



Newsletter of the Freshwater Mollusk Conservation Society
Volume 20 – Number 4 **December 2018**

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 FMCS By-Laws**



FMCS Meeting in Italy a Success

An extremely successful first step to bridging the gap between mollusk enthusiasts in North American and the rest of the world occurred in September 2018, at the First FMCS International Meeting in Verbania, Italy, thanks in large part to our generous hosts Nicoletta Riccardi, Maria Urbanska, and Manuel Lopes-Lima. Altogether, there were 72 regular participants at this Meeting, coming from 19 countries on five continents, with USA (11) and Germany (9) dominating, but with substantial contributions from other European countries (55%) and elsewhere.

Besides the presentation on the history of the FMCS and its present scope of activities given by Heidi Dunn, the Meeting included six keynote, 43 oral, and 26

poster presentations over a 3-day period. The presentations covered all aspects of Malacology, targeting the latest research advances in both theoretical and applied issues of mollusk conservation: taxonomy/biodiversity, ecology, ecotoxicology, methodological aspects of conservation, applications (bioremediation), development of molecular methods for in situ assessment (e-DNA), and invasive species. The presentations were skewed towards freshwater mussels, but gastropods were also treated. Selected presentations from this Meeting will be published in a Special Issue of *Hydrobiologia* in the near future.



The Meeting also left time for a lot of fun, and this, as everyone knows, helps to cement relationships and foster collaborations. Good food and good wine smooth out differences, predispose mutual understanding, and willingness to join a common purpose of mollusk preservation through research and outreach (such as making mussels "sexy" to generate public awareness).

The high level of the presentations stimulated broad discussion on many topics of common interest. In addition to the active discussions inside and outside the conference room and during the poster session, there was ample time to tighten relationship between North American members of FMCS and researchers from the other countries.



The social dinner, which took place in a unique location - Isola dei Pescatori - with a menu specially prepared for us by the fishermen, marked the closing of the Meeting. During dinner, thanks to the sympathy of some participants who have banned the traditional auction, we collected contributions for sending students to the 2019 FMCS Symposium in San Antonio, Texas.

The main purpose of this Meeting was to present FMCS to Europe and promote expanding membership in non-USA countries. This purpose was met, and a committee was

formed to develop a framework for forming FMCS chapters, particularly a European chapter, then expanding to chapters in other regions or countries. Now we must continue to foster openness towards non-USA countries to grow FMCS and facilitate freshwater mollusk conservation throughout the world.

Society News

2019 Officer Elections

Every other year, our Society elects members to serve in three Executive Committee positions: President elect (who, after two years, goes on to serve as President for two years, then Past President for two years), Treasurer (for a 2-year term), and Secretary (also for a 2-year term). This time, we have two candidates for President-elect, one candidate for Secretary, and two candidates for Treasurer. Statements from each of the candidates are presented below.

Once you have reviewed their statements, we encourage you to vote for your candidate of choice for each office. Voting will occur online, and is open now at the following site: <https://tinyurl.com/FMCS2019Ballot>. The last day to vote will be January 31, 2019. The winners will be announced during our Symposium in San Antonio.

Candidates for President-elect



Stephen McMurray

I am an Aquatic Resource Scientist with the Missouri Department of Conservation (MDC) and live in Columbia, Missouri, with my wife Becky, and our kids Grace, Sofie, and Noah. I have always had an attraction to rivers, creeks, ponds, lakes, and, even, ditches. I received my BS in Environmental Resources at Eastern Kentucky University (EKU), and, along the way, spent two summers surveying fish, mussels, and insects all over Kentucky for the Kentucky Nature Preserves Commission. I still remember my mentor, Ron



Dave Smith

I graduated from Colorado State University (BS and MS in Fish and Wildlife Biology) and University of Georgia (MS in Statistics and PhD in Forest Resources). For 25 years, I have worked as a researcher at the US Geological Survey Leetown Science Center with a focus on population assessment, aquatic ecology, and decision analysis. Shortly after arriving at Leetown, Janet Clayton and Rita Vilella introduced me to the wonders of freshwater mussels and the challenges of assessing and conserving them. Over time, my

(McMurray Statement, continued)

Cicerello, taking me to my first mussel bed; I was as giddy as a kid in a candy shop.

I also completed my MS in Biology-Aquatic Ecology at ECU under Dr. Guenter Shuster. My thesis research involved examining the hypothesized loss of recruitment in a diverse mussel bed in the Licking River downstream from Cave Run Lake. In 1997, I landed a job as a ECU Research Assistant working with the Kentucky Division of Water which, eventually, led to a full-time gig for six years, mostly working on aquatic macroinvertebrates in streams affected by nonpoint source pollution.

I have been the Missouri State Malacologist since 2004, where my responsibilities include coordinating and administering a program of scientific research and assessment that fulfills information needs for the management of freshwater mollusk and aquatic invertebrate populations in Missouri. In my opinion, I have the coolest job in Missouri, getting to travel the state and work on some of the rarest mussel species in diverse rivers like the Osage, Meramec, Gasconade, and St. Francis.

Professionally, my interests lie in conducting surveys; researching impacts to mollusks; working to improve our efforts to survey, monitor, and conserve the fauna; and having often-animated gravel bar discussions with colleagues about what species we just found. I do work with snails but admit that I usually try to defer to my colleagues with more experience. I have authored or coauthored two field guides, 14 journal articles, a popular article, multiple technical reports, and presented several papers at meetings.

I am a founding member of FMCS, and have served the Society as a co-chair of the Environmental Quality and Affairs Committee since 2008, helped draft the Standard Operating Procedures Manual, served on the Planning Committee for the 2007 Symposium, co-chaired both the 2010 Workshop and 2015 Symposium/Joint Meeting with the UMRCC, co-chaired the ad hoc Regional Meetings Committee, and am on the *Freshwater Mollusk Biology and Conservation* Editorial Review Board. In 2017, I was honored to be awarded a Meritorious Service award by the Society.

In addition to my service to FMCS, I have served as the Zoology Section Chair for the Kentucky Academy of Science, a guest editor for *Northeastern Naturalist*, and as a peer reviewer for *Aquatic Invasions*, *Journal of the Arkansas Academy of*

(Smith Statement, continued)

interests grew from how best to assess populations to how best to use assessments for decision making and improving conservation outcomes. Currently, I work with other researchers, biologists, and managers on a broad range of taxa, including freshwater mussels, to develop and evaluate management strategies to improve conservation using adaptive management and decision analysis. You can view my research profile [here: https://www.researchgate.net/profile/David_Smith47](https://www.researchgate.net/profile/David_Smith47).

Recent collaborative projects include working with the US Fish and Wildlife Service (FWS) on the species status assessment framework to inform endangered species determinations, developing conservation plans for imperiled aquatic species in the Upper Tennessee, Neuse and Tar, and Dan and Roanoke River basins, creating an adaptive management plan for restoration of the Herring River estuary in the Cape Cod National Seashore, and optimizing rules for turbine shutdown in hydro-dammed rivers with downstream eel migration. Also, I contribute as a curriculum developer and instructor in the areas of decision analysis, sampling design, and facilitation at the FWS National Conservation Training Center in Shepherdstown, West Virginia.

My organizational and committee work includes serving as Chair for the Limulus IUCN Red List Drafting Workgroup, Red List Authority Coordinator and Steering Committee member for the IUCN Horseshoe Crab Species Specialist Group, co-Chair of the First International Symposium on the Science and Conservation of Horseshoe Crabs in 2007 and Organizing Committee member for subsequent symposia in 2011, 2015, 2019 held in Hong Kong, Japan, and the Peoples Republic of China, and past-Chair and member of the Atlantic States Marine Fisheries Commission Adaptive Resource Management and Horseshoe Crab Stock Assessment Subcommittees.

I whole-heartedly welcome the opportunity to serve as an FMCS officer and President-elect to carry out the duties of the office as stipulated in the FMCS By-laws and promote the Society's purpose and remarkable achievements. To be nominated is an honor. In return, I offer a collaborative, consensus-building, and deliberative style of leadership and approach to decision making.

(McMurray Statement, continued)

Science, Journal of the Kentucky Academy of Science, Southeastern Naturalist, Transactions of the Illinois Academy of Science, and Walkerana. I also have provided mussel identification training and introductory presentations to MDC staff, volunteer conservation organizations, and elementary kids (thanks to my stepson Noah).

I am honored to be nominated to be President-elect and would be happy to be able to continue to serve the Society in that role. Looking back on the residents who have led the Society, there are some pretty big shoes to fill, and I would do my best to continue their work. My focus as President would be to continue the efforts that have allowed FMCS to flourish and grow, continue efforts to expand our international reach, continue to implement the National Strategy, and promote efforts to increase the diversity of our membership and the active participation of students and young professionals on our committees.

(Smith Statement, continued)

The challenges faced by freshwater mussels seem to compound daily. As the theme for the upcoming FMCS Symposium makes clear, the overriding conservation need is for humans and intact freshwater systems to coexist, which involves both social and ecological concerns. The FMCS plays a central and significant role in answering those challenges and meeting that need. If elected I would follow the example of previous President-elects and Presidents to advance the Society's initiatives, facilitate efforts to achieve the goals of the Revised National Strategy, and support the work of its talented and dedicated members.

Candidate for Secretary**Janet Clayton**

A native of West Virginia (WV), I obtained my BS in Biology in 1982 from Marshall University where I took every aquatic biology class they had to offer. I received my MS in Biology from Tennessee Technological University (TTU) in 1984. After spending three years as a conservation officer in Nashville Tennessee, I moved back to my home state in 1987 and began working for the WV Division of Natural Resources, primarily working with aquatic insects in the Compliance and Monitoring Unit.

Our group was being tasked with conducting a mussel survey and the new guy on the block was given the opportunity to go to TTU for two weeks to take Dr. Stansbery's malacology class. I was fortunate to be at the right place at the right time. I was fortunate to be at the right place at the right time when he was telling my supervisor, right outside my office door, that he really didn't want to go. I immediately popped out and said, "Can I go?" That class was my introduction to freshwater mussels back in 1989. Shortly thereafter, I moved to the Fish Research Unit where I again was primarily tasked with aquatic insects, this time for acid rain mitigation research. The only difference was that I now worked with the endangered species biologist, providing me the opportunity to continue to work with freshwater mussels as time allowed. Over the years, I had the opportunity to develop the freshwater mussel program for the state. As the Fish Research Unit was lost due to attrition, I began working with mussels full time. The State's Mussel Program has grown from conducting general presence/ absence surveys to the establishment of 26 long-term monitoring sites and conducting mussel restoration activities.

As a long-standing member of the Ohio River Valley Ecosystem Mollusk Group, I was involved with the development of the original Ohio River Protocol in 2004 which I later used as the basis for development of



the WV Mussel Survey Protocol with the assistance of other FMCS members. The WV Protocol has served as an example for other states to develop their own protocols and has been a great assistance to contractors working within mussel streams. Each year, through WV University, I teach a week-long mussel identification and ecology class to help researchers, managers, and consultants become familiar with the mussel fauna of WV.

I have been actively involved with FMCS since its inception. I am a member of the Guidelines and Techniques Committee which I co-chaired for a time. I worked on the development of the AFS Special Publication 30, Investigation and Monetary Values of Fish and Freshwater Mussels (both editions). I have used this document several times in the course of my work in evaluating mussel kills. I have attended many board meetings as co-chair, interested member, and most recently as current Secretary. I look forward to continuing to serve the Society if re-elected as your Secretary.

Candidates for Treasurer



Alan Christian

I am an Associate Professor of Freshwater Ecology, and Conservation and Undergraduate Program Director in the School for the Environment at the University of Massachusetts, Boston.

I am a broadly trained aquatic ecologist and environmental scientist with specific expertise in freshwater ecology and conservation, especially freshwater mussel ecology and conservation. My research spans geographies ranging from work in near-pristine systems to those heavily disturbed by human activity to restored systems. Through the lens of the biological continuum, I integrate molecular to landscape approaches allowing for spatially, temporally, and organizationally integrated research that directly or indirectly supports conservation policy and regulation.

I have been involved with FMCS since 1992 when I attended the Upper Mississippi River Conservation Commission Mussel Meeting in St. Louis as a graduate student at Arkansas State



Renee Mulcrone

I received my undergrad degree from the University of Illinois and my first experiences with live mussels were on the Kankakee River while working at the Illinois Natural History Survey. At that time, I was also working on a project compiling life history information on threatened and endangered (T and E) species on army installations. I had thought about going to grad school to focus on aquatic biology and was fascinated when I read about the life history of mussels. I attended the University of Michigan (Jack Burch was my advisor), where I received my masters and PhD degrees focusing on mussels in the Lake Erie drainage.

After graduating, I worked for an environmental consulting firm focusing on remediation projects (mainly PCB contamination in the Kalamazoo River). Outside Michigan, I also worked on a project compiling evidence in the Illinois watershed (in Arkansas and Oklahoma) for a lawsuit by the state of

(Christian Statement, continued)

University and have been active in FMCS ever since. My participation includes presenting at meetings and workshops, serving on committees, judging presentations, bringing students to meetings, and hosting meetings and workshops. John Harris and I hosted the 2007 Symposium (Directions in Freshwater Mollusk Conservation: Molecules to Ecosystems) and Workshop (Habitat Restoration; led by Heidi Dunn) in Little Rock, Arkansas. I also helped Mary McCann and Rebecca Winterringer organize and host the 2014 Workshop (Mussel Studies and Regulatory Process Associated with Dam Removals) in Portland, Maine. I wish to contribute more to FMCS and would be happy and honored to serve as Treasurer if elected by my peers.

(Mulcrone Statement, continued)

Oklahoma. I have conducted mussel surveys throughout Michigan for the past 28 years and hope someday to compile those data for some further analysis (or leave it for someone else to mess with!). I have participated on Michigan's T and E evaluation committees and the more recently formed Michigan Mollusk Committee (which includes state and federal agencies, academics and consultants).

Although I am old enough to remember when FMCS was just an idea, I haven't been very active over the years. I was impressed at the Cleveland Meeting by how much the society has grown and how professional it has become. Playing with data over the years gives me skills with numbers and I have served as treasurer for other local organizations. I would be happy to serve FMCS as Treasurer if elected.

Now that you have reviewed the statements from the candidates, **GO VOTE NOW.** All you need to do is to click on this link <https://tinyurl.com/FMCS2019Ballot> and follow the directions. It will take you less than two minutes. **Really!** Voting will end on January 31, 2019, and the winners will be announced during our Symposium in San Antonio.

**Minutes of the November 2018 FMCS Board Meeting
Conference Call Held on Thursday, November 15, 2018**

President Heidi Dunn conducted a roll call of those participating. In attendance were: Heidi Dunn, Janet Clayton, Teresa Newton, Jennifer Archambault, Emily Grossman, John Jenkinson, John Harris, Ryan Schwegman, Rachael Hoch, Amanda Rosenberg, Jeremy Tiemann, Steve McMurray, Tim Lane, Kevin Roe, Dave Berg, Dave Zanatta, Megan Bradley, Lisie Kitchel, Braven Beaty, Wendell Haag, Becca Winterringer, and Nathan Whelan. A quorum was declared and the meeting was called to order at 1:00 CST.

Kevin Roe made a motion to approve the March 2018 Board Meeting Minutes (published in the June 2018 *Ellipsaria*). Steve McMurray provided a second and all approved.

Treasurer's Report – Emily Grossman

The 2018 Mollusk Disease Workshop in March was a hit, with over 120 attendees. FMCS came out about \$10,000 ahead on the Workshop finances, in large part due to many generous sponsors – thanks again!

Workshop income

• Registration:	\$20,392.50
• Sponsorships:	7,502.00
• Field trip:	1,150.00
• T-shirts:	960.00
• <u>AFS values books:</u>	<u>1,382.20</u>
Total workshop income:	\$31,386.70

Workshop expenses \$20,770.18

Other income and expenses, 3/9/18 – 10/31/18

Income

• Memberships:	\$1,840.00
• Past years t-shirts, hats, etc.:	125.00
• Interest:	201.98
• Misc. donations:	50.00
• Amazon Smile proceeds:	<u>18.77</u>
• 2019 symposium sponsorships: (with an additional \$3500 committed)	\$5000.00

Total Income (excluding Workshop): \$7,235.75

Expenses

• Allen Press/FMBC costs:	\$4,237.03
• Webpage:	6,043.00 (database subscription renewal)
• Regional meetings:	100.00 (VA Atlantic Slope)
• 2019 Symposium expenses:	2,790.00
• Paypal/Square/CC fees:	195.65
• <u>Tax filing:</u>	<u>38.00</u>

Total expenses (excluding workshop): \$13,403.68

Bank Balance as of 10/31/18

Checking:	\$31,585.72
Savings:	110,298.39
<u>PayPal:</u>	<u>2,063.21</u>
Total:	\$143,947.32

The numbers from the Italy Meeting have not been finalized yet but it appears the balance will be near the breakeven point or slightly ahead.

Dave Berg made motion to accept the report, Kevin Roe provided a second, all approved.

Secretary's Report – Janet Clayton

There are currently 638 individuals on the active database. Janet plans to wait until after the 2019 Symposium and then archive those that have not renewed prior to Jan 2017 as there are currently 149 lapsed members. There are 463 active members. Of the active members, 92 are students, 340 regular members, 17 lifetime members, 6 contributing members, and 10 pending new members.

Eight people are listed as "Authors, Non-members" and are included under active status. When an author for FMBC is accepted and is not a FMCS member, they are placed into the database and listed as "Authors, Non-members". For some reason they are also given an active member status. This will be looked into and we will see if it can be corrected. Megan will work with Emily and contact webmaster Sophie.

Apparently, during the last email blast there was a snafu with three members, Janet among them. One part of the database said the emails were sent successfully and another part said they failed. They did indeed fail but when the message was sent directly to those failures, there was no bounce back. Janet will be checking after the next blast to see if this is repeated and, if so, will be getting in contact with Sophie

Old Business**Update on CASS** – Jeremy Tiemann

FMCS joined CASS a couple of years ago and the group has monthly conference calls. Most calls recently have dealt with the big push for a joint meeting in 2022 of all member societies. They are looking for a location, possibly in Minnesota or Michigan. The purpose of the meeting is to increase collaboration among member groups. Dave Zanatta said if the meeting is to be in Grand Rapids, Michigan, then he may be able to help out with local arrangements for FMCS.

The calls have not addressed any other issues recently. CASS has talked about developing a website so folks can find out who they are. FMCS has a minor voice in group due to our relatively small size. There are currently about 20,000 members in the CASS societies; with numbers increasing quickly soon after FMCS joined.

AFS liaison – Jeremy Tiemann

AFS was wanting contact with sister societies. Not many activities are reported now that both societies are now members of CASS.

Code of Conduct – Heidi Dunn

The revised FMCS Code of Conduct was sent to Board members earlier and was formally submitted to the Board for approval. The Board approved the Code and indicated that it should be posted in *Ellipsaria* and followed during future Society events. A copy of the approved Code is presented on page 28.

