Newsletter of the Freshwater Mollusk Conservation Society
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COVER STORY

Submitted by Jim Stoeckel

Thanks to Everyone for Making the 2024 FMCS Environmental Tolerances & Ecophysiology Techniques Workshop a Great Success!

The FMCS Environmental Tolerances & Ecophysiology Workshop was held March 5-7 at Auburn University in Auburn, Alabama. Approximately 84 people from across the United States attended the workshop. The indoor venue for the talks worked out very well and we had a beautiful Alabama spring day for the “Hands-On” workshop outdoor activities.

The first day of the workshop (Tuesday) kicked off with an excellent keynote address by Paul Johnson on the importance and use of environmental data to promote mollusk conservation and habitat recovery efforts. This was followed by ten speakers who covered methodologies, strengths, and weaknesses of various methodologies to measure environmental stress. These included a wide range of laboratory assays, integrative modeling frameworks and field approaches. This was followed by a Mixer and Poster Session for a relaxing evening of drinks and mingling with lots of productive discussions. A generous donation from Paul Johnson and the Alabama Aquatic Biodiversity Center allowed us to organize a student poster competition with cash prizes for the two top posters. Wednesday contained another great set of talks with the morning sessions focusing on data interpretation and scaling impacts up to the community level. The afternoon switched focus from researchers (what can we do?) to management (what do we need?). In the evening everyone was treated to an outdoor fish fry at the EW Shell Fisheries Center, with many more chances to mingle, share ideas, and discuss future collaborations. The Thursday hands-on workshops were a great success with perfect weather and the opportunity to rotate between an array of nine, hour-long modules. Modules covered a range of techniques including respirometry, valveometry, hemolymph extraction, excretion, and silo construction and deployment. Many thanks to the E.W. Shell Fisheries Center management and crew for making the laboratories, tanks, and ponds open to the workshop for hands-on demonstrations. Many thanks to all of the participants for taking the time to attend and showing such enthusiasm for the talks and workshops that everyone worked so hard on.

The program for this Workshop, including abstracts of the Tuesday and Wednesday talks, is available on the FMCS website at https://molluskconservation.org/Events.html. Many thanks to all of the presenters for being willing to share their knowledge and experience and putting so much effort into developing an excellent set of presentations (Carla Atkinson, Megan Bradley, Greg Cope, Andrea Darracq, Kaelyn Fogelman, Wendell Haag, Andy Hartzog, Peter Hazelton, Matthew Jenny, Paul Johnson, Adam Kaeser, Jonathan Lopez, Teresa Newton, Jessica Radich, Charles Randklev, Jordan Richard, Irene Sanchez Gonzalez, Jim Stoeckel, Carrie Straight, Richard Tawes, Diane Waller, and Maureen Walsh) and workshop

modules (Kaelyn Fogelman, Wendell Haag, Matt Lodata, Jonathan Lopez, Amy Maynard, Madi Polera, and Jim Stoeckel).

Workshop organizers (Alan Christian, Kaelyn Fogelman, Susan Fuller, Amy Maynard, and Jim Stoeckel), committee Chairs (Jessica Radich, David Foltz, Brian Helms, Nathaniel Sturm) and committee members (Sandy Abbot, Lindsey Adams, Andy Hartzog, Peter Hazelton, Valerie Kearney, Jonathan Lopez) did a great job organizing the conference and making sure everything ran smoothly. Colin Nunn and Gabe Inoshita provided invaluable help keeping ZOOM running smoothly for the remote attendees and speakers. The Ecophysiology Workshop would not have been possible without the generous support of many sponsors: Edge Engineering & Science. US Geological Survey, EnviroScience, BioSurvey Group, Little Italy Pizzeria, West Liberty University, Stantec, Virginia DWR, Allstar Ecology, Loligo Systems, Troy University, Mainstream Commercial Divers, Dinkins Biological Consulting, LLC, Auburn University School of Fisheries, Aquaculture, and Aquatic Sciences, Auburn University Museum of Natural History Auburn University College of Agriculture, EcoAnalysts, Lewis Environmental Consulting, LLC. Their support is greatly appreciated!


AQUACULTURE
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Announcements

Submitted by Daelyn Woolnough

Save the Date, Call for Special Session, and Preparing for Presentation Submission for the FMCS 2025

Symposium—Michigan

Co-Organizers: Daelyn Woolnough and David Zanatta

Co-Chairs of Program Committee: David Strayer and Joe Rathbun

The 14th FMCS Biennial Symposium will be held from May 12-16, 2025 in Ann Arbor/Ypsilanti, Michigan. This is a slight change from Detroit due to events happening in Detroit at the same time; however the Detroit Metro International Airport (DTW) is closer to Ann Arbor/Ypsilanti than downtown Detroit and we are organizing an exciting FMCS Symposium in 2025. Please save this week on your calendar and consider giving a presentation at the FMCS Symposium 2025. **More updates will be coming soon by email and on social media.**

Special Sessions at FMCS 2025

We welcome proposals for special sessions. The special sessions are likely a set of talks that are related and would be programmed together but we are open to any ideas. Proposals should include a paragraph that describes the content, the purpose of the special session, the names of proposed speakers, and their proposed titles. Proposals for special sessions should be sent to strayerd@caryinstitute.org before **15 October 2024**. Before submitting the proposal, organizers should contact proposed speakers to confirm that they would be willing to participate.

Presentations at FMCS 2025

There will be three formats for presentations at FMCS 2025: talks (traditional), lightning talks (5-min), and posters. Lightning talks are for those who want to share quick updates or just early results on a project. We welcome talks and poster presentations on a wide variety of topics related to freshwater mollusk conservation and biology, including (but not limited to) life history and ecology; status and distribution of species; surveys and monitoring; propagation; ecosystem and community ecology; genetics and phylogeny; ecosystem services; habitat and mollusk community restoration; contaminants and ecotoxicology; outreach; climate change; non-native mollusks; and mollusk kills.

Instructions for Authors

Abstracts are due by **11:59 pm Eastern U.S. on Wednesday, February 12, 2025**. Virtual attendees may present a traditional talk, poster, or lightning talk must indicate that their presentation will upload to WHOVA app in advance of the Symposium (details to follow) when they submit their presentation information (see below).

