

**Save the Date!**  
**MNRC**

*Modernizing Conservation: Innovation, Technology,  
and Social Expectations Changing the Landscape of  
Conservation*

February 1-4, 2021  
Tan-Tar-A Resort  
Osage Beach,  
Missouri

**MNRC Image Release**

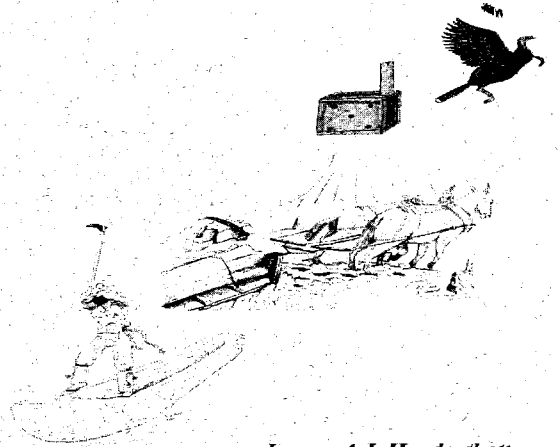
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**Missouri Natural Resources Conference**



# Missouri Natural Resources Conference

*"Exploration, Exploitation, and  
Conservation: Comparing History  
and Current Management"*



*Image: A.J. Hendershott*

February 4 thru February 6, 2020  
Tan-Tar-A Resort  
Osage Beach, Missouri



2020 MNRC  
Workshops & Contributed Papers  
Wednesday, February 5th  
1:00 pm - 3:00 pm

**Fisheries: Student Papers** (Paradise A)

**1:00 pm - 1:20 pm** *Management Evaluation of White Bass Population Dynamics and Exploitation in a South Central Missouri Reservoir.* Joey Root, Dave Knuth, Sara Tripp, & Paul Cieslewicz

**1:20 pm - 1:40 pm** *How Does Electrofishing Power and Environmental Factors Affect Smallmouth Bass Catchability in Mid-Sized Ozark Rivers.*

Mike Thomas, Andy Turner, Zachary Ford, Jan Dean, & Craig Paukert

**1:40 pm - 2:00 pm** *Assessing Gizzard Shad Population Dynamics in the Upper Mississippi River.*

Katelyn Bebee, Ethan Rutledge, Colby Gainer, Hae Kim, Quinton Phelps, Andy Bartles, & Kristen Bouska

**2:00 pm - 2:20 pm** *Impacts of Wastewater Effluents on Ozark Fish Community Structure.* Kelly Hoyer & Aaron Geheber

**2:20 pm - 2:40 pm** *Quantifying Morphology of *Cyprinella lutrensis x venusta* Hybrids in a Missouri Reservoir.* Topher Hockaday & Aaron Geheber

**2:40 pm - 3:00 pm** *Application of a Traditional Fisheries Management Technique on a Newly Established Fish Species on North America.* Hae Kim, Jason Emmel, Quinton Phelps, Catherine Lim, & John Odenkirk

Wednesday, February 5th  
1:00 pm - 3:00 pm

**Shortleaf Pine Silviculture** (Paradise B)

*Workshop Organizer:* Jim Guldin

Shortleaf pine is the most widely distributed of the four major species of southern pines, and yet, the most poorly understood. Forest Survey data show that the area of shortleaf pine-dominated stands now comprise less than 10% of the original range of the species. Therefore there is keen interest in restoring this species to sites where it has become reduced or been locally extirpated. The workshop will discuss three main issues. First, a timberland manager interested primarily in the growth and yield of southern yellow pine may find it difficult to muster a good deal of enthusiasm for shortleaf pine, though as recently as 1944, publications in mainstream forestry journals spoke about mixed stands of pine as "shortleaf-loblolly pine" stands. Second, the physiology of shortleaf pine has increasingly come under scrutiny – especially the characteristic basal crook, which gives shortleaf pine the unique ability to sprout if top-killed. Third, awareness has been heightened in the past decade about increasing prevalence of hybridization between loblolly and shortleaf pine. Hybrids have attributes of growth and appearance that are intermediate between the two species, but re-sprouting from the intermediate crook on hybrids is poor. The workshop will provide information based on practical application and peer-reviewed science to support land management decisions that favor shortleaf pine, and also will give land managers and researchers an opportunity to share thoughts and experiences.