By-Laws – Heidi Dunn

A revised version of changes to the FMCS By-Laws had been provided to Board members earlier and were formally submitted to the Board for approval. Some discussion occurred over the proposed By-Laws being vague on technical committees. Rachael Hoch requested clarification on how the new committee structure was determined. Heidi clarified that the intent is to have broad committees with sub-committees under them. Details will need to be worked out once the By-Laws are voted on at the 2019 Symposium. Rather than specifying what the technical committees are in the By-Laws, it states that technical committees will be established to meet the goals of the National Strategy. This will allow them to be fluid if need be. This change will ultimately reduce the number of voting members on the Board to 10-15 members. Lisie Kitchel suggested to change where it says the President forms ad hoc committees to the President and the Board form ad hoc committees. All approved the suggested change. The Board approved the full set of proposed changes to the By-Laws and authorized the President to present them to the Membership for approval.

John Jenkinson asked how the changes in the By-Laws need to be published in *Ellipsaria*. Heidi responded that both the proposed changes and a complete version of the By-Laws should be made available to the membership. (The proposed changes are presented starting on page 29, and a complete set of the By-Laws with the proposed changes included are presented following Page 58.)

Professional Development – Becca Winterringer

In response to a suggestion from Becca, the Board agreed that a booth should be present during the San Antonio Symposium to answer questions about the professional certification proposal. Becca will reach out to the local arrangements committee to sort out the details. A reminder to members about the proposal will be included in the December *Ellipsaria* (See page23).

Since July, the committee has not had much action as we have drafted a peer reviewed overview of the certification program in a one-page format and will be putting the Certification Program to vote to Society membership in San Antonio. The Committee has previously formulated an outline of the Certification Program, drafted skills and competencies, and identified a broad outline of Program administration. The committee will proceed in developing and implementing the Certification Program if it is approved by the membership.

- We will be sending out email blasts to membership in January/February 2019 on the goals/purpose of the certification program as outlined on the flyer.
- The committee may also present a poster on the topic, depending on the Symposium schedule, and have a table to answer questions and receive suggestions in advance of the Business meeting.

Chapters – ad hoc committee report – Manuel Lopes-Lima

Heidi, who attended the International Meeting in Italy noted that attendees were excited about FMCS and definitely want a European chapter (although they do take exception to Mollusk being spelled with a k). Twenty-one countries were represented. Manuel Lopes-Lima, Mark Hove, and Celeste Mazzacano have been tasked with developing a framework for how chapters would be established and accepted. Other chapters overseas are likely and already formed watershed groups could form chapters.

Webpage

Heidi noted that committees still need to populate their webpage. Committee reports should be included or at least a bullet list of activities and person to contact. Also suggested at the last Board meeting was a mug shot of committee chairs. Please get these to Megan. Thus far, Diversity and Inclusiveness is the only committee to have done this since the last Board meeting.

New Business**Proposals for Society Work**

Heidi brought up whether FMCS needs to develop guidelines and a process for soliciting bids or personnel for particular tasks. Because most of our tasks are specialized it was feared that this would bog down the process. Heidi will draft a possible process and bring to the next Board meeting. The process could be something like:

- A committee would bring a proposal to the Board.
- If approved, an email blast would be sent to all FMCS active members asking for interest among the members or suggestions about potential non-members.
- The committee making the request would be responsible for making the selection, getting the work done, providing oversight, and quality assurance.
- Once a year, the responsible committee would give a report on performance of the contractor, or the contractor could write a report once a year. The responsible committee would then approve and submit to the Board. Another option suggested was to have the report submitted with invoice for payment.

Once the process is approved it will be added to our Procedures Manual.

Amazon Smile – Emily Grossman

When purchasing from Amazon, if you select FMCS as your charity and buy through Smile.Amazon.com, FMCS will receive 0.5% of your purchase price. Emily Grossman has the system set up such that funds are direct deposited every three months. For the period July to September 2018, the Society received \$18.77. With regard to what to do with the money, the Board decided to just track it separately for now and see how much we receive. Apparently, more and more organizations are using Smile.

It was suggested that a poster be designed for display at the Symposium reminding folks to select FMCS as their charity. A powerpoint slide could also be used during the opening presentation at the Symposium. Megan Bradley suggested sending members a reminder. Rachael Hoch also suggested making another announcement in *Ellipsaria* (See page 27). Could be something like “Remember FMCS during your holiday shopping at Amazon.com”. This also could be attached to future email blasts.

Sterkiana – Jeremy Tiemann, Arthur Bogan

Steve McMurray reminded the Board that the Triannual Unionid Report has been scanned and is available on our website. During the last Board meeting, Arthur Bogan suggested that *Sterkiana* also might be scanned and made available on our website. *Sterkiana* was a journal, initially compiled and published by Dr. Auréle LaRoque. There are 72 numbered issues, published from 1959 to 1989. Al Buchanan left his copies of *Sterkiana* in the office when he retired and Steve has had all of them scanned. He thought about making them available to put on website but was concerned if there could be copyright issues. An attempt has been made to determine if a copyright exists and to track down Sally Dennis, the last living editor, to no avail. Kevin Roe said he could check with his administration about copyright issues; they have a department that does just that. He will check with them first and then move forward with posting if there are no problems.

Committee Reports

Symposium – Jeremy Tiemann, Charles Randklev, Nicoletta Riccardi

Jeremy Tiemann noted that the next Symposium will be April 14-18, 2019, in San Antonio, Texas. The registration page is live on the website. Abstracts are due January 4, 2019. Transportation to and from the airport is by taxi or a ride-sharing service like Uber or Lift only. Room rates at the hotel are only guaranteed until March. The Local committee is actively seeking sponsors and have raised just shy of \$10,000 so far. They also are currently working on a sponsorship page to appear on the registration website. The agenda for the Symposium is coming along. On Sunday prior to the Symposium, there will be a one-day Workshop on genetics and species status assessments. The Board meeting will likely be Sunday afternoon and Megan Bradley is organizing a student mixer for Sunday evening. Specific times for these activities have not yet been finalized. The banquet is scheduled for Tuesday evening and two field trips (mussel collecting and sightseeing) will occur on Thursday. Heidi questioned whether the business meeting would be with the banquet. Jeremy said that Charles Randklev was having a meeting with the hotel today (November 15) and many of these issues should soon fall into place once the hotel details were worked out. Committee meetings will have box lunches and concurrent sessions. It was suggested the Local Committee reach out to committee chairs to make sure the assigned rooms accommodate their size group and try to avoid overlapping similar committees. Becca Winterringer offered to share a spreadsheet she used to schedule the committee meetings at the Cleveland Symposium.

Heidi provided comments on the recent European meeting, emphasizing that those attendees want to continue to have FMCS meetings in Europe. They have already discussed not wanting to have these on years in which FMCS holds its symposia (odd-numbered years). Heidi directed them to Workshop years (even-numbered years). (An article about the European Meeting is presented on page 1 of this issue.)

Awards – Teresa Newton, Greg Cope, Emy Monroe

At the European meeting in Italy, \$906 was raised to help support a European student traveling to San Antonio. This student should be selected by the European group. Teresa Newton reported that she and Greg Cope have stepped down but staying on in advisory capacity for the 2019 Symposium. David Hayes and Susan Oetker have agreed to come on board. Emy is still on the committee. Teresa noted she was recently at a meeting where the judges used an App to assist with judging that automatically tallies the scores provided by the judges. Might be something worth looking into. During their last meeting, the Awards Committee decided that, from now on, only one award in each professional category would be awarded at each Symposium. So far, there has been one inquiry, but no nomination packages have yet been received for the 2019 Symposium. (A call for nominations is posted on page 21.)

Nominations – Leroy Koch

Heidi Dunn reported for Leroy Koch. A slate of officer candidates has been set and statements from the candidates will appear in the December issue of *Ellipsaria* (See article starting on page 3). For president are Steve McMurray and Dave Smith. For Treasurer are Renee Sherman and Alan Christian. Janet Clayton is running unopposed for Secretary. A survey monkey is being set up for voting and a link to the voting site will be provided in *Ellipsaria*. Leroy may be stepping down soon pending his retirement. If anyone is interested in taking over the nominations committee, let Heidi know.

Outreach – Jennifer Archambault, Kimberly Horndeski

Some of our members have been working on organizing the second student/mentor mixer at the upcoming Symposium in San Antonio, specifically Amy Maynard, Megan Bradley, and Dan Symonds. Amy drafted an announcement for the mixer and call for participants to be published in *Ellipsaria* (posted on Page __). Amy, Megan, and/or Dan would like to be included in the Local committee conference calls and added to the Symposium Committee's contact list so that they can better coordinate the details and logistics of the mixer. Jeremy Tiemann is to take care of this.

We mentioned work on infographics in our last report; efforts on that have been suspended for the time being, as it wasn't working well to adapt National Strategy information to them. To that end, our tangible productivity has been a bit quieter in waiting for the pending committee reorganization decisions.

Jennifer called for committee volunteers for a social media account administrator but has not received any response to that request. Jeremy Tiemann and Jennifer have been posting occasionally on the FMCS

Twitter and Facebook channels and Jennifer would be happy to relinquish those social media responsibilities to another person or have another person on the Board share it. She thanks Jeremy for his diligent efforts in taking the bulk of that effort in the last several months. This would be a great, low stakes opportunity for a person – especially a student or early career member – to join the Outreach Committee and serve FMCS.

The committee would be happy to accommodate outreach-related requests from the Board and is interested in guidance on what efforts would best benefit from our focus.

The Executive Committee recently received an email about a situation comedy episode involving someone stepping on a snail and someone responding about donating to CMA which turns out to stand for the Canada Mollusk Association. While researching the script for this episode, the writer came across FMCS and reached out to us asking how someone might actually donate to mollusk conservation. Heidi Dunn responded by stating that rather than sending money, more education on habitat protection, water quality, etc. would be more helpful to the fauna. Someone mentioned that maybe we should look into putting a Donate Button on website.

Gastropod Status and Distribution – Nathan Whelan

The majority of the committee's time has been spent finalizing the procedures for the names subcommittee, which will have its first active meeting at the 2019 Symposium. Paul Johnson will be providing more details on the procedures for updating the names list and the planned meeting. (See article starting on page 24.)

In discussing the names committee and creating a FMCS-sanctioned list of common and scientific names, we have discussed the publications of a new status and distribution list. We decided the best time to start working on this publication would be after meeting in 2019 when we can use the new taxonomy from the names subcommittee to update the list presented in Johnson *et al.* 2013.

Mussel Status and Distribution – John Harris, Art Bogan

1. J. D. Williams et al. Conservation assessment of freshwater mussels of US, Canada and Mexico.

This revision of Williams *et al.* (1993) is on hold while Williams completes other projects. Future action items will include: 1) Request co-author input on a revised methodology for conservation status determinations using the taxonomy adopted in the revised list of freshwater mussels in the United State and Canada, 2) Update status information for the geographic areas of responsibility to include examination of all the state T&E mussel lists or equivalent documents (SGCN - species of greatest conservation need), 3) Revise and update historical vs current distribution information for each taxon, conservation status information, and complete the text revision from the previous submission. A publication date of 2019 is anticipated.

2. Development of Mussel ID App - Susan Oetker. The App is currently out for review and comments by a select group of the FMCS membership, ~25 members. Following receipt of comments that are due 14 November 2018, modifications will be made and the App made available as a beta release. They received seven responses from 25 testers. The App is designed for a broad audience, middle school to professionals. Email John Harris or Susan Oetker if you want to review the App.

3. Atlas of Freshwater Mussels of North America. Currently, 151 of the approximately 356 taxa addressed in the Atlas have volunteer authors for species accounts. We have received 27 first draft accounts as of November 3, 2018. One species account is posted to the website. We are working diligently to clear the backlog of preliminary reviews of the remaining 26 draft species accounts so they can be sent to external reviewers. Accounts will be posted as they are completed.

Names Subcommittee – Nathan Whelan, Paul Johnson

They currently need a method for putting forth taxonomic changes. Heidi wants something to the Board soon, so they can review it before the Symposium. (See article starting on page 24.)

Guidelines and Techniques – Ryan Schwegman, Lisie Kitchel

The committee will be hosting the 2020 Workshop, covering survey techniques and possibly including a state by state guideline overview. Key topics will be discussed and decided at the 2019 Symposium. Looking at the Nashville, Tennessee, area with late spring time frame. The committee will be forming a small team to spearhead this workshop effort

There was some discussion on potential field component for the Workshop. Spring typically has unpredictable stream flows. There is nothing that says the Workshop has to occur in the spring; fall stream conditions may be more reliable, though many potential attendees may be still in or coming off field seasons. If the field site was on a regulated stream, it might be possible to receive scheduling assistance from the regulator. Potential locations brought up included Henry Horton State Park which is on the Duck River, not far south of Nashville and may be more economical. The Green River in Kentucky is only about 1.5 hours north and might also provide a field venue.

Environmental Affairs – Steve McMurray, Braven Beaty

Steve McMurray provided an update on a US House bill proposing to remove all freshwater mussels from Endangered Species Act protection. It was introduced by a Representative from Indiana, apparently to restore water levels in some Indiana lakes being drawn down to maintain flows in streams supporting endangered mussels. The bill had only one sponsor, and he was not re-elected.

Rachael Hoch mentioned that the Recovering America's Wildlife Act may warrant some attention. Heidi and Jeremy noted that they had discussed becoming a partner of it. Heidi suggested Steve look at his committee members and see if someone is interested in tracking legislation. He and Braven have discussed something similar. UMRCC has such a list and he has thought about asking if he could use it. Lisie Kitchel suggested reaching out to that person to see if they are watching for mussels.

Genetics – Kevin Roe, Dave Zanatta

Members of the Genetics Committee are assisting with organizing the upcoming Workshop at the San Antonio Symposium. Committee Members Berg, Inoue, and Roe will be presenting at the Workshop as well.

Information Exchange – John Jenkinson, Wendell Haag, Dave Berg

Ellipsaria

John Jenkinson is actively working on the December issue of *Ellipsaria* and everything on schedule.

Freshwater Mollusk Biology and Conservation (FMBC)

After the big FMBC issue in the fall of 2017 (seven papers), 2018 has been a bit slim. Volume 21(1) had two papers, and 21(2) had three papers. However, we currently have eight papers in review, two in revision, and three recommended for resubmission. Fall of 2019. Volume 22(2) will be a featured collection of articles originating from the 2018 FMCS Mollusk Health and Disease Workshop in La Crosse. At least 3-4 papers are already submitted. Deadline for submission has been moved to January 1.

We will be online with BioOne in January 2019. In November, we were a featured title in Marine and Freshwater Biology with BioOne. Once we go live with BioOne, we will submit an application to Clarivate Analytics to request an Impact Factor for FMBC.

In June, we contracted Two Herons Consulting to provide copy editing services for FMBC. This was necessary because copy editing provided by Allen Press was not resulting in a consistent product. Two Herons first reviewed our existing author instructions to ensure that they were consistent with AFS style, upon which we based the style of FMBC. They then copy edited the submissions for the second issue of Volume 21.

Propagation – Rachael Hoch, Tim Lane

Tim Lane has completed gathering contact information for all propagation facilities and this is posted online to the website. If anyone knows of new facilities, direct them to Tim if they would like to share their information. Tim also has completed putting all propagation and translocation information together for his facility. He is sending it to the other facilities and hopes they will do likewise. This will provide information on what species have been propagated and will hopefully keep folks from having to reinvent the wheel. We would eventually like to make it available to the entire FMCS. There are currently about 50 members on the committee.

Ad hoc Committees**Monetary Values of Mollusks** – Megan Bradley

FMCS has been asked by AFS to provide a representative to help in the planning and development of a training module using the new monetary values document. Their goal is to create a high quality course that results in those completing the course being technically proficient in applying the methodology as well as understanding the basic theories of the survey methodology and cost assessment. Megan, Janet Clayton, and Rachael Hoch are to participate on a conference call on November 20. More information will be available after the call.

Janet did reach out to folks to see if anyone was interested in assisting with long-term planning for revision of documents chapter on methodologies for conducting a kill assessment. Very few responded and, of those who did had little experience in conducting assessments. Rachael indicated some states had mussel kill protocols.

Megan said the FWS had a meeting looking at NRDA recovery efforts. They are looking to refine the science around testifying in injury cases. It is hoped a white paper will come out to help new biologists work through NRDA cases. Hopefully it will also help folks work through the kill assessment process. Tim Lane mentioned that there is also a paper on loss of ecosystem services.

Heidi informed folks that anyone who purchased the monetary values book, an errata notice was just put out. Diane Waller has new books for those who purchased books at the Workshop. A notice is to be put in *Ellipsaria* (See page 24).

Inclusiveness and Diversity – Tamara Smith, Jeremy Tiemann

This ad- hoc Committee is made up of Tamara Smith (Chair), Jeremy Tiemann, Brooke Penaluna, Kimberly Horndeski, and Neil Ford.

Initial Ad-Hoc Committee Tasks:

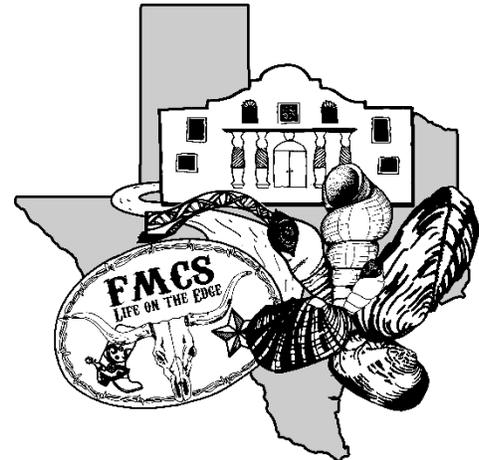
- Develop clear goals and objectives for the group.
 - Progress: The group has begun to draft a plan with goals, objectives and actions.
- Develop an optional demographic questionnaire to FMCS members to get baseline data to help identify needs or areas of concern and provide baseline data to measure our success.
 - Progress: This idea was presented to the Board and approved during the last Meeting call. The committee has started a draft questionnaire.
- Show photos of people on the website. In *Ellipsaria*, we asked folks to submit a photo of them and quote to be featured on the website! (Ask – In a sentence or two, tell us why you are a member of FMCS?). Talk to web-developer about getting a slide show of member photos and quotes on the website front-page and/or member page.
 - Progress: We've received a good number of photographs and quotes for the FMCS website. For now, we are just trying this out with our webmaster (Sophie Bender) with a handful of photos and quotes. Megan Bradley is coordinating with Sophie to test it out on the website.
 - We plan to submit again to the next issue of *Ellipsaria* to call for additional photos and quotes.
- Create a presence on the FMCS website (of the ad-hoc committee).
 - The committee developed language and sent to Megan to give to Sophie. The ad-hoc committee should have a presence on the committee webpage soon!
- Explore the idea of having a diversity & inclusion speaker at the Symposium.
 - Progress: We've are nearly confirmed with a diversity speaker for the banquet, [Erika Prosper H-E-B Customer Insights](#). We are ironing out the final details with the Symposium planning committee.
- Explore ways to welcome new members.
 - Progress: We're sending in a request to partner with the Diversity Joint Venture for Conservation Careers: <https://diversityinconservationjobs.org/> (they are reviewing our proposal, and will get back with us after their next Board meeting)
 - Idea: We're talking about a challenge for FMCS members to reach out to their community schools to give talks, etc. to engage underrepresented groups/ students. Initial focus will be inner-city schools.
 - We may submit another call for photos and quotes in the next issue of *Ellipsaria*.

