jeong, S. Feng, J. Kim, and M. J. Hayes, 2018. The risk of autumn frost damage to corn in the Midwestern United States according to sowing dates and growing season temperatures. Submitted to *Agricultural and Forest Meteorology*.

Haigh, T. R., W. Schacht, C. L. Knutson, A. Smart, J. Volesky, C. Allen, M. Hayes, and M. Burbach, 2018. Operationalizing drought preparedness for rangeland managers. Submitted to *Rangeland Ecology and Management*.

Holley E. R., C. G. Walters, G. C. Friesen, M. J. Hayes, M. J. Rudolph, D. A. Wilhite, and A. J. Liska, 2018. Climate change feedbacks via insurance: incentives for adaptation. Submitted to *Climatic Change*.

Jedd, T., D. Bhattacharya, C. Pesek, and M. Hayes, 2018. "Making do" with little: an assessment of drought impacts and management in prairie and Sandhills state parks. Submitted to *Environmental Management*.

McEvoy, J., D. Bathke, N. Burkardt, A. E. Cravens, T. Haigh, K. R. Hall, M. J. Hayes, T. Jedd, M. Poděbradská, and E. Wickham, 2018. Ecological drought: Accounting for the non-human impacts of water shortage in the Upper Missouri Headwaters Basin, Montana, USA. Submitted to *Resources*.

Crausbay, S., A. Ramirez, S. Carter, M. Cross, K. Hall, D. Bathke, J. Betancourt, S. Colt, A. Cravens, M. Dalton, J. Dunham, L. Hay, M. Hayes, J. McEvoy, C. McNutt, M. Moritz, K. Nislow, N. Raheem, T. Sanford, 2017. Defining ecological drought for the 21<sup>st</sup> century. *Bulletin of the American Meteorological Society*. <http://journals.ametsoc.org/doi/abs/10.1175/BAMS-D-16-0292.1>

Feng, S., M. Trnka, M. Hayes, and Y. Zhang, 2017. Why do different drought indices show distinct future drought risk outcomes in the U.S. Great Plains? *Journal of Climate*, 30: 265-278. <http://journals.ametsoc.org/doi/pdf/10.1175/JCLI-D-15-0590.1>

Jedd, T. R., M. J. Hayes, C. M. Carrillo, T. Haigh, C. J. Chizinski, and J. Swigart, 2017. Measuring park visitation vulnerability to climate extremes in U.S. Rockies National Parks tourism. *Tourism Geographies*. <http://dx.doi.org/10.1080/14616688.2017.1377283>

Nam, W.-H., E.-M. Hong, J.-Y. Choi, T. Kim, M. J. Hayes, and M. D. Svoboda, 2017. Assessment of the extreme 2014-2015 drought events in North Korea using weekly Standardized Precipitation Evapotranspiration Index (SPEI), 59(4): 65-74. <https://doi.org/10.5389/KSAE.2017.59.4.065>

Nam, W.-H., T. Tadesse, B. Wardlow, M. Hayes, M. Svoboda, E. Hong, Y. Pachepsky, and M.-W. Jang, 2017. Developing the Vegetation Drought Response Index for South Korea (VegDRI-SKorea) to assess the vegetation condition during drought events. *International Journal of Remote Sensing*, 39(5): 1548-1574.

Stiles, C. and M. Hayes, 2017. Recommendations for collaborative drought management in transboundary river basins. *Water Resources Impact*, 19(3): 17-19.

Brown, J., D. Kluck, C. McNutt, and M. Hayes, 2016. A socioecological approach to drought. *Rangelands*, 38(4): 162-168. <http://dx.doi.org/10.1016/j.rala.2016.06.007>

Choi, Y-S., H-J. Gim, C-H. Ho, S-J. Jeong, S. K. Park, and M. Hayes, 2016. Climatic influence on corn sowing date in the Midwestern United States. *International Journal of Climatology*, 1-8.