Wednesday, February 5th  
1:00 pm - 3:00 pm

Missouri Cave Workshop – A Toolbox  
(Room 62-64)

Workshop Organizers: *Scott House, Tom Aley,  
& David Ashley*

Karst features and biodiversity are important natural history resources in the Ozarks Region of Missouri. The intended audience for this workshop includes the foresters, wildlife managers, park naturalists, and agency staff responsible for managing these fragile resources. The topics covered in this workshop constitute a toolbox of information on karst topography and accessing individuals and organizations with experience dealing with karst management.

1:00 pm- 1:20 pm *Getting Cave Inventory, Mapping and Gating Done: The Butler Hollow Project* Scott House

1:20 pm - 1:40 pm *Biological Surveying and Monitoring* Mick Sutton

1:40 pm - 2:00 pm *Missouri Cave Bats; A Primer* Shelly Colatskie

2:00 pm - 2:20 pm *Missouri Cave Database and Cave Archives* Ken Grush

2:20 pm - 2:40 pm *Management Strategies for Protecting Water Supplies in Caves and Springs* Tom Aley

2:40 pm- 3:00 pm *Living on Karst Video (Perry County Missouri)* Denise Vaughn

2020 MNRC  
Workshops & Contributed Papers  
Thursday, February 6th  
8:00 am - 10:00 am

Fisheries/Aquatic Systems Papers 1  
(Paradise A)

8:00 am - 8:20 am *Macroinvertebrate Drift Dynamics: Implications for Sturgeon Conservation.* Maddie Cogar, Hae Kim, Kevin Haupt, Quinton Phelps, Sara Tripp, Donovan Henry, Kristen Chestnut, Colby Gainer, & Ethan Rutledge

8:20 am - 8:40 am *Water Quality and Seasonal Macrophyte Cover in a Heavy Metal Contaminated Urban Stream.* Jessica Wilson & Alba Argerich

8:40 am - 9:00 am *A Cursory Look into the Striped Bass Population in Norfolk Lake.* Alexandria Beezel, Jeremy Risley, & Quinton Phelps

9:00 am - 9:20 am *Investigating the Role of Stocking Location and Tracking Methods on Dispersal and Survival Estimates of Stocked Lake Sturgeon in the Osage and Gasconade Rivers.* Michael Moore & Craig Paukert

9:20 am - 9:40 am *Habitat Selection of Alligator Gar in Southeast Missouri.* James Studdard & Sara Tripp

9:40 am - 10:00 am *Progress Toward a Predictive Egg Quality and Spawning Potential Index in Paddlefish.* Ben Thomas, Leslie Martin, & Dr. Scott Lankford



2020 MNRC  
Workshops & Contributed Papers  
Thursday, February 6th  
10:30 am - 12:30 pm

Fisheries/Aquatic Systems Papers 2  
(Paradise A)

10:30 am - 10:50 am *Aquatic Landscape Conservation Tools: Helping Manage Missouri's Aquatic Systems.* Craig Paukert, Nick Sievert, Joanna Whittier, Emily Tracy Smith, E. Kleekamp, & J. Rogosch

10:50 am - 11:10 am *Assessment of the Fish Community of the Lower Niangua River in Relation to the Niangua Hydroelectric Project.* Jason Persinger, Christina Kelsay, Zach Ford, & Greg Stoner

11:10 am - 11:30 am *Examining the Influence of Altered Stream Flow on the Composition of Headwater Fish Communities.* Nicholas Sievert & Craig Paukert

11:30 am - 11:50 am *Evaluating Fish Community Changes to Stream Flow Alterations.* Emily Tracy-Smith, Craig Paukert, Nick Sievert, Paul Blanchard, Matt Combes, Brett Landwer, & Jason Persinger

11:50 am - 12:10 pm *Assessment of Water Quality Relative to Current and Potential Placement of Best Management Practices.* Joanna Whittier & Darren Thornhill

12:10 pm - 12:30 pm *Freshwater Mussels of the North Fork River and Bryant Creek, Missouri.* Stephen McMurray & J. Scott Faiman

Thursday, February 6th  
10:30 am - 12:30 pm

Community Conservation Opportunities  
Workshop  
(Paradise B)

