

**JESSICA ANNE STEPHENSON (NEE NELSON)**

**Curriculum Vitae**

*Graduate Research Assistant*

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**EDUCATION**

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Iowa State University, Ames, IA Sustainable Agriculture, Doctor of Philosophy	May 2026, anticipated
Iowa State University, Ames, IA Sustainable Agriculture, Master of Science	Dec 2022
Minnesota State University, Mankato, MN Environmental Science, Bachelor of Science Biology with Ecology emphasis, Bachelor of Science Geographical Information Systems Certificate	May 2014
North Hennepin Community College, Brooklyn Park, MN Associates of Liberal Arts	May 2011

**RESEARCH EXPERIENCE**

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**Graduate Research Assistant** June 2022 - Present

*Graduate Program in Sustainable Agriculture @ Depart. of Natural  
Resource Ecology and Management, Iowa State University*

- Develop watershed scenarios for 12 HUC12 watersheds in east central Iowa that intersect a 10-mile supplyshed to an anaerobic digester. Scenarios included conservation considerations to implement structural practices (i.e., wetlands, water and sediment control basins (WASCOBs) and agronomic considerations to evaluate conversion of fields currently managed in a crop management to a perennial feedstock cropping system such as prairie and winter hardy biomass crops.
- Explore and summarize land valuation metrics within agriculture, including finances, human perspectives, and ecological impacts.
- Organizing student scholars and professionals to create a working group for Agricultural Conservation Planning Framework (ACPF) GIS developers.
- Managing and training two student workers on how to use ACPF to develop several conservation scenarios and cropland management changes.

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**Graduate Research Assistant**

Jan 2019-Dec 2022

*Graduate Program in Sustainable Agriculture @ Dept. of Agronomy  
Iowa State University*

- Performed high-resolution terrain analysis of 12 study paired watersheds throughout Iowa to model soil erosion and redeposition. The paired watersheds consisted of a row crop field with prairie strips and a control field without prairie strips.
- Collected soil movement data using mesh soil erosion pads at 12 fields.
- Coordinated with landowners and farm operators to gain access to their farm and conduct my field work during the growing season.
- Developed statistical models to interpret the data collected and determine if prairie strips have an impact on soil movement and redeposition patterns in row crop fields. Data included mass soil movement, rainfall, and digital environmental datasets.
- Designed experimental layout for fields sampled in 2019 and 2020 using pre-existing protocols being used in Iowa since 2015.
- Constructed erosion pads for field sampling throughout the growing season.
- Python and R coding for database management and statistical analysis.
- Train students and staff on GIS and GPS technology to support Department of Agriculture's research projects.

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**PROFESSIONAL EXPERIENCE**

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**Graduate Student Research in Agricultural Conservation & Watershed Planning**

Feb 2020 - April 2021

*Oak Ridge Institute for Science and Education, USDA-ARS NLAE,  
Ames, IA*

- Provided support to the USDA Natural Resources Conservation Service (NRCS) in utilizing a new technology for conservation planning in agricultural watersheds, called the Agricultural Conservation Planning Framework (ACPF).
- Assisted in development of ACPF planning results for a total of 30 small watersheds across eight states using GIS software.
- Used data visualizing to enhance conservation management of agricultural landscapes.
- Facilitated interactions between the project's GIS analyses team and NRCS officials to evaluate and customize ACPF results to improve planning outcomes in each watershed.
- Contributed to presenting and training NRCS staff and local offices to interpret ACPF results for their watersheds and developing plans for farmer engagement.
- Designed and developed database management for each watershed.
- Modifying Python scripts to tailor BMP siting simulations to diverse topographic features throughout agricultural watershed in the U.S.