DOI: 10.1002/joc.4799

Finnessey, T., M. Hayes, J. Lukas, M. Svoboda, 2016. Using Climate Information for Drought Planning. *Climate Research*, 70: 251-263. <http://dx.doi.org/10.3354/cr01406>

Zeng, L., B. D. Wardlow, R. Wang, J. Shan, T. Tadesse, M. J. Hayes, and D. Li, 2016. A hybrid approach for detecting corn and soybean phenology with time-series MODIS data. *Remote Sensing of Environment*, 181: 237-250. <http://dx.doi.org/10.1016/j.rse.2016.03.039>

Büntgen, U., W. Tegel, M. Carrer, P. J. Krusic, M. Hayes, J. Esper, 2015. Commentary to Wetter et al. (2014): Limited tree-ring evidence for a 1540 European 'Megadrought'. *Climatic Change* 131(2): 183-190. DOI: 10.1007/s10584-015-1423-1.

Gustafson, D., M. Hayes, E. Janssen, D. Lobell, S. Long, G. Nelson, H. Pakrasi, P. Raven, G. P. Robertson, R. Robertson, and D. Wuebbles, 2015. Pharaoh's Dream Revisited: An Integrated U.S. Midwest Field Research Network for Climate Adaptation. *BioScience*, 66(1): 80-85. DOI: 10.1093/biosci/biv164.

Nam, W.-H., M. J. Hayes, M. D. Svoboda, T. Tadesse, and D. A. Wilhite, 2015. Drought Hazard Assessment in the Context of Climate Change for South Korea. *Agricultural Water Management*, 160: 106-117. DOI: 10.1016/j.agwat.2015.06.029.

Nam, W.-H., M. Hayes, D. Wilhite, and M. Svoboda, 2015. Projection of Temporal Trends on Drought Characteristics using the Standardized Precipitation Evapotranspiration (SPEI) Index in South Korea. *Journal of the Korean Society of Agricultural Engineers*. 57(1): 37-45. (Korean)

Nam, W.-H., T. Kim, E.-M. Hong, M. Hayes, and M. Svoboda, 2015. Water Supply Risk Assessment of Agricultural Reservoirs using Irrigation Vulnerability Model and Cluster Analysis. *Journal of the Korean Society of Agricultural Engineers*. 57(1): 59-67. (Korean)

Tadesse, T., B. D. Wardlow, J. Brown, M. Svoboda, M. Hayes, B. Fuchs, and D. Gutzmer. 2015. Assessing the Vegetation Condition Impacts of the 2011 Drought Across the U.S. Southern Great Plains Using the Vegetation Drought Response Index (VegDRI). *Journal of Applied Meteorology and Climatology*, 54(1), 153-169.

Trnka, M., R. Brazdil, M. Mozny, P. Stepanek, P. Dobrovolný, P. Zahradnicek, J. Balek, D. Semerádová, M. Dubrovsky, P. Hlavinka, J. Eitzinger, B. Wardlow, M. Svoboda, M. Hayes, Z. Zalud, 2015. Soil moisture trends in the Czech Republic between 1961 and 2012. *International Journal of Climatology*, 35(13): 3721-4056. DOI: 10.1002/joc.4242.

Vido, J., T. Tadesse, Z. Šustek, R. Kandřík, M. Hanzelová, J. Škvarenina, J. Škvareninová, and M. Hayes, 2015. Drought occurrence in central European mountainous region (Tatra National Park, Slovakia) within the period 1961-2010. *Advances in Meteorology*, 2015. DOI: 10.1155/2015/248728.

You, J., K. G. Hubbard, M. Shulski, M. Svoboda, M. Hayes, 2015. Development of a Long-Term (1884-2006) Serially Complete Dataset of U.S. Temperatures and Precipitation for Climate Services. *Journal Service Climatology*, 8(1): [https://www.stateclimate.org/sites/default/files/upload/pdf/journal-articles/2015\\_You\\_et\\_al\\_2015.pdf](https://www.stateclimate.org/sites/default/files/upload/pdf/journal-articles/2015_You_et_al_2015.pdf).

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Dubrovsky, M., M. Trnka, M. Hayes, M. Svoboda, D. Semeradova, L. Metelka, and P. Hlavinka. 2008. Performance of an interpolated stochastic weather generator in Czechia and Nebraska. American Geophysical Union Annual Meetings, San Francisco, CA, December.

