# MICHAEL J. HAYES

## PERSONAL


Work Address: University of Nebraska-Lincoln
School of Natural Resources
811 Hardin Hall
Lincoln, NE 68583-0988
Telephone: (402) 472-4271
E-mail: mhayes2@unl.edu


## EDUCATION

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| 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 Environmental Science Major in 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

2025: Holling Family Award for Sustained Excellence in Teaching and Learning
2014-2025: 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
American Association of State Climatologists
Robert B. Daugherty Water for Food Institute (Faculty Fellow)
Center for Great Plains Studies (Fellow)

## CURRENT GRANTS

Ochethi Sakowin Data for Climate Resilience. PI: C. Knutson. Co-PI: M. Hayes. Great Plains Tribal Water Alliance, $60,048. 10/1/2025 to 9/30/2027.

Community Climate Resilience on the Great Plains. PI: C. Rowe. Co-PIs: M. Hayes and others. UNL Grand Challenges Catalyst Competition-Planning Grants. UNL, $80,000. 9/1/2023 to

8/31/2025.

Co-LEARN: A Midwestern Community of Learning for Empowerment, Climate Adaptation and Resilience for the Next Generation. PI: M. Shulski. Co-PIs: L. PytlikZillig, M. Hayes, A. Khattak, R. Mahmood, and T. Roy. University of Iowa, $802,879. 9/1/22 to 8/31/27.

**PENDING GRANTS**

NSF Engineering Research Center for AI-Driven Rural Resilience (AIRR): Engineering a Neurosymbolic Foundation Model for Vibrant Rural Communities (Chat-VRC). PI: P. Hitzler. Co-PIs: D. McGuinness, M. Hayes, K. Baylis, M. Derby. NSF, $25,000,000. 9/1/2026 to 8/31/2031.

**RECENT GRANTS**

Perspectives of Drought Risk Management in Zambia. PI: M. Hayes. ARD Strategic (IANR), $12,000. 6/20/2024 to 6/30/2025.

Cultivate Resilience. PI: J. Keshwani. Co-PIs: M. Hayes, E. Ingram, D. Keshwani, J. Obermeyer, and L. Sandall. USDA-NIFA, $199,483. 9/15/2023 to 4/7/2027.

NSF Convergence Accelerator Track J: Predicting the Effect of Climate Extremes on the Food System to Improve Resilience of Global and Local Food Security. PI: M. Hayes. Co-PIs: T. Haigh and M. Svoboda. University of California-Santa Barbara, $80,898. 1/1/2023 to 12/31/2023.

Anticipating Social Unrest. PI: L.-K. Soh. I: R. Werum, M. Hayes, A. Samal. Citadel University. $521,451. 7/10/2019 to 7/9/2023.

A Multi-Spatial Approach to Monitoring Forage Characteristics of Western U.S. Grasslands. PI: M. Hayes. Co-PI: D. Bathke, M. Podebradska, M. Svoboda, B. Wardlow. U.S. Department of Interior. $254,900. 7/1/2020 to 6/30/2023.

Ute Mountain Ute Tribal Climate Adaptation Workshop Series. PI: M. Hayes. Ute Mountain Ute Tribe. $13,000. 5/10/2022 to 3/31/2023.

Establishing Drought Triggers to Support the Development of Drought Annexes to Agricultural Disaster Risk Management Plans in the Caribbean. PI: C. Knutson. Co-PI: D. Bathke, B. Fuchs, M. Hayes, K. Smith, and M. Svoboda. USAID, $64,999. 1/1/2021 to 2/28/22.

Providing Drought Risk Management Services for the World Bank. PI: M. Svoboda. I: D. Bathke, B. Fuchs, M. Hayes, C. Knutson, K. Smith, T. Tadesse, B. Wardlow. World Bank Group. $199,994. 5/8/2020 to 3/24/22.

Developing a Tool to Monitor Drought Impacts on Semi-Arid U.S. Grasslands using an Ecosystem Performance Approach. PI: M. Hayes. Co-PI: B. Wardlow, M. Svoboda, D. Bathke, and M. Poděbradská. Department of Interior, U.S. Geological Survey. $84,995. 3/4/2019 to

3/3/2022.

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 8/31/2021.

Providing Drought Information Services for the Nation: The National Drought Mitigation Center. PI: M. Svoboda. Co-PI: C. Knutson, T. Tadesse, D. Bathke, B. Fuchs, M. Hayes. NOAA/SARP, $2,400,000. 6/1/2015 to 8/31/2021.

Drought Risk Management in South Africa. PI: M. Svoboda. I: M. Hayes, B. Wardlow, T. Tadesse, B. Fuchs, and C. Knutson. World Bank Group, $40,000. 6/7/2019 to 8/15/2020.

