

Mississippi Water Resources Research Institute

**Annual Technical Report
2018**

WRRRI General Reports: General Information

Email Address: Jessie Schmidt
Institute: Mississippi

Products: 2017MS - ADMIN

Administration: (all publications are posted at www.wrrri.msstate.edu)
MWRRRI E-Newsletter, Spring, 2018, 8 pages.
MWRRRI E-Newsletter, Fall, 2018, 10 pages.
2018 Mississippi Water Resources Conference Proceedings, 98 pages.
MWRRRI Annual Report, July 1, 2017 – June 30, 2018, 29 pages. (not posted)

Information Transfer Program:

2018 Mississippi Water Resources Conference, Jackson, MS
2018 – Participant at Research Resource Fair, Mississippi State University
Listserv of 800+

Dr. Chao Xiaobo – 2017MS207B

Products:

Quarterly reports submitted

Chao, X, Bingner, R.L., Zhang, Y., Yasarer, L. and Jia, Y. (2018), Study of sediment and nutrients in Pelahatchie Bay and upland Mill-Pelahatchie Creek- Watershed, Mississippi Water Resources Conference, Jackson, MS, April 3-4.

Chao, X, Bingner, R.L., Zhang, Y., Yasarer, L. and Jia, Y. (2018), Numerical modeling of flow and sediment in Pelahatchie Bay and its upland watershed, The 13th International Conference on Hydrosience & Engineering, Chongqing, China, June 18-22.

Study of Sediment and Nutrients in Pelahatchie Bay and Upland Mill-Pelahatchie Creek Watershed, Chao, X., Bigner, R.L., Zhang, Y., Yasarer, L. Final Technical Report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 33 pgs.

Information Transfer:

Dr. Chao's research, along with USDA-ARS NSL and MDEQ has been incorporated into materials for releasing information to the public about AnnAGNPS and CCHE models and implementation of BMPs. Research results were presented at the 2018 MWRC in Jackson, MS.

Student Support:

<i>Name</i>	<i>Level</i>	<i>Major</i>
Jiayu Fang	PhD candidate	Computation Hydroscience

Dr. Joby Czarnecki and Dr. John Ramirez-Avila – 2017MS208B

Products:

Quarterly reports submitted

Prince Czarnecki, J.M., L. A. Hathcock, J. J. Ramirez-Avila, A.C. Linhoss, and T.J. Schauwecker, 2017. Unmanned aerial vehicles and structure from motion techniques and their use in protecting surface water quality. 2017 American Water Resources Association Annual Conference, Nov. 5-9, 2017, Portland, OR, Oral presentation.

Ramirez-Avila, J. J., Langendoen, E. J., Ortega-Achury, S. L., McAnally, W. H., Martin, James L., Schauwecker, T., & Prince Czarnecki, J. M. 2017. Estimación y Predicción de Descargas de Sedimentos y Tasas de Erosión de Bancos Fluviales. 1st International Congress and 2nd National Congress of Rivers and Wetlands. Neiva, Colombia.

Grafe, J., Ramirez-Avila, J.J., Schauwecker, T., Ortega-Achury, S.L., Prince Czarnecki, J.M., & Langendoen, E. 2018. Understanding Relations between Streamflow, Turbidity, and Suspended-Sediment Concentration in an Impaired Mississippian Stream. Mississippi Water Resources Research Institute. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Grafe, J., Schauwecker, T., Prince Czarnecki, J.M., Ortega-Achury, S.L., Martin, James L. & Noble, T. 2018. Impacts of Riparian Buffer Zones on Stream Water Quality: A Quantitative Assessment in the Catalpa Creek Watershed. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Schauwecker, T., Martin, James L., Ortega-Achury, S.L. & Prince Czarnecki, J.M. 2018. A Project Based Learning Study Oriented to Develop a Natural Stream Restoration Design. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., T. Schauwecker, J. Czarnecki, E. Langendoen, S. Ortega-Achury, J. Martin, 2018. Quantifying and Modeling in-Stream Processes: A first step to restore the Catalpa Creek. 2018 World Environmental & Water Resources Congress. Minneapolis, MN. Oral Presentation.

Steele, J., Grafe, J. and Ramirez-Avila, J.J. 2018. Analyzing Suspended Sediment Transport in Catalpa Creek. 2018 World Environmental and Water Resources Congress. Minneapolis, MN. Oral Presentation and Undergraduate Research Paper.

Wilkinson, H., Spiller, B., Forbes, N., Ramirez-Avila, J.J. 2018. A comparison of water quality conditions of stream segments under forested and herbaceous riparian zones. 2018 World Environmental and Water Resources Congress. Minneapolis, MN. Oral Presentation and Undergraduate Research Paper.

Grafe, J., Ramirez-Avila, J.J., Schauwecker, T., Ortega-Achury, S.L., Prince Czarnecki, J.M., and Langendoen, E. 2018. Understanding Relations between Streamflow, Turbidity, and

Suspended-Sediment Concentration in an Impaired Mississippian Stream. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Schauwecker, T, Czarnecki, J, Ortega-Achury, S.L., Langendoen, L. and Martin, J. 2018. Identification and assessment of stream processes within the Catalpa Creek in Mississippi. Ecostream Conference. Asheville, NC. Poster Presentation.