Svoboda, M., K. Smith, M. Sittler, S. Scott, J. Li, M. Hayes, D. Wood, D. Gutzmer, and M. Melvin. 2008. Drought impact reporting in the United States: giving the Drought Impact Reporter a face lift. *American Meteorological Society. Proceedings of the 17<sup>th</sup> Conference on Applied Climatology*, Whistler, British Columbia, Canada, August.

Trnka, M., M. Svoboda, M. Hayes, P. Hlavinka, M. Dubrovsky, D. Semeradova, and E. Hunt, 2008. Projections of soil climate during the 21st Century over the United States High Plains region with a focus on Nebraska. American Geophysical Union Annual Meetings, San Francisco, CA, December.

Dubrovsky, M., M. Svoboda, M. Trnka, M. Hayes, D. Wilhite, and Z. Zalud. 2007. Multi-GCM projections of global drought conditions with the use of the Palmer Drought Indices. American Geophysical Union Annual Meetings, San Francisco, CA, December.

Hayes, M., M. Trnka, M. Svoboda, P. Hlavinka, J. Balek, M. Dubrovsky, D. Wilhite, E. Pokorny, L. Bartosova, and J. Eitzinger. 2007. Understanding regional climate change consequences through the changes in soil moisture regimes. American Geophysical Union Annual Meetings, San Francisco, CA, December.

Higgins, M., M. Hayes, M. Svoboda, D. Wilhite, and D. Wood. 2006. The Drought Impact Reporter: A web-based national drought impacts reporting tool. *AWRA Spring Specialty Conference*, Houston, TX, May 8-10, 2006.

Trnka, M., M. Dubrovsky, D. Semeradova, Z. Zalud, M. Svoboda, M. Hayes, and D. Wilhite. 2006. Assessment of regional drought climatology: the Czech Republic as a case study. *Proceedings of the European Geophysical Union*. Vienna, Austria, April 1.

Brown, J., T. Tadesse, and M. Hayes. 2005. The Role of Remote Sensing in Improving Drought Decision Support. *Proceedings of the Pecora Conference*, Sioux Falls, SD, October 25.

Hayes, M., M. Dubrovsky, M. Trnka, M. Svoboda, D. Wilhite, Z. Zalud, and D. Semeradova. 2005. Application of Drought Indices for the Changed Climate. *Proceedings of the American Geophysical Union*, San Francisco, CA, December 7.

Hayes, M. M. Svoboda, M. Higgins, D. Wilhite, and D. Wood. 2005. The Drought Impact Reporter: A Web-based Drought Impacts Reporting Tool. *Proceedings of the American Geophysical Union*, San Francisco, CA, December 7.

Dubrovsky, M., M. Trnka, M. Svoboda, M. Hayes, D. Wilhite, Z. Zalud, and D. Semeradova. 2005. Drought Conditions in the Czech Republic in Present and Changed Climate. Proceedings of the European Geophysical Union, Vienna, Austria, June 15.

Dubrovsky, M., M. Trnka, M. Svoboda, M. Hayes, D. Wilhite, Z. Zalud, and D. Semeradova. 2005. Application of Three Drought Indices to Assess Impact of Climate Change on Drought Conditions. Proceedings of the European Meteorological Society, Utrecht, Netherlands, September 15.

Svoboda, M. and M. Hayes. 2005. A Web-based National Drought Impacts Reporting Tool. Proceedings of the 15<sup>th</sup> Conference on Applied Climatology, Savannah, GA, June 14.

Trnka, M., Z. Zalud, D. Semeradova, M. Dubrovsky, M. Svoboda, M. Hayes, D. Wilhite, and M. Mozny. 2005. Drought Occurrence Under Present and Future Climate. Proceedings of the Water and Plants: Challenges for Improved Production Conference, Stuttgart, Germany, September 27-29, p. 215-216.

Wilhite D. and M. Hayes. 2005. Drought Management: Moving from Crisis to Risk Management. Proceedings of the Rocky Mountain Mineral Law Foundation, Portland, OR, July 23.