The Committee continues to meet via conference calls and to work on a draft plan, questionnaire, etc. together on Google Drive.

Emily Grossman made a motion to adjourn at 3:28 pm CST and Steve McMurray provided a second. All approved

Respectively submitted by Janet L. Clayton, Secretary

Freshwater Mollusk Conservation Society 11th Biennial Symposium April 14 - 18, 2019 San Antonio, Texas



As you probably already know, the 11th Biennial FMCS Symposium will be held on April 14 - 18, 2019, at the Hyatt Regency San Antonio Riverwalk, in downtown San Antonio, Texas, USA. The meeting theme is **Life on the Edge: Reconciling Human Needs and Freshwater Mollusk Conservation**. The goal for this Symposium is to focus on the ways in which humans and freshwater systems can coexist to ensure the long-term persistence of freshwater mollusks. The Symposium will bring together regulators, researchers, consultants and enthusiasts in a forum that will allow for collaboration opportunities and information exchange.

The planning committee has lined up the following group of incredible keynote speakers who are sure to engage and inform, not only on mollusk conservation, but also on the great state of Texas and the urgent need to conserve its incredible and unique natural resources.

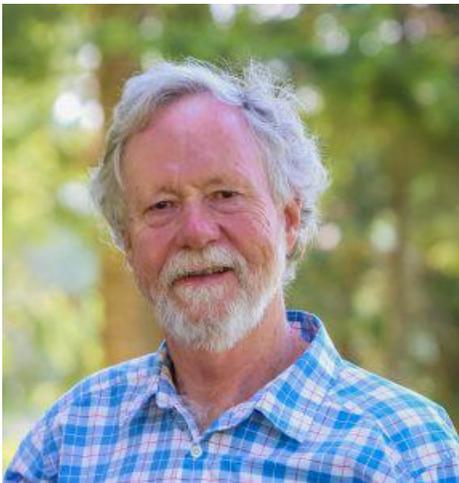
Mr. Tim Birdsong is Chief of Habitat Conservation for the Inland Fisheries Division of Texas Parks and Wildlife Department, where he leads efforts to restore and preserve the diversity of Texas freshwater habitats and species, with an emphasis on conservation of the more than 240 species of native freshwater fishes and mussels that occur in the state's 191,000 miles of creeks and rivers.

Tim's presentation will reflect on the importance of collaborative stewardship and public-private partnerships, and profile case studies in connecting and empowering local communities and river users to take action to conserve aquatic resources. Since 2010, those efforts have involved



voluntary-based cooperation with landowners to restore natural watershed processes on 439,467 acres of private lands, protection of freshwater systems and associated watersheds through 26,102 acres of conservation easements, restoration of 49,535 acres of spring, stream and riparian habitats, and large-scale control of invasive riparian plants along more than 200 miles of Texas rivers. In recognition of those efforts, Tim and cooperators were recognized through numerous state and national awards including the 2012 Fisheries Worker of the Year Award from the Texas Chapter of the American Fisheries Society, 2014 Award for Extraordinary Action in Fish Habitat Conservation jointly presented by the American Fisheries Society and National Fish Habitat Partnership, 2015 Texas Parks and Wildlife Conservation Award, 2016 Dr. James A. Henshall Warmwater Fisheries Award presented by Fly Fishers International, and the 2016 Sport Fish Restoration Outstanding Project Award presented by the American Fisheries Society.

Tim serves on numerous regional and national advisory councils and committees, including the Native Fish Conservation Network, National Fish Habitat Science and Data Committee, Association of Fish and Wildlife Agencies Climate Change Committee, and as past chair of the Southeast Aquatic Resources Partnership and Great Plains Landscape Conservation Cooperative. He has a MS in Fisheries and Coastal Sciences from Louisiana State University, a BS in Biology and Education from Southeastern Oklahoma State University, and a Certificate in Nonprofit Management from the University of Texas at Austin.



Dr. Fred Allendorf is a Regents Professor of Biology Emeritus at the University of Montana. Dr. Allendorf received his PhD from the University of Washington in 1975, and he was a post-doctoral scholar in Denmark and England. He has also held academic positions in New Zealand and Australia. He is an evolutionary geneticist who has spent much of his career applying the theory and molecular techniques of population genetics to problems in conservation. Dr. Allendorf's book *Conservation and the Genetics of Populations* (2013), co-authored with Gordon Luikart and Sally Aitken, provides an understanding of how genetics can be used to conserve species threatened with extinction. He has written several papers that strive to unite the fields of ecology and evolution with the spiritual practice of Zen.

Mr. Wyman Meinzer is the only official State Photographer of Texas, named so in 1997 by the Texas State Legislature and then Governor George W. Bush, an honor he still holds today. He was raised on the League Ranch, a 27,000-acre ranch in the rolling plains of Texas. Since then, he has traveled to every corner of this great state and all points in between in search of the first and last rays of sunlight in its magnificent sweep across the Texas landscape.

Meinzer graduated from Texas Tech University in 1974 with a Bachelor of Science degree in Wildlife Management and was voted Outstanding Alumnus in 1987 by the Department of Range and Wildlife Management at Texas Tech. He also received the Distinguished Alumnus award in 1995 from the School of



Agricultural Sciences and Natural Resources. In August of 1999, Meinzer was honored to give the graduation commencement address at his alma matter. During his 12 years as adjunct instructor in communications at Texas Tech, Wyman was selected as Agriculture Communications Teacher of the Year in 2005. In 2009, he received the Distinguished Alumnus award from Texas Tech in recognition of outstanding achievement and dedicated service.

Post graduation, Wyman spent five years as a professional predator hunter on the big ranches of the rolling plains. During this period, he worked to perfect his photographic skills and now, after 33 years as a professional photographer, Wyman has photographed and /or written 24 large format books, and his images have appeared on more than 250 magazine covers throughout America. His images have appeared in Smithsonian, National Geographic Books, Natural History, Ebony, Time, Newsweek, U.S. News and World Report, Audubon, Sports Afield, Field and Stream, Outdoor life, Texas Parks and Wildlife, Texas Highways, Korea GEO, German GEO, Das Tier, Airone, Horzu, BBC Wildlife, and a host others. He was recently named one of America’s ten outdoor legends by Field & Stream Magazine. Wyman also received the Living Legacy Award by the Harvey Weil Foundation for his artwork and encouraging others to engage in land and wildlife conservation.



Dr. Jeanette Howard is Director of Science - Water Program, The Nature Conservancy California Chapter. Jeanette leads TNC’s freshwater science engagements focused on developing and fostering a science enterprise to sustain healthy aquatic ecosystems in California. This work includes conservation planning for freshwater biodiversity statewide, defining environmental flows to maintain and restore freshwater species, habitats and ecological processes, building partnerships for water policy and management, and on-the-ground research projects to evaluate conservation actions. Prior to working at The Nature Conservancy, Jeanette completed her PhD in physical geography at the University of California, Berkeley, was a research scientist for the Confederated Tribes of the Umatilla Indian Reservation

restoring freshwater mussels and Pacific lamprey to Tribal rivers, and worked as a researcher at the National Geographic.

2019 FMCS Symposium – Schedule Overview

Sunday April 14	Monday April 15	Tuesday April 16	Wednesday April 17	Thursday April 18
Workshop	Plenary Session	Plenary Session	Plenary Session	Field Trips
	Concurrent Sessions	Concurrent Sessions	Concurrent Sessions	
Workshop Board Meeting Student/ Mentor Mixer	Committee Meetings	Committee Meetings	Business Lunch and Awards	
	Concurrent Sessions	Concurrent Sessions	Concurrent Sessions	
Welcome Mixer	Poster Session and Mixer	Dinner, Auction	Mixer	

Registration

Registration for the San Antonio Symposium **is now open** at the event website: https://molluskconservation.org/EVENTS/2019SYMPOSIUM/2019_FMCS-Symposium_INTRO.html Registration rates for this Symposium are as follows:

Early (before January 25, 2019)

- Regular member – \$450
- Student or Retired member – \$325
- Non-member – \$550
- Student non-member – \$375

Late (after January 24, 2019)

- Regular member – \$500
- Student or Retired member – \$350
- Non-member – \$600
- Student member – \$400

Location, Travel, and Lodging:

The Hyatt Regency San Antonio Riverwalk is conveniently located in downtown San Antonio on the Riverwalk. The hotel is a five-minute walk away from the Alamo and a number of restaurants and bars, including the Buckhorn Saloon (<http://www.buckhornmuseum.com>). San Antonio International airport can be reached in 20 minutes by car from the hotel. While there are no shuttles from the airport, taxi and “Uber” services are available.

Hotel room rates at the Hyatt Regency San Antonio Riverwalk will be **\$124/night for a king** and **\$149/night for a double**. Standard internet is included. Reservations can be made online or by calling (210) 222-1234. Be sure to say, “**I want the 2019 FMCS/Symposium April 2019 rate.**” **The last day to book rooms at this rate is March 18, 2019.** Currently, overnight valet parking is \$43 with “in and out” privileges, and overnight self-parking is available for \$31 plus tax.

Workshop -- Conservation Genetics/USFWS Species Status Assessments

Your two favorite topics are now combined into one amazing Workshop! This Workshop will cover conservation genetics in the morning and how the US Fish and Wildlife Service (FWS) uses that information to inform its Species Status Assessments in the afternoon.

Analysis of genetic data has become an integral tool for assessing the conservation status of species, and understanding genetic variation informs the 3 Rs (representation, resiliency, and redundancy) that are the centerpiece of the revised FWS Species Status Assessment. In addition to providing information on the amount and distribution of genetic variation in natural populations, genetic data can help to guide propagation and management of captive populations, construct pedigrees, detect and predict the effects of population fragmentation, and identify hybrid individuals. A degree in genetics is not required to take advantage of the information genetic data can provide. Anyone with a basic understanding of genetics, ecology, and conservation biology can understand how genetic information can be useful in their conservation endeavors. The Workshop will provide attendees with an appreciation for the value of genetic information for informing conservation and management actions. For more information about conservation genetics component, contact Kevin Roe (kjroe@iastate.edu).

The Species Status Assessment (SSA) Framework is an analytical approach developed by the FWS to conduct biological assessments to inform all Endangered Species Act (ESA) decisions. The second part of the Workshop will introduce participants to the purpose of SSA, familiarize them with the SSA Framework, and show the application of the SSA to freshwater mussels using case studies from across the country. Given the substantial number of mussels that have either recently been evaluated for ESA listing using SSAs or are currently undergoing analysis, it is important for biologists working with freshwater mussels, whether from management agencies, research institutions, or consultants, to understand the basic SSA approach and how the FWS

applies it for ESA decisions. The SSA Framework will also be integral for future decisions on mussels already listed under the ESA, such as 5-year status reviews and recovery planning. For background on the SSA Framework see the recent publication here: <http://www.fwspubs.org/doi/pdf/10.3996/052017-JFWM-041>. Authors from this paper will be leading the SSA Workshop. For more information contact about the SSA part of the Workshop, contact Susan Oetker (susan.oetker@fws.gov).

More details about the Workshop are presented on the event website: https://molluskconservation.org/EVENTS/2019SYMPOSIUM/2019_FMCS-Symposium_INTRO.html. The registration fee for the Workshop will be \$125 for regular members, \$200 for non-members, and \$75 for students and retirees.

Field Trips

On Thursday, April 18, Symposium attendees will have the option of attending one of two field trips. These trips will highlight different aspects of this beautiful and interesting part of Texas.

Central Texas Hill Country

San Antonio is just southeast of the Texas Hill Country, one of the most beautiful regions in Texas, famous for its wildflower-lined roadways and beautiful small towns. Start the day with climbing Enchanted Rock, a dome of pink granite rising 425ft above ground and one of the largest batholiths in the United States, offering a great view of the surrounding rolling hills. Then stroll along Main Street in Fredericksburg and enjoy your lunch in a beer garden. Visit the nearby LBJ Ranch at the Pedernales River, where Lyndon B Johnson, the 36th President of the United States, lived and died. End the day listening to live-music in legendary Luckenbach, which was made famous in a country song by Waylon Jennings. More information about these sights is available at these websites: <https://tpwd.texas.gov/state-parks/enchanted-rock>, <https://www.nps.gov/lyjo/planyourvisit/visitlbjranch.htm>, and <http://www.luckenbachtexas.com/home.htm>



Registration – \$125 per person

Mussel Sampling Trip

Come and find hidden gems in the most flash-flood prone area in the United States, Central Texas. Our gems include several endemic species in the Guadalupe River basin that you don't want to miss. Lunch will be BBQ in Lockhart, the BBQ capital of Texas. More about BBQ in Lockhart is available at: <http://www.lockhartchamber.com/pages/BBQCapitalofTexas>



Registration – \$100 per person

For more information concerning the field trips, please visit the symposium website (https://molluskconservation.org/EVENTS/2019SYMPOSIUM/2019_FMCS-Symposium_INTRO.html) or contact Astrid Schwalb (schwalb@txstate.edu). **Space is limited to 25 people per trip, so register soon.**

Workers Needed

Looking for ways to be more involved in FMCS? Here is your chance! The 2019 Symposium Planning Committee needs workers to help. If you are interested or want more information, contact Susan Oetker (susan_oetker@fws.gov) or Daelyn Woolnough (wooln1d@cmich.edu).

Auction Items Needed, Too!

We need you to donate items for the “World-Famous FMCS Auction” to be held at the San Antonio Symposium. Past items have included field equipment, rare books, T-shirts, art, jewelry, fishing gear, regional foods, beverages, and more. Proceeds fund the FMCS Student Travel Awards. When you come to the meeting, you can deliver your auction items to the registration desk, Charles Randklev, Clint Robertson, Susan Oetker, or auctioneer Steve Ahlstedt. If you can’t make the meeting in person or would rather ship your donations, please send the items to Attention: Charles Randklev, Texas A&M AgriLife Research and Extension Center at Dallas, 17360 Coit Road, Dallas, Texas 75252 (Phone 817-966-3235). Please clearly label shipped items as FMCS Auction Items and indicate if a receipt is desired.



Help Sponsor the Symposium

We are actively seeking sponsorships for this Symposium. We are requesting monetary sponsorship to cover expenses and cost of the symposium facilities. We understand that grants and budgets aren’t what they use to be but we need all the support you can provide and we appreciate any and all donations.

All Sponsor Contributions Include Recognition in the Symposium Program		
Basin	≥\$10,000	Three Complimentary Registrations, Logo on Website Registration Page, Recognition in the Symposium Program and at the Banquet Dinner. Choice of up to three free t-shirts, hats or FMCS fleeces.
River	\$9,999-\$5,000	Two Complimentary Registrations, Logo on Website Registration Page, Recognition in the Symposium Program
Stream	\$2,500-\$4,999	One Complimentary Registration, Logo on Website Registration Page and in the Symposium Program
Eddy	\$1,000-\$2,499	Logo on Website Registration Page and in the Symposium Program
Mussel	\$<999	Recognition in the Symposium Program

To make a sponsorship donation please contact FMCS Treasurer, Emily Grossman, at egrossman@ecoanalysts.com or fill out the form available on the Symposium page of the website. For more information about sponsorships for this Symposium, contact Matt Johnson (matt.johnson@enviroscienceinc.com).

ONE LAST THING! - Send Us Your Photos!!

This has been a big hit at the last few meetings. We will run a PowerPoint presentation when possible during the mixers, etc., showing FMCS members doing their things. So, send your field photos, lab photos, etc., to show off what you do at work or when just having fun! Send photos to Jennifer Khan, Jennifer.Morton@ag.tamu.edu. It would help if you would use "FMCS Photos" as the subject line.

For More Information:

For further general information about the Symposium, please contact any of the three Symposium co-chairs: Charles Randklev, (crandklev@ag.tamu.edu), Clint Robertson, (Clint.Robertson@tpwd.texas.gov), or Susan Oetker, (susan_oetker@fws.gov).

**Second Call for Abstracts
2019 Biennial FMCS Symposium
San Antonio, Texas – April 14 – 18, 2019**

The abstract submission deadline for the 2019 Symposium will be **Friday January 4th, 2019**. The Symposium format will include both oral and poster presentations. Oral presentations will be limited to 20 minutes (including the question and answer period). Poster size will be limited to 4 by 4 feet.

Abstracts for both the posters and the oral presentations are limited to 300 words. Abstract title should appear in all caps and be followed by the author(s) name(s), affiliation(s) and e-mail address(es). Abstracts should be written in Word utilizing Arial 11-point font. The text of the abstract should include clearly stated objectives, a brief description of methods, general results, and the basic conclusion(s). At the bottom of the abstract, please indicate your preference of oral or poster presentation, and if you would be willing to switch formats. If you are a student, please indicate if you want your presentation judged (if you have more than one, please only enter one for judging).

An example abstract has been posted on the 2019 Meeting page on our website: https://molluskconservation.org/EVENTS/2019SYMPOSIUM/2019_FMCS-Symposium_INTRO.html. **Please submit your abstract using the following abstract entry form:** <https://irnrfm.tamu.edu/fmi/webd/FreshwaterMolluskConservation>

**Awards Committee Announcements for the
Upcoming Symposium in San Antonio**

The Awards Committee (Emy Monroe, Susan Oetker, Dave Hayes, Teresa Newton, and Greg Cope) has identified several items members need to think about as you prepare for our upcoming Symposium in San Antonio, Texas. Please pay attention to the two submission deadlines; both are coming up sooner rather than later.

Second Call for 2019 FMCS Professional Award Nominations

Do you know someone who has made worthwhile contributions to freshwater mollusk conservation or to the Society either through donating their professional time or expertise or through their scientific endeavors? Consider nominating them for one of the three FMCS Professional Awards.

- The Meritorious Service Award—given to an individual for singular accomplishments or long-term contributions to the Society. The recipient of this award must be a past or present FMCS member who has performed long-term, exceptionally high-quality service to the Society.
- The William J. Clench Memorial Award—given to an individual for singular accomplishments or long-term contributions that have advanced the natural history and understanding of freshwater mollusks at an academic or non-academic level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusks for a substantial period of time, with a recommended minimum guideline of 20 years, and (2) made substantial contributions to the field of freshwater malacology.
- Lifetime Achievement Award—given to an individual for singular accomplishments or long-term contributions that have advanced the conservation and science of freshwater mollusks at a national or international level. The recipient of this award must have had (1) activity in one or more aspects of freshwater mollusk research and/or conservation for a substantial period of time, with a recommended minimum guideline of 20 years, and (2) made substantial contributions to the scientific understanding of freshwater mollusks and/or their conservation.

Nominations and supporting documentation for these professional awards are due by **December 31, 2018**. See the Awards Committee web site at http://molluskconservation.org/Mservices_awards.html for procedures and requirements. For more information or answers to questions about this nomination process, contact Teresa Newton, tnewton@usgs.gov, 608-781-6217; Emy Monroe, emymonroe@gmail.com, 608-783-8402; or Susan Oetker, Susan_Oetker@fws.gov, 404-679-7050.