Submissions

Submissions for presentations will happen through the WHOVA app that has been used for planning and programming of the last two FMCS events. WHOVA can be accessed via App (phone) or website. WHOVA has developed an abstract submission system and we will be announcing the process of submission in early Fall 2024. We look forward to sharing the WHOVA App submission process early Fall 2024 and are hopeful that this submission process will work to save FMCS volunteers time processing abstract submissions.

Full abstracts (see format below) will be required for traditional talks and posters. Full abstracts are not required for lightning talks, but a title, authors' names, and a 1-2 sentence description must be submitted by the abstract deadline. In addition to providing the abstract itself (see details below), presenters should be required to answer general questions about co-authors, willingness to switch presentation type, etc.

All students submitting abstracts, provided they meet eligibility requirements, will be judged for the best student platform or poster presentation awards, unless otherwise indicated.

Abstract format

The abstract title should be entered in BOLD CAPITAL LETTERS. Information on ALL co-authors and their contact information (institution and address) will be requested within the Whova app. The text of the abstract should include a clear summary of presentation including objectives, results, and conclusions.

Please keep abstracts to 300 words or less (see example below). Here is an example abstract that shows the required format.

Submitted by Martin Österling – Karlstad University, Sweden

2nd Freshwater Mollusk Conservation Society Meeting in Europe

Linking the Quadrants of the Earth: A Worldwide Exploration of Freshwater Mollusk Study and Conservation

Karlstad, Sweden, 17th to 20th September, 2024

3rd ANNOUCEMENT

Scope

Mollusks are the second most species rich animal phylum on earth, and have a wide variety of adaptations and ecological niches in their terrestrial and aquatic environments. The freshwater mollusks provide many important ecosystem functions and services; however, their highly endangered status, mainly caused by anthropogenic factors, means that their impact on the environment is in drastic decline. To combat this, conservation and reintroduction practices need to be developed and implemented to reduce and reverse their drastic population declines. Nonetheless, conservation strategies for freshwater mollusks are hampered by a lack of key information surrounding freshwater mollusk biology and ecology. In recent decades there has been an increased interest in studying these animals; integrating the knowledge from researchers and conservationists is a key for scientific progress. This conference aims to connect international freshwater mollusk researchers and conservationists to stimulate more international collaborations, and to help global policy makers establish policies and guidelines for future mollusk conservation efforts.

The Freshwater Mollusk Conservation Society (FMCS) is dedicated to the conservation of and advocacy of these animals but until now its activity has been mainly confined to North America. However, since freshwater mollusks are in global danger, there is a need to pursue the FMCS goals beyond geographic and political borders. This restricted consideration has prompted the idea of promoting FMCS in other continents, and in 2018 the 1st European FMCS meeting was arranged in Verbania, Italy. The implementation of congresses outside of the American continent aims to expand the membership, share research and data with international colleagues and foster collaboration. It is under this perspective that we want to introduce the upcoming 2024 meeting at Karlstad University in Sweden; the second of a series of FMCS sponsored international meetings.

Goals

1. To bring together international experts in biology and conservation of freshwater mollusks that, through the present and forthcoming conferences and debates, will be able to create a network of knowledge with the final goal of developing collaborative projects and eventually global directives for the protection and conservation of this important faunistic group.

2. To provide an incentive for non-North American freshwater malacologists to become members of FMCS and participate in planned activities, symposia, publications and workshops.
3. To set up a subcommittee within the society of local malacologists - e.g. initially from Europe, but to be expanded to other continents around the world - to provide structure and communication about resources, lobbying, collaboration and outreach. This will facilitate answering key questions and developing techniques to address the same or similar problems encountered across freshwater molluskan research.
4. To arrange joint international meetings around the world. The first three international freshwater bivalve meetings (Bragança, Portugal, 2012; Buffalo, NY, 2015; and Verbania, Italy, 2018) were exciting and fun with a very good international participation. With the 2024 international meeting at Karlstad University in Sweden, we want to expand the focus on bivalves including all the freshwater mollusks and thereby further improve the building of an international network.

We have planned for three days of presentations on a variety of topics that cover all aspects of Malacology, targeting the latest research advances in both theoretical and applied issues. A number of internationally recognized keynote speakers will present the state of current research on these topics. This will spark debate and interest on research needs concerning the many ways mollusks affect ecosystems and society. A more detailed list of sessions will be provided in forthcoming announcements, and for the moment, we count on everyone's enthusiasm to continue the ideas of bridging the gap and knowledge exchange between malacologists around the world that was initiated during the 1st FMCS meeting in Verbania, Italy.

Follow the link to our home page at: fmcs-karlstad.conference.kau.se

DEADLINES

Early bird registration end: 15 May 2024
Regular registration end: 30 June 2024
Abstract submission: 15 May 2024

Organizing Committee

Martin Österling – Karlstad University, Sweden; Sebastian Rock – Karlstad University, Sweden;

Magnus Lovén Wallerius – Karlstad University, Sweden; Raviv Gal – Karlstad University, Sweden;

Lea D. Schneider – The Rural Economy and Agricultural Societies - Halland, Sweden; Ted von Proschwitz – Gothenburg Natural History Museum, Sweden;

Niklas Wengström Swedish Anglers Association, Sweden;

Contact

fmcs.karlstad@kau.se

RivEM (River Ecology and Management Research Group): http://www.nrrv.se/ Address: Karlstad University, Universitetsgatan 2, 651 88 Karlstad, Sweden Registration / Whova

Scientific Committee (tentative)

Martin Österling – Karlstad University, Sweden; Nicoletta Riccardi – CNR – ISE, Italy;

Manuel Lopes Lima – CIBIO, Porto University, Portugal;

Tadeusz Zając – Institute of Nature Conservation, Polish Academy of Sciences, Poland; Maria Urbanska – Poznan University of Life Sciences, Poznan, Poland;

Alexandra Zieritz – University of Nottingham Malaysia Campus, Malaysia; Ronaldo Sousa – Minho University, Portugal;

Karel Douda – Czech University of Life Sciences Prague, Czech Republic;