Czarnecki, J. Linhoss, A., Hathcock, L., Ramirez-Avila, J., & Schauwecker, T. 2018. Assessing Soil Erosion with Unmanned Aerial Vehicles for Precision Conservation. 73rd Soil and Water Conservation Society International Annual Conference. Albuquerque, NM. Oral Presentation.

Schauwecker, T.; Ramirez-Avila, J.J., Czarnecki, J., Baker, B. 2018. Hydraulic and vegetative modeling for the restoration design of the upper reach of catalpa creek, an impaired stream in northeast Mississippi. 2018 National Conference on Ecosystem Restoration. New Orleans, LA. Poster Presentation.

Czarnecki, J. 2018. Best Practices and Lessons Learned in creating 3D Structure from UAV Imagery. MAST Mississippi Geospatial Conference 6. Long Beach, MS. Oral Presentation.

Czarnecki, J., Ramirez-Avila, J.J. Applied use of unmanned aerial vehicles in surface water quality protection. Final Technical Report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 11 pgs.

Information Transfer Program:

Many oral and poster presentations were made at various conferences in the U.S. as well as Neiva, Columbia.

Student Support:** this project shared students and presentations with project 2017MS209B

<i>Name</i>	<i>Level</i>	<i>Major</i>
James Grafe	Graduate	Civil and Environmental Engineering
Taylor Noble	Undergraduate	Civil and Environmental Engineering
James Steele	Undergraduate	Civil and Environmental Engineering
Katelyn Polk	Undergraduate	Civil and Environmental Engineering
Andre Remedios	Undergraduate	Civil and Environmental Engineering
Ryan Horton	Undergraduate	Civil and Environmental Engineering
Shanika Musser	Undergraduate	Civil and Environmental Engineering
Lucas Whittenton	Undergraduate	Agricultural Economics
Gage Creel	Undergraduate	Agricultural and Biological Engineering
Adam Goldman	Undergraduate	Agricultural and Biological Engineering
Shelby Adair	Undergraduate	Agricultural and Biological Engineering
Dillion Drake	Undergraduate	Agricultural and Biological Engineering
William Jarrell	Undergraduate	Agricultural and Biological Engineering
Garrett Prater	Undergraduate	Agricultural and Biological Engineering
Jesse Mitchell	Undergraduate	Landscape Architecture

Dr. John J. Ramirez-Avila – 2017MS209B

Products:

Quarterly reports submitted

Ramirez-Avila, J.J. 2017. Sediment Budget: From Hillslope to in-Stream Processes Abstract Submitted by Invitation to the 2017 ASA, CSSA, and SSSA Annual Meeting. Symposium - Managing Water Resources for a Secure Future. (Presentation October 23, 2017) (Invited Speaker).

Ramirez-Avila, J.J., E. Langendoen, T. Schauwecker, S. Ortega-Achury, J. Czarnecki, W. McAnally, J. Martin. 2017. Estimación de descargas de sedimentos y tasas erosión de bancos fluviales. Submitted by Invitation to the 1st International Congress of Rivers and Wetlands. Neiva, Columbia. (Presentation October 26, 2017).

Ramirez-Avila, J.J., Schauwecker, T., Czarnecki, J., Langendoen, E., Ortega-Achury, S.L., and Martin, J. 2018. Quantifying and Modeling in-stream Processes: A first step to restore the Catalpa Creel. 2018 World Environmental and Water Resources Congress. Minneapolis, MN. Oral Presentation.

Ramirez-Avila, J.J., Schauwecker, T., Martin, J.L., Ortega-Achury, S.L. and Prince Czarnecki, J.M. 2018. A Project Based Learning Study Oriented to Develop a Natural Stream Restoration Design. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Grafe, J., Schauwecker, T., Prince Czarnecki, J.M., Ortega-Achury, S.L., Martin, J.L. and Nobel, T. 2018. Impacts of Riparian Buffer Zones on Stream Water Quality: A Quantative Assessment in the Catalpa Creek Watershed. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Poster presentation and bottle distribution at the new Pathways to Health Fair in Ruleville, MS, April 7, 2018.

Presentation at the University Council on Water Resources conference in Pittsburg, PA, June 26-28, 2018.

Oral presentation at ASA-CSSA-SSSA annual meeting, Presentation on October 23, 2017.

At least 2 oral/poster presentations at ASCE-WERI World Congress.

Steele, J., Grafe, J., and Ramirez-Avila, J.J.. 2018. Analyzing Suspended Sediment Transport in Catalpa Creek. 2018 World Environmental & Water Resources Congress. Minnespolis, MN. Oral presentation and Undergraduate Research Paper.

Ramirez-Avila, J.J., Schauwecker, T., Langendoen, E., Ortega-Achury, S.L., and Martin, J. 2018. Quantifying and Modeling in-Stream Processes: A first step to restore the Catalpa Creek. 2018 World Environmental and Water Resources Congress, Minneapolis, MN. Oral presentation.

Ramirez-Avila, J.J., Schauwecker, T., Czarnecki, J., Ortega-Achury, S.L., Langendoen, E., and Martin, J. Identification and assessment of stream processes within the Catalpa Creek in Mississippi. Ecostream Conference, Asheville, NC, August 13-16, 2018.