Student Travel Awards Available

CALLING ALL STUDENTS To facilitate your participation in the San Antonio Symposium, FMCS will be offering some student travel awards. Support is provided via Society-paid lodging accommodations for the duration of the meeting at the host hotel (Hyatt Regency River Walk, San Antonio). We anticipate that up to nine awards will be made for this Symposium. Please see the Awards Committee web site at http://molluskconservation.org/Mservices_awards.html for application forms and procedures. A complete application package must be submitted by e-mail as a PDF file to Dave Hayes on or before **January 30, 2019**. Contact Dave Hayes (david.hayes@eku.edu), phone 859-622-1016, for more information.

Call for Judges for Student Presentations

The Awards Committee needs your help in judging to select the Best Student Platform and Poster Awards at the San Antonio Symposium. If you are interested in serving as a judge for these awards, please reply to Emy Monroe (emymonroe@gmail.com). Please note that all student presentations are completed as early as possible during the meeting so that we can finalize results in time for the awards presentation during the banquet. With that in mind, please indicate which general topics (sorry no list of session titles yet) you would prefer to judge,

and if you are arriving late to the conference (so I don't schedule you to judge before you arrive). Once the meeting schedule is out, please let me know of any conflicts that will not be obvious to me in the schedule, and if you request any changes in the schedule. The Awards Committee greatly appreciates our volunteer judges that make it possible to recognize outstanding student contributions at the meeting. Thank you for considering this request.

If you are a student interested in having your platform paper or poster judged, please indicate that when you submit your abstract. If you are presenting more than once, please select only one for judging.

Student/Mentor Mixer – Call for Mentors!

The Outreach Committee is looking for professionals to participate in the student-mentor mixer on Sunday, April 14 at the upcoming San Antonio Symposium. We would like to have representatives from academic, non-governmental, state/federal government, and environmental consulting backgrounds to represent the wide variety of career options that are available. Our goal is to connect students with professionals in their desired career path. What are the best pieces of advice you have to share with our student members? If you are willing to attend the mixer as mentor, please email Megan Bradley (Megan.Bradley@fws.gov) or Amy Maynard (amy.maynard@dgif.virginia.gov).

Professional Certification Program Reminder

During our Business Meeting at the 2019 Symposium in San Antonio, FMCS members will be asked to vote on whether to establish a Professional Mollusk Certification Program for our Society. The proposal is described starting on page 19 in the September 2018 issue of *Ellipsaria*. The Professional Development Ad hoc Committee also will have an information table at the Symposium to answer any questions in advance of the Business Meeting. If you have questions or comments about this proposed certification program, please contact the ad hoc committee co-chairs Rebecca Winterringer (rwinterringer@trcsolutions.com) or Amanda Rosenberger (rosenbergera@missouri.edu). They would appreciate receiving feedback in time to evaluate any possible changes before the topic is presented for a vote.

Attention Regional Groups!

The FMCS Board recently voted to establish an ad hoc committee to develop a framework for recognizing watershed or regional Chapters. We are thinking that Chapter status would be sought most often by existing watershed or regional mussel and snail discussion groups that want a formal affiliation with FMCS.

We are currently in the process of identifying: 1) groups that might want to pursue being FMCS Chapters, and 2) individuals who would be willing to serve on the ad hoc committee to form the framework for chapter recognition. If you coordinate the activities of a regional or

watershed mollusk group, please contact Heidi Dunn at Hdunn@ecoanalysts.com. She would like to compile a list of those groups along with their contact information. The first step in the process will be to poll these groups to see how much interest there is in forming chapters.

If there is enough interest, the ad hoc committee will continue to develop a framework for accepting chapters. Present committee members Greg Cope, Celeste Mazzacano, and Art Bogan have compiled some information from other Societies that could be used as a starting point. We need some additional folks to review what has been collected and help develop a structure that would work for FMCS. If this process goes forward, the committee would develop a minimum Chapter structure that would be included in our by-laws, and some guidelines that groups would use to form their FMCS Chapters. International chapters could be formed the same way (example FMCS Europe, FMCS Asia, etc.).

Investigation and Monetary Values of Fish and Freshwater Mollusk Kills; New Books are Being Distributed

There were some errors in the new Monetary Values books concerning values for carp and for a few small species of fish, and these errors were not noticed until after publication. New books have been issued to all purchasers. FMCS has a box of new books and we are currently working to send out those books to replace the copies that were purchased through the Disease and Die-off Workshop last March. If you do not receive a new book by the end of the year, please contact Diane Waller dwaller@usgs.gov or Emily Grossman EGrossman@ecoanalysts.com.

Freshwater Mollusks Conservation Society Names of Freshwater Mollusks Subcommittee

The initial meeting of the FMCS Names of Freshwater Mollusks Subcommittee was held on March 22, 2015. The goal was to develop an accepted list of scientific and common names of freshwater mollusks (gastropods and mussels) which would be updated and published every two years on the FMCS website. Members in attendance included Art Bogan, Kevin Cummings, Jeff Garner, John Harris, David Hayes, Nate Johnson, Paul Johnson, Kevin Roe, Jeremy Tiemann, Tom Watters, Nathan Whelan, and Jim Williams.

The FMCS needs to support long-term stability of scientific and common names to promote mollusk conservation to the general FMCS membership, state and federal resource managers, non-governmental organizations, and academics. Taxonomic changes are often difficult to understand, and tracking the history of various synonymies or continuing systematics / taxonomic research efforts can be challenging. Ongoing systematics research suggests that, in the next decade, there will be revisions leading to substantial changes in the current taxonomy of both mussels and gastropods. An organized effort to review and evaluate these changes will help assimilate new names and stabilize taxonomic changes more rapidly. Additionally, the subcommittee will assist ongoing research and publication efforts by better defining problems and highlighting deficiencies. By providing consensus checklists, the FMCS Names of Freshwater Mollusks Subcommittee would promote ongoing conservation and recovery activities.

Discussions during and following the initial meeting focused on the structure and operational procedures of the subcommittee. It was generally agreed the subcommittee would follow the protocol of the American Fisheries Society, Names of Fishes Committee (Page et al. 2013). To move forward, tasks 1 through 4 (presented below) were evaluated individually and, after discussion and modification, were

approved unanimously. Paul Johnson and John Harris were appointed Names Subcommittee chairs until the next FMCS biennial meeting

Based on the deliberations of the FMCS *Ad Hoc* committee on scientific and common names, we recommend the FMCS Board of Directors approve the establishment of the Names of Freshwater Mollusks Subcommittee with two working groups: (1) gastropods and (2) freshwater mussels. Individual working groups would be charged with reviewing proposed name changes and maintaining consensus lists on the FMCS website. Additionally, the subcommittee recommended that, if needed, a checklist of Scientific and Common Names should be published in *Freshwater Mollusk Biology and Conservation* every six years.

The scientific and common names subcommittee initially agreed their structure and duties would be:

1. Establish criteria for subcommittee organizational structure (number of members, length of term, and frequency of meetings).
 - a. Subcommittee shall be composed of seven appointed FMCS members with taxonomic expertise with each group (freshwater mussels and gastropods). Individuals can have simultaneous appointments on both subcommittees.
 - b. Subcommittee meetings should be held at 2-year intervals in conjunction with the FMCS biennial symposium. Subcommittee meetings will be open to any FMCS member interested in observing and/or participating in the proceedings.
 - c. Chairperson for each subcommittee shall be elected at biennial meetings by subcommittee members. Chairperson will serve one 6-year term and may not be reelected to two consecutive terms.
 - d. Initial subcommittee members will be appointed by respective subcommittee Chairs. Continuing with 2015 subcommittee members, Chairs will appoint volunteers to fill any remaining slots for initial subcommittees. However, future subcommittee member changes will require approval from the FMCS Board of Directors. Chairs will present to the FMCS Board a list of members that have expressed interest in serving, along with their recommendations.
 - e. To improve initial continuity for each subcommittee, four members will be appointed to four-year terms, and the remaining three for a two-year term. Once the initial terms have concluded, all members could volunteer to serve another 4-year term. Individual subcommittee members may be reappointed to consecutive terms. After initial terms are completed, subcommittee appointments will require the approval of FMCS Board of Directors.
 - f. If at any point during their 4-year term, a subcommittee member decides they can no longer serve, the Chair shall recommend a replacement to serve the remainder of the open term. New appointments will require approval of FMCS Board of Directors.
 - g. Both subcommittees meet simultaneously in a single room, so all members can participate in discussions. FMCS members in good standing and Board Members are welcome to attend the Scientific and Common Names meetings; however, only respective subcommittee members (mussel or gastropod) can vote on proposed amendments.
2. Maintain a consensus checklist of names on the FMCS website.
 - a. Consensus checklists of freshwater mussel and gastropod scientific and common names as determined by the respective subcommittees shall be open access on the FMCS website. Links to the list of names shall appear on the FMCS main webpage.
 - b. The Johnson *et al.* (2013) and Williams *et al.* (2017) manuscripts are suggested starting points for respective checklists to be formally modified starting at the 2019 biennial symposium.
 - c. A list of references relevant to subcommittees decisions will be cited in individual petitions (form attached) to guide future decisions. Subcommittees may maintain a list of references deemed inappropriate or invalid.
 - d. The subcommittees will maintain a record of decisions from each meeting. Subcommittee Chairs are responsible for maintaining records in the format of Appendix 1 of Turgeon *et al.*, 1998 (Common and Scientific Names of Mollusks, 2nd edition).
 - e. Subcommittee Chairs will be responsible for providing a revised checklist with any proposed changes to subcommittee members 90-60 days prior to the biennial meeting for comment. Any proposed changes would be accompanied by a formal petition detailing the anticipated change(s). A formal petition should cite appropriate peer-reviewed references in a cohesive argument in support of a specific taxonomic revision.

3. Periodically print checklists as an FMCS special publication, or in FMBC.
 - a. Update both lists (gastropods and mussels) every two years, and publish the current list on the FMCS website.
 - b. Updated checklists would be published in FMBC or as a special FMCS publication every six years beginning in 2019.
4. Establish a process for reviewing proposed name changes (scientific and common).
 - a. For a scientific or common name to be taken into consideration by the committee it must appear in a peer-reviewed publication.
 - b. Proposed changes shall be submitted for subcommittee review on the following form 60-90 days prior to the next biennial symposium. Submissions for consideration may be submitted by any FMCS member.
 - c. Proposed changes can be considered by the entire subcommittee, but only gastropod or mussel subcommittee members may vote on changes to their prospective checklists. In the case of a tie vote, the Chair will be asked to cast the tie breaking vote.
 - d. A summary of meeting proceedings and decisions shall be drafted by the subcommittee chairs for approval by subcommittee members and published online as an appendix to the list. A standard format will be developed to resemble Appendix 1 in Turgeon et al. AFS Common and Scientific Names of Mollusks publication (1998). This summary will provide visitors to the names webpage on the status of previous names that appeared and their replacements.

Literature Cited

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- Lopez-Lima, M., I.N. Bolotov, V.T. Do, D.C. Aldridge, M.M. Fonseca, H.M. Gan, M. Gofarov, A.V. Kondakov, V. Prié, R. Sousa, S. Varandas, I.V. Vihrev, A. Teixeira, R.W. Wu, X. Wu, A. Zieritz, E. Froufe, and A.E. Bogan. 2018. Expansion and systematics redefinition of the most threatened freshwater mussel family, the Margaritiferidae. *Molecular Systematics and Evolution*. 127:98-118.
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- Smith, C.H., N.A. Johnson, J.M. Pfeiffer, and M.M. Gangloff. 2017. Molecular and morphological data reveal non-monophyly and speciation in imperiled freshwater mussels (*Anodontoides* and *Strophitus*). *Molecular Phylogenetics and Evolution* 119:50-62.
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- Williams, J.D., A.E. Bogan, R.S. Butler, K.S. Cummings, J.T. Garner, J.L. Harris, N.A. Johnson, and G.T. Watters. 2017. Revised list of the freshwater mussels (Mollusca: Bivalvia: Unionida) of the United States and Canada. *Freshwater Mollusk Biology and Conservation* 20:33-58.

Petition for Proposed Scientific or Common Name Change

Title:

Provide a brief statement of the proposed change along with a full literature citation for the paper on which the proposal is based.

Description of the Problem:

This section shall summarize the specific proposal, along with required references. Information shall be a succinct history and summary of the proposed changes.

Supplemental Information:

This section shall reference any other published data (e.g., proposed phylogeny, character analyses) to be considered in support of the case for reassignment. The data presented should be published in peer-reviewed literature prior to submission to the committee.

Specific Recommendation:

Using the evidence provided, the presenter should provide the clear description of the action or question(s) the committee is being asked to review.

Literature Cited:

Include all supporting references used in the summary.

Submitted By: _____

Proposal Date: _____

Opinion of the Committee:

Each of the respective subcommittee members shall issue a detailed justification of their opinion to express support for or rejection of the petition.

Petition Number:

Free Money for FMCS !

If you buy things from the online retailer Amazon, you can support FMCS by shopping through the AmazonSmile program. When you shop at <https://smile.amazon.com> and select the Freshwater Mollusk Conservation Society as your charity of choice, the AmazonSmile Foundation will donate 0.5% of the purchase price of eligible items to FMCS. Millions of products on Amazon are eligible for these donations, they are marked “Eligible for AmazonSmile donation” on their product detail page. If you already have an Amazon account, you can shop on AmazonSmile using your existing account information.

Amazon pays all expenses of the Foundation – the operating expenses are not deducted from the donation amounts generated by purchases – so there is no cost to FMCS or members to participate. At present, the funds generated through AmazonSmile are being recorded and held for future uses.



Society Business Items

The following Code of Conduct was approved by the FMCS Board of Directors on 15 November 2018. It will appear in the Symposium Program and on the registration form for future Symposia and Workshops. Submitted by the Executive Committee.

Code of Conduct The Freshwater Mollusk Conservation Society

The Freshwater Mollusk Conservation Society (FMCS) is an international scientific organization whose purpose is to conserve and advocate for freshwater mollusks. FMCS members and attendees of FMCS-sponsored symposia, workshops, meetings, or other FMCS activities (events) are expected to adhere to this Code of Conduct. FMCS is committed to providing a safe, productive, and welcoming environment for all participants and staff. All participants including, but not limited to, members, guests, attendees, speakers, volunteers, exhibitors, service providers, and others are expected to abide by this Code of Conduct. This Code of Conduct applies to in-person, electronic (text, email, social media), and written communications.

The FMCS leadership encourages anyone to contact FMCS Executive Committee regarding ways in which the Society can improve inclusion and diversity and encourage a stimulating and supporting atmosphere.

Expected Behavior

- Communicate openly with respect and consideration for others, valuing a diversity of views and opinions.
- Avoid personal attacks directed toward other attendees, participants, suppliers, or vendors.
- Be mindful of your surroundings and of your fellow participants.
- Speak up, intervene, or alert an FMCS board member if discriminatory or inappropriate behavior directed at others is observed or you notice a dangerous situation or someone in distress.
- Abide by the rules and policies of the event venue, hotels, FMCS-contracted facility, or any other venue.
- Request permission from speakers before recording or taking photographs during their presentations. Turn off any ringers or other disrupting devices during oral and poster sessions.

Unacceptable Behavior

It is important that our events be places where no attendee or staff is ever belittled, harassed, or made to feel unsafe. The following behaviors will not be tolerated:

- Harassment, intimidation, or discrimination in any form.
- Physical, written, or verbal abuse of any attendee, speaker, volunteer, exhibitor, service provider, or other event participant.

Examples of unacceptable behavior include, but are not limited to, unwelcomed physical contact; verbal comments related to gender, sexual orientation, disability, physical appearance, body size, race, religion, or national origin; inappropriate use of nudity and/or sexual images in public spaces or in presentations; and threatening or stalking any attendee, speaker, volunteer, exhibitor, service provider, or other event participant.

Reporting Unacceptable Behavior & Consequences

All members, event attendees, and event staff are expected to abide by the FMCS Code of Conduct. Anyone experiencing or witnessing behavior that constitutes an immediate or serious threat to public or personal safety should locate a house phone and ask for security. If a security officer is not available contact 911. Once the person is out of danger, contact an FMCS executive officer. Anyone requested to stop unacceptable behavior is expected to comply immediately. If you are the victim of unacceptable behavior or have witnessed any such behavior, please immediately notify an FMCS executive officer.

Notification can occur by emailing, calling, or texting your concern to the FMCS President or the event services representative. After receiving a report of inappropriate behavior, the FMCS President, Executive Committee, and event services representative will assess the report and work with the complainant to determine the relevant facts, evidence, and most appropriate response.

Anyone filing a complaint concerning a suspected violation of the Code of Conduct must be acting in good faith and have reasonable grounds for believing the information disclosed indicated a violation of the Code of Conduct. Any allegation made with a malicious intent will be viewed as a Code of Conduct violation.

FMCS is committed to protecting the privacy of all individuals involved in the incident to the greatest extent practicable.

The FMCS Executive Committee reserves the right to take any lawful action deemed necessary in response to a violation of this Code of Conduct. This includes, but is not limited to, the immediate removal of the violator from the event without warning or refund. The FMCS Executive Committee may also elect to suspend the violator from future events. Repeated violations could result in loss of FMCS membership and a permanent ban on attendance at FMCS events.

Failure to adhere to the Code of Conduct is cause for removal from an event and/or suspension from membership in FMCS at the discretion of the Executive Committee. A Member may be suspended or removed from FMCS membership with cause by vote of two-thirds of the Board of Directors only after reasonable notice and an opportunity to be heard.

**Final Version of Proposed Amendments to the FMCS By-Laws
Heidi Dunn, Teresa Newton, and Jeremy Tiemann**

Suggested revisions to the FMCS By-Laws were posted in the September issue of *Ellipsaria* and members were invited to make comments and suggest changes to them. All of the comments received have been addressed, and the final revisions were sent to the Board for approval. The Board approved these proposed changes to the By-Laws on November 15, 2018, and authorized the President to put them before the full membership for a vote of adoption.

In the following revised version of the proposed amendments, wording involved in changes is presented in red. The green text is an explanation of the wording changes and will not be included in the final form of the By-Laws. The membership will be asked to vote on adopting the amended By-Laws at the San Antonio Symposium in April 2019.

Article II- Offices

[Section 2.3 needs to be modified to provide flexibility]

Section 2.3 Current Wording

2.3 The registered agent of the Society shall be Heidi L. Dunn, whose address is 1417 Hoff Industrial Drive, O’Fallon, Missouri 63366.

Section 2.3 Amended

2.3 The registered agent of the Society shall be appointed by the Executive Committee and shall maintain a permanent Society address in the state of incorporation. The registered agent will assist the Secretary and Treasurer in maintaining the Society as an incorporated, non-profit organization.

Article III – Membership

[Section 3.2 needs to be updated to include a retiree class. An additional section 3.12 Code of Conduct and 3.13 Suspension or Removal will be added.]