Anna Łabęcka – Jagiellonian University, Kraków, Poland; Paz Ondina – University of Santiago de Compostela, Spain; Jouni Taskinen – University of Jyväskylä, Finland;

Jürgen Geist – Technical University of Munich, Germany; Mary Seddon – IUCN, Mollusc Specialist Group;

Vincent Prie – Institute of Systematics, Evolution, Biodiversity (ISYEB);

Amy Maynard (president elect of the FMCS) – Neosho National Fish Hatchery, USA; David Strayer – Cary Institute of Ecosystem Studies, USA;

Arthur Bogan – North Carolina Museum of Natural Sciences, USA;

John Pfeiffer – Smithsonian Institution, Natural Museum of natural History; Carla Atkinson – University of Alabama, USA;

Megan Bradley (president of the FMCS) – Fish and Wildlife Service, USA; Teresa Newton – U.S. Geological Survey in Wisconsin, USA;

Astrid Schwalb – Texas State University, USA;

Upcoming Meetings

June 23 – 28, 2024 – Society for Conservation Biology North American Sectional Meeting, the 7th biennial North American Congress for Conservation Biology will be held in Vancouver, BC, June 23-28, 2024. https://scbnorthamerica.org/

September 17 to 19, 2024 -- 2nd European Freshwater Mollusk Conservation Society Meeting -- LINKING THE QUADRANTS OF THE EARTH: A Worldwide Exploration of Freshwater Mollusk Study and Conservation; Karlstad, Sweden. **(https://fmcs-karlstad.conference.kau.se/).** *Abstract submission should be sent to:* fmcs.abstract@kau.se

September 17 to 19, 2024 - International Conference on Shellfish Restoration (ICSR) -- Jekyll Island, Georgia at the Jekyll Island Convention Center. ICSR is inviting presentations on any topic related to the restoration or conservation of marine, brackish, or freshwater molluscan shellfish species. (https://www.icsr2024.com/)

May (12-16) 2025 – The 14th FMCS Biennial Symposium will be held in Ann Arbor/Ypsilanti, Michigan.

Contributed Articles

The following article was contributed by FMCS members and others interested in freshwater mollusks. Contributions like this are incorporated into Ellipsaria *without peer review and with little editing. The opinions expressed are those of the authors.*

Submitted by John Spaeth
Edge Engineering and Science
Cincinnati, Ohio

Annual Meeting of the Ohio River Valley Mollusk Group (ORVMG) - 2024

The ORVMG annual meeting convened on March 21-22, 2024, at the Thomas More University Biology Field Station, situated near the midpoint of the Ohio River (River Mile 461). The ORVMG's inaugural meeting dates back to 1995, spurred by the discovery of invasive Zebra Mussels (*Dreissena polymorpha*) during a 1994 mussel survey led by Heidi Dunn. Originally known as the Mollusk Subgroup of the Ohio River Valley Ecosystem Team, this gathering brought together stakeholders from USFWS, state resource agencies, and numerous others to address the potential impact of Zebra Mussels on the native mollusk fauna of the Ohio River basin. Over the past 29 years, this annual meeting has persisted, focusing on mollusk research, conservation efforts, inventory surveys, population demographics, propagation techniques, and taxonomic updates.

The 2024 meeting adopted a hybrid format, allowing for both in-person attendance at the Field Station and virtual participation via Zoom. Twenty-three presentations were delivered, spanning various topics and updates from states across the Ohio River Basin. Over 60 professionals journeyed to the Field Station from eight different states, while an additional 50 or more joined remotely, expanding the meeting's geographical reach. Attendees represented a diverse array of affiliations, including USFWS, USACE, USFS, USEPA, state resource agencies, consultants, NGOs, students, and universities.

John Spaeth of Edge Engineering and Science has chaired the ORVMG for the past five years, overseeing the organization and execution of the annual event. Special recognition was extended to Dr. Chris Lorentz, Molly Williams, and the TMU staff for their hospitality in hosting the meeting as well as support from Mitchell Kriege (Current Hydro), Jeremy Tiemann (Illinois Natural History Survey), and Taylor Fagin (USFWS). Situated along the Ohio River, the Field Station provided a picturesque backdrop and conducive facilities for collaboration, networking, and education throughout the event. A social gathering, featuring catered dinner and kegs sponsored by EnviroScience and Stantec, was held on the evening of March 21st, fostering collaboration, camaraderie, and tales of the field among attendees. Breakfast and coffee were sponsored by BioSurvey Group on the morning of the 22nd.

For those interested in staying updated on ORVMG activities, including details about the 2025 event, email requests can be sent to John Spaeth (jpspaeth@edge-es.com) to be added to the ORVMG email list.

A list of presenters and presentation topics/titles at the 2024 ORVMG meeting are provided below:

Elaine Barr – USFWS – A Novel Approach to Mollusk Inventory at Ohio River Islands National Wildlife Refuge.

Jason Brownknight – Little Miami Conservancy – Multivariate Assessment to Better Understand the Status of Freshwater Mussels in the Little Miami State and National Scenic River.

Chad Lewis – Lewis Environmental – Using Sonar Technology to Select Mussel Survey Areas for Dredge Disposal.

Scott Ray – Pennsylvania Fish and Boat Commission – Union City Aquatic Conservation Center Updates and Future Plans. (VIRTUAL)

Monte McGregor – KYDFWR – Freshwater Mollusk Propagation, Culture, and Restoration of Rare Mussels in the Ohio River System.

Leslie Sneed – Kentucky Resources Council – The Story of the "Clamshell" Dredge in the Tennessee River.

Andrew Phipps – USFWS White Sulphur Springs Fish Hatchery – General Hatchery Updates. (VIRTUAL)

Hunter Bellamy – USFWS White Sulphur Springs Fish Hatchery – Assessing the Unionid Assemblage of the Robert C. Byrd Pool, Ohio River. (VIRTUAL)

Charlie Morgan – Mainstream Divers – The Beginning of Mussel Surveying Efforts for the US Highway 51 Bridge Replacement near Cairo, Illinois.

Mike Compton – Kentucky State Nature Preserves – Updates and Notes of Select Mussel Species in Kentucky.

Wendell Haag – U.S. Forest Service – The Mussel Assemblage Health Index (MAHI).

