

Jillian M. Deines, PhD

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EDUCATION

2013 – 2018	Ph.D. Environmental Geosciences	Michigan State University
2006 – 2009	M.S. Biological Sciences	University of Notre Dame
2002 – 2006	B.S., Honors, Ecology and Evolutionary Biology Minor: Anthropology	Saint Louis University

PROFESSIONAL EXPERIENCE

2018 -	Postdoctoral Scholar Center on Food Security and Environment Advisor: David Lobell	Stanford University
2013 – 2018	Doctoral Fellow <i>Thesis: Integrating satellite observations into process-based models to inform agricultural water management</i> Co-advisors: David Hyndman, Jianguo (Jack) Liu	Michigan State University
2012 – 2013	Project Manager/Research Technician PalEON: PaleoEcological Observatory Network Primary Investigator: Jason McLachlan	University of Notre Dame
2010 – 2012	Research Technician Primary Investigator: David Lodge	University of Notre Dame
2010	Biological Science Technician	National Park Service
2009 – 2010	Environmental Educator/Plants Field Instructor	MESD Outdoor School
2006 – 2009	Graduate Research/Teaching Assistant <i>Thesis: Conservation management under climate change: on tropical drought resistance, non-native species response to increasing disturbance, and assisted migration</i> Advisor: Jessica Hellmann	University of Notre Dame

AWARDS & FELLOWSHIPS

2013 – 2018	University Distinguished Fellowship, Michigan State University
2014 – 2017	NASA Earth and Space Science Fellowship
2017	Best Student Paper Award, Geology & Society Division, Geological Society of America
2006 – 2007	NSF-IGERT “GLOBES” Fellowship, University of Notre Dame
2006	Undergraduate Research Award: 1 st Place, Saint Louis University Biology
2004	Udall Scholarship Honorable Mention

PEER-REVIEWED PUBLICATIONS

- 2019 **Deines, J.M.**, A.D. Kendall, J.J. Butler Jr., & D.W. Hyndman. 2019a. Quantifying irrigation adaptation strategies in response to novel stakeholder-driven groundwater management in the US High Plains Aquifer. *Environmental Research Letters* 14:044014. <http://dx.doi.org/10.1088/1748-9326/aafe39>
- Deines, J.M.**, A.D. Kendall, M. Crowley, J. Rapp, J. Cardille, & D.W. Hyndman. 2019b. Mapping three decades of irrigation over the US High Plains Aquifer using Landsat and Google Earth Engine. *Remote Sensing of Environment* 233:111400. <https://doi.org/10.1016/j.rse.2019.111400>
- Deines, J.M.**, S. Wang, & D.B. Lobell. 2019c. Satellites reveal a small positive yield effect from conservation tillage across the US Corn Belt. *Environmental Research Letters*, In Press. Available 2019-12-06 at <https://doi.org/10.1088/1748-9326/ab503b>
- Xu, T., **J.M. Deines**, A.D. Kendall, B. Basso, & D.W. Hyndman. 2019. Addressing challenges for mapping irrigated fields in subhumid temperate regions by integrating remote sensing and hydroclimatic data. *Remote Sensing* 11:370. <http://dx.doi.org/10.3390/RS11030370>
- Zipper, S.C., K. Stack Whitney, **J.M. Deines**, K. Befus, U. Bhatia, S. Albers, J. Beecher, C. Brelsford, M. Garcia, T. Gleeson, F. O'Donnell, D. Resnik, & E. Schlager. 2019. Balancing open science and data privacy in the water sciences. *Water Resources Research* 55:5202-5211. <https://doi.org/10.1029/2019WR025080>
- 2018 Ryan, S.F., **J.M. Deines**, J.M. Scriber, M.E. Pfrender, S.J. Emrich, J.J. Hellmann. 2018. Climate-mediated hybrid zone movement revealed with genomics, museum collection, and simulation modeling. *Proceedings of the National Academy of Sciences* (cover image). <http://dx.doi.org/10.1073/pnas.1714950115>
- 2017 **Deines, J.M.**, A.D. Kendall, & D.W. Hyndman. 2017. Annual irrigation dynamics in the US Northern High Plains derived from Landsat satellite data. *Geophysical Research Letters* 44:9350-9360. <http://dx.doi.org/10.1002/2017GL074071>
- Hyndman, D. W., T.Xu, **J.M. Deines**, G. Cao, R. Nagelkirk, A. Vina, W. McConnell, B. Basso, A. Kendall, S. Li, L. Luo, F. Lupi, J.A. Winkler, W. Yang, C. Zheng, & J. Liu. 2017. Quantifying changes in water use and groundwater availability in a megacity using novel integrated systems modeling. *Geophysical Research Letters* 44:8359-8368. <http://dx.doi.org/10.1002/2017GL074429>
- 2016 **Deines, J.M.**, X. Liu, & J. Liu. 2016a. Telecoupling in urban water systems: an examination of Beijing's imported water supply. *Water International* 40:251-270. <http://dx.doi.org/10.1080/02508060.2015.1113485>
- Smidt, S.J., E.K. Haacker, A.D. Kendall, **J.M. Deines**, L. Pei, K.A. Cotterman, H. Li, X. Liu, B. Basso, & D. Hyndman. 2016. Complex water management in modern agriculture: Trends in the water-energy-food nexus over the High Plains Aquifer. *Science of the Total Environment* 566:988-1001. <http://dx.doi.org/10.1016/j.scitotenv.2016.05.127>
- Yang, W., D.Hyndman, J. Winkler, A. Viña, **J.M. Deines**, F. Lupi, L. Luo, Y. Li, B. Basso, C. Zheng, D. Ma, S. Li, X. Liu, H. Zheng, G. Cao, Q. Meng, Z. Ouyang, & J. Liu. 2016. Urban water sustainability: framework and application. *Ecology and Society* 21:4. <http://dx.doi.org/10.5751/ES-08685-210404>
- Deines, J.M.**, D. Williams, Q. Hamlin, & J.S. McLachlan. 2016b. Changes in regional forest composition in Ohio between Euro-American settlement and the present. *American Midland Naturalist* 176:247-271.