<p>Section 3.2 Current Wording</p> <p>3.2 Qualification. The Society may have more than one class of members and shall consist of: Active, Emeritus, Student, and Contributing members.</p> <p>A. Active Members: <u>Qualifications</u> Must: a) share the stated purpose of the Society b) pay member dues</p> <p><u>Benefits</u> May: a) vote in Society affairs b) hold office and/or serve on the Board of Directors c) participate in Society functions, programs, and activities</p> <p>B. Emeritus Members: <u>Qualifications</u> Must: a) have been an Active Member and be selected in recognition of their contribution to freshwater molluscan conservation and to the Society b) share the stated purpose of the Society c) be an active member for 3 years [effective after 12/31/01] d) be elected by the Board of Directors of the Society after being nominated by an Active Member e) be recognized for service to the Society and freshwater malacology</p> <p><u>Benefits</u> May: a) vote in Society affairs b) hold office and/or serve on the Board of Directors</p>	<p>Section 3.2 Amended</p> <p>3.2 Qualification. The Society may have more than one class of members and shall consist of: Regular, Student, Retired, Lifetime, and Contributing members.</p> <p>A. Regular Members: <u>Qualifications</u> Must: a) share the stated purpose of the Society b) pay member dues</p> <p><u>Benefits:</u> May: a) vote in Society affairs b) hold office and/or serve on the Board of Directors c) participate in Society functions, programs, and activities</p> <p>B. Student Members: <u>Qualifications</u> Must: a) share the stated purpose of the Society b) be a student showing promise of becoming qualified for Regular Member status at a later date c) pay Student member dues</p> <p><u>Benefits</u> May: a) vote in society affairs b) apply for Active Member status c) participate in Society functions, programs, and activities</p> <p>C. Retired Members: <u>Qualifications</u> Must: a) share the stated purpose of the Society b) be retired from a career position and have been a Regular or Contributing Society member in the past c) pay Retired member dues</p> <p><u>Benefits</u> May: a) vote in Society affairs b) hold office and/or serve on the Board of Directors c) participate in Society functions, programs, and activities</p> <p>D. Lifetime Members: <u>Qualifications:</u> Must: a) share the stated purpose of the Society</p>
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	<p>b) have paid the life-time membership fee</p> <p><u>Benefits:</u> May: a) vote in Society affairs b) hold office and/or serve on the Board of Directors c) participate in Society functions, programs, and activities</p> <p>E. Contributing Members: <u>Qualifications</u> Must: a) share the stated purpose of the Society b) provide support to the Society c) have paid the contributing member fee</p> <p><u>Benefits</u> May: a) be acknowledged by the Society for support in newsletters, annual programs, and activities b) vote in Society affairs c) hold office and/or serve on the Board of Directors d) participate in Society functions, programs, and activities</p>
<p>E. Membership to all of the above membership classes, except Emeritus, requires the payment of dues or support as determined by the Society. Active, Emeritus, and Student Members constitute the voting membership of the Society and Active and Emeritus Members may hold office.</p> <p>F. The Board of Directors shall determine the manner of fixing a date as the record date for determining the members eligible to have notice of a members' meeting. The record date may not be more than one hundred (100) days before the meeting or action requiring a determination of who are the Active Members.</p>	<p>F. Membership to all membership classes requires the payment of dues or support as determined by the Society. Regular, Student, Retired, Lifetime, and Contributing Members constitute the voting membership of the Society and Regular, Retired, Lifetime, and Contributing Members may hold office.</p> <p>G. The Board of Directors shall determine the manner of fixing a date as the record date for determining the members eligible to have notice of a members' meeting. The record date may not be more than one hundred (100) days before the meeting or action requiring a determination of who are the Active Members.</p>
<p>3.12 Currently no text</p>	<p>3.12 Code of Conduct. Society members and attendees of Society-sponsored symposia, workshops, meetings, or other Society activities (events) are expected to adhere to the Society Code of Conduct. The Society is committed to providing a safe, productive, and welcoming environment for all participants and staff. All participants including, but not limited to, members, guests, attendees, speakers, volunteers, exhibitors, and service providers are expected to abide by this Code of Conduct.</p>

<p>3.13 Currently no text</p>	<p>3.13 Suspension or Removal. The FMCS Executive Committee reserves the right to take any lawful action deemed necessary in response to a violation of the Code of Conduct. This includes, but is not limited to, the immediate removal of the violator from the event without warning or refund. The FMCS Executive Committee may also elect to suspend the violator from future events. Repeated violations could result in loss of FMCS membership and a permanent ban on attendance at FMCS events.</p> <p>Failure to adhere to the Code of Conduct is cause for removal from an event and/or suspension from membership in FMCS at the discretion of the Executive Committee. A Member may be suspended or removed from FMCS membership with cause by vote of two-thirds of the Board of Directors only after reasonable notice and an opportunity to be heard.</p>
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Article V Board of Directors

Section 5.2

[Section 5.2 currently defines the Board of Directors as the Executive Committee and Committee Chairs. As the National Strategy changes and FMCS grows, we need to rethink how to restructure the Board to better represent the membership and undertake the day to day functions of FMCS.]

<u>Section 5.2 Current Wording</u>	<u>Section 5.2 Amended</u>
<p>5.2 Qualifications and Number of Directors. The number of Directors may be increased or decreased, but to no fewer than three, from time to time by amendment to the Articles or By-laws. A Director must be a member in good standing. The Board of Directors shall consist of the President as the presiding officer, the President-Elect, Past President, Secretary, Treasurer, and Chairs of Standing Committees as defined in the By-Laws. Chairs of Standing Committees are to be selected by members of that committee at the biennial symposium held in odd numbered years. A committee may have co-chairs but only one vote on the Board of Directors. A person may be Chair of only one Standing Committee at any given time.</p>	<p>5.2 Qualifications and Number of Directors. The number of Directors may be increased or decreased, but to no fewer than three, from time to time by amendment to the Articles or By-laws. A Director must be a member in good standing. The Board of Directors shall consist of the President as the presiding officer, the President-Elect, Past President, Secretary, and Treasurer (Executive Committee), and Chairs of Functional and Technical Committees defined in the By-Laws. Committee chairs are to be selected by members of that committee at the biennial symposium held in odd numbered years and shall hold no more than three consecutive terms. A committee may have subcommittees and subcommittee chairs, but that committee has only one vote on the Board of Directors. A person may be Chair of only one Committee at any given time.</p>

Section 5.15 Duties of the Board of Directors

[Section 5.15 needs to be reworded to reflect the changes in membership categories]

<u>Section 5.15 Current Wording</u>	<u>Section 5.15 Amended</u>
<p>5.15 Duties of the Board of Directors. The duties of the Board of Directors shall be:</p>	<p>5.15 Duties of the Board of Directors. The duties of the Board of Directors shall be:</p>

<p>A. To manage the business, functions, programs, and activities of the Society.</p> <p>B. To establish dues and support levels for Active Members, Student Members, and Contributing Members.</p> <p>C. To establish policy and promote the objectives of the Society.</p>	<p>A. To manage the business, functions, programs, and activities of the Society.</p> <p>B. To establish dues and support levels for Regular Members, Student Members, Retired Members, Lifetime Members, and Contributing Members.</p> <p>C. To establish policy and promote the objectives of the Society.</p>
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Section 5.18 Committees

[The committee structure needs to change to be more flexible.]

Section 5.18 Current wording	Section 5.18 Amended
<p>5.18 Committees. The Standing Committees shall be:</p> <ul style="list-style-type: none"> Awards Symposium Status/Distribution of Mussels Status/Distribution of Gastropods Outreach Information Exchange Environmental Quality and Affairs Propagation/Restoration and Introduction Nominations Genetics Guidelines & Techniques 	<p>5.18 Committees. Committees shall be of three types; Functional, Technical, and ad hoc.</p> <p><i>Functional Committees</i> will take care of the day to day functions of the Society. Functional committees shall include, but are not limited to:</p> <ul style="list-style-type: none"> Outreach (e.g., website, social media, event tools) Awards Nominations Symposia and Workshops, Publications (Ellipsaria, FMBC) Diversity and Inclusiveness National Strategy. <p><i>Technical Committees</i> will be established to meet the goals and objectives of the National Strategy. Broad committees will be formed that consist of subcommittees that function to address specific projects outlined in the current National Strategy. The National Strategy Committee will recommend changes to these committees based on their five-year evaluation. These recommendations will be voted on by the Board of Directors and communicated to the membership before the symposium following the review.</p> <p>The President and the Board will form <i>ad hoc Committees</i> to explore specific issues or answer specific questions. These committees will be dissolved when their task is complete. They will be evaluated by the Executive Committee at least every five years and either dissolved (if task is complete) or made into a Functional or Technical subcommittee.</p>

As indicated above, these proposed amendments to the By-Laws will be presented to the FMCS membership for adoption at the San Antonio Symposium in April 2019. A complete set of the By-Laws with these proposed amendments included is attached following the last page of this newsletter (after page 58). In that set of the By-Laws, sections in which changes are proposed to be made are presented in red type.

Announcements

OSU Mollusk Collection Dedication

On September 7, 2018, the mollusk collection at the Ohio State University Museum of Biological Diversity was renamed the David H. Stansbery Mollusc Collection. This dedication was made to acknowledge the monumental effort Dr. Stansbery made to develop a world-class collection of over 1.6 million specimens of freshwater mussels, freshwater snails, and other mollusks between 1972 and his retirement in 2000. Present Curator of the collection, Dr. George T. Watters, presided at the dedication, which was attended by three of Dr. Stansbery's children: Mark Stansbery, Linda Anschutz, and Kathleen Pang (pictured below). Faculty and staff gathered to help celebrate and remember Dr. Stansbery's incredible influence in the field of malacology.



Letter from the Section of Malacology of the National Museum, Brazil to the Malacological Community Worldwide

Rio de Janeiro, October 18, 2018

As already well-publicized within the global academic and scientific community, the Section of Malacology of the National Museum of Brazil, Rio de Janeiro, was destroyed during the terrible fire in the main historical building of the museum, on September 2, 2018.

The facility and contents of the Section of Malacology were lost, including books and separates, optical equipment, computers and the entire collection. Thanks to the professional and personal commitment of the technician of the Section, Claudio José Fernandes da Costa, with the help of some colleagues and the firemen, the drawers with type-material were saved. All the remaining collection, including more than 40,000 registered lots, a countless number of specimens and around 20,000 lots waiting to be processed were destroyed. Among them were specimens currently studied by us, students and collaborators, as well as specimens borrowed from other scientific institutions. Similar situations are faced by other sections of the museum, in the Departments of Entomology, Anthropology, and Geology and Palaeontology.

The Section of Malacology of the National Museum, in addition to holding one of the largest and most important collections of molluscs in Latin America, source of study for many researchers from Brazil and abroad since early in the twentieth century, has an extensive history of scientific production and educational activities covering the systematics and diversity of molluscs and contributing to the formation of many graduate students at the MS and PhD, some of them currently head of laboratories and research groups in Brazil and other countries.

The Section of Malacology has contributed significantly to the development and success of Malacology in Brazil, with the decisive leadership and participation of some of your members in the Brazilian Society of Malacology (SBMa). Former Curator, Prof. Dr. Arnaldo Campos dos Santos Coelho, was one of the founders of the Society in 1969, its President for two terms and organizer of three Brazilian Malacological Meetings (EBRAM). More recently, Dr. Alexandre Dias Pimenta was vice president of SBMa and collaborated in the organization of five EBRAM, in Rio de Janeiro. Staff at the Section of Malacology have also participated actively in the Congresses organized by the Asociación Latinoamericana de Malacología (ALM) and Unitas Malacologica.

The Section of Malacology intends to and will, as will the National Museum as a whole, restructure itself physically to continue its scientific and academic activities and fulfil its fundamental mission of developing and disseminating malacological research, especially in the formation of new generations of researchers and the maintenance of its malacological scientific collection.

Since the day of the fire, the National Museum has activated several fronts of action, aiming to ensure the continuity of its activities, especially its graduate programs and educational activities. To support these actions, procedures were created to allow for the receipt of donations of collections of objects and literature. We are also prepared to receive much-needed financial donations, designated to the Museum as a whole or to specific sections. This aid will be of fundamental importance for the acquisition of equipment and consumables, among many other immediate needs.

Consequently, the Section of Malacology of the National Museum of Brazil invites professional and amateur malacologist colleagues, including members of the Brazilian Society of Malacology (SBMa), Asociación Latinoamericana de Malacología (ALM), Unitas Malacologica (UM) and other malacological and conchological associations, to participate in the reconstruction of the Malacology of the National Museum through the following avenues:

1. **Donation of samples, collections and bibliography:** Material to reassemble the collection of Mollusca and malacological bibliography should be sent through a letter of intent directed to the Direction of the National Museum. This letter should mention the kind of item(s) to be donated and mentioning that the gift is meant to help with the reconstruction of the Section of Malacology. It is not necessary to quantify or specify in detail the items offered. Please send the letter to our e-mail: malacologia.mnrj@gmail.com
2. **Financial donations:** Aiming at the continuity of basic activities including the purchase of consumables, new equipment and the execution of much-needed collecting trips, donations must be made through a deposit in a bank account managed by SAMN (Associação Amigos do Museu Nacional), based at the museum:

Bank account information for financial contributions in Brazil:

Banco do Brasil, Agência: 3010-4,
Conta corrente: 60.618-9, CNPJ: 30024681/0001-99

Bank account information for financial contributions from other countries:

Corporate name: Associação Amigos do Museu Nacional CNPJ: 30024681/0001-99
Address: Rua das Marrecas, 40, sala 413-parte, Centro, Rio de Janeiro, RJ, Brasil. Zip code: 20031-120 SWIFT code: BRASBRRJBH
Account number/IBAN: BR3200000000030100000606189C1
Account name: SOS MUSEU NACIONAL
Linked agency: 3010-4 EMPRESA B. MESQUITA (RJ)
Liked account: 60.618-9

*Important: after the deposit, please send an e-mail to sosmuseunacional@samn.org.br copied to malacologia.mnrj@gmail.com attaching the receipt of deposit and mentioning that the donation is destined to the Section of Malacology.

The Section of Malacology of the National Museum of Brazil is committed to use all the donations received exclusively in the reconstruction and maintenance of its research and educational activities. In a timely manner, we will indicate the amount received and its application on our Internet page - www.museunacional.ufrj.br/malacologia

The professors, technicians and students of the Section of Malacology are grateful for all the support they have received so far from all their colleagues in Brazil and the world. If you have any question, please contact us: malacologia.mnrj@gmail.com

Best regards,

Dr. Alexandre Dias Pimenta
Dr. Vinicius Padula

Michigan Mussel Survey and Relocation Protocol Released

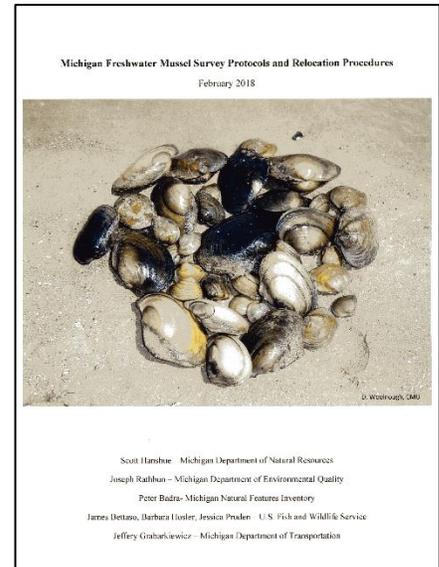
The U.S. Fish and Wildlife Service (FWS) Michigan Ecological Services Field Office and the Michigan Department of Natural Resources have completed the document, *Michigan Freshwater Mussel Survey Protocols and Relocation Procedures*. This protocol provides guidance for conducting freshwater mussel surveys and relocations in Michigan.

(Excerpt from the Introduction):

“ . . . The protocols herein are designed to document the potential presence or absence of state or federally listed mussel species as well as provide guidance for survey and relocation activities to minimize impacts to native mussels in Michigan. The following mussel survey and relocation protocols are applicable to most Michigan streams and rivers; however, inland lakes, impoundments, the Great Lakes, Lake St. Clair, or Great Lakes connecting waters are not covered by these protocols. Projects that may adversely affect mussels in these waters will require project-specific survey, relocation, and monitoring plans.”

The complete protocol document is available online at:

<https://www.fws.gov/midwest/EastLansing/te/pdf/MIFreshwaterMusselSurveyProtocolsRelocationProceduresFeb2018.pdf> For more information about this protocol contact the FWS Michigan Ecological Services Field Office at 517-351-2555.



Regional Meetings

Chesapeake Bay Freshwater Mussel Workgroup Reviewing Options

The Chesapeake Bay Freshwater Mussel Workgroup will be forgoing its 2019 "symposium style" meeting. The following changes will be made or are being considered in light the recent option to form as a chapter of FMCS. All participants of past meetings were asked via email whether or not they would be interested in forming a chapter of FMCS. Responses to the inquiry are in the process of being tallied. Over the course of 2019, we will work with meeting participants on a path forward -- which could include no change -- along with potential chapter structure and challenges to formation while consulting with the ad hoc FMCS Committee on chapter formation.

In 2019, a "workgroup style" meeting will be convened at a date to be determined that will focus on bringing together resource managers and relevant partners to discuss preliminary steps needed to implement regional conservation issues of priority species. Topics could include identifying survey gaps, coordinating sampling efforts, research needs, and prioritizing conservation efforts.

If you have questions about this review of options or the plans for the 2019 "workgroup style" meeting, please contact Matt Ashton (matthew.ashton@maryland.gov) or Julie Devers (julie.devers@fws.gov).

Ohio River Valley Mollusk Group Meeting, Thomas More University Biology Field Station November 7-8, 2018

Wednesday, November 7, 2018

Forty-five people attended this meeting. Dr. Chris Lorentz welcomed everyone and introduced them to the Center for Ohio River Research and Education and the Field Station facilities. In his opening

remarks, Leroy Koch announced his potential retirement from the US fish and Wildlife Service in 2019 and his resignation from chairing the ORVMG.

Robert Francis, Miami University Ohio, Dave Berg Lab

Has federal conservation legislation affected freshwater mussel biodiversity in the Ohio River and its tributaries?

- Focus on major federal conservation legislation – Clean Air Act, establishment of EPA, Clean Water Act, ESA
- Ecological “big data” – used to answer macro ecology questions; Global Biodiversity Information Facility (GBIF)
- Hypothesis – federal legislation has had a quantifiable effect on biodiversity of mussels in Ohio River and tributaries
- Methods – looked at data from 21 HUC 6 regions; 2,459 total occurrence points (1,570 unique occurrences); separate occurrences between pre-1972 and post-1972; quantify species richness pre-1972 and post-1972
- Results – 12 out of 21 HUC 6 regions showed declines; 1 remained the same; 2 increased; 6 had insufficient data; average of 7.7 species lost post 1972
- Future research – look at smaller (HUC 8) and larger (bioregions) spatial scales; Is species loss tribe specific?