Traci DuBose – Oak Ridge Institute for Science and Education (ORISE) – Is Mussel Assemblage Health Correlated with Indicators of Biotic Integrity or Stream Impairment.

Dan Marsh – Cincinnati Zoo - Association of Zoos and Aquaria (AZA) Freshwater Mussel Safe Program

Eric Chapman – Western Pennsylvania Conservancy – Freshwater Mussel Conservation in the Upper Ohio River Watershed. (VIRTUAL)

Dr. Jason Rech (Miami University) and Nate Schoobs (Ohio State University) – Radiocarbon Dating Mussel Shell Deposits in the Ohio River Watershed. (VIRTUAL)

Gabriel Inoshita – Miami University – Modeling Zero-Inflated Count Data to Improve Population Estimation Precision.

Mitchell Kriege – Edge Engineering & Science – Freshwater Mussels of the Upper Kentucky River Mainstem and (Part 2) Call for Ohio River Mussel Preserves.

Taylor Fagin – USFWS Kentucky Field Office – Ring Pink (*Obovaria retusa*) eDNA study.

Alex Donahoo – Miami University – Predicting Hotspots of Mussel Biodiversity for Analysis of Conservation Priorities.

Nicholas Wheeler – Marshall University – Develop a Biomonitoring Protocol for Freshwater Mussels within the Ohio River. (VIRTUAL)

Jeronimo Silva – University of Tennessee Knoxville – Investigating Mussel Die-offs Through in situ Experiments, Surveys, and Epidemiological Analysis in the Clinch River.

Cody Fleece – Stantec – Claytor Hydroelectric Project (FERC No.739) – Mussel Silo and Water Quality Study Year 2.

Katelyn Jackson – EA Engineering – Long-Term Mussel Monitoring on the Ohio River near the Willow Island Hydroelectric Project.

ORVMG annual meeting March 21-22, 2024, at the Thomas More University Biology Field Station, on the Ohio River. Photo submitted by John Spaeth

By: Amanda Osborne, October 25, 2023

The Watters Aquatic Conservation Center Marks the Beginning of an Exciting New Chapter in Freshwater Mussel Conservation

Local biodiversity conservation is of utmost importance, and the Columbus Zoo and Aquarium has partnered with many educational and public entities and groups throughout the years to help lead local initiatives aimed at protecting some of the most imperiled species in the region.

Among these remarkable efforts is the Freshwater Mussel Research and Conservation Center, a facility dedicated to the study and preservation of freshwater mussels and other aquatic organisms, meeting six primary needs:

- To assess the health of mussels both in their native range and in professional care.
- To establish a brood stock and propagate mussels for reintroduction to mitigate population decline.
- To conduct basic research, including identifying fish host relationships and developing in vitro propagation methods.
- To offer temporary refugia to mussels removed from locations impacted by environmental disasters or during translocations between different locations.
- To provide training to high school, undergraduate, and graduate students.
- To provide educational outreach to Zoo guests and local educational institutions.

This unique facility is a result of a multi-organization partnership, all of whom have impactful roles:

Originally serving as a lodge and retreat for the Jeffrey Manufacturing Company, this property underwent a significant transformation in 2001-2002 to become the cornerstone of freshwater mussel research and conservation in the region. Driven by the vision and dedication of individuals like Dr. Tom Watters, Doug Warmolts (the Zoo's Vice President of Animal Care), Mike Brittsan (retired Zoo Curator), Ohio Division of Wildlife biologists, and numerous volunteers, the facility emerged as a shining example of what can be achieved when passion and commitment meet conservation science.

Why Are Freshwater Mussels Important?

Freshwater mussels play a vital role in maintaining healthy river ecosystems, yet many species face endangerment at various levels. In fact, approximately 20% of North America's threatened and endangered species are freshwater mussels.
Over the past 20 years, the Freshwater Mussel Conservation and Research Center has taken pioneering steps to address these challenges, including releasing thousands of federal and state-endangered Northern Riffleshell and Clubshell mussels into Big Darby Creek all the way from the Allegheny River of Pennsylvania as part of the largest relocation of an endangered species in the history of Ohio.

The team has also been involved in the process of in vitro propagation of mussels. This innovative technique bypasses the need for host fish, potentially enabling the production and rearing of thousands of mussels, rather than just a few hundred through traditional methods.

Ohio is invested in This Work

In 2022, the Columbus Zoo received a significant boost of $500,000 from the Ohio Department of Natural Resources to support upgrades and conservation efforts at the Freshwater Mussel Conservation and Research Center. This injection of funds underscores the facility's importance and commitment to its mission.

After 20 Years of Work, The Facility is Rededicated and Celebrated

On September 15, 2023, the Freshwater Mussel Conservation and Research Center celebrated its 20th anniversary with a special ceremony and program, including its rededication. Now known as the Watters Aquatic Conservation Center, the facility was named after Dr. Tom Watters, Curator of Mollusks at The Ohio State University Museum of Biological Diversity and co-founder of the Zoo's mussel facility.

Distinguished guests, including Dr. Renee Watters, Dr. Watter's widow, representatives from the Ohio Department of Natural Resources, the Ohio State University, City of Columbus, and the Columbus Recreation and Parks Department attended the event, marking the beginning of an exciting new phase in freshwater mussel conservation.

In a world where freshwater ecosystems are increasingly threatened, the Watters Aquatic Conservation Center and its unique partnership, stands as a beacon of hope. With its dedication to research, education, and collaboration, it is poised to make a significant impact on the preservation of these remarkable, yet vulnerable, creatures and the ecosystems they call home.

The Power of Research and Education

The primary focus of the Watters Aquatic Conservation Center is to deepen our understanding of imperiled mussels and their ecosystems. This encompasses host fish identification, captive husbandry requirements, reproductive biology, and nutrition. For example, the identification of host fish for the federally endangered clubshell has opened doors for potential mussel cultivation and reintroduction efforts.

Additionally, the facility serves as a crucial sanctuary during unforeseen environmental disasters. The recent silage spill on Big Darby Creek demonstrated the importance of such refugia for mussels (this was several years ago).