Workshop Organizer: Jon Skinner

Various conservation opportunities exist in urban and community settings. These offer the chance to include native plants to improve the diversity of plants in a community, improve water quality, and add to wildlife habitat. Unfortunately, not all topics can be discussed in a workshop. We will introduce the following:

10:30 am - 11:30 am *Native Plants in Urban Rainwater Management Systems.* Ronda Burnett & Carrie Lamb

11:30 am - 11:50 am *Silva Cells for Difficult Planting Locations.* Mark Grueber & Danny Moncheski

11:50 am - 12:10 pm *Stem Girdling Roots and Proper Tree Planting.* Cindy Garner

12:10 pm - 12:30 pm *Forest ReLeaf of Missouri.* Jon Skinner



Thursday, February 6th  
10:30 am - 12:30 pm

**Addressing Risks of Invasive Plants to  
Songbirds and Livestock, and New Control  
Approaches Workshop**

(Room 62-64)

**Workshop Organizer:** Carol Davit

The threats of invasive plants on ecology and economies are real. For example, research indicates clear negative impacts of bush honeysuckle and other non-native invasive plants on the life cycles of songbirds. Invasives play a role in songbird nest predation, decreased nutrition, and loss of native habitat cover. Farmers and cattle producers must learn to manage new threats such as the toxicity of perilla and the spread of Caucasian bluestem, as well as continually expanding threats, including sericea lespedeza and spotted knapweed. Expert speakers will share the ways invasive plants threaten songbirds and also impact livestock production. This information will serve to increase control of invasives to benefit songbird habitat and to benefit livestock production/farming operations, and also to build broader coalitions of support among key stakeholder groups. Speakers will also demonstrate the Missouri Invasive Plant Task Force's (MoIP) database technology to create tailored lists of invasive plant priority control regions of the state. Finally, speakers will share how MoIP is using advocacy and outreach to cease the sale of certain invasive plant species in the state. Attendees will understand the latest paths toward meaningful action in protecting Missouri's natural and agricultural resources, and they will gain new tools for communicating invasive plant threats and opportunities to their colleagues, clients, and stakeholders.

Thursday, February 6th  
10:30 am - 12:30 pm

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**10:30 am - 11:00 am** *Impacts of Invasive Plants on Songbirds.* Sarah Kendrick & Mike Leahy

**11:00 am - 11:30 am** *Managing Threats of Invasive Plants in Livestock Pastures.* Steve Clubine

**11:30 am - 12:00 pm** *Moving from Excel to the Cloud: Utilizing Web Technology to Improve Capacity for Invasive Species Management and Outreach.* Matt Arndt

**12:00 pm - 12:30 pm** *Ceasing Sale of Invasive Plants*  
Carol Davit & Bill Ruppert

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**2020 MNRC**

**Workshops & Contributed Papers**

**Thursday, February 6th**

**1:30 pm - 3:30 pm**

**Natural Resource Papers**

(Paradise A)

**1:30 pm - 1:50 pm** *Growth Response of a Giant Cane Nursery to Disturbance from Prescribed Fire and Mowing.* Matthew Garden

**1:50 pm - 2:10 pm** *Using a Marking Study to Describe the Metapopulation Dynamics of the Regal Fritillary Butterfly to Inform Management.* Daniel Marschalek

**2:10 pm - 2:30 pm** *The Development of an eDNA Survey for the Rare Longnose Darter (*Percina nasuta*) in Missouri Against the Background of Rangewide Taxonomic Uncertainty.* Leah Berkman, Jacob Westhoff, Katy Klymus, Nathan Thompson, & Cathy Richter

**2:30 pm - 2:50 pm** *Surviving Missouri's Waters: An*

**Thursday, February 6th**

**1:30 pm - 3:30 pm**

*-Continued-*

*80-Year History of Fish Kills.* Rebecca O'Hearn, Katrina Knott, Jim Baker, Doug Novinger, Matt Combes, Brad Harris, Kristi Savage-Clark, Eric Gramlich, & Tim Reilly

**2:50 pm - 3:10 pm** *Morphological Variation Among Native and Non-Native Populations of Mayan Cichlid (*Mayaheros urophthalmus*).* Cory Blackwelder & Aaron Geheber