USAID MENAdrought. PI: M. Svoboda. I: N. Brozovic, M. Hayes, C. Knutson, D. Bathke, T. Jedd, C. Neale. International Water Management Institute. $429,694. 4/26/2019 to 9/30/2020.

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. 9/1/2016 to 8/31/2020.

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. $80,354. 7/1/2016 to 6/30/2020.

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 6/30/2019.

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.

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.

## RECENT PUBLICATIONS (2010-Current)

### Journal Articles in the Review Process

Dížková, P., L Bartošová, M. Bláhová, D.Semerádová, M. Poděbradská, M. Fischer, B. Wardlow, M. Hayes, J. Balek, L. Hájková, Z. Žalud, M. Trnka, 2025. Changes in the spatiotemporal variability in the growing season in Europe. Submitted to *Agricultural and Forest Meteorology*.

Gupta, C., R. Mahmood, P. Flanagan, T. Roy, M. Hayes, and L. Chen, 2025. An Assessment of Extreme Precipitation Trends in the Missouri River Basin: Insights from Three Gridded Precipitation Data Sets and Climate Indices Analysis. Submitted to *International Journal of Climatology*.

Mwape, A., M. Hayes, D. Bathke, K. Smith, R. Mahmood, E. Jones, 2025. Benefits of Stakeholder Participation in Drought Risk Management: Evidence from the Nebraska Republican River Basin Drought Exercise. Accepted to *Case Studies in the Environment*.

Mwape, A., M. Hayes, D. Bathke, K. H. Smith, R. Mahmood, E. Jones, 2025. Drought Management in Zambia: Insights from the 2023/2024 Drought. Submitted to *Climate*.

Werum, R., D. Schaefer, B. Zhang, and M. Hayes, 2025. Most Politics Are Local: Women's Protests in South Asia, 2016-2022. Submitted to *Journal of Conflict Resolution*.

Whitesel, D., R. Mahmood, X. Lin, R. Pielke Sr., L. Chen, M. Hayes, J. Lahowetz, M. Durr, B.J. Fard, J. Bell, and W. Sorensen, 2025. An Initial Assessment of Equivalent Temperature as a Measure of Heat Danger. Submitted to *Theoretical and Applied Climatology*.

Zhang, B., K.H. Smith, F. Schilder, F.K. Abu Salem, A. Samal, T. Tadesse, M. Hayes 2025. Tracking Drought Impacts from Texts: Towards AI-Assisted Drought Impact Detection. Submitted to *Bulletin of the American Meteorological Society*.

**Published Journal Articles**

Baylis, K., E. Lentz, K. Caylor, M. Gu, C. Gunderson, T. Haigh, M. Hayes, H. Lahr, D. Maxwell, C. Funk, 2025. Six Lessons for Closing the Last Mile: How to Make Climate Decision Support Actionable. Accepted to *Earth's Future*.

Prajapati, V.K., R. Kaur, V. Prasad, M. Khanna, C. Neale, M. Hayes, M. Svoboda, J. Swigart, T. Tadesse, V. Sehgal, and A. Rani, 2025. Drought declaration potential of seasonally averaged vs. end of season - composite drought indices: comparative validation over Karnataka state of India. *Theoretical and Applied Climatology*, 156, 43. https://doi.org/10.1007/s00704-024-05266-1

Werum, R., M. Hayes, D. Schaefer, B. Zhang, 2025. Climate Extremes and Protests in India, Pakistan and Bangladesh, 1995-2013. *Weather, Climate, and Society*, 17(2): 161-175. https://doi.org/10.1175/WCAS-D-24-0066.1

Bergaoui, K., M. Belhaj Fraj, S. Fragaszy, A. Ghanim, O. Hamadin, E. Al-Karablieh, J. Al-Bakri, M. Fakih, A. Fayad, F. Comair, M. Yessef, H. B. Mansour, H. Belgrissi, K. Arsenault, C. Lidard-Peters, S. Kumar, A. Hazra, W. Nie, M. Hayes, M. Svoboda, and R. McDonnell, 2024. Development of a Composite Drought Indicator for operational drought monitoring in the MENA region. *Scientific Reports*. 14, 5414. https://doi.org/10.1038/s41598-024-55626-0

Fard, B.J., J. Puvvula, K. Smith, M. Hayes, R. Lookadoo, R. Mahmood, S. Medcalf, C. Rowe, M. Durr, J.E. Bell, 2024. Health vulnerability mapping for drought: a case study in a predominantly rural, agricultural state. Environmental Research: Health, 2(4). https://doi.org/10.1088/2752-5309/ad689a