Zalud, Z., M. Trnka, M. Dubrovsky, M. Svoboda, M. Hayes, M. Mozny, D. Semeradova, and P. Hlavinka. 2005. Methodology for Assessment of Drought Episodes Under Present and Expected Climate Conditions. Proceedings of the 15<sup>th</sup> Czech Bioclimatological Conference, Kotiny-Brno, Czech Republic, September 12-14, p. 91.

Hayes, M. J., M. D. Svoboda, C. L. Knutson, and D. A. Wilhite. 2004. Estimating the Economic Impacts of Drought. Proceedings of the 14<sup>th</sup> Conference on Applied Climatology, Seattle, WA, January 11-15.

Svoboda, M. D., M. J. Hayes, D. A. Wilhite, and T. Tadesse. 2004. Recent Advances in Drought Monitoring. Proceedings of the 14<sup>th</sup> Conference on Applied Climatology, Seattle, WA, January 11-15.

Svoboda, M. D. and M. J. Hayes. 2004. Drought Assessment: The U.S. Drought Monitor and Beyond. Proceedings of the International Conference on Drought and Drought Monitoring in Agriculture, Vienna, Austria, June 7.

Tadesse, T., J. F. Brown, and M. J. Hayes. 2003. Assessing and Monitoring Drought with Climate, Satellite, and Other Geophysical Data Sets Using Data Mining Techniques. Proceedings of the 30<sup>th</sup> International Symposium on Remote Sensing of Environment, Honolulu, HI, November 10-14.

Tadesse, T., J. F. Brown, and M. J. Hayes. 2003. Modeling Drought with Climate, Satellite, and Other Land Data Sets Using Data Mining Techniques. Proceedings of the 7<sup>th</sup> World Multi-Conference on Systemics, Cybernetics, and Informatics, Orlando, FL, July 27-30, p. 198-201.

Waltman, W. J., S. Goddard, S. E. Reichenbach, M. D. Svoboda, M. J. Hayes, and J. S. Peake. 2003. Patterns and Trends of Soil Climate Regimes and Drought Events in the Northern Great Plains. Papers of the Applied Geography Conferences, 26: 333-342.

Hayes, M. 2002. Public Health Impacts of Drought. Proceedings of the 16<sup>th</sup> International Conference on Biometeorology, Kansas City, MO, October 28-November 1, 2002.

Hayes, M. and M. Svoboda. 2002. Determining Drought Severity and Extent: the U. S. National Drought Monitor. Proceedings of the 16<sup>th</sup> International Conference on Biometeorology, Kansas City, MO, October 28-November 1, 2002.

Hayes, M., M. Svoboda, W. Waltman, S. Goddard, and K. Hubbard. 2002. Monitoring Droughts with Improved Resolution. Proceedings of the 13<sup>th</sup> Conference on Applied Climatology, Portland, OR, May 13-16, 2002, p. 207-208.

Svoboda, M., M. Hayes, and R. Tinker. 2002. Three Years and Counting: What's New with the Drought Monitor? Proceedings of the 13<sup>th</sup> Conference on Applied Climatology, Portland, OR, May 13-16, 2002, p. 223-226.

Tadesse, T., M. Hayes, D. Wilhite, and S. Harms. 2002. Data Mining and Knowledge Discovery of Drought in Nebraska. Proceedings of the 16<sup>th</sup> International Conference on Biometeorology, Kansas City, MO, October 28-November 1, 2002.

Hayes, M. 2001. Equipping Your Personal Drought Monitoring Tool Box. Proceedings of the American Society of Civil Engineers Conference, Houston, TX, October 11-13, 2001.

### **STATION PROJECTS**

M. Shulski, M. Hayes, and D. Wilhite. Development of a Climate Impact Reporter for the U.S. Great Plains. 2013-2018. NEB 38-097.