## **Watershed Outreach & GIS Analyst**

Aug 2015 - Jan 2019

*Water Resources Center, Minnesota State University, Mankato*

- Managed crop residue management survey datasets between 2012-2016 in Le Sueur River Watershed using ArcPad, ArcCollector, and ArcGIS, then compared to historical County records from 1990's and 2007. Results were uploaded to ArcGIS Online platform to share with a larger audience.
- Integrated different aspects of GIS technology to prepare hydro terrain analysis products across three HUC8 watersheds (Yellow River Watershed District, Lac Qui Parle-Yellow Bank River Watershed District, and Watonwan River Watershed), one HUC10 watershed (Wood Lake Creek).
- Applied Agricultural Conservation Planning Framework (ACPF) and GIS toolset, in unison with local conservation planners to prioritize agricultural best management practices (BMPs) suited for each work area's distinct topography and water features.
- Developed land management scenario mapbooks and databases using hydromodified DEM datasets, soil data, land use and other GIS datasets.
- Coordinated and led four hydro terrain analysis and field-scale GIS targeting workshops with local and regional natural resource professionals.
- Trained students how to interpret GIS datasets and best practices while performing raster analysis for natural resource management.
- Established South Central Minnesota GIS User Group meetings with local partners serving on Steering Committee.
- Met with city officials to identify needs for changes in drainage management to protect infrastructure from increased frequency of high-intensity rain events.
- Worked with producers and ditch inspectors to investigate the history of drainage to identify leverage points for increased water storage on the landscape.
- Formed South Central Minnesota GIS User Group Steering Committee to coordinate quarterly meetings for improved information flow among regional private and public organizations.
- Coordinated and led eight community watershed meetings in Le Sueur River Watershed. Meetings facilitated dissemination of information from public agencies, citizens crop consultants, engineering firms, and researchers about local water resources concerns and a good land stewardship ethic. Discussions fostered cross-sector communication with those that live, work, and play in the watershed.
- Organized bi-monthly Le Sueur River Watershed Network meetings to help shape annual objectives and measure progress towards their vision for the Le Sueur River Watershed outlined in the *7 Recommendations for Cleaner Water and River Health*.
- Created outreach materials with Le Sueur River Watershed Network citizen-volunteer steering committee to educate elected officials, state agencies, local staff, and citizens about the Network's *7 Recommendations for Cleaner Water and River Health*.
- Provided GIS technical support to various private and public entities (i.e. County, SWCD, DNR, Watershed Districts, BWSR, etc.) through map development, database requests, and product demonstrations.
- Presented at national and state conferences on GIS applications, agricultural watershed management concerns and other project-related findings.

- Developed, designed, and maintained websites for Le Sueur River Watershed Network, Minnesota Nutrient Planning Portal, Conservation Marketplace Midwest, and Minnesota River Valley 2014 Ravine Stabilization Workshop.
- Performed equipment needs assessment and developed a strategy to acquire software and hardware to improve workflow efficiency at the Water Resources Center.
- Maintained and troubleshoot problems with equipment for Water Resources Center and Southern Minnesota Regional Science and Engineering Fair.
- Assisted Watershed Load Monitoring Network (WPLMN) specialist prepare sampling equipment and collect water quality samples from streams in the Greater Blue Earth River Basin. Followed SOP for YSI Sonde™, Van-Dorn bottle, and grab samples with Nasco swing sampler.

**GIS Analyst**

Nov 2014 - Aug 2015

*Water Resources Center, Minnesota State University, Mankato*

- Digitized breachlines using LiDAR-derived, 3-meter DEM to model surface water flow paths appropriately within the jurisdiction of Yellow Medicine River Watershed District.