The Master thesis titled “Assessment of In-Stream Processes in Catalpa Creek Headwaters” is still in progress and expected to be published in May 2019.

In-stream processes within the Catalpa Creek. James Grafe, John J. Ramirez Avila, Tim Schauwecker, Joby Czarnecki, Sandra L. Ortega Achury, James L. Martin, Eddy J. Langendoen (peer reviewed publication to be submitted).

Two student papers summarizing different components of our project results will be submitted in January 2019 to the ASCE-EWRI Undergraduate Student Paper contest.

Benthic macroinvertebrate diversity and water quality of Catalpa Creek in Mississippi. Taylor Noble, Bradley Richardson, Shanika Musser, Sandra L. Ortega Achury, John J. Ramirez-Avila

Influence of riparian vegetation on stream health and water quality. Shanika Musser, James Grafe, Sandra L. Ortega Achury, John J. Ramirez Avila

At least two peer reviewed journal papers are in preparation.

Spatio-temporal variability of sediment concentrations and loads along the Catalpa Creek. John J. Ramirez-Avila, Sandra L. Ortega-Achury, Tim Schauwecker, Joby Czarnecki.

Understanding the Riparian Buffers in Mississippian Streams: Effects on nutrient loads. Sandra L. Ortega-Achury, John J. Ramirez-Avila, James L. Martin.

Identification and assessment of stream processes within the Catalpa Creek in Mississippi. Ecostream Conference, Asheville, NC. Poster presentation.

Schauwecker, T., Ramirez-Avila, J.J., J. Czarnecki, J., Baker, B. 2018. Hydraulic and vegetative modeling for the restoration design of the upper reach of Catalpa Creek, an impaired stream in northeast Mississippi. 2018 National Conference on Ecosystem Restoration. New Orleans, LA. Poster Presentation.

Ramirez-Avila, J.J., Schauwecker, T., Czarnecki, J., Langendoen, E., Ortega-Achury, S.L., and Martin, J. 2018. Quantifying and Modeling in-Stream Processes: A first step to restore the Catalpa Creek. 2018 World Environmental & Water Resources Congress. Minneapolis, MN. Oral Presentation.

Ramirez-Avila, J. J., Schauwecker; T., Martin, J.L., Ortega-Achury, D.L., and Prince Czarnecki, J.M. 2018. A Project Based Learning Study Oriented to Develop a Natural Stream Restoration Design. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J.; Grafe, J., Schauwecker, T., Prince Czarnecki, J.M., Ortega-Achury, S.L., Martin, J.L., and Noble, T. 2018. Impacts of Riparian Buffer Zones on Stream Water Quality: A Quantitative Assessment in the Catalpa Creek Watershed. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Langendoen, E., Schauwecker, T., Ortega-Achury, S.L., Czarnecki, J., McAnally, W., and Martin, J.. 2017. Estimación y predicción de descargas de sedimentos y tasas erosión de bancos fluviales. Invited Speaker. 1st International Congress of Rivers and Wetlands. Neiva, Colombia. (Invited Speaker). Oral Presentation.

Ramirez-Avila, J.J. 2017. Sediment Budget: From Hillslope to in-Stream Processes. 2017 ASA, CSSA, and SSSA Annual Meeting. Symposium -Managing Water Resources for a Secure Future. Tampa, FL. (Invited Speaker). Oral Presentation.

Musser, S, Grafe, J., Ortega-Achury, S.L., and Ramirez-Avila, J.J.. 2018. How Do Grassed Riparian Zones Affect Stream Temperature? MSU Undergraduate Research Symposium. Summer 2018. Poster Presentation.

Noble-Cagle, T., Grafe, J., Ortega-Achury, S.L., and Ramirez-Avila, J.J. 2018. Enhancing Water Resources in Mississippi: Effects of riparian zones on stream health and water quality. MSU Undergraduate Research Symposium. Spring 2018. Poster Presentation.

Catlett, G.E., Grafe, J., Ortega-Achury, S.L., and Ramirez-Avila, J.J. 2018. Temporal and Spatial Analysis of Water Quality for Catalpa Creek Watershed. MSU Undergraduate Research Symposium. Spring 2018. Poster Presentation.

Cooley, G., Grafe, J., Ortega-Achury, S.L., and Ramirez-Avila, J.J. 2018. Impacts of Land Use and Vegetation Corridors in Stream Water Quality. MSU Undergraduate Research Symposium. Spring 2018. Poster Presentation.

Steele, J., Grafe, J., and Ramirez-Avila, J.J. 2018. Analyzing Suspended Sediment Transport in Catalpa Creek. 2018 World Environmental & Water Resources Congress. Minneapolis, MN. Oral Presentation and Undergraduate Research Paper.

Wilkinson, H., Spiller, B., Forbes, N., Ramirez-Avila, J.J. 2018. A comparison of water quality conditions of stream segments under forested and herbaceous riparian zones. 2018 World Environmental & Water Resources Congress. Minneapolis, MN. Oral Presentation and Undergraduate Research Paper.

Grafe, J., Ramirez-Avila, J.J., Schauwecker, T., Ortega-Achury, S. L., Prince Czarnecki, J.M., and Langendoen, E. 2018. Understanding Relations between Streamflow, Turbidity, and Suspended-Sediment Concentration in an Impaired Mississippian Stream. Mississippi Water Resources Conference. Jackson, MS. Oral Presentation.