Huning, L.S., S.M. Bateni, M. Hayes, S. Ho, S. Jayasinghe, R. Kumar, C. Lima, CA. Love, K. Madani, Y. Markonis, M.A. Matin, C. Miao, M. Motagh, A. Naeger, D.Y. Oliveira, L.K. Read, L. Samaniego, N. Shokri, S. Shukla, R. Sultanian, R Stefanski, F. Trabelsi, D. Tsegai, L.U.C. Vo, N. Wanders, M. Wens, A. Zarei, A. AghaKouchak, 2024. Sustainability nexus analytics, informatics, and data (AID): Drought. *Sustainability Nexus Forum*, 32(1), 1-12. https://doi.org/10.1007/s00550-024-00546-w

Whitesel, D., R. Mahmood, P. Flanagan, E. Rappin, U. Nair, R. A. Pielke Sr., and M. Hayes, 2024. Impacts of irrigation on a precipitation event during GRAINEX in the High Plains Aquifer Region. *Agricultural and Forest Meteorology*, 345. https://doi.org/10.1016/j.agrformet.2023.109854.https://doi.org/10.1016/j.agrformet.2023.109854.

Cravens, A., J. Goolsby, T. Jedd, D. Bathke, S. Crausbay, A. Cooper, J. Dunham, T. Haigh, K. Hall, M. Hayes, J. McEvoy, M. Podebradska, A. Ramirez, E. Wickham, and D. Zoanni, 2023. The patchwork governance of ecologically available water: a case study in the Upper Missouri

Headwaters, Montana, USA. *Journal of the American Water Resources Association*. https://doi.org/10.1111/1752-1688.13167.

Lachenmeier, E., R. Mahmood, C. Phillips, U. Nair, E. Rappin, R. Pielke Sr., W. Brown, S. Oncley, J. Wurman, K. Kosiba, A. Kaulfus, J. Santanello Jr., E. Kim, P. Lawston-Parker, M. Hayes, and T. Franz, 2023. Irrigated agriculture significantly modifies seasonal boundary layer atmosphere and lower tropospheric convective environment. *Journal of Applied Meteorology and Climatology*. https://doi.org/10.1175/JAMC-D-23-0020.1

Poděbradská, M., B. Wylie, M. Hayes, D. Bathke, Y. Bayissa, S. Boyte, J. Brown and B. Wardlow, 2023. Using seasonal climate scenarios in the ForageAhead annual forage production model for early drought impact assessment. *Ecosphere*, 14(5). https://doi.org/10.1002/ecs2.4496.

Sundstrom, S., D. Angeler, J. Bell, M. Hayes, J. Hodbod, B. Jalalzadeh-Fard, R. Mahmood, E. VanWormer, and C. Allen, 2023. Panarchy Theory for Convergence. *Sustainability Science*, 18, 1667-1682. https://doi.org/10.1007/s11625-023-01299-z.

Zhang, B., F. Abu Salem, M. Hayes, K. Smith, T. Tadesse, and B. Wardlow, 2023. Explainable Machine Learning for the Prediction and Assessment of Complex Drought Impacts. *Science of the Total Environment*. 898: 165509. https://doi.org/10.1016/j.scitotenv.2023.165509.

Bartošová, L., M. Fischer; J. Balek; M. Bláhová; L. Kudláčková; F. Chuchma; P. Hlavinka; M. Možný; P. Zahradníček; N. Wall; M. Hayes; C. Hain; M. Anderson; W. Wagner; Z. Žalud; M. Trnka, 2022. Validity and reliability of drought reporters in estimating soil water content and drought impacts in Central Europe. *Agriculture and Forest Meteorology*, 315. https://doi.org/10.1016/j.agrformet.2022.108808.

Poděbradská, M., B. Wylie, D. Bathke, Y. Bayissa, D. Dahal, J. Derner, P. Fay, M. Hayes, W. Schacht, J. Volesky, P. Wagle, and B. Wardlow, 2022. Monitoring climate impacts on annual forage production across U.S. semi-arid grasslands. *Remote Sensing*, 14(4), https://doi.org/10.3390/rs14010004.

Zhang, L., Q. Hu, M. Hayes, M. Burbach, T. Messer, Y. Zhou, and Z. Tang, 2022. Evaluating Nebraska's local comprehensive plans to achieve the national wetland conservation missions in the USA. *Ecosystem Health and Sustainability*, 8(1), https://doi.org/10.1080/20964129.2022.2070550.

Cravens, A. E., J. Henderson, J. Friedman, N. Burkardt, A. E. Cooper, T. Haigh, M. Hayes, J. McEvoy, S. Paladino, A. K. Wilke, and H. Wilmer, 2021. A Typology of Drought Decision Making: Synthesizing Across Cases to Understand Drought Preparedness and Response Actions. *Weather and Climate Extremes*, 33, https://doi.org/10.1016/j.wace.2021.100362.

Fard, B. J., R. Mahmood, M. Hayes, C. Rowe, A. Abadi, M. Shulski, S. Medcalf, R. Lookadoo, and J.Bell, 2021. Mapping heat vulnerability index based on different urbanization levels in Nebraska, USA. *GeoHealth*. https://doi.org/10.1029/2021GH000478.

