

**Tyler Anthony Groh**

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**EDUCATION**

<b>Ph.D. Iowa State University</b> Environmental Science	<b>August 2018</b>
<b>M.S. University of Illinois Urbana-Champaign</b> Natural Resources and Environmental Science	<b>May 2014</b>
<b>B.S. University of Wisconsin Stevens Point</b> Watershed Management	<b>December 2011</b>

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**RESEARCH EXPERIENCE**

<b>Penn State University Assistant Research Professor</b>	<b>April 2020-Present</b>
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- 25% Research appointment
- Research centered around soil-water interaction biogeochemistry
  - Set up long-term riparian buffer to measure how the soil's health changes over time under a variety of buffer vegetation and how this change affects nutrients removed.
  - Starting an experiment that assesses biochar addition to riparian buffers to enhance water quality benefits.

<b>Iowa State University Postdoctoral Research</b>	<b>Aug 2018-March 2020</b>
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- Assessing new designs of saturated riparian buffers
- Assessing nitrate removal and hydrology in new designs including
  - Dual outlet design for surface intake drainage systems
  - Double lateral pipe
  - Gravel envelope
- Running infiltration analysis
- Coordinating and mentoring undergraduate assistants
- Managing research lab
- Research collaborator and Co-PI with departments across Iowa State University that are also assessing and modeling saturated riparian buffers
- Mentoring undergraduates in independent study projects
- Consulting on saturated buffer designs across the state of Iowa

<b>Ph.D. Research</b>	<b>Nitrate removal in riparian buffers</b>	<b>May 2014-Aug 2018</b>
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- In charge of the nitrate removal, specifically microbial denitrification, research portion of the riparian buffer study
- Saturated and conventional buffers were studied

- Collaborative, multiple lab research (USDA-ARS NLAE and Iowa State)
- Collected soil, water, and gas samples from riparian buffers
- Organized and supervised undergraduate assistants, conducting in lab experiments with soil cores, running water, soil, and gas samples on machines (spectrophotometer, gas chromatograph, elemental analyzer, ion-selective electrodes, pH electrodes, and DO meters)
- Supervised and mentored undergraduate independent projects

#### M.S. Research

#### **Nitrogen and phosphorus removal, along with greenhouse gas emissions from constructed wetlands** Jan 2012-May 2014

- Main graduate student on the constructed wetland project
- Collaborative, multiple lab research
- Field work: soil, water, and gas sampling from three constructed wetlands
- Field equipment: pressure transducers, data loggers, Agri Drain control box, ISCO automated water samplers
- Sample analyzation: Lachat, ion chromatograph, gas chromatograph, Li-Cor, and elemental
- Undergraduate assistant supervision

#### PUBLICATIONS

**Groh, T.A.**, T.M. Isenhardt, and R.C. 2020. Schultz. Long-term Nitrate Removal in Three Riparian Buffers: 21 Years of Data From the Bear Creek Watershed in Central Iowa, USA. Sci. Total Environ. doi:10.1016/j.scitotenv.2020.140114

McEachran, A.R., L.C. Dickey, C.R. Rehmann, **T.A. Groh**, T.M. Isenhardt, M.A. Perez, and C.J. Rutherford. 2020. Improving the Effectiveness of Saturated Riparian Buffers for Removing Nitrate From Subsurface Drainage. J. Environ. Qual. doi:10.1002/jeq2.20160

**Groh, T.A.**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2019. Denitrification Potential In Three Saturated Riparian Buffers. Ag. Ecosys. Environ. J. doi:10.1016/j.agee.2019.106656.