Submitted by John Pfeiffer

Requesting feedback on potentially problematic freshwater mollusk common names

John Pfeiffer[1], Jer Pin Chong[2], Sara Craft[3], Traci DuBose[4], Alex Franzen[5], Mark Hove[6], Tamara A. Smith[7], and Daelyn A. Woolnough[8]

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[2] University of Illinois at Chicago, Chicago, IL
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Content Warning: This article contains racial slurs that some readers may find offensive.

Common names play an important role in understanding and protecting biodiversity by providing shared and accessible language that bridges gaps between science, conservation, and education. Common names are a convenient communication tool that allows scientists and nonscientists to exchange information and share experiences related to biodiversity. Common names also have the benefit of remaining stable amid frequent changes to scientific names.

Freshwater mussels are well known for having descriptive (e.g., Purple Wartyback, Threeridge, Ring Pink), imaginative (e.g., Washboard, Spectaclecase, Elephantear), and beautiful (e.g., Golden Riffleshell, Birdwing Pearlymussel, Rainbow) common names. These stable and memorable common names are an important asset to the freshwater mussel community and help stakeholders engage with the general public. However, not all freshwater mussel common names have advanced scientific communication; in fact, several common names have undermined it.

Common names can be problematic for a variety of reasons, such as the inclusion of derogatory terms, eponymous (i.e., honorific) common names that celebrate individuals with racist behaviors, or names for invasive species with inappropriate geographic references. Problematic common names may perpetuate discrimination, disrupt communication, and prevent inclusive engagement. Acknowledging, and if necessary, changing problematic common names is a useful step scientific societies can take to improve communication and make their community more inclusive (Lancette, 2021; Winker, 2022). However, changes to common names should not be undertaken lightly, as doing so undercuts one of their main advantages — stability. Furthermore, changes to common name may be more effective when they have been carefully considered and commented on by the stakeholders that use them. With that in mind, our objective here is to briefly describe the racist history of some freshwater mussel common names, discuss the potentially problematic nature of five freshwater mussel common names recognized by Freshwater Mollusk Conservation Society (FMCS), and solicit input from society members on possible paths forward.

In 1915, the US Bureau of Fishes (precursor of the United States Fish and Wildlife Service) published one of the first formal lists of US freshwater mussel scientific and common names (Coker, 1915). This publication had the laudable goal of “publishing in convenient reference form a list of the species most commonly mentioned, showing the scientific name with its common equivalent” and was aimed at improving communication between scientists and “…persons without scientific training who are yet interested in scientific papers dealing with their distribution, habits, and life history”. Over 100 years

later, the FMCS Scientific and Common Names Subcommittee shares the same goal and is similarly committed to maintaining "lists of common and scientific names of freshwater gastropods and bivalves" designed to "support stability and promote effective communication about freshwater mollusks" (FMCS, 2024).

Many of the common names formalized in Coker (1915) are still recognized in the FMCS checklist of freshwater mussels (FMCS, 2023), while many of the scientific names are not — demonstrative of the stability of common names. However, there are several overtly racist common names recognized in Coker (1915) and other early works (Strecker, 1910; Utterback, 1915) that are not recognized in the FMCS checklist of freshwater mussels (Table 1). These racist common names were initially coined by shell hunters associated with the pearl button industry and were constructed by combining a racial slur (i.e., nigger, squaw) and a reference to a body part (i.e., head, foot, toe). The derogatory nature of these names is unquestionable. Most of these names were no longer used in the literature by the 1950s; although Squawfoot has persisted into the 21st century (Figure 1). Recognizing the racist nature of these common names is important to creating a more informed FMCS. It also provides the community an opportunity to learn from past mistakes and think critically about the impacts of existing and future common names.

Given the racist pattern of referencing a Black person's head in several freshwater mussel common names (Table 1), concerns have been raised about the racial connotations of "monkeyface" which is used in five common names in the FMCS checklist (Figure 2). For many years, "monkeyface" was used alongside overtly racist common names in the literature (Figure 3) and during a historical period when comparing Black people to monkeys was racist propaganda used to dehumanize and rationalize mistreatment (i.e., simianization). The historical and cultural context in which "monkeyface" was initially applied to freshwater mussel common names raises concerns about its racial connotations. Several, now abandoned, freshwater mussel common names included unambiguously racist references to a Black person's head, it remains unclear if "monkeyface" was being used similarly.

We request your input regarding the use of "monkeyface" in five currently recognized freshwater mussel common names (Figure 2). Please consider completing a voluntary and anonymous survey by following this link. The results of this survey may be used as supplemental information in a petition for proposed common name changes to be evaluated by the FMCS Scientific and Common Names of Freshwater Mollusks Subcommittee.

Table 1. List of previously used racist freshwater mussel common names and their modern equivalents.

Nominal species	Previous common name	Source	Valid species	Current common name
Alasmidonta marginata	Nigger Toe	Utterback, 1915	*Alasmidonta marginata*	Elktoe
Obovaria ellipsis	Missouri niggerhead	Coker, 1915	*Obovaria olivaria*	Hickorynut
Pleurobema obliquum catillus	Osage Nigger-Head	Utterback, 1915	*Pleurobema sintoxia*	Round Pigtoe
Quadrula coccinea	Flat niggerhead	Coker, 1915	*Pleurobema sintoxia*	Round Pigtoe
Quadrula ebenus	Niggerhead	Coker, 1915	*Reginaia ebenus*	Ebonyshell
Rotundaria tuberculata	Red Nigger Head	Utterback, 1915	*Cyclonaias tuberculata*	Purple Wartyback
Strophitus edentulus	Squaw-foot	Coker, 1915	*Strophitus undulatus*	Creeper