Ramirez-Avila, J.J., Ortega-Achury, S.L., Assessing and predicting in-stream processes in the Catalpa Creek watershed. Final Technical Report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 17 pgs.

Information Transfer Program:

Many oral and poster presentations were made at various conferences in the US as well as Neiva, Columbia. Also:

- The Master thesis titled "Assessment of In-Stream Processes in Catalpa Creek Headwaters" is still in progress and expected to be published in May 2019.
- One peer reviewed journal paper is expected to be published from this effort as a product to fulfill graduation requirements.

- In-stream processes within the Catalpa Creek. James Grafe, John J. Ramirez Avila, Tim Schuwecker, Joby Czarnecki, Sandra L. Ortega Achury, James L. Martin, Eddy J. Langendoen.
- Six presentations involving the different studies associated to this project were submitted to different regional (i.e. 2019 MWRRI) and national (i.e. EWRI 2019) conferences in 2019.
- Two student papers summarizing different components of our project results will be submitted in January 2019 to the ASCE-EWRI Undergraduate Student Paper contest.
 - Benthic macroinvertebrate diversity and water quality of Catalpa Creek in Mississippi. Taylor Noble, Bradley Richardson, Shanika Musser, Sandra L. Ortega Achury, John J. Ramirez-Avila
 - Influence of riparian vegetation on stream health and water quality. Shanika Musser, James Grafe, Sandra L. Ortega Achury, John J. Ramirez Avila
- At least two peer reviewed journal papers are in preparation.
 - Spatio-temporal variability of sediment concentrations and loads along the Catalpa Creek. John J. Ramirez-Avila, Sandra L. Ortega-Achury, Tim Schuwecker, Joby Czarnecki.

Understanding the Riparian Buffers in Mississippian Streams: Effects on nutrient loads. Sandra L. Ortega-Achury, John J. Ramirez-Avila, James L. Martin.

Student Support: ** this project shared students and presentations with project 2017MS208B.

<i>Name</i>	<i>Level</i>	<i>Major</i>
James Grafe	Graduate	Civil & Environmental Engineering
Ben Spiller	Undergraduate	Civil & Environmental Engineering
Harley Wilkinson	Undergraduate	Civil & Environmental Engineering
Taylor Buie	Undergraduate	Civil & Environmental Engineering
Nathan Forbes	Undergraduate	Civil & Environmental Engineering
Jim Steele	Undergraduate	Civil & Environmental Engineering
Tulia Delgado	Graduate	Civil & Environmental Engineering
Diana Linder	Undergraduate	Civil & Environmental Engineering
Germaine Cole	Undergraduate	Civil & Environmental Engineering
Taylor Noble	Undergraduate	Civil & Environmental Engineering
Geneva Cattle	Undergraduate	Civil & Environmental Engineering
Bradley Richardson	PhD candidate	Wildlife, Fisheries & Aquaculture
Jennifer Deignan	Undergraduate	Civil & Environmental Engineering
Claire Ray	Undergraduate	Civil & Environmental Engineering
Daniel Wells	Undergraduate	Civil & Environmental Engineering
Shanika Musser	Undergraduate	Civil & Environmental Engineering
Ryan Horton	Undergraduate	Civil & Environmental Engineering
Andres Ramedios	Undergraduate	Civil & Environmental Engineering

Dr. Kristine Willett, Mr. John Green, Ms. Stephanie Otts – 2017MS210B

Products:

Quarterly reports

Showalter Otts, S., Green, J., Willett, K., Janasie, C., Woo, L., Fratesi, M.A., Thorton, C., Avula, B., and Rhymes, J. 2017. "Testing for Lead in Drinking Water in the Mississippi Delta through

Community-Engaged Research: Findings from a Pilot Study and Next Steps for Expansion.” Poster Presented at the Delta Regional Forum of the Delta Directions Consortium. Clarksdale, MS.

Charleston Cooking Class, September 2017 (Title: Community-Based Research Strategies to Analyze Risk of Lead Contamination in Public Water Supplies in the Mississippi Delta)

Train-the-Trainers workshop with Right! from the start maternal and child health program.

Willett, K.L., Otts, S.S., Green, J.J., Janasie, C., Woo, L., Thornton, C., Fratesi, A., Avula, B., Khan, I., Rhymes, J. Research Strategies to Engage Communities in the Analysis of Lead Contamination of Water Supplies in the Mississippi Delta. Poster Presentation. Society of Environmental Toxicology and Chemistry. November 2017.

J. Green, Woo, L.C., Fratesi, M., Parkman, B., Otts, S., Janasie, C., Thornton, C., Avula, B., Willett, K., Rhymes, J., and Snell, S. Strategies to Analyze Risk of Lead Contamination in Public Water Supplies in the Mississippi Delta: Contributions from Community-Based Research 2017 Mississippi Public Health Association (MPHA) conference, Oct. 12-13, 2017, Jackson, MS.

Otts, S. and C. Janasie, National Sea Grant Law Center, How Safe is the Water?: An Analysis of the Lead Contamination Risks of Public Water Supplies in the Mississippi Delta (Dec. 2017), <http://nsglc.olemiss.edu/projects/lead-contamination/files/howSAFEiswater.pdf>

Willett, Green, and Showalter-Otts collaborated with Susana Cervantes from Harvard Law School in mentoring three students during the HLS Mississippi Delta Spring Break Pro Bono Trip 2018. Three reports summarizing their research were written resulting from this mentorship.