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Ferguson, D., C. Alvord, M. Crimmins, M. H. Redsteer, M. Hayes, C. McNutt, R. Pulwarty, M. Svoboda. 2011. Drought Preparedness for Tribes in the Four Corners Region. Report from April 2010 Workshop. Tucson, AZ: Climate Assessment for the Southwest.

Hayes, M., D. Wilhite, M. Svoboda, and M. Trnka. 2011. Investigating the Connections between Climate Change, Drought, and Agricultural Production. In: Handbook on Climate Change and Agriculture, R. Mendelsohn and A. Dinar, eds., Edward Eigar Publishing Ltd., pp. 73-86.

Wardlow, B., M. Hayes, M. Svoboda, and T. Tadesse. 2010. Opportunities for integrating NASA data into drought applications: a prospectus from the National Drought Mitigation Center. NASA White Paper, NASA Headquarters, Hydrology and Agricultural Applications Branch, Washington, D.C.

**Conference Proceedings and Poster Presentations**

Johnson, L. E., D. Bathke, H. Akin, M. Hayes, and M. Svoboda. From Complex to Clear: Improving Drought Communication. 2026. American Meteorological Society Annual Meeting, Houston, TX (January 25-29).

Smith, K. H., M. J. Hayes, D. Gutzmer, and M. Svoboda. 20 Years of Drought Impacts. 2025. American Meteorological Society Annual Meeting, Houston, TX (January 25-29).

Haider, S. T. B., R. Mahmood, D. Whitesel, P. Flanagan, L. Chen, and M. Hayes. Land use Land cover Change, Irrigation and their impacts on Atmospheric Boundary Layer and Precipitation: A WRF-Model Based Assessment. 2025. American Geophysical Union Annual Meeting, New Orleans, LA (December 15-19).

Smith, K. H., M. J. Hayes, D. Gutzmer, and M. Svoboda. The U.S. Drought Impact Reporter at 20 Years: What We Have Learned. 2025. American Geophysical Union Annual Meeting, New Orleans, LA (December 15-19).

Gupta, C., R. Mahmood, P. Flanagan T. Roy, and M. Hayes. Trends in Extreme Precipitation in the Missouri and Upper Mississippi River Basins: A Comparative Study of 1950–1986 and 1987–2023. 2025. 22nd Annual Climate Prediction Applications Science Workshop & the 49th Annual Climate Diagnostics and Prediction Workshop, Lincoln, NE (March 24-27).

Haider, S. T. B., R. Mahmood, D. Whitesel, P. Flanagan, L. Chen, and Mike Hayes. Impacts of Land use land cover change and Irrigation on Atmospheric Boundary Layer and Precipitation in Nebraska. 2025. 22nd Annual Climate Prediction Applications Science Workshop & the 49th Annual Climate Diagnostics and Prediction Workshop, Lincoln, NE (March 24-27).

Keshwani, J., E. Ingram, L. Sandall, D. Keshwani, J. Obermeyer, M. Hayes, and K. Yumnam. Cultivate ACCESS: Cultivate Resilience. 2025. Nebraska Environmental Education Conference, Ashland, NE (February 26-27).

Zhang, B., M. Hayes, K. H. Smith, and T. Tadesse. Novel AI Applications for Drought Impact Monitoring and Assessment. 2024. American Geophysical Union Annual Meeting, Washington, D.C. (December 9-13).
https://agu.confex.com/agu/agu24/meetingapp.cgi/Paper/1703715

Joshi, D., L.-K. Soh, A. Samal, R. Werum, and M. Hayes. Leveraging Environment and Culture to Anticipate Social Unrest with Integrated Model- and Data-Driven Approaches. 2024. ICARS Tech Week Conference, McLean, VA (September 9-13).

Werum, R., D. Schaefer, B Zhang, and M. Hayes. Women's Rights Protests and Gendered Violence in Western Asia, 2016-2022. 2024. Eastern Sociological Society Conference, Washington, D.C. (February 29-March 3).

Zhang, B., S. Srivastava, B. Balaji, M. Hayes, T. Tadesse, and T. Roy. Application of Reinforcement Learning to Optimize Human-Flood Interactions. Tackling Climate Change with Machine Learning at NeurIPS. 2023. New Orleans, LA (December 11-14).

Zhang, B., B. J. Fard, M. Hayes, J. Bell, X. Shi, A. Abadi, K. H. Smith, and T. Tadesse. Investigation of the Relationships between Drought Characteristics and Respiratory- and Cardiovascular-Related Mortality. 2023. American Geophysical Union Annual Meeting, San Francisco, CA (December 11-15).