Dave Berg, Miami University Ohio

Using molecular genetic methods to understand the genus Plethobasus

- *P. cicatricosus* (white wartyback) – federally endangered; recovery = viable population in Tennessee River; five year review = need more information
- *P. cooperianus* (orange-footed pimpleback) – federally endangered; recovery = viable populations in Tennessee, Cumberland, and Ohio Rivers; all known populations in captivity; five year review = need more information
- *P. cyphyus* (sheepnose) – federally endangered; no recovery plan; five year review = need more information
- DNA sequencing – mitochondrial DNA and nuclear DNA
 - Sequence similarity
 - Within *P. cooperianus* = 98.1% (mtDNA) and 99.1% (nDNA)
 - Within *P. cyphyus* = 99% (mtDNA) and 99.5% (nDNA)
 - *P. cicatricosus* vs. *P. cooperianus* = 89.4% (mtDNA) and 88% (nDNA)
 - vs. *P. cyphyus* = 96.7% (mtDNA) and 99.8% (nDNA)
- Hypothesis: this is a *P. cicatricosus*
 - MAYBE
- Hypothesis: *P. cicatricosus* is sister to *P. cyphyus*
 - *P. cicatricosus* + *P. cyphyus* = monophyletic group
- Hypothesis: *Plethobasus* forms a monophyletic group
 - YES, most likely

Jess Jones, FWS Virginia

Assessing genetic variation of mussel hatchery operations

- Freshwater Mussel Conservation Center (FMCC) mussel releases 2013 – 2018 = >55,000 individuals
- FMCC mussel releases 2018= 12,549 individuals
- Key management need – determine level of genetic diversity that is maintained or lost during captive propagation and culture of freshwater mussels
- Hypotheses
 - H₀ – no change in genetic diversity from wild pop to broodstock and subsequent progeny
 - H₁ – change (loss) of genetic diversity from wild pop to broodstock and subsequent progeny
- Methods
 - genetic samples collected using Isohelix buccal swab kits
 - assess genetic diversity using mtDNA and nDNA markers

- *Epioblasma aureola* (golden riffleshell) – wild stock/broodstock and progeny
 - Wild – A=5; Progeny – A=10 (A=allelic diversity)
- *E. brevidens* (Cumberlandian Combshell) – wildstock, broodstock, progeny
 - Wild – A=9; Brood – A=3; Progeny – A=12
- *E. capsaeformis* (oyster mussel) – wild stock, broodstock, progeny
 - Wild – A=12; Brood – A= 8, 14; Progeny – A=12, 14, 15
- *E. obliquata* (purple catspaw) – wild stock, progeny
 - Wild – A=12; Progeny – not available yet
- *E. triquetra* (snuffbox) – progeny
 - Progeny – A=10
- Key findings
 - current hatchery practices utilizing wild collected female mussels as broodstock likely maintain nDNA genetic diversity of progeny
 - mtDNA analyses pending, current practices may reduce mtDNA variation
 - high fertilization rates of females by males in healthy large population likely key factor
 - glochidia broods of females seem to magnify population genetic variation

Heidi Dunn – FMCS update

- had a recent symposium in Italy attended by 100+ people from around the world
- next FMCS Workshop (in 2020) is on sampling techniques and protocols
- San Antonio symposium April 14-18, 2019
- interest in forming chapters likely based on geography
 - ORVMG could potentially become a chapter if interested

Monte McGregor, Kentucky Dept. Fish & Wildlife, Center for Mollusk Conservation

- Kentucky has 105 species of freshwater mussels – 12 extinct, 27 t/e species
- Center for Mollusk Conservation
 - flow through facilities
 - advanced algae culture methods and technology
 - *In vitro* culture – mass production, high transformation rates, great potential for toxicology, recovery potential
 - 2006 to present – 70 species tested with 64 species transformed successfully
 - >76 total species propagated; 20 t/e species – 10 species released at stockable size, 8 species translocated to historic locations
- Potentially saved golden riffleshell and purple catspaw from extinction
 - 50 purple catspaw released in 2017 (at 8 locations=400 total) were found to be doing okay in 2018 so released >1,000 individuals at 6 sites (2 in Ohio, -2in Kentucky, and 2 in Tennessee) including 50 individuals released into Killbuck Creek where the broodstock is from
- Released a few thousand juvenile pink muckets into the Green and Licking rivers
- River restoration
 - Licking River – 180 unimpounded river miles; 56 mussel species (1 extinct and 5 extirpated); 120 fish species
 - rough pigtoe, rabbitsfoot, pink mucket, northern riffleshell, clubshell, and purple catspaw have been released into the river
 - species diversity is the same, but density has nearly doubled between 2005 to 2018 (Green River monitoring site)
 - Green River – 13 monitoring stations; several dam removal projects
 - increased populations at multiple locations for multiple species
- Cage culture at Lake Cumberland - catspaw, pink mucket, Cumberland bean, tan riffleshell, plain pocketbook (~5,000 mussels produced of all species this year in cages)-majority Cumberlandian combshell and Cumberland bean).
 - Cumberlandian combshell, round hickorynut
 - finding significant growth in just 4-5 months

- Working on poster for FMCS “Guide to the Larval Mussels of Kentucky” – only need eight more to cover entire U.S. so if you have access to larvae please contact Monte

Alissa Ganser, Virginia Tech

Assessing distribution, abundance, and genetics for three species of freshwater mussels in Tennessee and Cumberland River valleys

- *Lasmigona holstonia* (Tennessee heelsplitter) – candidate for ESA listing
- *Medionidus conradicus* (Cumberland moccasinshell) – candidate for ESA listing
- *Ptychobranhus subtentus* (fluted kidney shell) – federally endangered
- Genetic analysis
 - tissue foot swabs from each individual
 - tagged with Hallprint shellfish tag
 - processed with isohelix DNA extraction kit
 - analyzing mtDNA and nDNA
 - determine populations with high diversity – could be good candidates for management efforts like transplantation and/or propagation
 - provide information for management decisions
 - over 360 DNA samples collected and extracted (70 *L. holstonia*, 161 *M. conradicus*, 136 *P. subtentus*)
- distribution of species
 - compare historic (pre-1980) vs. current distribution to calculate percentage of populations lost over time
 - starting with *L. holstonia* – experiments to answer questions related to life history, host fish, and habitat use; estimating abundance
- outcomes
 - distribution and abundance will likely relate to genetic diversity
 - expect more differences among *L. holstonia* populations
 - critical biological data will provide information about the need for listing for *L. holstonia* and *M. conradicus*

Eric Waits, USEPA

UnionID: A New eDNA Barcoding Assay for the Detection and Identification of North American Freshwater Mussels

- eDNA barcoding assay customized for detecting Unionida
 - surveyed entire mitochondrial genome and found region that can be used for identification; this is a novel locus
 - currently have just under 80 species assayed
- current efforts are focused on populating a DNA voucher database to include all species in the order Unionida (n=298)
- contact Eric Waits if you can provide voucher specimens (513-569-7301; waits.eric@epa.gov)

Jeremy Tiemann, Illinois Natural History Survey

Danville Dam Removal

- 87,000+ dams in U.S. – most privately owned
- 77% of river basins in U.S. are impounded
- Habitat changes + impeded movement = altered communities
 - Reduced and fragmented populations for many groups
- In last 75 years, approximately 1,150 dams have been removed in U.S.
- Vermilion River of the Wabash
 - 4,000 km² watershed in “corn desert”
 - substrate = sand, gravel, cobble
 - 100+ fish species, including 14 darters
 - 45 species freshwater mussels
 - one of the highest quality streams, Illinois’ only National Scenic River

- Danville dam study
 - determined extant species richness and relative abundance
 - dam removed slowly over approx. 2 months
 - salvaged approx. 750 individuals of 23 species live
- clubshell and riffleshell monitoring update
 - 4,000 individuals of each species relocated into Middle and Salt Forks of Vermilion River
 - gradual decrease in detection and survival since releases
 - had three 30-year flood events within six weeks during summer 2015
 - used floating antenna to try to track mussels
 - approx. 20 individuals moved >1/2 mile; maximum movement >2 miles
 - have found approx. 10% tag loss with superglue

Thursday, November 8, 2018

John Spaeth, ESI

Removal of the Williamsburg Dam on the East Fork Little Miami River in Ohio

- Prior records of rayed bean but no surveys completed in 10+ years
- 2017 surveys found 59 live individuals of 10 species
- 2018 Mussel Salvage and Relocations
 - Below dam – 119 individuals moved to relocations site at EFLMR
 - Above dam – 704 individuals of 12 species
 - All but 241 individuals were moved upstream of SR 32
 - 241 individuals translocated to Mill Creek in Hamilton County
 - 28 *Lampsilis siliquoides*, 188 *Lasmigona complanata*, 25 *Pyganodon grandis*
 - Placed in Mill Cree in October (a month ago) and starting to bury as of last week

Oil spill remediation on the Allegheny River in New York

- 2017 surveys in area of raw crude oil spill from early 1900's found a lot of rayed bean – formal consultation with the FWS was completed
- 2018 salvage efforts commenced prior to beginning construction
 - 5 days of surveys; >150 hours search time; 1,300 meters of transect rope
 - Max density = 18.6 rayed bean/m²; average density = >6 rayed bean/m²
 - Found 8,192 rayed bean (73.6% relative abundance)
 - Found 11,130 individuals total of 15 species
 - Found one *Epioblasma rangiana*, first record of that species in New York
- More salvage efforts to come in 2019
- Full presentation will be made at FMCS

Jeremy Tiemann, Illinois Natural History Survey

Alien Invaders: determining and documenting invasive Corbiculids in Illinois

- unknown *Corbicula* found in Illinois
 - still no name
 - has now been found in Mississippi and Ohio rivers
- ##### *How biotic & abiotic factors affect the detection of Corbicula*
- eDNA for *Corbicula*
 - detected in four lakes with known records
 - no detection in lakes with no known records
 - How does eDNA vary?
 - biotic – density
 - no correlation between eDNA and density
 - abiotic – temperature, discharge
 - positive correlation between eDNA and temperature
 - negative correlation between eDNA and discharge

Juvenile mussel growth and survival in a stream recently invaded by Corbicula

- compare juvenile mussel growth in streams where *Corbicula* are abundant to streams where *Corbicula* are absent
 - monitor spread of *Corbicula* in Kishwaukee basin
- Vulnerability of native & nonnative mollusks in black carp invaded areas*
- assess preference and vulnerability of native & non-native mollusks

Jess Jones, FWS

Development of molecular and morphological resources for identification and monitoring of freshwater mussel species in the genera Fusconaia and Pleurobema in the Green River, Kentucky

- assess phylogenetic relationships
- estimate genetic diversity and effective population size
 - *P. plenum*, *P. cordatum*, *P. sintoxia/rubrum*
 - Effective population sizes in river
 - *P. cordatum* – 2000; *P. plenum* – 300; *P. sintoxia/rubrum* – 200
- quantify morphological variation to develop dichotomous and photographic keys
 - *F. subrotunda*, *P. sintoxia/rubrum*, *P. plenum*, *F. flava*, *P. cordatum*
 - Collected 209 individuals of the 5 species
 - Interviewed four experts to identify individual mussels

Mike Compton, Office of the Kentucky Nature Preserves

Cumberland papershell (Anodontoides denigrata)

- Upper Cumberland River endemic in Kentucky and Tennessee
- Distribution is greatly reduced, with only three robust populations remaining in KY (robust population = multiple individuals of multiple age classes)
- Moore Creek (Knox County, KY) is one of the three robust populations, likely the best population
 - found approx. 100 individuals in one afternoon, tagged approx. 88 individuals and relocated them to Mill Branch

Preliminary ecological assessment of the Green and Nolin Rivers in Mammoth Cave National Park following removal of Lock and Dam #6

- Dam breached in November 2017 and removed in April 2018
- Lock and Dam #5 slated for removal in 2019 (approx. 25km d/s of Lock and Dam #6)
- Objectives - document current physical and biological conditions following removal of Dams 5 and 6; establish baseline dataset for long-term monitoring and analysis
 - vegetation surveys
 - macroinvertebrate surveys – 5 sites
 - mussel surveys – 27 sites
 - fish surveys
 - habitat surveys – 18 sites
- Results
 - mussels – 482 individuals of 27 species
 - impounded – 1.3; flowing – 9.3; pool – 2.3
 - physical habitat – more gravel, pebble, cobble in flowing section; more sand and mud in impounded section
- Summary
 - Lock and Dam #6 removal decreased permanent and seasonal impoundment of Green River by 16 km
 - macroinvertebrates, mussels and fish indicate free flowing section had relatively diverse assemblages compared to impounded section

Kentucky creekshell (Leaunio ortmanni) Species Status Assessment

- occurs in KY and has now been found in TN

Brant Fisher, Indiana Department of Natural Resources

Conservation Strategies of Mussels in Indiana

- *Epioblasma triquetra* (snuffbox) propagation

- last remaining reproducing population is in Salamonie River
- Salamonie River population used to augment Tippecanoe River population using cage cultures
- collect 4-8 females from Salamonie River (day 1); collect approx. 100 log perch from Tippecanoe River (day 2) and drive log perch over to Salamonie River; extract glochidia from snuffbox and inject into gills of log perch; drive log perch back to Tippecanoe River and place into cages (approx. 20 fish per cage)
- *Epioblasma rangiana* (northern riffleshell) augmentation from Hunter Station
 - likely extirpated from Indiana
 - placed into Tippecanoe River at three sites
 - through 2018 – pit-tagged = 31% dead, 18% unaccounted for; glitter = 10% dead
- *Pleurobema clava* (clubshell) augmentation from Hunter Station
 - Only reproducing populations in Tippecanoe River
 - placed into Eel River at three sites
 - through 2018 – pit-tagged = 0.7% (3 individuals) dead, 12% unaccounted for; glitter = 1 individual dead

Collin Moratz, USFWS Carterville, Illinois

Ohio River Basin Fish Habitat Partnership

- administer National Fish Passage Program
- focus on dam removal, stream restoration, and floodplain retention

Ryan Argo, ORSANCO

- developed database of mussel records in Ohio River which will be publicly available
- contact Ryan to get and/or submit records

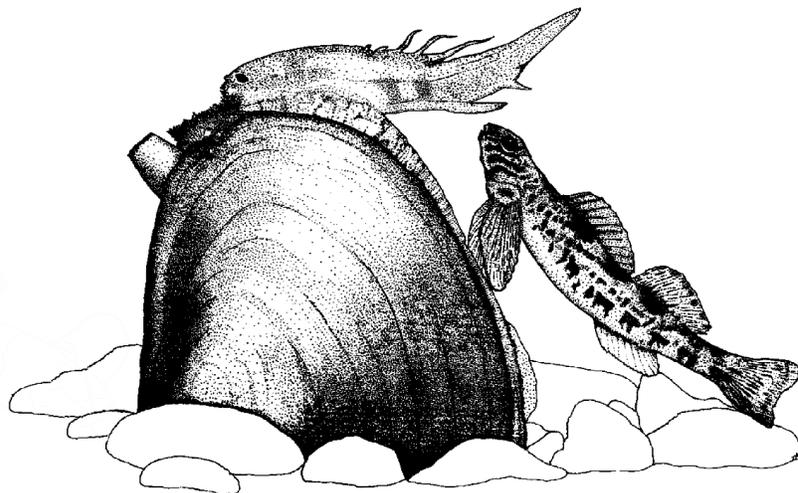
Amy Bergdale, EPA

- plans for eDNA meeting in 2019

Marissa Reed, FWS

- Midwest Region (Region 3) has developed a mussel database for reporting mussel records collected when doing surveys under federal permits
- in the external testing phase now, with rollout anticipated to be prior to 2019 field season
- contact Marissa if interested in reviewing and providing feedback on the database

The 2019 Ohio River Valley Mollusk Group Meeting will be held on November 6 and 7, 2019 at Thomas More Biology Field Station



Upcoming Meetings

March 7 – 11, 2019 – National Shellfisheries Association and World Aquaculture Society joint meeting, New Orleans Marriott, New Orleans, Louisiana, USA. Theme: *Aquaculture – The Big Easy Choice!*
<https://www.was.org/meetings/pdf/AQ2019RegBro.pdf>

April 14 – 18, 2019 – FMCS 11th Biennial Symposium, Hyatt Regency, San Antonio, Texas, USA. Theme: *Life on the Edge: Reconciling River Management*. Other details not yet announced.

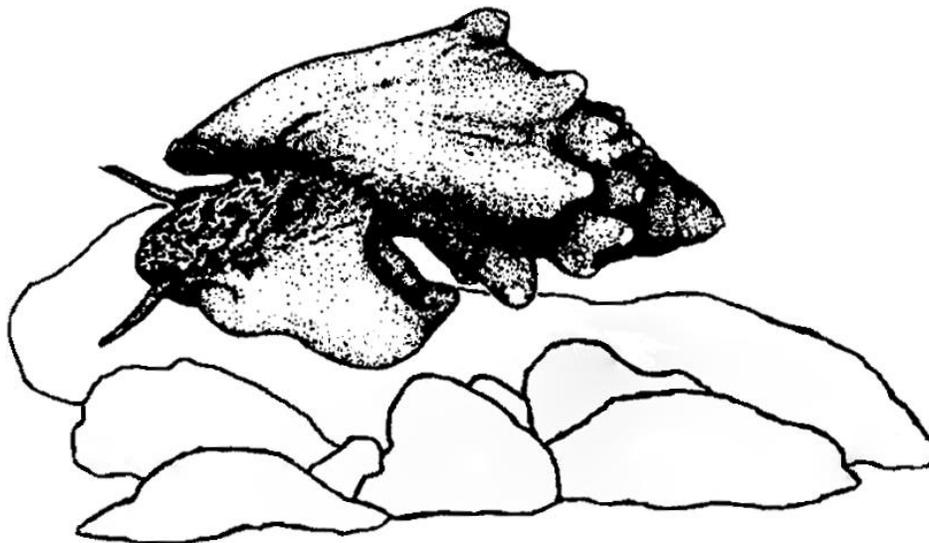
May, 19 – 23, 2019 – Society for Freshwater Science Annual Meeting, Salt Palace, Salt Lake City, Utah, USA Theme: *Translational Ecology in Freshwater Science* <http://sfsannualmeeting.org/>

June ? – ?, 2019 – American Malacological Society 85th Annual Meeting [Date, Site, and theme not yet posted] <http://www.malacological.org>

September 29 – October 3, 2019 – Joint Meeting of the American Fisheries Society and the Wildlife Society, Reno-Sparks Convention Center, Reno, Nevada, USA Theme: (not yet announced)
<http://afstws2019.org/>

October 27 – 30, 2019 – Southeastern Association of Fish and Wildlife Agencies 73rd Annual Conference, Hilton Head Marriott Resort, Hilton Head, South Carolina., USA.
<http://www.seafwa.org/conference/overview/>

July ? – ?, 2020 – Society for Conservation Biology North American Sectional Meeting, [Date, Site, and theme not yet posted] <http://conbio.org/groups/sections/north-america/meetings/>



Contributed Articles

The following articles have been contributed by FMCS members and others interested in freshwater mollusks. These contributions are incorporated into *Ellipsaria* without peer review and with minimal editing. The opinions expressed are those of the authors.