- Wolfe. Identifying and responding to lead hazards in water. HLS Mississippi Delta Spring Break Pro Bono Trip 2018
- Svedman. Proactively reducing exposure to lead through water. HLS Mississippi Delta Spring Break Pro Bono Trip 2018
- Lee, Jude. Identifying and treating children with EBLLs. HLS Mississippi Delta Spring Break Pro Bono Trip 2018

S. Otts and C. Janasie, An Analysis of the Lead Contamination Risks of Public Water Supplies in the Mississippi Delta, Mississippi Water Resources Conference, April 4, 2018, Jackson, MS. <http://nsglc.olemiss.edu/projects/lead-contamination/files/mwrri2018.pdf>

Green, John J., Mary Alexandra Fratesi, Lynn Woo, Kristie Willett, Cammi Thornton, Bharthi Avula, Ikhlas Khan, Stephanie Otts, and Catherine Janasie. April 3-4, 2018. "Informing Environmental Health through Community-Engaged Research: Testing for Lead in Drinking Water in the Mississippi Delta." Poster Presented at the Mississippi Water Resources Conference. Jackson, MS.

Willett, K.L., Green, J.J., Otts, S. April 4, 2018. "Strategies to Analyze Risk of Lead Contamination in Public Water Supplies in the Mississippi: Contributions from Community-Based Research" University of Mississippi Medical Center Research Day 3-Minute Lecture. Jackson, MS.

Alex Fratesi. April 7, 2018. "Lead Exposure in Drinking Water: What It Means and Ways to Manage It" New Pathways to Health Fair. Ruleville, MS.

Drinking Water and Lead Contamination in the Mississippi Delta, National Sea Grant Law Center, <http://nsglc.olemiss.edu/projects/lead-contamination/index.html> (project webpage).

Tri-County Workforce Alliance's High School Mentorship Program in the Health Care Professions

campus tours on June 13, 2018.

S. Otts and C. Janasie An Analysis of the Lead Contamination Risks of Public Water Supplies in the Mississippi Delta, Universities Council on Water Resources Annual Conference, Pittsburgh, PA, June 26-28, 2018.

S. Otts: Delta Scholars Initiative presentation through the Delta Directions Consortium and the Mississippi State University Shackouls Honors College (July 13).

Otts, Willett, Fratesi, and Green: "Interdisciplinary and community engagement approaches: The case of lead in the Mississippi Delta" Panel at Delta Regional Forum: Population Health, Development, and Entrepreneurial Problem Solving, July 18, 2018.

Otts and Green: Meeting with the American Heart Association's Mississippi Delta Health Equity Committee in Mound Bayou. This included a presentation on the project along with dialogue about ways to expand the study (September 13).

Prepared "Lead exposure and drinking water" fact sheets for Bolivar, Sunflower, and Tallahatchie counties.

Proposed a joint session at the 2018 Delta Regional Forum in Clarksdale (July 18-19).

Attended the Glenn Foundation for Better Living Health, Wellness & Safety Tailgate, October 12, 2018 to pass out materials about lead in drinking water and to sign up potential participants for bottle distribution.

Attended a booth at the Greenville Delta Hot Tamale Festival, October 18-20, 2018 to pass out materials about lead in drinking water and to sign up potential participants for bottle distribution.

Expansion of summary report to include remaining at-risk counties for lead (additional 11 counties throughout the state).

Alex Fratesi defended her Honors Thesis 11/9/18. Community-Based Research Methods to Inform Public Health Practice and Policy: The Case of Lead in the Mississippi Delta. University of Mississippi, Oxford, MS, 79 pgs.

Willett, K., Green, J., and Otts, S. Assessing the Effectiveness of Community-Based Research Strategies to Analyze Risk of lead contamination in Public Water Supplies in the Mississippi Delta. Final Technical Report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 13 pgs.

Information Transfer Program:

Investigators collaborating on this research were presenting data to community members. Sharing information as well as the collection of samples was completed within the surrounding communities.

The Project Team worked with community partners to organize nine lead awareness and drinking water sampling events using eight different strategies of outreach, engagement, and recruitment. We also did two prior events supported by University of Mississippi seed funding. Because those

two events (conducted in partnership with Tri-County Workforce Alliance) were also held in the Delta, we have included those results in this report.

1. New Pathways to Health Program (Sept. 2016; Dec. 2016): Participants were recruited through presentations during program orientation and other regularly scheduled events.
2. Church Collaboration (June 2017): In partnership with the Right! From the Start Initiative participants were recruited through outreach to a church congregation in Belzoni, MS.
3. Cooking Class (Sept. 2017): Participants were recruited through a presentation at the “Cooking Matters” class offered by the James C. Kennedy Wellness Center in Tallahatchie, MS.
4. Well Owners Workshop (Oct. 2017): In partnership with MSU Extension, participants were recruited through a Mississippi Well Owners Workshop.
5. Train the Trainer (Oct. 2017): In partnership with Right! from the Start Initiative, community health care service providers working with breastfeeding mothers received training on project methods and collected water samples to learn process.
6. Student Health Fair in Ruleville (April 2018): In partnership with Tri-County Workforce Alliance New Pathways to Health Program, participants were recruited through a Student Health Council fair at Ruleville High School.
7. Community Health Center Booths (June 2018): Participants were recruited through three informational booths at Aaron E. Henry Community Health Services Center facilities in Batesville and Tunica and Delta Health Center facilities in Greenville.
8. Hot Tamale Festival (Oct. 2018): Participants were recruited through an informational booth set up at the Hot Tamale Festival in Greenville.