**Groh, T.A.**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2019. In situ Denitrification in Saturated Riparian Buffers. J. Environ. Qual. doi:10.2134/jeq2018.03.0125

Davis, M.P., **T.A. Groh**, D.B. Jaynes, T.B. Parkin, and T.M. Isenhardt. 2019. Nitrous Oxide Emissions from Saturated Riparian Buffers: Are We Trading a Water Quality Problem for an Air Quality Problem? J. Environ. Qual. doi:10.2134/jeq2018.03.0127

Davis, M.P., **T.A. Groh**, R.J. Williams, T.B. Parkin, T.M. Isenhardt, and K.S. Hofmockel. 2018. Portable Automation of the Static Chamber Sample Collection for Quantifying Soil Gas Flux. J. Environ. Qual. doi:10.2134/jeq2017.10.0387

**Groh, T.A.,** L.E. Gentry, and M.B. David. 2015. Nitrogen Removal and Greenhouse Gas Emissions from Constructed Wetlands Receiving Tile Drainage Water. *J. Environ. Qual.* 44:1001-1010. doi:10.2134/jeq2014.10.0415

**Groh, T.A.,** M.B. David, and L.E. Gentry. Long Term Nitrogen and Phosphorus Removal in Constructed Wetlands. (In Prep).

**Groh, T.A.,** M.P. Davis, M.B. David, and L.E. Gentry. Change in Soil Carbon, Nitrogen, and Phosphorus During The First 20 Years of Constructed Wetland Establishment. (In Prep).

**Iowa State NREM Field Notes Article Author** **2015-2016**  
Authored article titled "Nitrogen Removal in Saturated Riparian Buffers: A Hot Topic." Field Notes is a graduate student edited annual journal that is released to inform the public on research in the NREM department.

### **BOOK CHAPTERS**

Schultz, R.C., T.M. Isenhardt, W.J. Beck, **T.A. Groh,** and M.P. Davis. 2019. Agroforestry practices: riparian forest buffers and filter strips. In: M.R. Mosquera-Losada and R. Prabhu (eds.), *Agroforestry for Sustainable Agriculture*. Burleigh Dodds Science Publishing Limited.  
<http://dx.doi.org/10.19103/AS.2018.0041.01>

### **GRANTS AND FUNDING**

#### **Funded Grant Proposals Submitted:**

**T.A. Groh (PI),** J.R. Fetter, and J. P. Kaye. Long-Term Riparian Buffer Research and Demonstration Site. Science to Practice Grant Funded by the Penn State College of Agricultural Sciences and Penn State Extension. 2020. **(\$10,000).**

W.J. Beck, **T.A. Groh (Co-PI),** T.M. Isenhardt, P.L Moore, K.E. Schilling, and R.C. Schultz. Dam! Impacts of Beaver Dams on Surface and Groundwater Quality. Funded by the Iowa Nutrient Research Center. 2020. **(\$94,500).**

C. Lu, T.M. Isenhardt, W. Crumpton, M.J. Helmers, M.P. Davis, **T.A. Groh (Co-PI),** and D.B. Jaynes. Before the streams: Modeling the effectiveness of in-field and edge-of-field practices in reducing nitrogen loads. Funded by the Iowa Nutrient Research Center. 2018. **(\$67,249).**

## **POSTERS AND PRESENTATIONS**

**T.A. Groh**, T.M. Isenhardt, and D.B. Jaynes. 2020. Surface Infiltration in Two Saturated Riparian Buffers. ASA, SSSA, and CSA International Meeting. **(Presentation)**.

L.C. Dickey, A.R. McEachran, C.J. Rutherford, M.A. Perez, C.R. Rehmann, T.M. Isenhardt, D.B. Jaynes, and **T.A. Groh**. 2020. Slope Stability Analysis of a Saturated Riparian Buffer: A Case Study. Geo-Congress. **(Paper/Presentation)**.

L.C. Dickey, A.R. McEachran, C.J. Rutherford, M.A. Perez, C.R. Rehmann, T.M. Isenhardt, D.B. Jaynes, and **T.A. Groh**. 2020. Slope Stability Analysis of Saturated Riparian Buffers. 20<sup>th</sup> Annual International Erosion Control Association Environmental Connection Conference. **(Paper/Presentation)**.

**T.A. Groh**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2019. Limitations to Denitrification in Saturated Riparian Buffers. NCERA-217 Meeting. **(Poster)**.

**T.A. Groh**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2018. Denitrification in Saturated Riparian Buffers. ASA, SSSA, and CSA International Meeting. **(Presentation)**.

M.P. Davis, **T.A. Groh**, D.B. Jaynes, T.B. Parkin, and T.M. Isenhardt. 2018. Nitrous Oxide Emissions from Saturated Riparian Buffers. ASA, SSSA, and CSA International Meeting. **(Presentation)**.