Srivastava, S., B. Zhang, M. Hayes, T. Tadesse, and T. Roy. Application of Reinforcement Learning to Represent Human-Flood Interactions. 2023. American Geophysical Union Annual Meeting, San Francisco, CA (December 11-15).

McEvoy, J., A. E. Cravens, J. B. Goolsby, T. Jedd, D. J. Bathke, S. Crausbay, A. E. Cooper, J. Dunham, T. Haigh, K. R. Hall, M. Hayes, M. Poděbradská, A. Ramirez, E. Wickham, and D. Zoanni. The Patchwork Governance of Ecologically Available Water: A Case Study in the Upper Missouri Headwaters, Montana, USA. 2023 American Association of Geography Annual Meeting, Denver, CO (March 23-27, 2023).

Zhang, B., F. A. Salem, M. Hayes, K. Smith, and T. Tadesse. Explainable Machine Learning Applications to Predict and Assess Complex Drought Impacts based on a Multi-sourced Dataset. 2023 American Meteorological Society Annual Meeting, Denver, CO (January 8-12, 2023).

Werum, R., M. Hayes, D. Schaefer, and B. Zhang. Climate Extremes and Protest in Asia: A Cross-Disciplinary Analysis of Protests in India, Pakistan and Bangladesh, 1995-2013. 2022 American Sociology Association Annual Meeting, Los Angeles, CA (August 5-9, 2022).

Zhang, B., M. Hayes, Y. Zhou, Y. Guan, D. Schaefer, R. Werum, A. Samal, K. Smith, and T. Tadesse. Can Causal Inference Help Investigate Drought Impacts on Social Unrest in India? 2022 American Geophysical Annual Fall Meeting, Chicago, IL (December 12-16, 2022).

Zhang, B., F. Schilder, K. Smith, S. Harms, T. Tadesse, M. Hayes, 2021. TweetDrought: a deep-learning drought impacts recognizer based on twitter data. American Geophysical Union (AGU) Annual Fall 2021 Meeting, virtual, December 13-17, 2021.

Zhang, B., F. Schilder, K. Smith, S. Harms, T. Tadesse, M. Hayes, 2021. TweetDrought: a deep-learning drought impacts recognizer based on twitter data. Tackling Climate Change with Machine Learning Workshop, 38th International Conference on Machine Learning, virtual, July 18-24, 2021.

Schaefer, D., R. Werum, M. Hayes, D. Joshi, A. Samal and L. Soh, 2021. Exploring social and environmental antecedents of unrest in India. Inter-University Seminar on Armed Forces and Society Conference, Reston, VA.

Poděbradská, M., B. Wylie, M. Hayes, B. Wardlow, and D. Bathke, 2020. Combining seasonal climate scenarios with forage production models to inform drought decision-making. American Geophysical Union Annual Meeting, Virtual, December 2020.

Blomberg, K., P. Flanagan, R. Mahmood, C. Rowe, and M. Hayes, 2020. Modelling irrigation impacts on atmospheric conditions during the 2012 historic drought. American Meteorological Society Annual Meeting, Boston, MA, January 2020.

Flanagan, P., R. Mahmood, T. Sohl, M. Svoboda, B. Wardlow, M. Hayes, and E. Rappin, 2020. Impacts of future land-use land-cover on boundary layer development in the north-central United States. American Meteorological Society Annual Meeting, Boston, MA, January 2020.

Lachenmeier, E., R. Mahmood, T. Franz, M. Hayes, E. Rappin, U. Nair, R. Pielke Sr., A. Kaulfus, C. Phillips, W. Brown, and S. Oncley, 2020. The impacts of irrigated and rainfed agriculture on near surface atmosphere: preliminary results from GRAINEX. American Meteorological Society Annual Meeting, Boston, MA, January 2020.

Hayes, M., M. Noel, T. Tadesse, and L. Niyonkuru, 2019. Linking public health impacts with drought severity in the U.S. and the Greater Horn of Africa. American Geophysical Union Annual Meeting, San Francisco, December 2019.

Johnson, L., M. Hayes, and H. Geli, 2019. Using new tools to build an improved drought climatology for Food-Energy-Water system (FEWS) impacts in New Mexico. American Geophysical Union Annual Meeting, San Francisco, December 2019.

Nam, W.-H., T. Kim, E.-M. Hong, S. Feng, and M. Hayes, 2019. Multi-model ensemble projections of the climate change effect on the mega-drought. American Geophysical Union Annual Meeting, San Francisco, December 2019.

Poděbradská, M., B. Wylie, M. Hayes, B. Wardlow, and D. Bathke, 2019. Monitoring drought impacts on annual forage production in semi-arid grasslands. American Geophysical Union Annual Meeting, San Francisco, December 2019.