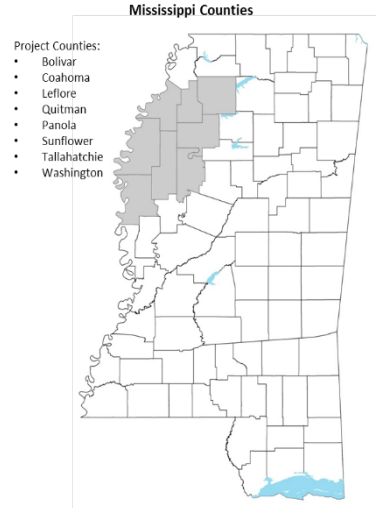


Figure 1. The seven delta counties that were the original focus of this research project

Student Support:

<i>Name</i>	<i>Level</i>	<i>Major</i>
Alex Fratesi	Undergraduate	Chemistry
Rachel Haggard	Graduate	Sociology
Katrina Alford	Graduate	Sociology
Heather Costa-Greger	Graduate	Sociology
William Bedwell	Graduate	Law
Morgan Stringer	Graduate	Law

2018MS-ADMIN

Products:

- www.wrri.msstate.edu
- 2019 Mississippi Water Resources Conference – April 2-3, 2019 – Jackson, MS
- 2019 Mississippi Water Resources Conference – Program – 16 pgs.
- MWRRI E-Newsletter, Spring, 2019, 9 pgs.

Information Transfer Program:

2019 Mississippi Water Resources Conference, Jackson, MS
Listserv of 800+

Dr. James Cizdziel – 2018MS211B

Products:

Quarterly report submitted

Austin Scircle, "Spatial Distribution of Microplastics in the Mississippi River Basin" poster presentation at Mississippi Academy of Science Annual Meeting, Hattiesburg, MS, February 21-22, 2019. **Austin won 2nd place.**

James Cizdziel presented a poster, "One Pot" Method for Analysis for Microplastics from Natural Waters, Soils, and Sediments at the Society for Environmental Toxicology and Chemistry (SETAC) National Meeting in November 4-8, 2018 in Sacramento, CA. Poster authors include, Austin Scircle, Lilly Li, and Zhiqiang Gao.

Cizdziel, J. and A. Scircle, Microplastics in the Mississippi River System, oral presentation made at the 2019 Mississippi Water Resources Conference, April 2-3, 2019, Jackson, MS.

Austin Scircle, "One Pot" Method for Collection and Preparation of Microplastic Samples for Detection and Characterization Purposes, poster presentation made at 2019 Mississippi Water Resources Conference, April 2-3, 2019, Jackson, MS.

James Cizdziel co-chaired a special session on Microplastic Pollution at the Society for Environmental Toxicology and Chemistry (SETAC) 2019 Europe Annual Meeting in Helsinki, Finland. June, 2019. The event was well attended and a summary paper is forthcoming.

Submitted a paper to the Journal of Chemical Education titled "Microplastics: What's the Big Deal? Detecting and Quantifying Microplastics in Natural and Bottled Water using Fluorescence Microscopy: A New Experiment for Instrumental Analysis and Environmental Chemistry Courses". Once the paper has been accepted a pdf will be provided.

We will also continue our microplastic-mercury sorption experiments and present the research at the International Conference on Mercury as a Global Pollutant in Krakow, Poland (Sept. 7-13, 2019). Year 2 funding used.

Scircle, A., and J. Cizdziel. "Detecting and Quantifying Microplastics in Bottled Water Using Fluorescence Microscopy: A New for Instrumental Analysis and Environmental Chemistry Courses," *Journal of Chemical Education* (in review).

Scircle, A., and J. Cizdziel. One Pot Method for Collection and Preparation of Water Samples for Microplastic Analyses (in preparation).

"Microplastics in the Mississippi River System and Along the Mississippi Gulf Coast: method development and spatial and temporal trends." A. Scircle, PhD expected 12/2020.

"Interaction of Mercury and Other Heavy Metals with Microplastics." G. Geo, PhD expected 12/2021.

"Recovery Tests for a Novel One-Pot Method for Analysis of Microplastics from Natural Waters." Lilly Li, undergraduate thesis, University of Mississippi, Oxford, MS, 5/2019.

"Quantitative Analysis and Characterization of Microplastics in the Mississippi River." Holly Horton, undergraduate thesis, University of Mississippi, Oxford, MS, 5/2019.

"Preparation and Characterization of Virgin and Weathered Microplastics using Cryomilling and Scanning Electron Microscopy." Danielle Behrend, undergraduate thesis, 12/2019.

Cizdziel, J. Microplastics in the Mississippi River and Mississippi South. Final Technical Report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 13 pgs.