D. Wilhite and M. Hayes. Drought Management: Mitigation, Planning, and Policy Options. 2007-2012. NEB-38-054.

D. Wilhite and M. Hayes. Drought: Response and Policy Implications. 2001-2006. NEB-27-007.

### **PRESENTATIONS**

#### 2017

11 "invited" presentations  
1 volunteer presentation

#### 2016

19 "invited" presentations

#### 2015

18 "invited" presentations

8 volunteer presentations

2014

17 “invited” presentations

3 volunteer presentations

2013

32 “invited” presentations

2012

21 “invited” presentations

2011

19 “invited” presentations

3 conference poster presentations

2010

19 “invited” presentations

2 volunteer presentations

1 conference poster presentation

2009

14 “invited” presentations

1 volunteer presentation

2008

16 “invited” presentations

3 NDMC-organized workshop presentations

2 volunteer presentations

1 conference poster presentation

2007

12 “invited” presentations

2 drought workshop presentations (organized by the Mni Sose Intertribal Water Rights Coalition)

2006

11 “invited” presentations

12 NDMC-organized workshop presentations

4 conference poster presentations

2005

16 “invited” presentations

4 NDMC-organized workshop presentations

2 conference oral presentations

2004

12 “invited” presentations  
4 NDMC-organized workshop presentations  
2 conference oral presentations

**NDMC-ORGANIZED WORKSHOPS (NATIONAL)\***

2011

Chicago, IL: June 8-9

2010

Lincoln, NE: November 15-16

2009

Kansas City, MO: April 27-28

Helena, MT: June 24-25

Austin, TX: October 7-8

Lincoln, NE: December 8-11

2008

Kansas City, MO: June 18-19

Maui, HI: June 24

Hawaii, HI: June 26

Lincoln, NE: October 20-24

2007

Rapid City, SD: April 11

Portland, OR: October 10-11

2006

El Reno, OK: March 8-9

DeKalb, IL: March 13-14

Roswell, NM: May 23

North Platte, NE: June 5

Chadron, NE: June 6

2005

Billings, MT: February 22-23

Kansas City, MO: March 24

Washington, D.C.: March 28

2004

Flagstaff, AZ: June 29-30

\*Includes my involvement with organization and participation

**INTERNATIONAL PROGRAM ACTIVITIES**

Drought Planning/Policy Workshops

Dubai, United Arab Emirates, 5/17



Basseterre, St. Kitts and Nevis, 5/17  
St. John's, Antigua and Barbuda, 5/17  
St. George's, Grenada, 3/17  
Castries, Saint Lucia, 3/17  
Dresden, Germany, 11/16\*  
Basseterre, St. Kitts and Nevis, 3/16\*  
St. Johns, Antigua and Barbuda, 2/16\*  
Castries, Saint Lucia, 1/16\*  
Budapest, Hungary, 9/97  
Cuernavaca, Mexico, 10/98\*  
Recife, Brazil, 12/98  
Fortaleza, Brazil, 12/98  
Budapest-Felsögöd, Hungary, 4/00  
Culiacán, Mexico, 5/00\*  
Rabat, Morocco, 2/01  
Prague, Czech Republic, 5/03  
Vienna, Austria, 6/04  
Bamako, Mali, 9/09\*

\*Workshops organized by the NDMC

#### Visiting Scientists

Since the beginning of 2009, the NDMC and I have helped host visiting scientists for extended stays from Japan, Korea, China, India, Ethiopia, Australia, Slovakia, Czech Republic, Spain, and the Netherlands.

#### International Travel

- 2017. **Ethiopia.** Participated in a workshop and meetings held in Addis Ababa for the project titled NASA IDS: Seasonal Prediction of Hydro-Climatic Extremes for the GHA.
- 2017. **United Arab Emirates.** Worked with the International Centre for Biosaline Agriculture (ICBA) to organize and conduct a drought vulnerability assessment workshop in June.
- 2017. **St. Kitts and Nevis.** Worked with the Caribbean Institute of Meteorology and Hydrology to organize and conduct a drought policy workshop in May.
- 2017. **Antigua and Barbuda.** Worked with the Caribbean Institute of Meteorology and Hydrology to organize and conduct a drought policy workshop in May.
- 2017. **Grenada.** Worked with the Caribbean Institute of Meteorology and Hydrology to organize and conduct a drought policy workshop in March.
- 2017. **Saint Lucia.** Worked with the Caribbean Institute of Meteorology and Hydrology to organize and conduct a drought policy workshop in March.
- 2016. **Brazil.** Invited to participate in a workshop on the Assessment of the 2010-2016 Drought in the Brazilian Semiarid Region held in Fortaleza, and provided assistance on the Monitor de Secas do Nordeste (the Drought Monitor product for Northeast Brazil).
- 2016. **Germany.** Worked with the German Weather Service to organize and conduct a drought workshop for central Europe in Dresden in November.
- 2016. **Tunisia.** Worked with the International Centre for Biosaline Agriculture to organize and conduct stakeholder engagement meetings in Tunis in October.
- 2016. **St. Kitts and Nevis.** Worked with the Caribbean Institute of Meteorology and Hydrology