Gim, H.-J., C.-H. Ho, S.-J. Jeong, J. Kim, S. Feng, and M. Hayes, 2019. Long-term variations of cropland growing season start at a sub-county level using AVHRR NDVI over the Midwestern United States. Asia Oceania Geosciences Society Annual Meeting, Singapore, July 2019.

Noel, M., D. Bathke, T. Haigh, K. Smith, M. Svoboda, and M. Hayes, 2018. Developing a framework to link drought impacts and drought severity state by state. American Meteorological Society Annual Meeting, Phoenix, AZ, January 2019.

Petersen, B., B. Fuchs, M. Hayes, M. Brusberg, and D. Bathke. Using GIS to show drought impacts on North American agricultural commodities. American Meteorological Society Annual Meeting, Phoenix, AZ, January 2019.

Nam, W.-H., S. Feng, M. J. Hayes, M. D. Svoboda, B. A. Fuchs, E-M Hong, T. Kim, and C.-H. Ho. Flash drought risk assessment over China and Korea using the Evaporative Demand Drought Index (EDDI). American Geophysical Union Fall Meeting, Washington, D. C., December 2018.

Smith, K. H., A. J. Tyre, J. Hamik, and M. J. Hayes, 2018. Anticipating years with weather-related increased risk of West Nile Virus to humans in Nebraska. American Geophysical Union Fall Meeting, Washington, D. C., December 2018.

Noel, M., D. Bathke, T. Haigh, K. Smith, M. Svoboda, and M. Hayes, 2018. Developing a framework to link drought impacts and drought severity state by state. American Geophysical Union Fall Meeting, Washington, D. C., December 2018.

Hayes, M. J., L. E. Johnson, and H. M. E. Geli, 2018. Building an improved drought climatology for FEW system impacts in New Mexico using new drought monitoring tools. American Geophysical Union Fall Meeting, Washington, D. C., December 2018.

Gim, H.-J., C.-H. Hoi, S.-J. Jeong, J. Kim, S. Feng, and M. J. Hayes, 2018. AVHRR-retrieved crop green-up date at sub-county level over the Midwestern United States. Korean Meteorological Society Annual Meeting, October 2018.

Wickham, E., M. J. Hayes, and M. Svoboda, 2018. U.S. drought vulnerability analysis: using climatological and social data to evaluate urban drought vulnerability at the country scale. European Drought Conference, Utrecht, Netherlands, October 2018.

Neale, C., R. Kaur, M. J. Hayes, D. Heeren, A. Kilic, M. Khanna, A. Sarangi, V. Sehgal, and R. Sahoo, 2018. Improving water management, agricultural production and food security in drought prone areas. American Society of Agricultural and Biological Engineers (ASABE), Detroit, MI, July 2018.

Podebradska, M., B. Wylie, M. J. Hayes, B. Wardlow, and D. Bathke, 2018. Developing a tool to monitor drought impacts on Nebraska Sandhills grasslands using an ecosystem performance approach. Great Plains Grassland Summit, Denver, CO, April 2018.

Paltz, E., M. Hayes, and M. Van Den Broeke, 2018. Impact of past experiences with tornadoes on future decisions in Nebraska. American Meteorological Society Annual Meeting, Austin, TX, January 2018.

Bumann, E., T. Awada, B. Wardlow, M. Hayes, C. Helzer, J. Hiller, and P. Cherubini, 2017. Assessing climatic responses of *Betula papyrifera* (Paper Birch) in a remnant population along the Niobrara River in Nebraska through dendroecological and remote sensing techniques. Ecological Society of America Annual Meeting, Portland, OR, August 2017.

Paltz, E. and M. Hayes, 2017. Impact of past experiences with tornadoes on future decisions. UCARE Annual Research Fair, Lincoln, NE, April 2017.

Geli, H. M. E., T. Jedd, M. Svoboda, B. Wardlow, M. J. Hayes, C. M. U. Neale, C. Hain, and M. Anderson, 2016. Evaluation of the performance of multiple drought indices for Tunisia. AGU, San Francisco, CA, December 2016.

Okalebo, J., B. Weinhold, A. Suyker, G. Erickson, M. Hayes, T. Awada, 2015. "The Platte River –High Plains (PR-HPA) Long-Term Agro-Ecosystem Research (LTAR) Network –Data and Technological Resources to Address Current and Emerging Issues in Agroecosystems.," AGU, San Francisco, California, December 18, 2015.

Okalebo J., K. Hubbard, A. Kilic, R. Oglesby, and M. Hayes, 2015. An Evaluation of In-Season Water Stress Sensitivity Using a Multiplicative Evapotranspiration - Grain Yield Model for *Zea*

*mays* L. Growing in Mead, Nebraska. American Water Resources Association. 2015 Summer Specialty Conference. Climate Change Adaptation, New Orleans, Louisiana, June 15 - 17, 2015.