**Stormwater Member**

Sept 2014 - Aug 2015

*Americorps - Minnesota GreenCorps, Water Resources Center, Minnesota State University, Mankato*

- Integrated different aspects of GIS technology to prepare hydro terrain analysis products for five HUC12 subwatersheds of Le Sueur River Watershed.
- Coordinated paddle with DNR and Mankato Paddling and Outings Club to provide an opportunity for Le Sueur River Watershed Network participants to paddle the river to listen to researchers describe changes in hydrology.
- Worked with MDA to host a field day and brainstorm opportunities with participants to experiment and demonstrate benefits of increasing water storage across the landscape.
- Prepared and presented subwatershed mapbooks to Le Sueur River Watershed Network Steering Committee to gather feedback on how to best display results for public consumption.
- Evaluated existing rural stormwater management within Le Sueur River Watershed.
- Work with local conservation districts to identify available conservation programs to provide financial assistance to producers.
- Prepared a list of conservation practices and funding mechanisms to support experimentation of stormwater practices within rural communities and farming operations.

**Community Outreach & GIS Intern**

Jan 2013 - Sept 2014

*Water Resources Center, Minnesota State University, Mankato*

- Organized and facilitated meetings and conferences for civic engagement and community outreach projects.
- Developed, designed, and updated the following websites: Le Sueur River Watershed Network ([www.lesueurriver.org](http://www.lesueurriver.org)), Minnesota Nutrient Planning Portal ([www.mrbdc.mnsu.edu/mnnutrients](http://www.mrbdc.mnsu.edu/mnnutrients)), and Minnesota River Valley Ravine Stabilization Charette ([mnravines.org](http://mnravines.org)).

- Developed efficient generation and distribution of *Minnesota River Weekly Update* newsletter using Microsoft Office product, InfoPath Designer.
- Prepared water management policy analysis for Minnesota by compiling approved water plans and synthesized reports from case studies and research.
- Provided GIS support to WRC staff and cooperators.
- Performed terrain analysis on elevation models to identify potential water storage areas.
- Conducted crop residue management surveys identifying crop practices and tillage rotations.

## PROFESSIONAL ASSOCIATIONS

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- Theme Chair, *Intersection of Agroecology and Industrial Ecology Track, International Symposium on Sustainable Systems and Technology*, (2023)
- Elected Member, *Leadership Committee, STRIPS* (2020-present)
- Member, *Data Committee, STRIPS* (2020-present)
- Member, *Soil and Water Conservation Society, Iowa Chapter* (2019-Present)
- Member, *Practical Farmers of Iowa* (2019-Present)
- Hydrologic Landforms & Hydrography Workgroup, *3d Geomatics Committee* (2018-2019)
- Watershed Leaders Network Workshop, *Fishers & Farmers Partnership* (2017-2018)
- Steering Committee Member, *South Central Minnesota GIS User Group* (2016-2019)
- Board Member, Minnesota River Basin Representative, *Soil and Water Conservation Society, Minnesota Chapter* (2016-2020)
- Board Member, Co-President, *Conservation Marketplace Midwest* (2015-2018)

## ADDITIONAL TRAINING

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- Agricultural Worker Pesticide Safety Training (2019)
- Getting Started with ArcGIS Pro, MN GIS/LIS Consortium Spring Workshops (2017)
- ArcGIS for Server: Administration and Advanced Topics, MN GIS/LIS Consortium Spring Workshops (2017)
- Growing Future Skills: Building Dynamic Maps with CartoDB, Upper Midwest Geocon (2016)
- Civic Governance, Minnesota Active Citizenship Initiative (2015-2017)
- Agricultural Conservation Planning Framework, University of Minnesota (2015)
- Southwest Civic Engagement Cohort, University of Minnesota (2013-2014)

## PUBLICATIONS

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- **Stephenson, J.A. et al.**
- Tomer, M.D., and J. Nelson. 2020. Measurements of landscape capacity for water detention and wetland restoration practices can inform watershed planning goals and implementation strategies. *Journal of Soil and Water Conservation*.

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- Nelson, J. 2018. Landscape-specific adaptations of the ACPF: Guidance on customizing the Agricultural Conservation Planning Framework (ACPF) GIS Toolbox. Regents of the University of Minnesota, Twin Cities.
  - Yuan, F., P. Larson, R. Mulvihill, D. Libby, J. Nelson, T. Grupa, and R. Moore. 2018. Mapping and analyzing stream network changes in Watonwan River Watershed, Minnesota, USA. ISPRS International Journal of Geographic Information.