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- Deines, A.M., M. Wittmann, **J.M. Deines**, & D.M. Lodge. 2016. Tradeoffs among ecosystem services associated with global tilapia introductions. *Reviews in Fisheries Science and Aquaculture* 24:178-191. <http://dx.doi.org/10.1080/23308249.2015.1115466>
- 2014 O'Neil, S.T., J.D.K. Dzurisin, C.M. Williams, N.F. Lobo, J.K. Higgins, **J.M. Deines**, R.D. Carmichael, E. Zeng, J. Tan, G.C. Wu, S.J. Emrich, & J.J. Hellmann. 2014. Gene expression in closely-related species mirrors local adaptation: consequences for responses to a warming world. *Molecular Ecology* 23:2686-2698. <http://dx.doi.org/10.1111/mec.12773>
- 2011 **Deines, J.M.**, J.J. Hellmann, & T.J. Curran. 2011. Traits associated with drought survival in three Australian tropical rainforest seedlings. *Australian Journal of Botany* 59:621-629. <http://dx.doi.org/10.1071/BT10321>
- 2008 **Mueller (Deines), J.M.**, & J.J. Hellmann. 2008. An assessment of invasion risk from assisted migration. *Conservation Biology* 22:562-567. <https://doi.org/10.1111/j.1523-1739.2008.00952.x>

MANUSCRIPTS IN REVIEW

- Deines, J.M.**, M.E. Schipanski, B. Golden, S.C. Zipper, S. Nozari, C. Rottler, B. Guerrero, & V. Sharda. Transitions from irrigated to dryland agriculture in the Ogallala Aquifer: Land use suitability and regional economic impacts. In Review at *Agricultural Water Management*.

SELECTED MANUSCRIPTS IN PREPARATION

- Deines, J.M.**, A.D. Kendall, J.J. Butler Jr., B. Basso, & D.W. Hyndman. Evaluation of stakeholder-driven groundwater management in the US High Plains Aquifer through crop modeling and remote sensing. In Preparation for *Water Resources Research* (available upon request)
- Deines, J.M.**, W. Dado, R. Patel, D.B. Lobell. Insights into effective satellite crop yield estimation from an extensive ground truth dataset in the US Corn Belt. In Preparation for *Agricultural and Forest Meteorology*.
- Liu, X., **J.M. Deines**, A.D. Kendall, & D.W. Hyndman. Hydrologic response to irrigation across the Republican River Basin of the High Plains Aquifer. In Preparation for *Groundwater*.