Okalebo J., Hubbard K., Kilic A., Oglesby R. and M. Hayes. 2013. In-season water stress sensitivity of Zea mays L. Mead NE. Poster presentation: Too Hot, Too Wet, Too Dry: Building Resilient Agroecosystems May 5-8 at the 2013 Water for Food Conference, Lincoln, NE.

Hayes, M. 2011. Delivering Drought Information Services to the Great Plains and the World. Proceedings of the UNL Climate, Water and Ecoystems: Shaping the Great Plains Conference, October 11, 2011.

Hayes, M. 2011. Delivering Drought Information Services to the World: Activities of the National Drought Mitigation Center. Proceedings of COST 734 Final Conference, Topolcianky, Slovakia, May 4-5, 2011.

Hayes, M. 2011. The Drought Interest Group: Lessons Learned from 16 Years of Delivering Drought Information Services to the World. Proceedings of the Open Science Conference of the World Climate Research Program, Denver, CO, October 24-28, 2011.

Hayes, M., C. Bergman, D. Bathke, J. Nothwehr, N. Wall, M. Svoboda, T. Bernadt, and J. Robine, 2011. Engaging Drought Decision-Makers across the United States. Proceedings of COST 734 Final Conference, Topolcianky, Slovakia, May 4-5, 2011.

Knutson, C. L., V. M. Mehta, N. Rosenberg, J. R. Olsen, N. A.Wall, T. K. Bernadt, and M. J. Hayes. 2011. Potential Applications of Decadal Climate Predictions in Water and Agriculture Sectors in the Missouri River Basin, Proceedings of the UNL Climate, Water and Ecoystems: Shaping the Great Plains Conference, October 11, 2011.

Swain, S., S. Narumalani, B. Wardlow, D. Rundquist, and M. J. Hayes. 2011. Relationships among vegetation indices, canopy temperatures, and root-zone soil moisture in the U.S. Corn Belt: a close-range sensing approach. *Association of American Geographers Annual Meeting*, Seattle, WA, April 12-16.

Tadesse, T., B. D. Wardlow, M. J. Hayes, M. D. Svoboda, J. Li, C. C. Poulsen, and K. Callahan. 2010. Predicting general vegetation condition using different scenarios over the central U.S. Second Annual International Conference of "Water for Food: Growing More with Less", May 2-5, 2010, Lincoln, Nebraska.

Tadesse, T., B.D. Wardlow, K. Callahan, and C.C. Poulsen. 2010. Integrating satellite, climate, oceanic, and biophysical information to predict the general vegetation condition. Association of American Geographers' Annual Meeting, Washington, DC, April 14-18.

Tadesse, T, B. Wardlow, M. Hayes, M. Svoboda, J. Li, K. Callahan, and C.C. Poulsen. 2010. Scenario-based vegetation outlook (S-VegOut): predicting general vegetation condition using different scenarios over the central United States. 90th Annual American Meteorological Society Annual Meeting, Atlanta, GA, January 17-21.

**STATION PROJECTS**

M. Hayes, R. Mahmood, M. Svoboda, S. Hu, D. Bathke, and B. Wardlow. Enhancing Climate Resilience in the Central United States: Addressing Climate Impacts from Climate Extremes and Change. 2024-2029. NEB-38-128.

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**

2024
6 "invited" presentations
6 volunteer presentations

2023
6 "invited" presentations

2022
5 "invited" presentations

2021
6 "invited" presentations
1 volunteer presentation

2020
2 "invited" presentations

2019
14 "invited" presentations
9 volunteer presentations

2018
6 "invited" presentations
11 volunteer presentations

2017
11 "invited" presentations
1 volunteer presentations

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

**DROUGHT RISK MANAGEMENT/CLIMATE RESILIENCE WORKSHOPS (NATIONAL)***

2023
Tri-Ute Climate Resilience Workshop, Montrose, Colorado, May 2-3

2022
Utilizing Climate Information on Ute Tribal Lands, Towaoc, Colorado: November 15-16
Climate and Drought Early Warning, Virtual: May 23-24

2021
Great Plains Tribal Water Alliance, Rapid City, South Dakota: October 5

2019
Santee Sioux, NE (9 Tribes in Lower Missouri River Basin): November 13-14
*Includes my involvement with organization and participation

**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

Virtual Caribbean Workshops, 1/27/2022, 2/24/2022, 4/12/2022
Virtual Caribbean Workshop, 8/6/2021
Amman, Jordan, 10/19
Amman, Jordan, 5/19
Beirut, Lebanon, 4/19
Dubai, United Arab Emirates, 6/18
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-Felsogöd, 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