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## PRESENTATIONS

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- **ISSST**
- **Iowa Learning Farms**
- Nelson, J.A. (2023, April) Leveraging technology to imagine potential sustainable cropping systems in Iowa. Annual GPSA Symposium.
- Nelson, J.A. (2023, April) Monitoring soil movement in row crops. Upper Midwest Soil Health Team – University of Minnesota.
- Nelson, J.A. (2023, February) Conservation planning and bioeconomic analysis using GIS tools. Iowa State University GIS Seminar.
- Nelson, J.A. (2022, November) Development of land management scenarios using the ACPF. North Central Regional Water Network.
- Nelson, J.A. (2022, September) Monitoring soil movement at the field-scale in row-crop systems with prairie strips. Public portion of M.S. Thesis Defense.
- Nelson, J.A. and J. Tyndall. (2022, September) Mud Creek Watershed (HUC 070801030303). Grass2Gas Iowa Modeling Team.
- Nelson, J.A. and J. Tyndall. (2022, August) Sediment transport in cropped fields with strips of prairie vegetation. 2022 STRIPS Cooperator’s Meeting.
- Nelson, J.A., and J. Tyndall. (2022, July) Quantify the bioeconomic and ecological uplift value at a watershed-scale of change. Grass2Gas Goal 2 Project Meeting.
- Nelson, J.A., M. Liebman, J. Niemi, and T. Youngquist. (2022, April) Monitoring soil movement patterns in prairie strip fields. Annual Graduate Program in Sustainable Agriculture Symposium.
- Nelson, J.A., M. Liebman, J. Niemi, and T. Youngquist. (2022, January) Investigating soil movement patterns in fields with prairie strips. STRIPS symposium.
- Nelson, J.A., M. Liebman, J. Niemi, and T. Youngquist. (2021, November) Monitoring in-field soil erosion patterns and mechanisms. 2021 ASA, CSSA, SSSA International Annual Meeting.
- Nelson, J.A. (2021, October) Building map products with ACPF data. Session 3, Watershed Applications of Agricultural Conservation Planning Framework.
- Nelson, J.A., M. Liebman, J. Niemi, and T. Youngquist. (2021, September) Prairie Strips: Monitoring in-field soil movement. STRIPS Research Team.
- Nelson, J.A. and M. Liebman. (2021, July) Advancing methods for monitoring field-scale soil movement. 76th Annual Soil and Water Conservation Society Conference.
- Nelson, J.A. and M. Liebman. (2021, April) Earth, wind, and water: Using prairie to reduce erosion. Annual Graduate Program in Sustainable Agriculture Symposium.
- Nelson, J.A. and M.D. Tomer. (2021, April) Evaluating opportunities for water detention based on landscape capacity of a watershed. Iowa Water Conference. -
- Nelson, J.A., M. Liebman. (2020, July) From Top to Bottom: Impact of prairie strips

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on soil movement in cropped fields. 75th Annual Soil and Water Conservation Society Conference.