- to organize and conduct a drought policy workshop in March.
2016. **Saint Lucia.** Worked with the Caribbean Institute of Meteorology and Hydrology to organize and conduct a drought policy workshop in January.
2015. **Austria.** Participated within the AgroDroughtAustria project workshop in November.
2015. **Switzerland.** Participated as a member in the Advisory Committee for the Integrated Drought Management Programme in September.
2015. **Czech Republic.** Visiting scientist at Mendel University in Brno in February, June, and November, and organizer of the InterDrought Summer School held in Mikoluv in June.
2014. **Switzerland.** Participated as a member in the Advisory Committee for the Integrated Drought Management Programme in September.
2014. **Brazil.** Invited by Sebrae in Recife, Pernambuco, to make several presentations on drought and meet with drought managers and officials in August.
2014. **Czech Republic.** Visiting scientist at Mendel University in Brno, and organizer of the InterDrought Summer School held in Mikoluv in June.
2013. **Sweden.** Participated in a World Water Week Seminar sponsored by the Daugherty Water for Food Institute, as well as attended a meeting of the organizing committee for the Integrated Drought Management Programme, held in Stockholm in September.
2013. **Austria and Czech Republic.** Hosted as a visiting scientist for 10 weeks during May and June at Mendel University in Brno, Czech Republic. Also participated in an interdisciplinary climate change resilience conference hosted by CzechGlobe and participated within the InterDrought Summer School held in Telc.
2013. **Switzerland.** Made multiple presentations at the High-Level Meeting on National Drought Policy held at the United Nations in Geneva in March.
2012. **India.** As part of a delegation involving University of Nebraska and Daugherty Water for Food Institute officials, met with officials of the Indian Agricultural Research Institute (IARI) and visited field sites where climate change adaptation projects are taking place, November 12-15.
2012. **Czech Republic.** Met with scientists involved in the large interdisciplinary drought project (InterDrought), August 27-29.
2012. **China.** Participated in an international climate change and drought conference and met with officials of several universities and governmental organizations and made multiple presentations, June 1-9.
2012. **Austria and Czech Republic.** Met with scientists and participated in the Scientific Advisory Board meeting for the interdisciplinary climate change project, CzechGlobe, May 10-16.
2012. **India.** As part of a delegation involving University of Nebraska and Daugherty Water for Food Institute officials, participated and presented at a meeting taking place at the Indian Agricultural Research Institute (IARI) in Delhi, May 7-8.
2012. **Italy.** Served on the Steering Committee organizing the Global Drought Information System Workshop held in Frascati and participated within the Workshop, April 11-13.
2011. **China.** Met with officials of several universities and governmental organizations and made multiple presentations, July 5-8.
2011. **Australia.** Participated in a drought workshop at the University of Canberra, May 27-28.
2011. **Slovakia and Czech Republic.** Participated and presented in the COST 734 Final Conference, and met with collaborators at Mendel University in Brno, Czech Republic, May 2-6.