2025. **Czech Republic**. Continued collaboration on global drought monitoring and drought impact assessments with colleague at Mendel University in Brno in September.
2023. **Czech Republic**. Building collaboration for global drought monitoring projects with colleagues at Mendel University in Brno in June.
2019. **Jordan**. Organized and helped host two workshops in Amman in May and October with the International Water Management Institute (IWMI).
2019. **Lebanon**. Organized and helped host a workshop in Beirut in April with the International Water Management Institute (IWMI).
2018. **United Arab Emirates**. Worked with the International Centre for Biosaline Agriculture (ICBA) to organize and conduct a follow-up drought vulnerability assessment workshop in June.
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 May.
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 208: "Climate Literacy in the Natural Resources", 3 credits
2023, 2024, 2025
NRES 370: "Applied Climatology", 3 credits
2018, 2019, 2020, 2021, 2022
NRES 452/852: "Climate and Society", 3 credits
2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024
NRES 478/878: "Regional Climatology", 3 credits
2019, 2021, 2023, 2025

## 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)
Xeng Du (2018)
Mary Noel (2019, co-advisor)
Azariah Lawal (2020, co-advisor)
Emilee Lachenmeier (2020)
Alexis Chaves (2022, co-advisor)
Haeli Leighty (2022)
Daniel Whitesel (2022)
Grace Cutting (2022)
Grace Campbell (2023)
Kidus Berhe (2023)
Emmanuel Audu (2024)
Betty Makena (2024)
Sherly Shelton (2024)

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)
Azar Abadi (2018)
Yared Bayissa (2018)
Richie Donahou (2018, University of Arkansas)
Zion Schell (2018)
Elliot Wickham (2019, advisor)
Tonya Haigh (2019)
Kelly Smith (2019)
Natalie Umphlett (2019)
Eric Holley (2020, co-advisor)
Marketa Podebradska (2021, advisor)
Ligang Zhang (2022, co-advisor)

Stonie Cooper (2023)
Beichen Zhang (2024, co-advisor)
Hebah Alkhasoneh (2024)
Caily Schwartz (2024)
Praval Sharma (2024)
Andrew Mwape (2025, advisor)
Shivendra Srivastava (2025)
Lindsay Johnson (current, advisor)
Jerome Okojokwu-Idu (current, advisor)
Cameron Wunderlin (current)
Devon Healy (current)
Qianqian Li (current)
Chanchal Gupta (current)
Tasneem Haider (current)
Shetu Akter (current)
Brie Paladino (current)
Kierstin Blomberg (current)

## PROFESSIONAL SERVICE

Chair, December 2024-current, Environmental Science Major Curriculum Committee.
Member, January 2024-current, Advisory Board for the Nebraska State Climate Report.
Member, January 2024-current, SNR Promotion and Tenure Committee.
Chair, January 2024-current, Center for Great Plains Studies Stubbendieck Great Plains Distinguished Book Prize Committee.
Chair, November 2023-April 2024, Nebraska State Climatologist Search Committee.
Member, August 2023-current, Nebraska Indian Committee College Advisory Committee for the Indigenous Environmental Health B.S. Degree.
Member, April 2023-current, Drought Working Group, United Nations University Resource Nexus Analytics, Informatics, and Data (AID) Programme.
Member, January 2023-December 2023, Center for Great Plains Studies Stubbendieck Great Plains Distinguished Book Prize Committee.
Member, August 2022-December 2024, SCIPP CAP-RISA External Advisory Committee.
Member Representative, August 2021-current, University Corporation for Atmospheric Research Member for UNL.
Chair, 2020-2024, Applied Climate and Spatial Science Curriculum Committee.
Series Editor, 2016-current, Drought and Water Crises Book Series Editor, CRC Press.
Coordinator, 2016-current, SNR Applied Climate Science Curriculum.
Member, 2016-current, SNR Undergraduate Curriculum Committee.
Contact, 2013-current, Ph.D. and M.S. Climate Assessment and Impacts Specializations for Natural Resource Sciences.
Member, October 2022-November 2022, SNR Administrative Assistant Search Committee.
Chair, 2021-June 2022, SNR Faculty Advisory Committee.
Member, 2020-December 2022, AGU Hazard Equity Working Group (HEWG).
Member, 2019-May 2022, CASNR Teaching and Learning Improvement Council.
Member, 2019-2021, SNR Faculty Advisory Committee.
Member, 2018-May 2022, CASNR Faculty Advisory Committee.

Chair, 2019, Applied Climate Science Recruitment Committee.
Chair, 2017-2018, High Plains Regional Climate Center Director Search Committee.
Chair, 2017-2018, ARD Faculty Advisory Council.
Chapter Co-Author, 2016-2018, Northern Great Plains Chapter for the National Climate Assessment.
Member, 2016-2018, SNR Recruitment Committee.
Member, 2016-2018, 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, 2015-2022, WMO Commission on Agricultural Meteorology Expert Team.
Member, 2015-2017, ARD Faculty 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.
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, 2009-2016, 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.
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.