Information Transfer Program:

University of Mississippi hosted two scientists from the USGS Washington Water Science Center's Microplastics Laboratory who came to learn about the new analytical methods. Discussion included: field methods, quality assurance methods and confirmatory methods like FTIR and Raman were extremely valuable and helpful in the development of an upcoming workshop on MPs that the USGS will sponsor.

Presented information regarding microplastic pollution to a student assembly at Lafayette Middle School.

Student Support:

<i>Name</i>	<i>Level</i>	<i>Major</i>
Danielle Behrend	Undergraduate (thesis completed 5/2019)	Chemistry
Zhiqiang Gao	PhD Candidate (expected 12/2021)	Chemistry
Holly Horton	Undergraduate (thesis completed 5/2019)	Chemistry
Libby Li	Undergraduate (thesis completed 5/2019)	Chemistry
Klara Missling	Undergraduate	Chemistry
Austin Scircle	PhD Candidate (expected 12/2020)	Chemistry

Dr. Gary Ervin and Gray Turnage – 2018MS212B

Products:

Calhoun, K., G.N. Ervin, and G. Turnage. 2018. Management of problematic native aquatic vegetation to enhance multi-user in southeastern waterbodies. Presented at the Aquatic Plant Management Society annual conference, Buffalo, NY, July 15-18, 2018.

Calhoun, K., G. Turnage, and G.N. Ervin. 2018. Management of problematic native aquatic vegetation to enhance multi-user benefits in southeastern waterbodies. Presented at the Texas

Aquatic Plant Management Society annual conference, San Antonio, TX, November 26-27, 2018.

Calhoun, K., G. Turnage, and G.N. Ervin. 2018. Management of problematic native aquatic vegetation to enhance multi-user benefits in southeastern waterbodies. Presented at the Mid-South Aquatic Plant Management Society annual conference, Chattanooga, TN, November 5-7, 2018.

Ervin, G.N., G. Turnage, and K. Calhoun. 2019. Experimental evaluation of herbicides for chemical management of nuisance native aquatic plants. Presented at Mississippi Water Resources Conference, Jackson, MS, April 2-3, 2019.

Calhoun, K., G.N. Ervin, and G. Turnage. 2019. Management of problematic native aquatic vegetation to enhance multi-user benefits in southeastern waterbodies. Presented at the Weed Science Society of America Annual Conference, New Orleans, LA, February 11-14, 2019.

Ervin, G.N., and C. Shoemaker. 2019. Wetland vegetation for water quality improvement: Is the simplest advice still the best? Society of Wetland Scientists Annual Conference, Baltimore, MD, May 29, 2019.

Ervin, G.N. 2019. Managing Aquatic and Wetland Plants for Ecosystem Service. *Invited seminar* at U.S. Army Corps of Engineers, Engineering Research and Development Center, Environmental Laboratory, Vicksburg, MS, June 19, 2019.

Ervin, G.N. and G. Turnage. Aquatic vegetation management to enhance multiple-user benefits of southeastern wetlands. Final technical report submitted to Mississippi Water Resources Research Institute, Mississippi State University, Mississippi State, MS, 6 pgs.

Student Support:

<i>Name</i>	<i>Level</i>	<i>Major</i>
Kennedy Calhoun	graduate student	Biological Sciences
Adrian Lazaro-Lobo	PhD candidate	Biological Sciences
Allison Ratliff	undergraduate	Biochemistry
Anirudh Aditya	undergraduate	Biochemistry
Akshita T. Singh	undergraduate	Biological Sciences
Mason Thomas	undergraduate	Wildlife, Fisheries & Aquaculture
Landon Sanders	GRA	Geography
Chandler Bryant	11 th grade at MSMS	n/a

Information Transfer Program:

Research data has been presented at conferences in Mississippi, New York, Tennessee, Louisiana, and Maryland.

Dr. James Cizdziel – G19AP000-4 – 104G annual progress report

Assessing Microplastic Pollution in the Mississippi River System and at Oyster Reefs in the Mississippi Sound Estuary

Products: (shared publications with 2018MS211B)

Austin Scircle and James Cizdziel, "One-pot Method for Collection and Preparation of microplastic Samples for Detection and Characterization Purposes," poster presentation at Mississippi Water Resources Conference, April 2-3, 2019, Jackson, MS.

James Cizdziel and Austin Scircle, Microplastics in the Mississippi River System, oral presentation at Mississippi Water Resources Conference, April 2-3, 2019, Jackson, MS.

James Cizdziel and Austin Scircle, "Spatial Study of Microplastic Pollution in the Mississippi River Basin," 2019 SETAC Annual Meeting, Helsinki, Finland.

James Cizdziel co-chaired a session at the 2019 SETAC meeting in Helsinki titled, "Micro(Nano) plastic Pollution: Tackling the Plastic Problem by Identifying Sources, Investigating Fate and Novel Approaches."

Student Support: (shared with project 2018MS211B)

<i>Name</i>	<i>Level</i>	<i>Major</i>
Zhiqiang Gao	PhD Candidate	Chemistry
Holly Horton	Undergraduate	Chemistry
Libby Li	Undergraduate	Chemistry
Austin Scircle	PhD Candidate	Chemistry

Information Transfer Program:

Presentations have been given in Mississippi as well as Helsinki, Finland.