Building a Response Network to Investigate Potential Pathogens Associated with Unionid Mortality Events

Eric Leis¹, Diane Waller², Susan Knowles³, Tony Goldberg⁴, Joel Putnam², Jordan Richard⁵, Sara Erickson¹, Emilie Blevins⁶, and Jesse Weinzinger⁷

- ¹- US Fish and Wildlife Service, La Crosse Fish Health Center-Midwest Fisheries Center, Onalaska, Wisconsin
- ²- US Geological Survey, Upper Midwest Environmental Sciences Center, La Crosse, Wisconsin
- ³- US Geological Survey, National Wildlife Health Center, Madison, Wisconsin
- ⁴- University of Wisconsin, Madison, Wisconsin
- ⁵- US Fish and Wildlife Service, Virginia Field Office, Abingdon, Virginia
- ⁶- Xerces Society for Invertebrate Conservation, Portland, Oregon
- ⁷- Wisconsin Department of Natural Resources, Mussel Monitoring Program, Madison, Wisconsin

Unexplained mortality events have confounded the mussel conservation community for over 30 years. While the effects of chemical pollutants and environmental factors have been examined, few investigations have focused on the identification of potential mussel pathogens. Consequently, very little is known regarding the impact that pathogens have on freshwater mussel health, especially as they pertain to propagation efforts. There are several barriers that have hindered progress in the study of freshwater mussel disease, one of which is lack of appropriate diagnostic tools, and another is lack of guidance for field personnel regarding sampling procedures and laboratory contacts.

A mortality event has been recurring in the Clinch River in Tennessee and southwestern Virginia since 2016 (J. Richard. 2018. *Ellipsaria* 20(1):1-3). This event was the impetus for the development of a standardized sampling plan with the overall goal of identifying potential unionid pathogens that could be further investigated for their role in mortality events, including the development of countermeasures. To this end, we assembled a multi-agency, multi-disciplinary team to identify any etiological agent(s) associated with this ongoing mortality event. We are using an epidemiological approach to characterize temporal and spatial profiles of mussels from affected and unaffected sites along the Clinch River. Nonlethal hemolymph samples are being collected and screened for the presence of pathogens using metagenomic analysis as well as traditional culture-based methods. Metabolomic assays are also being employed to identify disease markers, and a subsample of mussels is being examined using histopathological techniques.

Using the same sampling and diagnostic approach, this effort has been expanded to include three additional mussel die-off sites. In late September 2018, the Wisconsin Department of Natural Resources (WIDNR) found unusually high mussel mortality during annual monitoring of snuffbox (*Epioblasma triquetra*) habitat in the Embarrass River in north-central Wisconsin. The Embarrass River contains one of few remaining populations of the federally endangered snuffbox mussel in the Midwest United States. The WIDNR contacted the US Geological Survey National Wildlife Health Center in Madison, Wisconsin, which triggered notification of our response team. Due to the proximity of the Embarrass River, we were able to collect samples on-site during a period of active mortality (Figure 1).



Figure 1. *Lampsilis cardium* from the Embarrass River, Wisconsin, displaying signs of stress. Photograph by Jesse Weinzinger, WIDNR

Similarly, in the Pacific Northwest, two other mussel mortality events have been recurring for several years in the Crooked and Chehalis rivers, in Oregon and Washington, respectively. The Xerces Society collected samples from affected and unaffected rivers and tributaries and shipped them to the La Crosse Fish Health Center for diagnostic analysis (Figure 2).

The four mortality events that we are currently investigating vary widely in geography, mussel fauna, habitat characteristics, and epidemiologic features. Through the application of standardized sampling strategies and diagnostic techniques, we hope to build a reference database on the normal microbiota of mussel communities and begin to unravel potential causative agents of mortality across diverse systems. Additionally, we hope to build regional response networks that interconnect agencies and diagnostic laboratories.

To facilitate communication about ongoing disease events, our mussel mortality response team is requesting that field biologists report incidents of sick, dying, or large numbers of dead mussels. The intent is to create a common notification network and a link between those who may observe mortality events and those in laboratories who

are performing diagnostic assays, in an effort to identify causes of disease in unionid mussels. To report a mussel mortality event and/or submit samples, send an email with basic information regarding the event to: Eric Leis, email: eric.leis@fws.gov, and/or Susan Knowles, email: sknowles@usgs.gov. A response email will be sent with the appropriate forms and shipping instructions. We also encourage the reporting of mortality events on the national WHISpers database: <https://www.nwhc.usgs.gov/whispers/>

Additionally, as part of our efforts to better understand mussel mortality events, we have compiled information and case reports on prior die-off events as far back as the 1970's. If you know of a mussel mortality event that has occurred at any time in the past and would be willing to share this information, please contact Jordan Richard (email: jordan_richard@fws.gov). Even if you have little or no documentation about the event, no amount of information is too small. Our case database includes both undiagnosed mortality events and kills from known spills, contamination issues, etc., and all information is valuable.



Figure 2. Empty shells of the Western Pearlshell, *Margaritifera falcata*, scatter the bottom of the Chehalis River, Washington, where a mussel die-off is occurring. Photograph by Emilie Blevins, Xerces Society.

***Ligumia subrostrata* Host Fishes and Geospatial Associations**

**Cameron Swanson¹, Mark Hove^{1,2}, Alex Franzen¹, Daniel Hornbach²,
Mike Davis³, and Bernard Sietman³**

¹ University of Minnesota, St. Paul, Minnesota 55108, corresponding author - mark_hove@umn.edu

² Macalester College, St. Paul, Minnesota, 55105

³ Minnesota Department of Natural Resources (DNR), Lake City, Minnesota 55041

Much of the research on the Pondmussel *Ligumia subrostrata* (Say, 1831), a species considered Threatened in Minnesota, has focused on its statewide distribution and host fishes. Seeking to continue this research, we identified host fishes both through laboratory suitability trials and by collecting potential naturally-infected host fishes from the Rock River in southwest Minnesota. We, then, studied geospatial patterns in land use, the distribution of *L. subrostrata*, and associated host fish species.

We followed standard methods to identify glochidial hosts for *L. subrostrata* in the Rock River, (Hove *et al.*, 2016a). For naturally-infected fishes, we measured all or a subset of the juveniles released from each fish species we examined. Glochidial shell dimensions of unknown juveniles were measured from scanning electron micrographs using Digimizer (v. 5.0.0) and discriminant analysis (JMP® v. 12) was used to compare them to measurements of known glochidia for mussel species recorded from the Rock River (Sietman 2003). Mussel and fish nomenclature follows Williams *et al.*, (2017) and Page *et al.*, (2013), respectively.

We identified three potential hosts for *L. subrostrata* in laboratory trials: *Salvelinus fontinalis*, *Esox lucius*, and *Sander vitreus*, which released small numbers of juveniles (Table 1). The following fishes also were tested but did not release any juvenile mussels (number of trials, number of fish inoculated): *Lepisosteus osseus* (1, 1), *L. platostomus* (1, 4), *Carassius auratus* (1, 4), *Cyprinus carpio* (1, 1), *Rhinichthys atratulus* (1, 7), *R. cataractae* (1, 12), *Semotilus atromaculatus* (1, 7), *Salmo trutta* (1, 1), *Aphredoderus sayanus* (1, 11), *Lota lota* (1, 3), and *Sander canadensis* (1, 4).

Table 1. *Ligumia subrostrata* host suitability trial results from the laboratory study.

Fish species that did release juvenile mussels	Number of fish inoculated	Number of fish survived	Glochidia attachment period (days)	Number of juveniles collected
<i>Salvelinus fontinalis</i>	7	4	22-31	7
<i>Esox lucius</i>	2	2	22	3
<i>Sander vitreus</i>	3	2	9	1

We recovered juveniles of three mussel species from naturally-infected Rock River fishes. Glochidial valves of these juveniles varied greatly in size and shape between species (Table 2), allowing us to separate species visually and confirm identifications using discriminant analyses with 100% probability. Juvenile *Ligumia subrostrata* were released by *Lepomis cyanellus* and *L. humilus*; *Toxolasma parvum* juveniles were released from *L. cyanellus*, *L. humilus*, *L. macrochirus*, and *Fundulus sciadicus*; and juveniles of *Strophitus undulatus* were released from *Semotilus atromaculatus* (Table 2).

We examined geospatial data and *L. subrostrata* distribution records in the Rock River drainage. Geospatial data were aggregated to HUC 12 units from the Watershed Boundary Dataset (<https://datagateway.nrcs.usda.gov/>). Occurrences of live *L. subrostrata* from the Minnesota DNR's statewide mussel survey were tested for association with several variables including: presence of known host fishes from the genus *Lepomis*, presence of large, potentially molluscivorous fishes (*Ictiobus* spp., *Moxostoma* spp., *Ictalurus punctatus*, and *Aplodinotus grunniens*), land use, stream slope, compliance with the 2015 Minnesota buffer law, and fish IBI scores.

Results of the analysis indicated that live *L. subrostrata* were less likely to be found in areas with a higher percentage of cultivated crops. Analysis of the geospatial data in the Rock River drainage also indicated that the percentage of land in cultivation was correlated with the percentage of land in wetlands ($r=-0.51$, $p=0.023$), the percentage of land in buffer compliance ($r=0.53$, $p=0.015$), and stream slope ($r=-0.74$, $p=0.0002$). When we conducted a nominal logistic regression using percentage of land in cultivation, HUC 12 area, fish IBI score, and presence of known host *Lepomis* spp., the results indicated that the percentage of land in cultivation had a statistically significant negative impact ($\chi^2=5.7$, $p=0.017$) on the occurrence of live *L. subrostrata*, while HUC 12 area had a nearly significant positive impact ($\chi^2=2.9$, $p=0.088$).

In conclusion, this study confirmed that sunfishes (*Lepomis* spp.) are hosts for *L. subrostrata* (Hove *et al.*, 2016b, Tillery *et al.*, 2017), and that land use likely influences *L. subrostrata* distribution in the Rock River basin.

Table 2. Identifications of juvenile mussels released by naturally-infected fishes from the Rock River, Minnesota. Reference Glochidia source codes: CC - Chanarambie Creek (Rock River watershed), RR - Rock River, Pipestone County (CO), KaC - Kanaranzi Creek (Rock River watershed), Rock CO; KoC - Kohlman Creek, Ramsey CO; SC - St. Croix River, Chisago CO; and SR - Sunrise River, Chisago CO. Dimension units are in microns, mean (μ) \pm 1 standard deviation (range).

Species	Source	Glochidia shell height	Glochidia shell length	Glochidia hinge length	Juvenile mussels collected, number measured, and species identification*
Reference Glochidia					
<i>Ligumia subrostrata</i>	RR	275 \pm 9 (260-296)	212 \pm 6 (197-221)	128 \pm 5 (120-148)	
<i>Toxolasma parvum</i>	KoC, CC, KaC	199 \pm 9 (168-212)	177 \pm 10 (156-197)	100 \pm 7 (83-115)	
<i>Strophitus undulatus</i>	SC, SR	300 \pm 10 (281-325)	366 \pm 16 (336-402)	271 \pm 18 (236-309)	
Juvenile mussels released by naturally-infected fishes					
<i>Lepomis cyanellus</i>	RR	274 \pm 8 (268-280) 197 \pm 7 (191-205)	203 \pm 7 (198-203) 168 \pm 4 (164-172)	122 \pm 4 (119-124) 95 \pm 6 (90-105)	68 (2) <i>L. subrostrata</i> 238 (5) <i>T. parvum</i>
<i>L. humilus</i>	RR	252 193 \pm 6 (185-199)	199 168 \pm 4 (163-174)	123 93 \pm 4 (89-98)	2 (1) <i>L. subrostrata</i> 54 (5) <i>T. parvum</i>
<i>L. macrochirus</i>	RR	193 \pm 3 (191-195)	164 \pm 2 (162-165)	89 \pm 3 (87-91)	9 (2) <i>T. parvum</i>
<i>Fundulus sciadicus</i>	RR	190 \pm 5 (182-198)	162 \pm 6 (153-172)	91 \pm 7 (79-98)	115 (15) <i>T. parvum</i>
<i>Semotilus atromaculatus</i>	RR	316	374	287	1 (1) <i>S. undulatus</i>

* Number collected (number measured)

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Moving at a Snail Pace: Sighting of Globally Invasive *Physella acuta* (Draparnaud, 1805) in Budhabalanga River, India (Gastropoda, Physidae)

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The freshwater mollusc *Physella acuta* (synonyms, *Physa acuta*) belongs to the family Physidae and is widely distributed throughout the globe. This species is reported to be native to North America and seems to have spread over other parts of the world via Mediterranean region to the Europe and rest of the world (Dillon *et al.* 2002, Taylor 2003, Ali 1993, Semenchenko *et al.* 2008). In India, the first report of *Physella acuta* was in 1995 (Raut *et al.* 1995), when the family Physidae was known only from the fossil records (Subba Rao, 1989). Later, this species was reported from other parts of the country *viz.* Manjari River, Maharashtra (Subba Rao *et al.* 1994), Delhi (Surya Rao *et al.* 1997); Kolkata [=Calcutta], Bardwan (Raut *et al.* 1995, Saha *et al.* 2006); Assam (Devi *et al.* 2008); Kangra, Himachal Pradesh (Biswas *et al.* 2015); Himayatsagar and Osmansagar in Andhra Pradesh (Karuthapandi *et al.* 2013) and Chandigarh (Kumar *et al.* 2018) both from lentic and lotic freshwater ecosystems.

During a malacological survey in 2017-2018, the authors collected four examples of *Physella acuta* (Draparnaud, 1805) for the first time from the Budhabalanga River (Lat. 21.915146°, Long. 86.726864°) in Odisha state of India. The species was found along with other species of the families Lymnaeidae [*Radix rufescens* (Gray, 1822)], Viviparidae [*Filopaludina bengalensis* (Lamarck, 1822)], Planorbidae [*Idiopoma dissimilis* (Müller, 1774)], Thiaridae [*Tarebia granifera* (Lamarck, 1816), *Melanoides tuberculata* (Müller, 1774)] and also along with some Bivalvia species. The specimens were brought to the Zoological Survey of India laboratory, where they were identified to species level and deposited in the National Zoological Collections of the Malacology Division (ZSI M 32230/8). The identification of the species was done based on the external shell characters. The shell is small to moderate in size, sinistral, moderately thick, smooth and polished, elongate-ovate, the apex is pointed (some time eroded, as in Figure 1), large body whorl, spire short, the suture impressed, the parietal callus wide, and the columellar fold is well marked.



Figure 1. Photographs of *Physella acuta* collected from Budhabalanga River, India.

Since *Physella acuta* is a native of North America, the possible dispersal route to India could be through International goods trade, aquarium trade, or by human intension, as evident from the previous reports of the species occurrence are near seaports, airports, or business hubs of the country. According to Kumar *et al.* (2018) *P. acuta* has the tendency of wide tolerance of the environment condition and being a hermaphrodite, is able to produce excessive offspring and thereby better survive in harsh environmental conditions. The reporting of *Physella acuta* from Budhabalanga River in Odisha is a not only a new record from Odisha, but also indicates it is widening its range to Eastern Ghats landscape of India, and which was not known previously. Future population studies and bio-monitoring of freshwater habitats should be conducted to understand the impact of *P. acuta* on the native biodiversity.

Acknowledgements

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An Endemic Cochliopidae from Ecuador

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Recent ecological fieldwork in the Rio Cayapas basin, Esmeraldas Province, Ecuador, during 2016-2017 turned up an intriguing medium sized operculate freshwater gastropod. After much discussion with friends, Harry Lee provided the identification as *Lithococcus multicarinatus* (Miller, 1878), belonging to the Cochliopidae in the Rissooidea. A copy of the original figure by Miller (1879: plate 15, fig 4) is provided here (Figure 1) along with a photograph of a modern specimen (Figure 2). Pilsbry (1911:602) described *Lithococcus* with *Lithoglyphus multicarinatus* as the type species from the Rio Cayapas, Ecuador, and observed it was abundant on rocks.

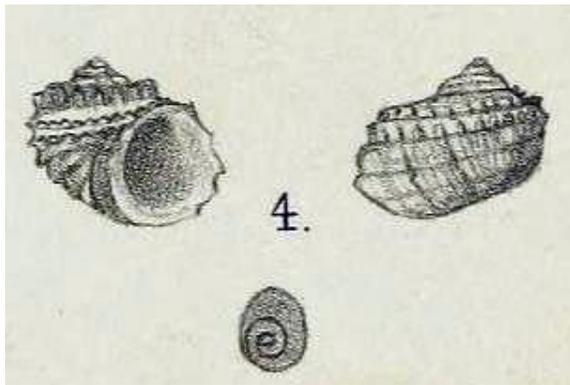


Figure 1. Original figure of *Lithoglyphus multicarinatus* in Miller 1879: plate 15 fig. 4.



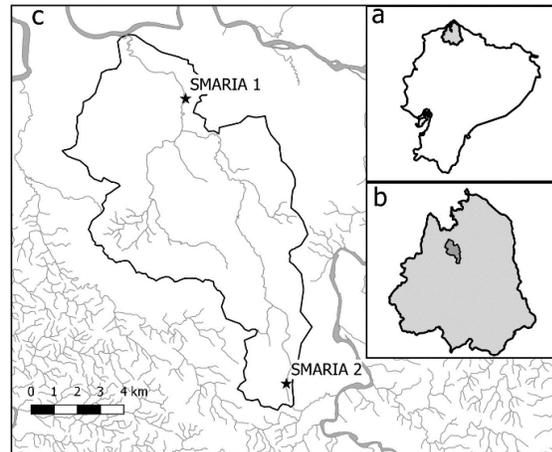
Figure 2. Photograph of a modern specimen of *Lithococcus multicarinatus* CEMZ-M-001. Total height 9.2 mm.

Hershler and Thompson (1992:61-64) placed *Lithococcus* Pilsbry, 1911 in the Cochliopinae, Hydrobiidae and recognized 3 species. They provided information and figures of the anatomy, shell, operculum, radula and listed the range of *Lithococcus* as “Pacific coastal streams from the Rio Baru, Costa Rica south to the Rio Santiago basin in northwest Ecuador.” This includes the Rio Cayapas, Esmeraldas Province, Ecuador. Liu et al. (2001) confirmed the phylogenetic position of *Lithococcus* within the Cochliopinae using molecular data. Bouchet and Rocroi (2005) and Bouchet et al. (2017) recognized the Cochliopidae as a family based on previous molecular work. The World Register of Marine Species (WoRMS, 2018) recognized *Lithococcus* as containing four species in the Cochliopidae.

The known distribution of *Lithococcus multicarinatus* is the Santa María stream, a small third order stream with a 69 km² watershed (Figure 3). The area is sparsely populated, but 50 % of the watershed has been converted to pasture land and other agricultural uses (calculations based on MAG, 2016). There was intensive illegal gold mining in the Santa María watershed during the 1990’s, but no mining activities have been observed during the last 10 years and monitoring data (unpublished) indicate a recovery of water quality to levels that are like undisturbed watersheds in the area. *Lithococcus multicarinatus* was found in two low gradient reaches with bed substrates ranging from cobbles to thick gravel out of 18 sites sampled in the Santiago-Cayapas watershed.

Figure 3.

- Location of the Santiago-Cayapas watershed in Ecuador,
- Location of the Santa María watershed in the Santiago-Cayapas watershed,
- Locations (at stars) where specimens of *Lithococcus multicarinatus* were found.