**Groh, T.A.**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2017. Saturated Riparian Buffer in Situ and Potential Denitrification. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.—**Second Place in Presentation Contest**.

Davis, M.P., T.M. Isenhardt, D.B. Jaynes, T.B. Parkin, **T.A. Groh**, M.L. Soupir, K.S. Hofmockel. 2017 Direct and Indirect Nitrous Oxide Emissions from Saturated Riparian Buffers and Woodchip Bioreactors: Are We Trading a Water Quality Problem for an Air Quality Problem? ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.—**First Place in Presentation Contest**.

**Groh, T.A.**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.B. Parkin. 2017. Denitrification in Saturated Riparian Buffers. Iowa Water Center Conference. **(Poster)**.—**Third Place in Poster Contest**.

**Groh, T.A.**, T.M. Isenhardt, M.P. Davis, D.B. Jaynes, and T.B. Parkin. 2016. Analyzing Denitrification in Saturated Riparian Buffers. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.

Davis M.P., D.B. Jaynes, T.B. Parkin, T.M. Isenhardt, **T.A. Groh**. 2016. Greenhouse Gas Emissions from Bear Creek in Central Iowa: The Importance of Direct Measurements on Low Ordered Agricultural Streams. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.

**Groh, T.A.**, M.P. Davis, T.M. Isenhardt, D.B. Jaynes, and T.M. Parkin. 2016. Nitrate Removal via Microbial Denitrification in Saturated Riparian Buffers. Iowa Water Center Conference. **(Poster)**.

**Groh, T.A.**, T.M. Isenhardt, D.B. Jaynes, T.B. Parkin, K.S. Hofmockel, and M.P. Davis. 2015. Nitrate Removal in Saturated Riparian Buffers: A Result of Denitrification? ASA, SSSA, and CSSA Annual Meeting. **(Poster)**.

Davis, M.P., T.M. Isenhardt, D.B. Jaynes, T.B. Parkin, K.S. Hofmockel, and **T.A. Groh**. 2015. Greenhouse Gas Emissions from Two Saturated Riparian Buffers Located in Central Iowa. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.

**Groh, T.A.** 2015. Nitrate Removal in Saturated Riparian Buffers: A Result of Denitrification? Association for Temperate Agroforestry Meeting. **(Presentation)**.

**Groh, T.A.**, T.M. Isenhardt, D.B. Jaynes, T.B. Parkin, K.S. Hofmockel, and M.P. Davis. 2015. Denitrification in Saturated Riparian Buffers Receiving Tile Drainage Water. Association for Temperate Agroforestry Meeting. **(Poster)**.

**Groh, T.A.**, and M.P. Davis. 2015. Saturated Buffers Denitrification and Greenhouse Gas Study. Drainage Water Meeting (ADMS and NCERA 217) **(Presentation)**.

Isenhardt, T.M., D.B. Jaynes, **T.A. Groh**, and M.P. Davis. 2015. Denitrification within Saturated Riparian Buffers Re-designed to Remove Nitrate from Artificial Subsurface Drainage. Iowa Water Center Conference. **(Poster)**.

**Groh, T.A.**, M.B. David, L.E. Gentry. 2013. Nutrient Removal and Greenhouse Gas Fluxes in 19 Year Old Constructed Wetlands: A Temporal Analysis and Comparison. ASA, SSSA, and CSSA Annual Meeting. **(Poster)**.

David, M.B., L.A. Schipper, A.J. Gold, B.A. Needelman, K. Addy, L.E. Gentry, M. Goldman, T. Lavaire, **T.A. Groh**, and R.A. Cooke. 2013. Managing Denitrification in Tile-Drained Agricultural Watersheds. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.

**Groh, T.A.**, M.B. David, L.E. Gentry, and C.M. Smith. 2012. Nutrient Treatment Revisited: A Study of Nutrient Removal and Greenhouse Gas Emissions in 19 Year Old Constructed Wetlands. ASA, SSSA, and CSSA Annual Meeting. **(Poster)**.

David, M.B., L.E. Gentry, **T.A. Groh**, R.A. Cooke, D.A. Kovacic, and G.F. Czapar. 2012. Managing Denitrification in Constructed Wetlands. ASA, SSSA, and CSSA Annual Meeting. **(Presentation)**.