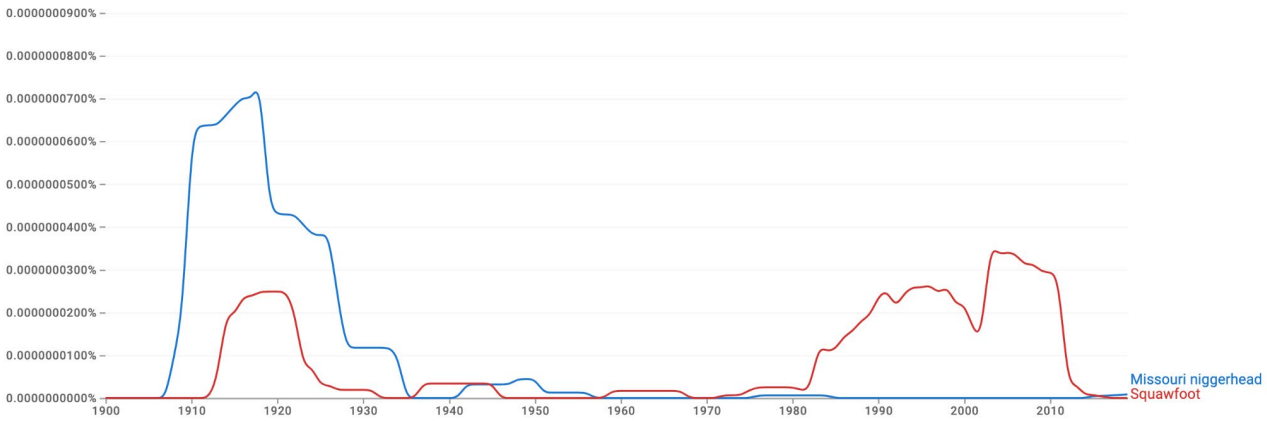

Figure 1. Usage of two racist freshwater mussel common names across time using Google Books Ngram Viewer (Michel et al., 2011).

Figure 2. Representative specimens of FMCS recognized mussel species with "monkeyface" in the common name.

A

"Warty pig-toe." *Q. cooperiana, pustulosa*, etc.
"Nigger-head." *Q. ebena;* sometimes also *Obovaria retusa.*
"Monkey face." *Q. metanevra.*
"Butterfly." *Plagiola securis.*
"Pocketbook." *L. ventricosa*, also *capax.*

B

Quadrula cylindrica	Rabbit's foot	Long, narrow, rough back; hard; often stained.
Quadrula ebenus	Niggerhead	Unsurpassed; yields "iridescents."
Quadrula granifera	Purple warty-back	Good quality, but purple-nacred.
Quadrula heros	Washboard	Very large; usually second grade; often discolored by stains; valued chiefly for large buttons.
Quadrula lachrymosa	Maple-leaf	Rough back; excellent in texture; yields "iridescents," but thinnish at tips.
Quadrula metanevra	Monkey-face	Like maple-leaf, but inferior.
Quadrula obliqua	Ohio River pig-toe	Good quality; pure white, but lacking in luster.

Figure 3. Partial list of scientific and common names from Strecker, 1910 (A) and Coker, 1915 (B).

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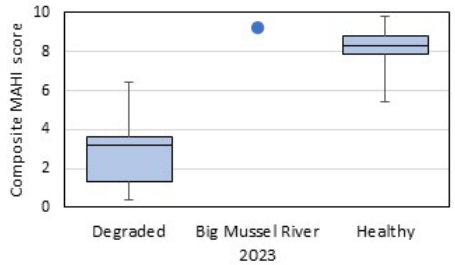
Any use of trade, firm or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government. The findings and conclusions in this article are those of the author(s) and do not necessarily represent the views of the U.S. Fish and Wildlife Service.

Submitted by Wendell Haag
US Forest Service

NEW!
A broadly applicable, objective freshwater mussel assemblage health index (MAHI)
Submitted by Wendell R. Haag, Angela K. Burrow, Traci P. DuBose, and Stephen J. Price

It is our pleasure to announce the availability of the Freshwater Mussel Assemblage Health Index (MAHI). MAHI is a bioassessment tool for evaluating the health of freshwater mussel assemblages, which allows inference about overall stream health. It is conceptually similar to the Index of Biotic Integrity (IBI), which typically is based on aquatic insect or fish assemblages. MAHI uses commonly collected mussel survey data to compute a score for four metrics, each reflecting a fundamental aspect of assemblage or population health: species loss, recruitment, abundance, and population growth. The composite MAHI score is the unweighted mean of the four metric scores. All scores are scaled from 0–10, representing increasing health, based on survey data from 50 streams across eastern North America. MAHI provides an objective score that eliminates individual bias, and it is free of untested assumptions about species tolerance. Scores can be compared among streams throughout eastern North America regardless of stream size, biogeographic region, or other intrinsic factors, and it may be adapted to other regions. MAHI can be a valuable tool for monitoring, including early detection of mussel declines, better understanding the causes of declines, and evaluating the effectiveness of conservation strategies and management actions.



Portion of example output from the MAHI Excel application showing how the score of a site compares with healthy and degraded mussel assemblages.

Details about development, calculation, and evaluation of MAHI can be found in the following publication, which is scheduled to appear in the June issue of *Freshwater Science*:
Haag, W.R., A.K. Burrow, T.P. DuBose, and S.J. Price. 2024. A broadly applicable, objective freshwater mussel assemblage health index (MAHI). Freshwater Science, in press.
https://doi.org/10.1086/730378

In addition to the publication describing MAHI, we developed an Excel application that allows users to input required data, and it returns individual metric scores, a composite MAHI score, and other information. The application can be downloaded at:
https://www.fs.usda.gov/research/srs/products/dataandtools/tools/mahi, and
https://www.americanrivers.org/MAHI.

ROUGHT-INDUCED MASS MORTALITY OF FRESHWATER MUSSELS ALTERS ECOSYSTEM FUNCTION: A MESOCOSM EXPERIMENT.

Traci P Dubose[1], Carla L Atkinson[2], Caryn C Vaughn[1] & Stephen W Golladay[3]. [1] University of Oklahoma, Norman, OK; [2] University of Alabama, Tuscaloosa, AL; [3] Jones Center at Ichauway, Newton, GA.