**3:10 pm - 3:30 pm** *Economist, Environmental Economics.* Nicole Didero

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**Thursday, February 6th**

**1:30 pm - 3:30 pm**

**The Bees Knees: Native Pollinator Habitat How-To Workshop**

**(Paradise B)**

**Workshop Organizer:** *Bill White*

Habitat is being identified as the key ingredient to increasing our native pollinator populations and viewed as a means of overcoming the impacts of climate change, pesticides, and diseases. We know that more native wildflowers mean more pollinators and the more diverse the wildflowers the more diverse the pollinators. While much of the headlines on pollinator declines focus on non-native honeybees, the real crisis involves the 450 species of native bees and the hundreds of species of native moths and butterflies we find in Missouri. This workshop will focus on the basic habitat needs of butterflies and native bees including:

-Native pollinator reliance on native plants

**Thursday, February 6th**

**1:30 pm - 3:30 pm**

*-Continued-*

-Butterfly nectar and host plants  
-Monarch butterfly habitat needs  
-Native bee habitat considerations  
-Pollinator garden basics and design  
-Field planting and management basics

**1:30 pm - 2:00 pm** *Native Pollinator Reliance on Native Plants* Bill White

**2:00 pm - 2:30 pm** *Butterfly Nectar and Host Plants, Monarch Butterfly Habitat Needs*

**2:30 pm - 3:00 pm** *Native Bee Habitat Considerations for Design of Pollinator Gardens.* Susie Van de Reit

**3:00 pm - 3:30 pm** *Field Planting and Management Basics for Native Pollinators.* Jerod Huebner

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**Thursday, February 6th**

**1:30 pm - 3:30 pm**

**Cattle and Conservation: Gaining a Consistent Message on Grazing and Haying Practices in Missouri Workshop**

**(Paradise C)**

**Workshop Organizer:** *Adam Jones*

With Missouri being consistently ranked in the top 5 states in the U.S. for beef cows, there is significant acreage within the state devoted to cattle and other livestock production. This alone brings a suite of challenges from a wildlife habitat and water quality perspective as it relates to landscape conservation. This workshop will provide a variety of topics including stream flows

2020 MNRC  
Posters  
February 4th - February 6th  
(Windgate Hall)

*Fish Kills: A 2019 Review of Statewide Fish Kills and Pollution Investigations.* Steffanie Abel, Rebecca O'Hearn, & Jim Baker

*Hydraulic Modeling of Big Barren Creek using HEC-RAS, SE Missouri.* Shoukat Ahmed, Dr. Robert Pavlowsky, & Marc Owen

*Dissolved Oxygen in the Lower Niangua River in Relation to the Niangua Hydroelectric Project.* Alexandria Algieri, Katrina Knott, Jim Baker, & Rebecca O'Hearn

*The Ozark Underground Laboratory and the Tumbling Creek Cave Foundation Collaborate to Advance Karst Conservation, Management, and Education.* David Ashley, Tom Aley, & Cathy Aley

*Counting Carcasses: A Case Study of the 2018 Sandy Creek Fish Kill.* Jim Baker & Rebecca O'Hearn

*Dispersal and Movement Patterns of Stocked Striped Bass in Bull Shoals Lake.* Hadley Boehm, Andy Turner, & Craig Paukert

*Lake Sturgeon (*Acipenser fulvescens*) Passage of Osage River Lock and Dam #1.* Brandon Brooke, Michael Moore, & Craig Paukert

*Pre-settlement Stream Channel Form and Riparian Characteristics Using Government Land Records, Big Barren Creek Watershed, Mark Twain National Forest.* Sierra Casagrand, Dr. Robert Pavlowsky, & Marc Owen

Posters  
February 4th - February 6th  
(Windgate Hall)

*Urban Wildlife Management Success: Six Years of Canada Goose (*Branta Canadensis*) Population Management on Missouri Western State University Campus.* Cary D. Chevalier, Robert Bremer, Caitlin Glore, Marissa Gruetze, Jackie Herron, Jason Kusilek, Jeremy Reynolds, & Samuel Weber

*Nonpoint Pollution Source Modeling and Bank<sup>o</sup> Erosion Contribution in Mineral Fork and Mill Creek Watersheds, SE Missouri.* Kayla Coonen, Marc Owen & Dr. Robert Pavlowsky

*Gizzard Shad Habitat Use in the Upper Mississippi River.* Elaine Ewigman, Ethan Rutledge, Colby Gainer, Quinton Phelps, Kristen Bouska, & Andy Bartels