- 2010. **Switzerland.** Participated in the Consultation Meeting on the Integrated Drought Management Programme hosted by the World Meteorological Organization and held in Geneva, November 15-16.
- 2010. **Brazil.** Attended the Second International Conference on Climate, Sustainability, and Development in Semi-Arid Regions held in Fortaleza, August 16-20.
- 2009. **Mali.** Drought Monitor Workshop, Bamako, Mali, September 14-17.
- 2008. **Australia.** Joint USA-Australia Drought Workshop: "Drought in a Changing Climate, Sharing Management Approaches", Canberra, Australia, November 17-19.
- 2007. **Morocco.** Worked with USAID to make an assessment of Morocco's drought management strategies. Two trips: August 20-29 and December 1-15.
- 2006. **Spain.** Participated in the Mediterranean Drought Forum in Madrid, February 14.
- 2005. **China.** Participated in the China-U.S. Drought Monitoring and Assessment Workshop in Beijing, November 15-17.
- 2005. **Bermuda.** Participated in the Workshop on Assessing, Modeling, and Monitoring the Impacts of Extreme Climate Events in Hamilton, October 13-14.
- 2004. **Austria.** Participated in the "Drought and Drought Monitoring in Agriculture" international workshop in Vienna, June.
- 2004. **Czech Republic.** Participated in discussions related to the NATO Science Program project with colleagues from Mendel University and had a meeting at the Hydrometeorological Institute in Prague, June.

### **COURSES TAUGHT**

NRES 452/852: "Climate and Society", 3 credits  
2008, 2010, 2012, 2014, 2016, 2018

### **STUDENTS**

Served on M.S. Committees for:

- Polly Ann Najarian (2000)
- James George (2001, UNO)
- Melissa Melvin (2006)
- Jeff Nothwehr (2007)
- Prabhakar Shrestha (2009)
- Amir Vafa (2010)
- Jeff Henson (2013)
- Chris Carparelli (2014, advisor)
- Shrikanth Kondabolu (2014, advisor)
- Brian Monk (2015)
- Eric Holley (2016, co-advisor)
- Evan Bumann (2017)
- Aaron Greuel (current)
- Marketa Podebradska (current, advisor)
- Xeng Du (current)
- Mary Hillis (current, co-advisor)

Served on Ph.D. Committees for:

- Olga Wilhelmi (1999)

Tsegaye Tadesse (2002)  
Hong Wu (2002)  
Patrick Guinan (2004, University of Missouri-Columbia)  
Donna Woudenberg (2006)  
Yacoubou Tawaye (2007)  
Sharmistha Swain (2012)  
George Limpert (2013)  
Hussain Alsarraf (2013)  
Crystal Bergman (2014, advisor)  
Jane Okalebo (2015)  
Eric Hunt (2015)  
Mark Svoboda (2016)  
Juliana Dai (2016)  
Matthew Collier (current, University of Oklahoma)  
Nicole Wall (current)  
Natalie Umphlett (current)  
Stonie Cooper (current)  
Zion Schell (current)  
Elliot Wickham (current, advisor)  
Eric Holley (current, co-advisor)  
Azar Abadi (current)  
Tonya Haigh (current)  
Kelly Smith (current)  
Sabrina Jauernic (current)  
Lindsay Johnson (current, advisor)

### **PROFESSIONAL SERVICE**

Chair, 2017-present, High Plains Regional Climate Center Director Search Committee.

Chair, 2017-present, ARD Advisory Council.

Chapter Co-Author, 2016-present, Northern Great Plains Chapter for the National Climate Assessment.

Series Editor, 2016-present, Drought and Water Crises Book Series Editor, CRC Press.

Member, 2016-present, SNR Recruitment Committee.

Chair, 2016-present, SNR Applied Climate Science Curriculum Committee.

Member, 2016-present, SNR Undergraduate Committee.

Member, 2016-present, UNL Threat and Hazard Identification and Risk Assessment (THIRA) Advisory Committee.

Member, 2016-2017, SNR Teaching Structure Subcommittee.

Co-Editor, 2016, Special Issue of *Climate Research Journal*: Drought in Central Europe—from Drought Response to Preparedness.

Member, 2015-present, WMO Commission on Agricultural Meteorology Expert Team.

Member, 2015-2017, ARD Advisory Council.

Member, 2015-2017, Central Plains Research Data Center Steering Committee.

Chair, 2015-2016, National Drought Mitigation Center Director Search Committee.

Member, 2015-2016, Daugherty Water for Food Institute Executive Director Search Committee.

Member, 2014-2016, Integrated Drought Management Programme Advisory Committee.