- Nelson, J.A., C.M.J. Sandoval-Green, and R.L. McNeely. (2020, July) Preliminary ACPF toolbox results for targeted watersheds and considerations for adapting tools in various landscapes. 75th Annual Soil and Water Conservation Society Conference.
- Nelson, J.A., M.D. Tomer, and D. James. (2020, May) Working with ACPF data. Meeting with NRCS staff Piloting ACPF.
- Nelson, J.A. and R. Reynolds. (2020, February) Intro to Food at First Garden. Master Gardeners.
- Nelson, J.A., M. Liebman, and T. Youngquist. (2020, January) Soil Movement Study. 2020 Annual STRIPS Symposium, Ames, IA.
- Nelson, J.A. (2019, June). Novel methods for monitoring soil movement. Presentation during field day demonstrating prairie strips, Nevada, IA.
- Nelson, J.A. and K. Musser. (2018, October) Linking Citizens and Watershed Science. Presentation at Water Resources Conference, St. Paul, MN.
- Nelson, J.A. (2017, August) ACPF in the Minnesota River Basin: Integrating citizen involvement with targeting efforts in Mark Tomer (Chair), Update on the Agricultural Conservation Planning Framework: New tools, training resources, and watershed engagement efforts. Symposium conducted at the 72nd Annual International Soil and Water Conservation Society Conference, Madison, WI.
- Nelson, J.A. and J. Klang. (2016, July) Evaluation of economic barriers to incentivizing ecosystem services in Minnesota. Presentation at the 71st Annual International Soil and Water Conservation Society Conference, Louisville, KY.
- Nelson, J.A. and S. Porter. (2015, October) The Agricultural Conservation Planning Framework (ACPF) and its application in the Le Sueur River Watersheds in southern Minnesota. Presentation at Minnesota GIS/LIS Consortium 25th Annual Conference & Workshops, Duluth, MN.
- Nelson, J.A. and J. Klang. (2015, October) Linking water storage BMPs to watershed goals. Presentation at the Minnesota Water Resources Conference, St. Paul, MN.
- Musser, K. and J.A. Nelson. (2015, October) Citizen led subwatershed targeting in the Le Sueur River Watershed. Presentation at the Minnesota Water Resources Conference, St. Paul, MN.
- Nelson, J.A. (2015, August) Downstream impacts on impaired waters. Presentation at Agricultural Drainage and the Future of Water Quality Workshop, Mankato, MN.
- Nelson, J.A. and R. Moore. (2015, July) Use of ACPF in subwatersheds of the Le Sueur River, Minnesota in Mark Tomer (Chair), Engaging farmers in watershed planning through precision conservation: Midwestern case studies utilizing the Agricultural Conservation Planning Framework. Symposium conducted at the 70th Annual International Soil and Water Conservation Society Conference, Greensboro, NC.
- Nelson, J.A. (2015, March) Past, present and future of water quality in the Le Sueur River Watershed. Watershed Division meeting at Minnesota Pollution Control Agency, St. Paul, MN.
- Nelson, J.A., A. Nickel and S.J. Fisher. (2013, April) Impacts of flood pulses on limnetic macroinvertebrates in Minnesota River backwater lakes. Presentation at the

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Undergraduate Research Symposium held at Minnesota State University, Mankato, MN.

- Nelson, J.A., A. Nickel and S.J. Fisher. (2013, March) Impacts of flood pulses on limnetic macroinvertebrates in Minnesota River backwater lakes. Poster presented at Minnesota Chapter of the American Fisheries Society 46th Annual Meeting, St. Cloud, MN.
- Nelson, J.A., A. Nickel and S.J. Fisher. (2012, December) River backwater connectivity relationships to limnetic macroinvertebrates. Poster presented at 73rd Midwest Fish and Wildlife Conference, Wichita, KS.

## **WORKSHOPS**

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- Nelson, J.A. (2022, January) Data Entering. STRIPS Data Management Workshop, Ames, IA.
- James, D.E., Obrecht, J., Nelson, J.A., McNeely, R. and C. Sandoval-Green. (2021, September-October) Agricultural Conservation Planning Framework Technical Cohort Training, webinar series.
- Nelson, J.A., M.T. Reineke, and C. Freeman. (2018, September) Visualizing ACPF and PTMApp datasets for watershed planning. Greater Blue Earth River Basin Alliance, Mankato, MN.
- Nelson, J.A., M.T. Reineke, and T. Grupa. (2018, August) Visualizing and editing hydro terrain analysis datasets. Greater Blue Earth River Basin Alliance, Mankato, MN.
- Nelson, J.A. and T. Grupa. (2017, June) ArcCollector to verify breachline inventory. Greater Blue Earth River Basin Alliance, St. James, MN.
- Nelson, J.A. (2016, May, June, and September) Yellow Medicine River Watershed Hydro Terrain Analysis Training: 3-Day Workshop Series. Yellow Medicine River Watershed District, Minnesota, MN.
- Klang, J., J.A. Nelson, K. Breth, D. Anderson, and L. Meschke. (2016, August) Quantifying Water Storage Benefits Workshop. Mankato, MN.
- Nelson, J.A. and A. Meyer. (2015, September) Hydro Terrain Analysis Workshop. Lac Qui Parle-Yellow Bank River Watershed District, Madison, MN