Groh, T.A., and P.M. McGinley. 2011. Groundwater Phosphorus: Can Anything Control This Macronutrient? College of Natural Resources Annual Undergraduate Research Symposium (**Poster**).

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## **EXTENSION AND OUTREACH**

### **Penn State University Watershed Management Extension Specialist**

**April 2020-Present**

- 75% Extension appointment
- Provide science-based education focused on water quality in agricultural water and urban stormwater to stakeholders across Pennsylvania.
  - Head of Water Cooler Talk Webinar Series
    - Monthly webinar covering current water resource research and work across Pennsylvania
    - Average of 155 Registrants
  - Co-founder and Co-head of Riparian Buffer Workgroup
    - Extension-based interdisciplinary group of specialists and educators that work with riparian buffers
    - Mission is to create a more unified educational message relating to riparian buffers for all stakeholders across Pennsylvania
  - Author of 3 Watershed Winds Articles
    - Watershed Winds is a monthly electronic publication put out by the PSU Extension Water Team

### **Iowa State University Extension and Outreach**

#### **New York Conservation District Employees' Association Water Symposium**

**March 2020**

- Invited Speaker
- Siting and designing saturated buffers in Chesapeake Bay Watershed

#### **Design of Drainage Water Quality Practices Workshop**

**Dec 2019 and 2018**

- Presented on siting and designing saturated buffers
  - Workshop through Iowa State University Extension
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## **TEACHING EXPERIENCE**

### **Iowa State University**

**Fall 2017**

#### **Graduate Teaching Assistant: Junior Ecology**

##### **BIOL/AECL 312**

- Developed Team-based Learning (TBL) materials for new TBL section
- Team activity development
- Taught and assisted groups during class
- Grading
- Assisted in Scholarship of Teaching and Learning (SoTL) for new TBL section

**Iowa State University** **Springs 2017 and 2016**  
**Graduate Teaching Assistant: Senior and Graduate Watershed Management**  
**NREM 407/507**

- Responsibilities: grading, in-class teaching assistance, weekly 6-hour field trip assistance, individual student group assistance, and laboratory instructor when primary instructor was absent

**Iowa State University** **Fall 2016**  
**Instructor of Record: Freshman Introduction to Renewable Natural Resources**  
**NREM 120**

- One of the two instructors on record for NREM 120's in-class section
- Open to a variety of majors
- Enrollment: 262
- Developed lecture as well as online Blackboard and Top Hat materials

**Iowa State University** **Spring and Fall 2017 and 2016**  
**Graduate Teaching Assistant: Junior and Senior Field Experience in Soil Description and Interpretation**  
**AGRON 370**

- In-class and in-field undergraduate instruction of how to describe soils taxonomically while understanding the science of soil profiling
- Class annually participates in both the American Society of Agronomy (ASA) and the North American Colleges and Teachers of Agriculture (NACTA) competitions
- Assisted with trips as an assistant coach and organized trip logistics

**Iowa State University** **Fall 2015**  
**Graduate Teaching Assistant: Freshman Introduction to Soils**  
**AGRON 154**

- Responsibilities: assist in the agronomy learning center where students from the class went to get help on online course content as well as their weekly quizzes

**University of Illinois Urbana-Champaign** **Spring of 2014, 2013, and 2012**  
**Graduate Teaching Assistant: Sophomore Introduction to Soils**  
**NRES 201**

- Taught one of the five three hour laboratories
- Responsibilities: weekly preparation for the lab, both in the actual lab and out in the field, preparing a 20-30 lecture before each lab, proctoring exams for the main lecture, and making sure the exams were appropriate for the students' level of comprehension

**University of Illinois Urbana-Champaign** **Fall 2013**  
**Graduate Teaching Assistant: Freshman Introduction to Natural Resources and Environmental Sciences for Majors**  
**NRES 102**

- Responsibilities: teach a few lectures when main professor was not around, grade assignments, help out during lectures when students had questions, and help teach the field day

**University of Illinois Urbana-Champaign** **Fall 2012**  
**Graduate Teaching Assistant: Sophomore Watershed Water Quality**  
**NRES 285**