Droughts are becoming more frequent and intense globally. As sedentary organisms, native freshwater mussels are vulnerable to the high-water temperatures and shrinking aquatic habitat caused by extreme events. While drought-driven die offs have been documented in the southern Great Plains, the ecosystem impacts of these droughts have not been completely quantified. To better quantify impacts of mussel mass mortality events on ecological function, we conducted a mesocosm experiment that simulated a mussel die-off. We created three scenarios in eighteen 946L mesocosms: nine control mesocosms without freshwater mussels, four mesocosms with a live mussel community, and five mesocosms with a mussel community that experienced a die-off. We measured water column nutrients, primary production, and the macroinvertebrate community before (3 samples over 20 days) and after (4 samples over 39 days) the mussel mortality event. We also measured mussel decomposition following the die-off. In the week after the die-off, ammonium increased by 94% in the mortality mesocosms and was significantly higher than the control mesocosms, but not the live mesocosms. Soluble reactive phosphorus increased in mortality mesocosms but was not significantly different than the control or live mesocosms. The rapid nutrient release following mussel mortality likely stimulates both the autotrophic and heterotrophic components

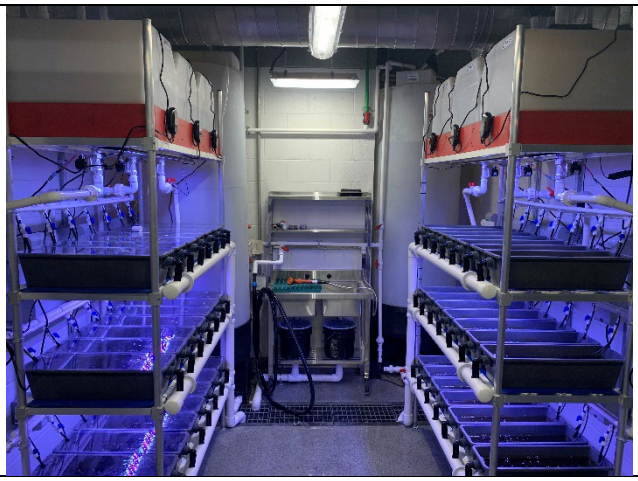
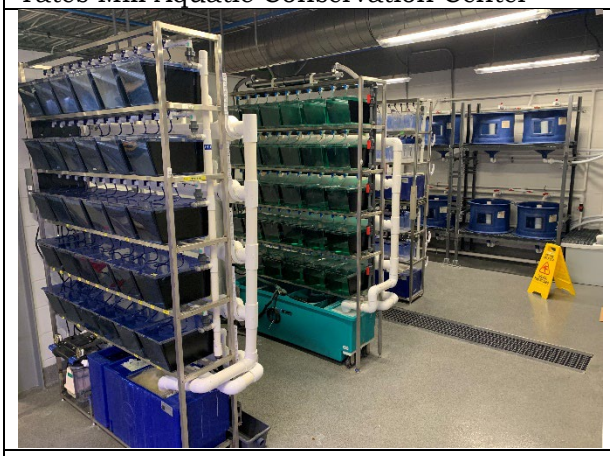
of river food webs. Benthic gross primary production was greater in mortality and live mesocosms than in control mesocosms. Decomposition of organic matter increased immediately following mussel death in mortality mesocosms and was statistically different than live mesocosms. We combined our mesocosm experiment results with field observations and the literature to build a conceptual model of how unionid mass mortality events likely impact ecosystem function across short and long-time scales. This conceptual model should aid development of conservation and management strategies that sustain stream structure and function in the face of drought-driven mussel losses.

Submitted by Chris B. Eads

Opening of a New Mollusk Propagation Laboratory at North Carolina State University

Chris B. Eads, Loretta M. Lutackas, David C. Lawson, W. Gregory Cope

Construction and renovation of the new Yates Mill Aquatic Conservation Center at North Carolina State University was completed in May 2023. Since that time, staff have been building and testing systems for holding and rearing of freshwater fish, mussels, and snails. Active freshwater mussel propagation and research began in March 2024. Our primary mission is to support conservation of imperiled aquatic fauna through propagation, research, and public outreach. In total, the facility consists of approximately 4400 ft^2 of both indoor and outdoor research and production space. An additional 800 ft^2 pump house delivers up to 400 GPM of flow from the pond a historic millpond filtered down to 25 microns. Besides traditional mussel propagation using fish hosts, an in vitro propagation laboratory will support additional research and production of mussels. Being located within a county park provides additional opportunities for outreach to K-12 students and local citizens. Funding for establishment and operation came from a settlement over a large highway project in the Raleigh, NC metropolitan area that crosses through habitat of five federally listed aquatic species. Our website is still under construction, but more information can be found at www.yatesmillaquaticconservationcenter.org.

	
Yates Mill Aquatic Conservation Center	Pulsed-flow systems for juvenile mussel rearing
	
Holding area for inoculated fish hosts	Luring mussels are excellent ambassadors for the fauna on public tours