*Update on the Big River Lead Remediation Structures Project, Missouri.* Michael Ferguson

*Macroinvertebrate Community Structure Along a Gradient of Substrate Size in an Impounded River.* Garrett Frandson, Brett Landwer, & Alba Argerich

*Investigating Vital Rate Drivers of Upper Mississippi River Fishes to Support Management and Restoration.* Colby Gainer, Ethan Rutledge, Hae Kim, Quinton Phelps, Kristen Bouska, & Andrew Bartels

*Does Algal Toxin Accumulation in Sportfish Present a Human Health Risk in Missouri?* Jacob A. Gaskill, Katrina Knott, Rebecca O'Hearn, Darby Niswonger, Alba Argerich, & Rebecca L. North

Posters  
February 4th - February 6th  
(Windgate Hall)

*Habitat Diversity and Macroinvertebrate Abundance Within an Urban, Heavy-Metal Contaminated Stream in Joplin, Missouri.* Tabitha Gatts, Jessica Wilson, & Alba Argerich

*Genomic Divergence, Admixture, and Signatures of Local Adaptation in the Subspecies of Smallmouth Bass (*Micropterus dolomieu velox*)* Joe C. Gunn, Leah K. Berkman, Shannon Brewer, James M. Long, Andrew T. Taylor, & Lori S. Eggert

*Are Acoustic Lures Effective to Increase Imperiled Bat Captures?* Amy Hammesfahr, Christine Rega-Brodsky, Kathryn Womack-Bulliner, & James Whitney

*Missourians for Monarchs Habitat Monitoring.* Wesley Hanks, Donnamarie H. Duffin, & Casey Bergthold

*Effects of Overstory Harvest and Midstory Release on Oak Regeneration in Bottomland Forests in Northern Missouri.* Isaac Hayford, Benjamin Knapp, & Megan Buchanan

*Assessing the Effects of Length Limit Regulations on the Mark Twain Lake Crappie Fishery.* Annie Hentschke & Ross Dames

*Assessment of White Oak Mortality in Missouri Using a Geospatial Analysis Framework.* Saaruj Khadka, Hong S. He, & Azad Henareh Khalyani



Posters  
February 4th - February 6th  
(Windgate Hall)

*Bacterial Source Tracking of Greene and Polk County Waterways Utilizing Next-Generation Sequencing.* John Kincaid & Dr. Babur Mirza

*Farmer Adoption of Agroforestry Practices for Conservation: Motivators, Barriers, and an Attempt to Protect our Common Home.* Raelin Kronenberg & Sarah Lovell

*First Records of Larval Diet of an Endemic Critically Imperiled Caddisfly Species of Conservation Concern in Missouri.* William R. Mabee, Russell G. Rhodes, & Barry C. Poulton

*Reintroduction of Macroflora for Savanna Reconstruction and Woodland Restoration: A Tale of Trees and Seeds.* Dacoda Maddox, Ben Knapp, Lauren Pile, John Kabrick, Dan Dey, & Chris Newbold

*Establishment of Black Walnut Plantation and Conversion of Hardwood Forest for Agroforestry.* Stewart McCollum, Kara Powelson, Michael Goerndt, William McClain, Melissa Bledsoe, & Toby Dogwiler

*Comparison of Blue Catfish (*Ictalurus furcatus*) and Flathead Catfish (*Pylodictis olivaris*) Age Estimates Derived from Pectoral Spines and Lapilli Otoliths.* Joe McMullen

*Arundinaria Gigantea Density in Relation to Proximity to Water.* Lynda Miller, Justin Westover, & Sabrina Lator



Posters  
February 4th - February 6th  
(Windgate Hall)

*A Preliminary Investigation of Ranavirus in Lake Taneycomo, Taney Co., Missouri.* Lynda Miller, Sabrina Lator, & Justin Westover

*The Influence of Heavy Metal Contamination on Benthic Algae in an Urban Stream.* Sabine Miller, Alba Argerich, & Jessica Wilson

*An Update on Diet of Wild Black Carp (*Mylopharyngodon piceus*) in the Mississippi River Basin: Taxa Accumulation and Recent Additions to Unionid Mussel Species Consumed.* Lauren Mott, Barry C. Poulton, P. Kroboth, D. Chapman, A. George, S. McMurray, & S. Faiman