DATA PRODUCTS

- 2019 **Deines, J.M.**, A.D. Kendall, J.J. Butler, Jr., & D.W. Hyndman. 2019. Derived data and analysis code accompanying Deines et al. 2019, Environmental Research Letters (Version v1.0.0) [Data set]. Zenodo. <http://doi.org/10.5281/zenodo.2542229>
- Deines, J.M.**, A.D. Kendall, M. Crowley, J. Rapp, J. Cardille, & D.W. Hyndman . 2019. Annual Irrigation Maps – High Plains Aquifer (AIM-HPA, Deines et al. 2019). Available at <http://dx.doi.org/10.4211/hs.a371fd69d41b4232806d81e17fe4efcb>
- 2017 **Deines, J.M.**, A.D. Kendall, & D.W. Hyndman. 2017. Annual Irrigation Maps – Republican River Basin (AIM-RRB; Deines et al. 2017). Available at <http://dx.doi.org/10.4211/hs.55331a41d5f34c97baf90beb910af070>

- 2015 **Deines, J.M.**, J. McLachlan, A. Hamlin, D. Williams, and J. Peters. 2015. Ohio Public Land Survey (PLS) Witness Tree GIS Shapefile. Long Term Ecological Research Network. <http://dx.doi.org/10.6073/pasta/6c8ccb2a4e385f757abbb276987833d7>

TEACHING AND WORKSHOP PRESENTER EXPERIENCE

- 2018 Google Earth Engine for Remote Sensing and Geographic Data Analysis Work. Afternoon workshop, Stanford Earth SkillShare Series, November 30, 2018.
- 2017 Google Earth Engine Tutorial. Co-presenter and content developer. Geohackweek 2017, University of Washington, Seattle. **Jillian Deines**, Catherine Kuhn. Workshop materials available at <https://geohackweek.github.io/GoogleEarthEngine/> and featured on Google Earth Engine's Training Resources page at <https://developers.google.com/earth-engine/tt>
- 2015 Student Workshop: Using R to Model, Manipulate, and Manage Spatial Data. Co-presenter and content developer. International Association of Landscape Ecology World Congress in Portland, OR. July 7, 2015. Whalen Dillon, **Jillian Deines**, Thomas Edwards, Karl Jarvis, Francesco Tonini.
- 2014 **Deines, J.M.** A Tale of Two Aquifers: Issues in Global Groundwater Use. Invited guest lecture for Dr. William Taylor's course, "Global Issues in Fisheries and Wildlife Resources." Michigan State University, April 7, 2014.

INVITED PRESENTATIONS

- 2019 **Deines, J.M.**, *Invited presenter*, with W. Dado, R. Patel, & D.B.Lobell. Insights into effective satellite crop yield estimation from an extensive ground truth dataset in the US Corn Belt. American Geophysical Union, San Francisco, CA. December 2019.
- Deines, J.M.** *Invited presenter*. Informing groundwater management with satellite data: mapping three decades of irrigation over the US High Plains Aquifer. North Central Region Water Network webinar on Big Data and Water Resource Management. June 12, 2019.
- Deines, J.M.** *Panelist*, "Win-win opportunities in environmental protection." Colloquium hosted by the Environmental Science and Public Policy program, Michigan State University, April 25, 2019.
- Deines, J.M.** *Invited seminar*. Advancing geospatial methods for sustainable agricultural water management. Department of Human Environment Systems, Boise State University. January 23, 2019.
- 2018 **Deines, J.M.** *Invited seminar*. Integrating satellite observations into process-based models to inform agricultural water management. Desert Research Institute, Reno, NV. January 15, 2018.

CONTRIBUTED PRESENTATIONS

*Undergraduate mentee; + graduate mentee

- 2019 **Deines, J.M.**, S. Wang, & D.B. Lobell. Investigating the yield impacts of conservation tillage in the US Corn Belt using Landsat. Oral presentation, December 2019, American

Geophysical Union, San Francisco, CA

+Brady, A.J., A.D. Kendall, **J.M. Deines**, & D.W. Hyndman. Detecting changes in irrigation technology over the High Plains Aquifer, USA, using three decades of satellite data. Poster, December 2019, American Geophysical Union, San Francisco, CA

+Dado, W., J.M. Deines, & D.B. Lobell. Improving satellite-based soybean yield mapping across irrigated and rain-fed conditions. Poster, December 2019, American Geophysical Union, San Francisco, CA.