## **HONORS AND AWARDS**

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- Placed Second in Research Poster Contest, *Iowa Water Conference* (Apr 2021)
- Education Minnesota Outstanding Leadership Award, *Minnesota Valley Uniserv* (Apr 2015)
- May Volunteer of the Month at Adult Basic Education, *Mankato Area Public Schools*, (May 2014)
- John and Anne Frey Bioscience Scholarship, *John and Anne Frey Foundation*, (Aug 2013 - May 2014)
- Undergraduate Research Center Grant, *Minnesota State University, Mankato* (Mar 2013)
- McNair Achievement Program First Year Scholar of the Year, *McNair Program at Minnesota State University, Mankato* (Sept 2012 - July 2013)



## GRANTS RECEIVED

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July 2017 - Jan 2018	<b>Wood Lake Creek Watershed Hydro Terrain Analysis</b> <i>Southwest Prairie Technical Service Area</i> Principle Investigator	\$12,390
July 2016 - Dec 2018	<b>Watowan River Watershed Hydro Terrain Analysis</b> <i>Greater Blue Earth River Basin Alliance</i> Principle Investigator	\$52,280
June 2016 - June 2019	<b>Integrating Targeted Watershed Tools with Citizen Involvement</b> <i>Legislative Citizen Commission for Minnesota Resources</i> Co-Principle Investigator	\$169,000

## INSTITUTIONAL SERVICE

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- Co-organizer, *CCHANGE Scholars Peer-to-Peer Learning Meetings*, 2023-present
- Member, *SILPH Data Committee* (2023-present)
- Committee member, *Graduate Program of Sustainable Agriculture Colloquium Planning Committee* (2019, 2023)
- Co-president, *Sustainable Agriculture Student Association* (2023)
- Food at First Officer, *Sustainable Agriculture Student Association* (2020, 2022, 2023)
- Biomonitoring Educator, *Explore STEM Camps* (2018)
- Search Committee member for MINRALS Director, *Minnesota State University, Mankato*, (2016, 2017)
- Water Quality Sampling Educator, *Max Scholarship Program Retreat*, 2014
- Aquatic Macroinvertebrate Sampling Educator, *Fisheries Biology (BIOL 505) Lab* (2013)

## COMMUNITY INVOLVEMENT

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- Volunteer and head chef, *Food at First* (2020-Present)
- Garst Sister Fall Party crew member, *Whiterock Conservancy* (2019)
- Advisory Board Member and Management Committee Member, *Minnesota River Congress* (2015-2019)
- Capstone Mentor, *Eastern Carver County Schools* (May 2017)
- Presentation on impacts of climate change to water resources, *Mankato Paddling and Outings Club* (2016, 2017)
- Lead Crew Member, *Sibley Park Clean-up* (2016)
- ESL Teacher Aide, Adult Basic Education, *Mankato Area Public Schools, MN* (Feb 2013 - May 2015)
- Science Fair Judge, *Southern Minnesota Regional Science Fair, Mankato, MN* (Feb 2012, Apr 2013, Feb 2014)
- Osprey Migration Pattern Volunteer, *West Coon Rapids Dam Regional Park, Brooklyn Park, MN* (Feb - June 2011)

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- Pathology Lab Volunteer, *North Memorial Hospital, Robbinsdale, MN* (June - Dec 2010)