- Responsibilities: grading, organizing labs, answering questions during class activities, and lecturing during field days
- Course included both a lecture and lab component

**University of Illinois Urbana-Champaign** **Fall 2012**  
**Graduate Teaching Assistant: Freshman Introduction to Natural Resources and Environmental Science for Non-majors**  
**NRES 102 (Online)**

- Responsibilities: organizing and grading 150 students' discussions, assignments, and quizzes
- Class operated through the Illinois Compass 2G platform (Blackboard)
- Proctored three in-class exams which brought all 500 students together

## **Teaching Awards**

**ISU Department of NREM Outstanding TA Award Recipient** **Spring 2017**  
 Nominated and chosen by the NREM department for my work as a TA. This award is for any outstanding NREM TA who shows dedication to teaching while continuing their research in the department.

**University of Illinois List of Teachers Ranked As Excellent** **Spring 2012**  
**Spring 2013**  
**Fall 2013**  
**Spring 2014**

The names placed on this list belonged to those university teachers who achieved a high enough score on the semester student evaluations. Each semester I had students evaluate me, I had a high enough score to be on this esteemed list.

**2013 NRES department nominee for the College of ACES's Louis V. Logeman Graduate Student Teaching Award**

This award is only given to two teaching assistants per academic year, and the College of Agricultural, Consumer and Environmental Sciences only gave these awards to graduate students who are nominated by their department as one of the best their home department has to offer. I was the department of Natural Resources and Environmental Sciences' nominee in 2013, and was honored to be chosen to represent the department for this outstanding teaching award.



## SERVICE

<b>Faculty Reviewer for PSU's College of Agricultural Sciences' Graduate Student Competitive Grants Program</b>	<b>Nov 2020</b>
<b>Iowa State Department of Natural Resource Ecology and Management's Graduate Student Organization</b>	
Welcome and Social Chair	<b>2016-2017</b>
Treasurer	<b>2015-2016</b>
Field Notes Article Editor	
Interview Committee Member	
Weekly Seminar Committee Member	
Field Notes Article Committee Member	<b>2014-2015</b>
<b>Iowa State Interdisciplinary Program of Environmental Science's Graduate Student Organization</b>	
President	<b>2016-2017</b>
Vice President	<b>2015-2016</b>
<b>University of Illinois Department of NRES</b>	<b>2012-2014</b>
<b>Graduate Student Representative for the Turner Hall and Introduction to Soil Science Laboratory Renovation Project Committee</b>	
<ul style="list-style-type: none"><li>• Took part in both fundraising events as well as developing plans for new laboratories and classrooms in Turner Hall on the University of Illinois campus.</li></ul>	

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## HONORS

<b>University of Wisconsin-Stevens Point Chancellor's Leadership Award Recipient</b>	<b>2011</b>
Given to graduating seniors who demonstrate leadership in both campus and community activities as well as personal growth throughout their time at UWSP. The Chancellor's Leadership Award is limited to 30 recipients graduating in December.	
<b>University of Wisconsin-Stevens Point Chapter Phi Kappa Phi Honor Society Member</b>	<b>2010</b>
<b>University of Wisconsin-Stevens Point Chapter Phi Eta Sigma Honor Society Member</b>	<b>2008</b>

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## **PROFESSIONAL SOCIETIES**

Soil Science Society of America (SSSA)  
American Society of Agronomy (ASA)  
Crop Science Society of America (CSSA)  
American Water Resources Association (AWRA)  
Soil and Water Conservation Society (SWCS)

## **SOCIETY-BASED ACTIVITIES**

ASA Community Chair	<b>2021</b>
• Managing Denitrification in Agronomic Systems Community	
ASA Community Vice Chair	<b>2020</b>
• Managing Denitrification in Agronomic Systems Community	
ASA Soil Judging Committee	<b>2017-2019</b>
ASA Leadership Conference Attendee	<b>2015</b>
ASA Annual Meeting Student Intern	<b>2015 and 2012</b>
SSSA Editor for K-12 Soil Chemistry Webpage	<b>2012</b>
SSSA Advisor for High school nutrient filter experiment	<b>2012</b>

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