*Geomorphic Assessment of Mussel Habitat in Roubidoux Creek and Big Piney River, Fort Leonard Wood, Pulaski County, Missouri.* Joe Nash & Dr. Robert Pavlowsky

*Missouri Prescribed Burn Associations.* Courtney Nicks, Wes Buchheit, Len Gilmore, Wesley Hanks, & Josh Marshall

*Spatial and Temporal Variations in Nutrients in Lamar Lake, an Impaired Water Supply.* Daniel Obrecht, Alba Argerich, & Rebecca North

*Missouri's 80 Year History of Fish Kill and Pollution Investigations.* Rebecca O'Hearn, Katrina Knott, Jim Baker, Doug Novinger, Matt Combes, Brad Harris, Kristi Savage-Clark, Eric Gramlich, & Tim Reilly



Posters  
February 4th - February 6th  
(Windgate Hall)

*Using Side Scan Sonar Mapping to Compare Fluvial Habitats in Two Large Ozark Tributaries to the Lower Missouri River.* Seth Owens, Michael Moore, & Craig Paukert

*Evaluating the Effectiveness of Zote Soap Baited Trotilines.* Henry Priest, Colton McKivitz, Coty Prunest, Hae Kim, Colby Gainer, Ethan Rutledge, & Quinton Phelps

*Missouri Agricultural Watersheds Assessment (MAWA) Program.* Tyler Pursley, Marc Owen, Kayla Coonen, & Triston Rice

*Use of Focal Bird Species to Monitor Progress Towards Conservation Goals in the Little Niangua River Priority Geography.* Rhonda L. Rimer & the Little Niangua River Accomplishments and Monitoring Operational Team

*Population Structure and Habitat Use of Bluegill in the Upper Mississippi River* Ethan Rutledge, Colby Gainer, Hae Kim, Quinton Phelps, Kristen Bouska, & Andy Bartels

*Home, Home on the Range, Where the Burying and Carrion Beetles Play.* Evelyn Snead & Daniel A. Marschalek

*Are We Succeeding in Controlling Invasive *Sericea Lespedeza* (*Lespedeza cuneate*) Populations at Prairie Fork Conservation Area?* Carlee Steppe, Lauren S. Pile, Benjamin O. Knapp, & Chris Newbold

Posters  
February 4th - February 6th  
(Windgate Hall)

*Effect of Waveform, Power, and Water Temperature on Electrofishing Catchability of Blue Catfish and Flathead Catfish.* Mike Thomas, William Morris, Zachary Ford, Andy Turner, Jan Dean, & Craig Paukert

*An Eleven-Year Study of an Urban Turtle Metapopulation.* Chayata Thammarat, Mistina Wheeler, & Mark Mills

*Assessing Multi-Scale Habitat Relationships and Responses to Forest Management for Cryptic Herpetofauna in the Missouri Ozarks, USA.* Shelby Timm, Alexander Wolf, Xiaoming Gao, and Kenneth Kellner

*Effects of Atmospheric Weather Pressure Change on Silver Carp (*Hypophthalmichthys molitrix*) Movement Through a Lock and Dam.* Jonathan Twyman & Sara Tripp

*Carbon Inputs and Turnover in Ozark Oak/Hickory Woodlands: Managing at Various Scales to Maximize Ecological Function into the Future.* D. Alexander Wait

*Myotis sodalis and Myotis septentrionalis Captures and Roosting Preferences in Post White-Nose Syndrome Missouri 2017-2019.* Katherine Ward

*Does Aquatic Vegetation in a Spring-Fed Pond Follow a Seasonal Pattern?* Hannah Whaley & Dr. LaToya Kissoon-Charles

Posters  
February 4th - February 6th  
(Windgate Hall)

*Nocturnal Insect Abundance Across Habitats in Fort Leonard Wood, Missouri.* Gloria Williams, Justin Hinson, James Allen, & Robin Verble

*Using Camera Traps to Assess the Effects of Predator Urine on Potential Nuisance Wildlife.* Cara Yocom-Russell & R. Verble

*Multi-Phased Approach to Bacteria Source Assessment, Pearson Creek, Greene County, Missouri.* Jean Fehr, Marc R. Owen, & Dr. Robert T. Pavlowsky

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NOTES