Senior theses were completed by Libby Li and Holly Horton.

An age appropriate presentation was given to students at Lafayette Middle School.

Total Students:

Other	1
Undergrad	37
Graduate	6
PhD candidates	5

WRRI Annual Reports: Project Synopsis

Email address: jessie.schmidt@msstate.edu

Institute: Mississippi

Grant Type

Annual Base Grant

National Competitive Grant

Coordination Grant

Student Internship

Project Title

Assessing Microplastic Pollution in the Mississippi River System and at Oyster Reefs in the Mississippi Sound Estuary

Project ID

G19AP0004

Project Impact (provide a synopsis of the primary findings and/or impact of this project. Please limit your answer to 250 words.)

Microplastics (MPs) are harming aquatic organisms and entering the human diet. The majority of seafood comes from coastal areas where MPs congregate. This project aims to systematically quantify the concentrations and loads of MPs and characterize their shapes, size distribution, and chemical composition in the Mississippi River (MR) system – a source of drinking water to over 18 million people, as well as at oyster reefs in the Mississippi Sound Estuary.

Samples have been collected during summer 2018 and spring 2019 from the main stem of the Mississippi River, its major tributaries and along the Gulf Coast. Spring samples were collected under mostly flood conditions; however, late summer is typically the lowest flow with fall and winter intermediate.

We are investigating sorption/desorption behavior of Hg species with MPs because of the heightening concern over MP pollution is their ability to serve as carriers of pollutants that are either part of the plastics (additives) or they are accumulated from the environment.

MPs are prepared by cryomilling weathered plastics found in the environment. Weathered plastics have different surface characteristics and pore structure compared to MPs generated raw virgin plastics.

Multiple samples have been collected from the Gulf Coast, many near oyster reefs and we are processing them in order to characterize microplastic abundances and types. We are completing experiments with different types of MPs at varying concentrations with both Hg^{+2} and MeHg, as well as for different size-classes of particles. These results are providing insight into sorption characteristics of mercury species with environmentally relevant MPs.

WRI Annual Reports: Project Synopsis

Email address: jessie.schmidt@msstate.edu

Institute: Mississippi

Grant Type

Annual Base Grant

National Competitive Grant

Coordination Grant

Student Internship

Project Title

Microplastics in the Mississippi River and Mississippi Sound

Project ID

2018MS211b

Project Impact (provide a synopsis of the primary findings and/or impact of this project. Please limit your answer to 250 words.)

This one year project, part of a larger ongoing research effort to evaluate microplastic (MP) pollution in the Mississippi River System and at oyster reefs in the Mississippi Sound, established new field and laboratory methods for quantifying and characterizing microplastic pollution and collected preliminary data from the Mississippi River and its tributaries. A 'one-pot' method was developed that minimizes contamination and losses during sample preparation for detection and characterization purposes.

- Morphology of theMPs was dominated by fragments and fibers,
- Particle count increased near exponentially with decreasing size,
- Tributaries and sites near pollution centers had higher MPs concentrations,
- Ohio and Missouri rivers had the highest tributary loadings, Tennessee and Yazoo rivers the lowest, reflecting both flows and MP concentrations,
- Counts and loads of MPs generally increased down the main stem of the Mississippi River until New Orleans, where loads declined,
- Samples should be collected upstream from boat ramps as boat traffic can increase water turbidity,

- Fluorescence source intensity, exposure time, and dye concentration have the greatest impact on MPs counting accuracy, and
- MP counts in lab and reagent blanks were low (<10% of sample counts) and doubling the water sampling volume roughly doubled counts.

WRRI Annual Reports: Project Synopsis

Email address: jessie.schmidt@msstate.edu

Institute: Mississippi

Grant Type

Annual Base Grant

National Competitive Grant

Coordination Grant

Student Internship

Project Title

Study of Sediment and Nutrients in Pelahatchie Bay and Upland Mill-Pelahatchie Creek Watershed

Project ID

2017MS207b

Project Impact (provide a synopsis of the primary findings and/or impact of this project. Please limit your answer to 250 words.)

BMPs are effective ways to reduce the loads of sediment and nutrients from upland watershed. According to model predicts reducing the upland nutrients and SS loads by 50% would reduce average concentrations of SS, NH₄, NO₃, PO₄, and Chlorophyll a in PB by approximately 50%, 40%, 50%, 6%, and 55%, respectively.

- Integrated AnnAGNPS watershed model and CCHE model provides useful tools to study the response of WQ in surface water to the loads of upland watershed, and provides a system analysis approach to evaluate the effectiveness of BMPs on the reduction of nutrients and SS loads.
- Numerical models are effective tools to predict the loads of SS and nutrients from upland watershed and simulate the long term and short term distributions of SS and nutrients in the receiving waterbodies.
- CCHE_MESH is a very effective tool to generate computational mesh for natural water body with complex geometry.

- In Mill-Pelahatchie Watershed, the urban growth increased runoff and nitrogen loads but implementing water retention ponds limited these loads by up to 1% and 25%, respectively, in high urban growth areas.
- The implementation of BMPs, such as the establishment, stabilization measures of disturbed soil on urban construction sites that included water and sediment retention ponds is very effective to reduce the loads of SS and nutrients in the upland watershed.