+Rapp, J., A.D. Kendall, J.M. Deines, & D.W. Hyndman. Detecting irrigation in nuanced and diverse landscapes: A comparison of neural networks and forest-based classifiers. Poster, December 2019, American Geophysical Union, San Francisco, CA.

Deines J.M., A.D. Kendall, J.J. Butler, Jr., B. Basso, & D.W. Hyndman. Combining remote sensing and crop models to assess the sustainability of stakeholder-driven groundwater management in the US High Plains Aquifer. Oral presentation, Chapman Conference on the Quest for Sustainability of Heavily Stressed Aquifers at Regional to Global Scales, Valencia, Spain. Oct. 23, 2019.

Deines, J.M. From maps to management insights: Understanding the yield impacts of conservation tillage in the US Corn Belt. Oral presentation, Geo for Good Summit, Google. September 18, 2019.

2018 **Deines, J.M.**, A.D. Kendall, M. Crowley, J. Rapp, J. Cardille, & D.W. Hyndman. Shifting irrigation patterns in response to policy, technology, and water availability: Mapping three decades of irrigation across the US High Plains Aquifer with Landsat. eLightning Session, December 2018, American Geophysical Union, Washington, DC.

*Drippe, E.P., A.D. Kendall, **J.M. Deines**, T. Xu, & D.W. Hyndman. Improving classification of humid-region irrigation using the red-edge band of Sentinel-2: Comparing irrigated and non-irrigated corn and soy in southwestern Michigan. Poster, December 2018, American Geophysical Union, Washington, DC.

2017 **Deines, J.M.**, A.D. Kendall, & D.W. Hyndman. 2017. Mapping annual irrigation dynamics to inform water management. Oral presentation at the Google Exhibition Booth, December 14, 2017. American Geophysical Union, New Orleans, LA.

Deines, J.M., A.D. Kendall, J.J. Butler, Jr., & D.W. Hyndman. 2017. Evaluation of stakeholder-driven groundwater management through integrated modeling and remote sensing in the US High Plains Aquifer. Oral presentation, December 13, 2017. American Geophysical Union, New Orleans, LA.

*Rapp, J., **J.M. Deines**, A.D. Kendall, & D.W. Hyndman. 2017. Expanding the Annual Irrigation Maps (AIM) Product to the entire High Plains Aquifer: Addressing the challenges of cotton and deficit-irrigated fields. Poster presentation, Monday 11, 2017. American Geophysical Union, New Orleans, LA.

Deines, J.M., A.D. Kendall, & D. Hyndman. 2017. Mapping annual irrigation dynamics in the northern US High Plains Aquifer using Landsat satellite data. Oral presentation, October 25, 2017. Geological Society of America, Seattle, WA.

**Best Student Paper Award, Geology & Society Division

2016 **Deines, J.M.**, A.D. Kendall, & D. Hyndman. 2016. Multi-year mapping of irrigated croplands over the US High Plains Aquifer using satellite data. Oral presentation, December 2016. American Geophysical Union, San Francisco, CA.