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Submitted by Rob Dillon

Coordinator, FWGNA Project
DillonR@fwgna.org

The Freshwater Gastropods of The Great Plains

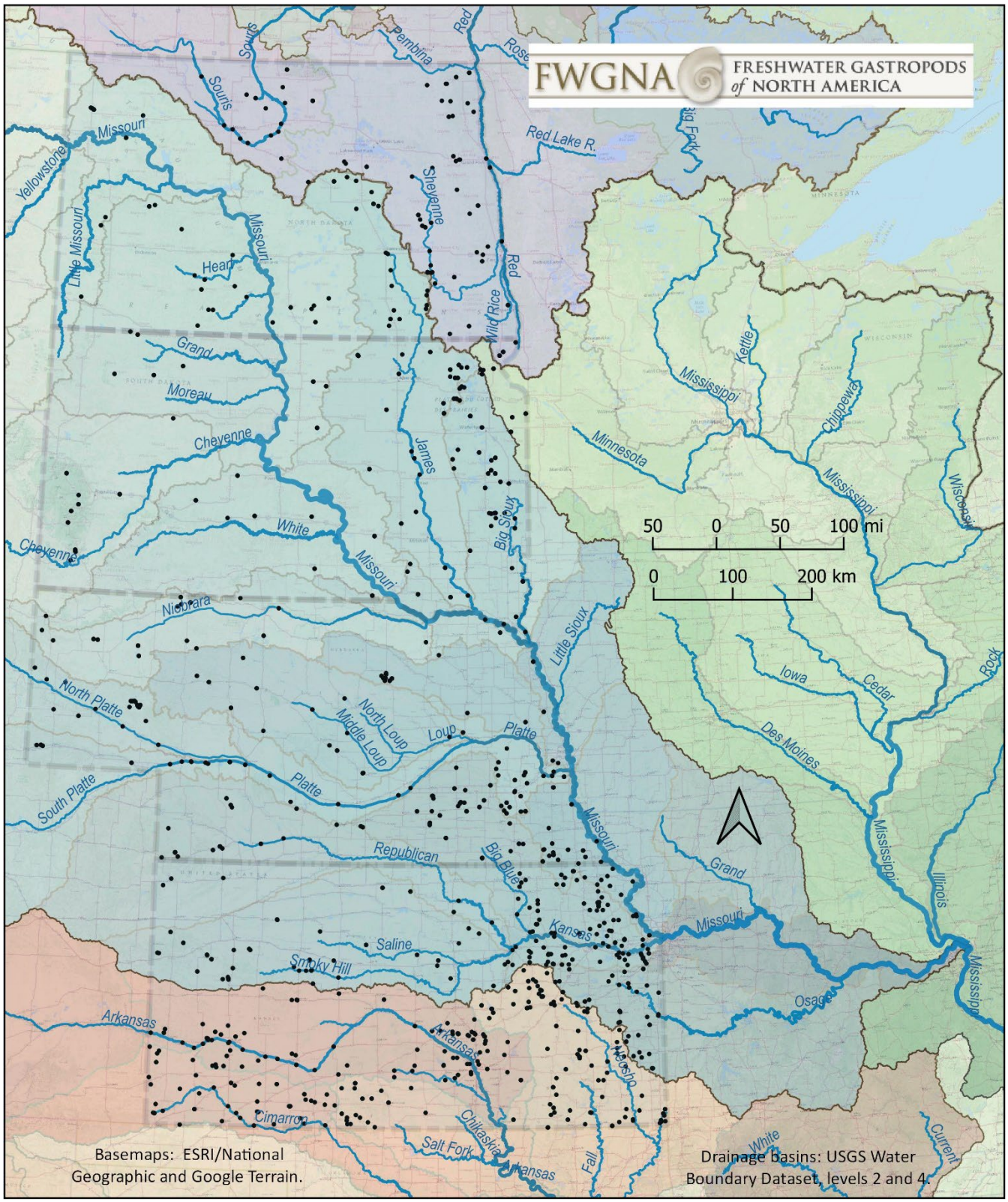
We are pleased to announce a major expansion of the FWGNA Project, now extending our coverage westward to include the prairie states of Kansas, Nebraska, South Dakota, and North Dakota. The Freshwater Gastropods of the Great Plains, by Bruce J. Stephen, Robert T. Dillon, Jr, and Martin Kohl is now online and available for reference! Check it out:

Visit the FWGGP

In this important new web resource, we report the results of an original survey of 795 rivers, streams, lakes, and ponds across a big slice of the American heartland, documenting 33 gastropod species. For each species we provide range maps and ecological notes, with a photo gallery and a dichotomous key for easy identification.

Although in areal extent our 308,000 square mile Great Plains study area is the largest of the eight regions thus far covered by the FWGNA Project, by freshwater gastropod species richness it is the smallest. We suggest two historical factors to account for the relative poverty of the Great Plains malacofauna: the absence of landform diversity, and the absence of time sufficient for a regionally adapted fauna to evolve. The effects of Pleistocene glaciation, if any, seem to have been to increase species richness. State subtotals were 16 species in Kansas, 18 in Nebraska, 19 in South Dakota, and 23 in North Dakota.

We also document reductions in species richness for three of the four Great Plains states when compared to expectation from the published literature. Kansas seems to have lost 4 species, South Dakota 6 and Nebraska 14. The freshwater gastropod species apparently missing from each state typically become more common further north. Although some of this phenomenon is certainly due to sampling error, we think it likely that climate change may have been a factor in the decreased species richness of The Great Plains.


FWGNA
FRESHWATER GASTROPODS of NORTH AMERICA
50 0 50 100 mi
0 100 200 km
Basemaps: ESRI/National Geographic and Google Terrain.
Drainage basins: USGS Water Boundary Dataset, levels 2 and 4.

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Ellipsaria is posted on the FMCS web twice a year: with a Spring issue in May, and a Fall issue in October of each year. The newsletter routinely includes Society news, meeting notices, pertinent announcements, and informal articles about ongoing research concerning freshwater mollusks and their habitats. Anyone may submit material for inclusion in *Ellipsaria* and all issues are accessible to anyone on the FMCS website (http://molluskconservation.org).

Articles contributed to *Ellipsaria* should be preliminary or initial observations of note (e.g., natural history observations, meaningful new distribution records, interesting finds, etc.) concerning freshwater mollusks, their habitats, and/or their conservation. Articles that include quantitative analyses, draw conclusions based on analyses, or propose taxonomic revisions should not be submitted to *Ellipsaria* and, instead, should be submitted to a peer-reviewed journal such as *FMBC*. Please limit the length of contributed articles to about one page of text (i.e., excluding pertinent tables, figures, and references).

Information for possible inclusion in *Ellipsaria* should be submitted via e-mail to the editors, Bob Anderson and Don Hubbs, at Ellipsaria@gmail.com. Contributions may be submitted at any time but are due by the 15th of the month before each issue is posted. MSWord is optimal for text, but the editor may be able to convert other formats. Graphics should be in a form that can be manipulated using PhotoShop. Note that submissions are not peer-reviewed but are edited for clarity and checked for appropriateness for posting in this freshwater mollusk newsletter. Feel free to contact the editor with questions about possible submissions or transmission concerns.

FMCS Committees and Their Chairs/Co-chairs

If you are interested in participating in committee activities, please contact one of the appropriate chairs.

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Parting Shots

Submitted by Matthew Reed, Tennessee Valley Authority, Chattanooga, Tennessee

Field photos from mussel surveys on the Hiwassee River last year and Steve Ahlstedt "getting it done" in 2016.

Steve Ahlstedt surveying mussels in 2016

Hellbender with mussels

What have we here?

If you would like to contribute a freshwater mollusk-related image for use as a **Parting Shot** in *Ellipsaria*, e-mail the picture, informative caption, and photo credit to Ellipsaria@gmail.com.