Member, 2015-2016, SNR 5-Year Review Planning Committee.

Member, 2013-2014, Daugherty Water for Food Institute 2014 Conference Steering Committee.

Contact, 2013-present, Ph.D. and M.S. Climate Assessment and Impacts Specializations for Natural Resource Sciences.

Member, 2012-2013, NIDIS Carolinas Pilot Steering Committee.

Member, 2012-2013, NIDIS Chesapeake Bay Pilot Steering Committee.

Co-Chair, 2012-2014, Center for Great Plains Studies 2014 Symposium Steering Committee.

Member, 2011-2015, Global Drought Information System Workshops Steering Committee.

Member, 2011-2016, Scientific Advisory Board, CzechGlobe project in the Czech Republic.

Co-Chair, 2009-2016, National Integrated Drought Information System (NIDIS) Program Implementation Team.

Member, 2009-present, NIDIS Engaging the Preparedness Communities Working Group.

Member, 2009-2013, SCIPP RISA Stakeholder Services Committee.

Member, 2007-2017, Nebraska Climate Assessment and Response Committee.

Member, 2013, Micrometeorologist Position Search Committee.

Member, 2012-2013, Daugherty Water for Food Institute 2013 Conference Steering Committee.

Member, 2012-2013, SNR Director Search Advisory Committee.

Leader, 2012, Applied Climate Science Faculty Area.

Member, 2012, National Drought Forum Steering Committee, held in Washington, D.C., December 11-12.

Member, 2012, Global Drought Information System Workshop Steering Committee, held in Frascati, Italy, April 11-13.

Co-Convener, 2010, AGU Fall Meeting Session on Drought and Food Security.

Faculty Member, 2010, Summer Institute on Climate Change held in Lincoln, May 11-13.

Member, 2006-2009, NIDIS Program Implementation Team.

Co-Chair, 2006-2009, NIDIS Engaging the Preparedness Communities Working Group.

Board Member, 2007-2010, Center for Great Plains Studies Board of Governors.

Member, 2009-2010, Nominating Committee, Center for Great Plains Studies.

Member, 2007-2009, Scholarship Committee, Center for Great Plains Studies.

Reviewer, March 2007, National Research Council Review Team for the Climate Change Science Program's Synthesis and Assessment Product 3.3: Weather and Climate Extremes in a Changing Climate.

Co-Chair, 2006-2009, Engaging the Preparedness Communities Working Group, National Integrated Drought Information System.

Member, 2007-2009, Integration Advisory Team, School of Natural Resources, University of Nebraska-Lincoln.

Member, 2006-2012, Promotion and Tenure Committee, School of Natural Resources, University of Nebraska-Lincoln.

Member, 2001-2008, Outreach Committee, School of Natural Resources, University of Nebraska-Lincoln.

Co-Chair, 2003-2004, Stakeholder Processes and Needs Working Group, WGA/NOAA National Integrated Drought Information System.

Member, 2003-2004, WGA/NOAA National Integrated Drought Information System Core Team.

Member, 2003-2004, WGA/NOAA National Integrated Drought Information System Interdisciplinary Team.

Member, 2001-2005, Web Site Development Subcommittee, Interim National Drought Council.  
Member, 2001-2005, Monitoring and Prediction Subcommittee, Interim National Drought Council.

Co-author, 1999-2005, U.S. Drought Monitor (<http://drought.unl.edu/dm/>).

Co-author, 2002-2005, North American Drought Monitor  
(<http://www.ncdc.noaa.gov/oa/climate/monitoring/drought/nadm/>)

Member, 2000-2016, Nebraska Risk Assessment Committee.

NDMC Liaison, 1998-2016, Nebraska Agriculture, Natural Resources, and Wildlife Subcommittee.

NDMC Liaison, 1998-2016, Nebraska Municipal Water Supply, Health, and Energy Subcommittee.

Member, 1996-2016, Nebraska Water Availability and Outlook Committee.

Member, 1999-2000, Agriculture Working Group, National Drought Policy Commission.

Member, 1997-1999, Preparedness and Mitigation Working Group, Western Drought Coordination Council.