- *Rapp, J., **J.M. Deines**, A.D. Kendall, & D. Hyndman. 2016. Assessing inaccuracies in remotely sensed irrigation maps across the High Plains Aquifer. Poster presentation. American Geophysical Union, San Francisco, CA.
- 2015 **Deines, J.M.**, A.D. Kendall, & D. Hyndman. 2015. Quantifying the impact of a transboundary streamflow agreement on groundwater resources in the US High Plains Aquifer. Poster presentation, December 17, 2015. American Geophysical Union, San Francisco, CA.
- Deines, J.M.**, X. Liu, & J. Liu. 2015. Telecoupling in urban water systems: an examination of Beijing's imported water supply. Poster presentation, July 6, 2015. International Associate of Landscape Ecology World Congress, Portland, OR.
- Deines, J.M.**, A.D. Kendall, J. Liu, and D. Hyndman. 2015. Agent-based evaluation of groundwater permits in agricultural-stream systems. Poster presented at the NSF Water, Sustainability, and Climate program meeting in Washington, D.C. February 10, 2015.
- 2013 **Deines, J.M.**, D. Hyndman, B. Basso, G. Cao, A. Kendall, S. Li, Y. Li, L. Luo, F. Lupi, D. Ma, W. McConnell, Q. Meng, R. Nagelkirk, Z. Ouyang, A. Vina, J. Winkler, W. Yang, C. Zheng, & J. Liu. Testing an integrated approach for water sustainability in megacities. Oral presentation, Water for a Sustainable World Research Symposium, Michigan State University. November 2013.
- Deines, J.M.**, D. Hyndman, B. Basso, G. Cao, A. Kendall, S. Li, Y. Li, L. Luo, F. Lupi, D. Ma, W. McConnell, Q. Meng, R. Nagelkirk, Z. Ouyang, A. Vina, J. Winkler, W. Yang, C. Zheng, & J. Liu. A Systems Approach to Water Sustainability in Megacities under Global Change. Poster presented at the United Nations 68th Anniversary Commemoration Conference: Water, Food Security, and the Developing Global Crisis, hosted by the Greater Lansing Chapter of the United Nations Association, East Lansing, Michigan. October 28, 2013.
- *Williams, D, **J.M. Deines**, & J.S. McLachlan. The changing forests of Ohio: drivers of composition shifts between the settlement era and today. Oral presentation, Midwest Ecology and Evolution Conference, March 23, 2013.

GRANT WRITING EXPERIENCE

(*funded)

2019	*Working Group member and assisting author, USGS Powell Center <i>Visualizing the Invisible: Causes, Consequences, Changes, and Management of Streamflow Depletion across the U.S.</i>	\$162,405*
2017	*Assisting author, NSF/NIFA INFEWS <i>INFEWS/TI: Developing Pathways Toward Sustainable Irrigation across the United States Using Process-based Systems Models (SIRUS)</i>	\$2,499,756*
	MSU Earth and Environmental Sciences Travel Award	\$700
2015	*NASA-MSU Professional Enhancement Award	\$700*

2014	<p>*PI, NASA Earth and Space Science Fellowship Faculty sponsor: Dr. Jianguo “Jack” Liu <i>Groundwater and economic sustainability in agricultural systems under climate change: A coupled human-natural systems approach</i> (\$30,000 per year, annually renewed in 2015 and 2016)</p>	\$90,000*
2013	<p>Assisting author, NSF Water, Sustainability, and Climate <i>WSC-Category 2: Collaborative: A Systems Approach to Megacity Water Sustainability Under Global Change</i></p>	\$3,798,065
2012	<p>*Staff proposal coordinator, Assisting author, NSF Macrosystems Biology <i>Collaborative Research and NEON: MSB Category 2: PalEON - a PaleoEcological Observatory Network to assess terrestrial ecosystem models</i></p>	\$5,113,060*

PROFESSIONAL SERVICE/OUTREACH

Reviewer: Data in Brief, Environmental Research Letters, Global Ecology and Conservation, Nature Sustainability, Professional Geographer, Remote Sensing

POPULAR SCIENCE ARTICLES/NOTEWORTHY ITEMS

2018	<p>“Satellites investigate irrigation in a stressed aquifer.” NASA’s Image of the Day, July 9, 2018. Story by Adam Voiland. https://earthobservatory.nasa.gov/images/92387/satellites-investigate-irrigation-in-a-stressed-aquifer</p>
2017	<p>“Modeling Beijing’s water crisis.” Eos Research Spotlight. October 25, 2017. Story by Elizabeth Thompson. https://eos.org/research-spotlights/modeling-beijings-water-crisis</p> <p>“How much water flows into agricultural irrigation? New study provides 18-year water use record.” NSF Bulletin, October 19, 2017. Story by Cheryl Dybas & Val Ostrowski. https://www.nsf.gov/news/news_summ.jsp?cntn_id=243386</p>
2008	<p>Mueller (Deines) and Hellmann 2008 recommended by F1000 (https://doi.org/10.3410/f.1116539.572575)</p>