Most freshwater gastropods have smooth shells as an adaptation to fast flowing waters. However, *Lithococcus multicarinatus* is characterized by a rugged shell that is densely covered with filamentous algae which is likely to provide some camouflage against predation at the cost of limiting its distribution to slow flowing waters. It is adapted to warm water (26.4-30.2 °C) with low conductivity (75-82 $\mu\text{S cm}^{-1}$), circumneutral pH (7.0-7.9) and low turbidity (4-10 FAU). *Lithococcus multicarinatus* tolerates an ample range of oxygen concentrations from undersaturation (5.8 mg $\text{O}_2 \text{ l}^{-1}$, 70 % saturation at SM1, Figure 4a) caused by moderate organic pollution to supersaturation (9.3 mg $\text{O}_2 \text{ l}^{-1}$, 120 % saturation at SM2, Figure 4b) caused by algal growth after removal of the riparian canopy.



Figure 4. The two sampling locations in the Santa María stream where *Lithococcus multicarinatus* was found.

Currently, *Lithococcus multicarinatus* is listed as being of least concern by the International Union for Conservation of Nature and Natural Resources (IUCN; Correoso, 2016). However, given its limited distribution and the threat of habitat losses due to increasing mining activities in the Cayapas and Santiago watersheds (PUCESE 2012), it would be desirable to change its conservation status to data deficient or near threatened and an examination of the lower Cayapas and Santiago watershed be conducted to better establish its current distribution area.

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First Confirmed Record of the Freshwater Exotic Snail *Lymnaeidae Galba truncatula* (Müller, 1774) in Santa Catarina State/ SC, Central Southern Brazil

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Up until now, the little freshwater snails in the family Lymnaeidae have been represented in the geographic territory of Santa Catarina State/ SC by only three species: two native species (one endemic), and one exotic form (Agudo-Padrón 2018a). On September 6, 2018, the second author forwarded for determination some photographs of two singular little limnic snails (Figure 1).

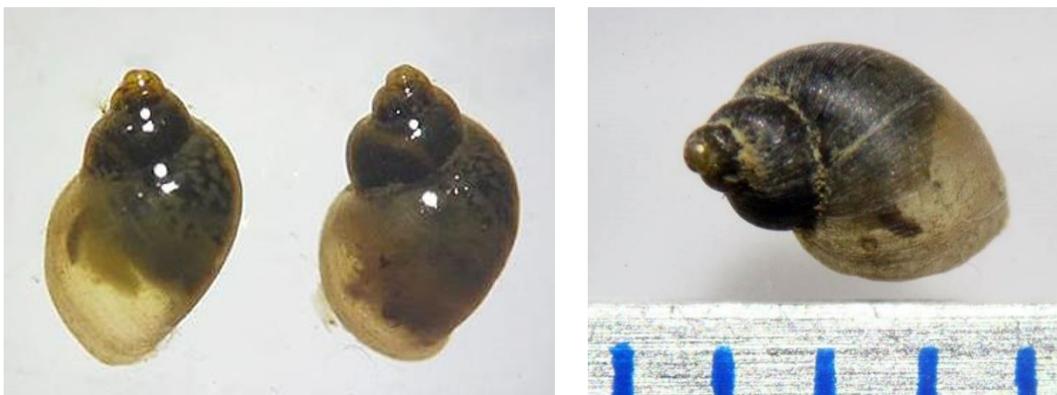


Figure 1. Specimens of non-native/ exotic European freshwater snail *Galba* (- *Lymnaea*) *truncatula* (Müller, 1774) found in Rio Benedito (Benedito River) hydrographic microbasin. Photographs by Francisco Carneiro.

These specimens were found in a riverside sector of the hydrographic microbasin Rio Benedito (Benedito River) (26°47'02.59"S; 49°25'16.99"W), located in the Benedito Novo Municipal District in the Blumenau Micro-region, a part of the Itajaí Basin Valley (Figure 2). This Basin has been identified as Malacological Region 6 of Santa Catarina State/ SC, Central Southern Brazil (Agudo-Padrón 2018a: 58) is the geographic space in the State with great representation of non-marine mollusks and environmental interest due to its peculiar geographical and ecological characteristics.



Figure 2. Location (map – red color) of the Benedito Novo Municipal District in the Itajaí Basin Valley region of Santa Catarina State/ SC, and the site in the Rio Benedito Microbasin where the *Galba* (- *Lymnaea*) *truncatula* specimens were found. Photograph by Francisco Carneiro.

These shells were collected with the aid of a Surber Sampler for Benthos in a rocky environment with sandy bed/ substrate (Figure 2) during a biotic sampling campaign held in the area of the local small hydroelectric power plant Pequena Central Hidrelétrica (PCH) Alto Benedito Novo 1. Sympatric malacofauna occurring in the locality included the Pysidae *Physella* (- *Physa*) *acuta* (Draparnaud, 1805), another alien species previously verified in the State territory (Agudo-Padrón 2018b).

The specimens were finally confirmed as non-native/ exotic freshwater snails Lymnaeidae *Galba* (- *Lymnaea*) *truncatula* (Müller, 1774), a European invasive species with medical/ sanitarian interest. It is known to be a host/ vector of the veterinarian (mainly) parasitic disease Fascioliasis, caused by liver flukes *Fasciola hepatica* (Medeiros *et al.* 2014).

The specimens have been deposited in the Malacological Collection of the Regional University Foundation of Blumenau - FURB", Blumenau/ SC (~ vouchers FURB MO 354 and MO 355).

A previous report exists for "*Galba* sp" from an unspecified locality (Campos Novos Municipal District ?) in the Santa Catarina Highlands, Malacological Region 4 of the State (Medeiros *et al.* 2014:248, Figure 3). Thus, the present report represents the first confirmed geographical record of this non-native freshwater snail species in the geographical territory of Santa Catarina State/ SC This raises to ten the number of regional known amphibious and limnic exotic forms, and to 33 the total number of alien species listed, and to 234 the general inventory of continental/ non-marine mollusks known from the State (Agudo-Padrón 2018a).

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**About the Spatial Advancement of the Invasive Asiatic Golden Mussel
Limnoperna fortunei (Dunker, 1857) in Santa Catarina State/ SC, Central
Southern Brazil: A New Geographical Record**

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The problematic biofouling organism known as the Asiatic golden mussel Mytilidae *Limnoperna fortunei* (Dunker, 1857), is today a formal member of the regional non-marine malacofauna in the territory of the State of Santa Catarina/ SC (Agudo-Padrón 2018^a and b). Since the confirmation of its occurrence in the watershed of the Upper Uruguay River to six years ago, in 2012 (Agudo-Padrón 2012; Agudo-Padrón and Porto Filho 2013; Agudo-Padrón 2016b), the spread of this mussel has been systematically monitored by us both directly in the field as through of reports provided by opportune collaborators, being this last the following case.

On July 3, 2018, Marieli Cristina Scartezini, a local professional biologist, requested the identification of a small limnic bivalve mollusk (random sample, found in a dense colony) illustrated in a field photograph (Figure 1). These animals were found within the Municipality of São Carlos, Western region of the State (27°05'00"S ; 53°01'00"W), in a section of the Upper Uruguay River Basin. This site is a few kilometers downstream from the mouth of the Chapecó River, an important tributary of the Uruguay. The region has a rugged geographical terrain, is very anthropized (Agudo-Padrón 2016a:31), and the natural surrounding vegetation has been practically fully replaced by temporary crops (Figure 2).



Figure 1. Specimen of non-native/ exotic Asiatic golden mussel *Limnoperna fortunei* (Dunker, 1857) (left) and alien Corbiculid shells (right), all found in riverside of the Upper Uruguay River Basin in São Carlos Municipal District, Western region of Santa Catarina State/ SC. Photographs by Marieli Cristina Scartezini.

The species was immediately confirmed by us as typical of the exotic invasive Asiatic golden mussel *Limnoperna fortunei* (Dunker, 1857), confirming once again our forecasts for the region (Agudo-Padrón 2016). Other malacofauna found occurring in the locality included the freshwater clams Cyrenidae *Corbicula fluminea* (Müller, 1774) and *Corbicula largillierti* (Philippi, 1844) (Figure 1), two other "alien" species previously verified in the region and State in general (Agudo-Padrón 2018 b).

Recognized globally, invasive alien forms are the second major cause of the extinction of native species, immediately behind the destruction of habitats by human/ anthropic intervention. Unfortunately, in Santa Catarina State/ SC, this worrisome situation results increasingly evident, in rampant form (Agudo-Padrón 2018 b). The future of our still little-known native and endemic continental mollusks really is uncertain !



Figure 2. Location (map – red color) of the São Carlos Municipal District in the Upper Uruguay River Basin, Western region of Santa Catarina State/ SC. The collection point was at the yellow mark on the vicinity map. Local environmental aspects are shown in the lower figures taken by Marieli Cristina Scartezini.

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Ellipsaria is posted on the FMCS web site quarterly: around the first of March, June, September, and December. This newsletter routinely includes Society news, abstracts, meeting notices, pertinent announcements, informal articles about ongoing research, and comments on current issues affecting freshwater mollusks. Anyone may submit material for inclusion in *Ellipsaria* and all issues are accessible to anyone on the FMCS website (<http://molluskconservation.org>).

Information for possible inclusion in *Ellipsaria* should be submitted via e-mail to the editor, John Jenkinson, at jjjenkinson@hotmail.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 documents but the editor may be able to convert other formats. Graphics should be in a form that can be manipulated using PhotoShop. Please limit the length of informal articles to about one page of text. Note that submissions are not peer reviewed but are checked for clarity and appropriateness for this freshwater mollusk newsletter. Feel free to contact the editor with questions about possible submissions or transmission concerns.

FMCS Standing 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 Shot



At the FMCS 8th Biennial Symposium in Guntersville, Alabama, Andrew Henderson and Rachael Hoch danced together to bluegrass music during the Social which sparked a romance that spanned Tennessee and North Carolina. Five years later, they got married on November 3, 2018. Rachael and Andrew felt they should pay homage to the aquatic animals that brought them together, so they consulted with cake topper artist Emily Tomasik and their baker and friend Alyse Baca to design the top of their wedding cake in the form of a Blotchside Logperch and Wavy-rayed Lamprussel demonstrating their relationship. The photographer, Rachael Hoch, along with her husband, Andrew Henderson, would like to express their thanks to FMCS for bringing them together for a lifetime of loving each other and our mollusks!

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 jjjenkinson@hotmail.com.



BY-LAWS OF

THE FRESHWATER MOLLUSK CONSERVATION SOCIETY

A MISSOURI GENERAL NOT-FOR-PROFIT CORPORATION

INTRODUCTION

The name of this organization shall be the Freshwater Mollusk Conservation Society (Society). This Society shall be an independent non-profit scientific and professional organization.

ARTICLE I

PURPOSES AND RESTRICTIONS

1.1 The purposes of the Society shall be those non-profit purposes stated in the Articles of Incorporation, as amended. No part of the net earnings or other assets of the Society shall inure to the benefit of, be distributed to or among, or revert to any director, officer, contributor or other private individual having, directly or indirectly, any personal or private interest in the activities of the Society, except the Society may pay reasonable compensation for services rendered and may make payments and distributions to further the non-profit purposes stated in the Articles of Incorporation.

1.2 This Society is organized and may be operated for any and all lawful purposes authorized by the State of Missouri. However, said purposes shall be limited to the purposes of a non-profit organization league within the meaning of Section 501(3)(c) of the Internal Revenue Code of 1986, as amended (or the corresponding provisions of any future United States Internal Revenue law). Said purposes shall include, but shall not be limited to, activities in accord with the following general objectives:

- A. Advocate freshwater mollusk conservation.
- B. Serve as a source and conduit of information on freshwater mollusks.
- C. Promote science-based management of freshwater mollusks.
- D. Promote and facilitate education about and awareness of freshwater mollusks and their importance to freshwater ecosystems.
- E. Facilitate implementation of the *National Strategy for the Conservation of Native Freshwater Mussels and Snails*, and any similar strategy developed for the conservation of other freshwater mollusks.

1.3 Notwithstanding any other provision of these By-laws, the Society shall not substantially carry on any other activities not permitted to be carried on by a corporation exempt from federal income tax under Section 501(3)(c) of the Internal Revenue Code of 1986, as amended.

1.4 The Society may seek outside funding through all lawful means consistent with the laws governing non-profit corporations.

ARTICLE II

OFFICES

2.1 The principal office of the Society in the State of Missouri shall be located in the City of O'Fallon. The Society may have such other offices within or without the City of O'Fallon as may be required.

2.2 The registered office of the Society required under the laws of the State of Missouri to be maintained in the State of Missouri may be, but need not be, identical with the principal office in the State of Missouri, and the address of the registered office may be changed from time to time in conformity with the laws of the State of Missouri.

2.3 The registered agent of the shall be appointed by the Executive Committee and shall maintain a permanent Society address in the state of incorporation. The registered agent will assist the Secretary and Treasurer in maintaining the Society as an incorporated, non-profit organization.

ARTICLE III

MEMBERSHIP

3.1 Classes of Members. Members shall have the specific rights and obligations with respect to voting, dissolution, redemption and transfer, as described in these By-laws. The Board of Directors shall determine if the prospective member does in fact qualify.

3.2 Qualification. The Society may have more than one class of members and shall consist of: Regular, Student, Retired, Lifetime, and Contributing members. All persons satisfying the following qualifications shall be eligible for membership in the Society upon payment of the requisite membership dues:

A. Regular Members:

Qualifications

Must:

- a) share the stated purpose of the Society
- b) pay member dues

Benefits:

May:

- a) vote in Society affairs
- b) hold office and/or serve on the Board of Directors
- c) participate in Society functions, programs, and activities

B. Student Members:Qualifications

Must:

- a) share the stated purpose of the Society
- b) be a student showing promise of becoming qualified for Regular Member status at a later date
- c) pay Student member dues

Benefits

May:

- a) vote in society affairs
- b) apply for Active Member status
- c) participate in Society functions, programs, and activities

C. Retired Members:Qualifications

Must:

- a) share the stated purpose of the Society
- b) be retired from a career position and have been a Regular or Contributing Society member in the past
- c) pay Retired member dues

Benefits

May:

- a) vote in Society affairs
- b) hold office and/or serve on the Board of Directors
- c) participate in Society functions, programs, and activities

D. Lifetime Members:Qualifications:

Must:

- a) share the stated purpose of the Society
- b) have paid the life-time membership fee

Benefits:

May:

- a) vote in Society affairs
- b) hold office and/or serve on the Board of Directors
- c) participate in Society functions, programs, and activities

E. Contributing Members:Qualifications

Must:

- a) share the stated purpose of the Society
- b) provide support to the Society
- c) have paid the contributing member fee

Benefits

May:

- a) be acknowledged by the Society for support in newsletters, annual programs, and activities
- b) vote in Society affairs
- c) hold office and/or serve on the Board of Directors
- d) participate in Society functions, programs, and activities

F. Membership to all membership classes requires the payment of dues or support as determined by the Society. Regular, Student, Retired, Lifetime, and Contributing Members constitute the voting membership of the Society and Regular, Retired, Lifetime, and Contributing Members may hold office.

G. The Board of Directors shall determine the manner of fixing a date as the record date for determining the members eligible to have notice of a members' meeting. The record date may not be more than one hundred (100) days before the meeting or action requiring a determination of who are the Active Members.

3.3 Dues. The Directors shall establish the dues necessary to become a member of the Society. Each year at their annual meeting the Directors shall fix the amount of such membership dues.

3.4 Resignation. A Member may resign from the Society by delivering his written resignation to the President, Treasurer or Secretary of the Society at its principal office, or may resign by failure to pay dues within 180 days of the date set for the payment of the membership dues. Such resignation shall be effective upon receipt, unless specified to be effective at some other time, and acceptance thereof shall not be necessary to make it effective unless it so states.

3.5 Annual Meetings. Annual meetings of the members shall be held at a time fixed by the Board of Directors. The Board of Directors shall schedule an annual meeting of the voting members by giving the voting members at least 90 days written notice. The annual meeting may be held at the principal office of the Society or at such other place, either within or without the State of Missouri, as the Board of Directors shall determine.

At this meeting, there shall be a business meeting open to all members for reports of officers, for a report on the election of officers, reports of the Standing Committees and other items of business.

3.6 Special Meetings. Special meetings of the members may be held at any time and at any place, either within or without the State of Missouri, as designated in the notice of special meeting. Special meetings of the members may be called by the President or by the Directors.

Call and Notice of Special Meetings. Written notice stating the place, day and hour of a special meeting of members and the purpose or purposes for which the meeting is called, shall be delivered not less than five nor more than 40 days before the date of the special meeting, either personally, by mail, or by electronic mail. If the notice is mailed, such notice shall be deemed to

be delivered on the date transmitted by electronic mail or facsimile or deposited in the United States mail with postage prepaid, addressed to the member at his address as it appears on the records of the Society.

3.7 Quorum. At any meeting of the members ten percent (10%) of the members then in good standing, whether present in person or duly represented, shall constitute a quorum. Any meeting may be adjourned to such date or dates not more than seven (7) days after the first session of the meeting by fifty percent (50%) of the votes cast upon the question, whether or not a quorum is present, and the meeting may be held as adjourned without further notice.

3.8 Action by Vote. Each member shall have one vote. When a quorum is present at any meeting, fifty percent (50%) of the votes properly cast by members present in person or duly represented shall decide any question, excluding the election of any officer, unless otherwise provided by law, the Articles of Incorporation, or these By-laws.

3.9 Action by Writing. Any action required or permitted to be taken at any meeting of the members may be taken without a meeting if the procedure used for proposing amendments to these By-laws is followed. This procedure is found in Article 8, "Amendments." The procedure for action by writing also has these additional requirements: All solicitations for votes by written ballot shall: (1) Indicate the number of responses needed to meet the quorum requirements; (2) State the percentage of approvals necessary to approve each matter other than election of Directors; and (3) Specify the time by which a ballot must be received by the Society in order to be counted.

3.10 Transfer of Membership. No member of the Society may transfer their membership to another individual person or entity. A member in good standing may request the Board of Directors to change their class of membership.

3.11 Membership Certificates. The Board of Directors may issue to the members certificates from the Society evidencing membership in the Society. If so, the certificate shall be signed by an officer of the Society. The certificate shall also designate the class of the member.

3.12 Code of Conduct. Society members and attendees of Society-sponsored symposia, workshops, meetings, or other Society activities (events) are expected to adhere to the Society Code of Conduct. The Society is committed to providing a safe, productive, and welcoming environment for all participants and staff. All participants including, but not limited to, members, guests, attendees, speakers, volunteers, exhibitors, and service providers are expected to abide by this Code of Conduct.

3.13 Suspension or Removal. The FMCS Executive Committee reserves the right to take any lawful action deemed necessary in response to a violation of the Code of Conduct. This includes, but is not limited to, the immediate removal of the violator from the event without warning or refund. The FMCS Executive Committee may also elect to suspend the violator from future events. Repeated violations could result in loss of FMCS membership and a permanent ban on attendance at FMCS events.

Failure to adhere to the Code of Conduct is cause for removal from an event and/or suspension from membership in FMCS at the discretion of the Executive Committee. A Member may be suspended or removed from FMCS membership with cause by vote of two-thirds of the Board of Directors only after reasonable notice and an opportunity to be heard.

ARTICLE IV

HONORARY MEMBERS, SPONSORS, BENEFACTORS, CONTRIBUTORS, ADVISERS, FRIENDS OF THE SOCIETY

The Directors may designate, award, or honor certain persons or groups of persons as honorary members, sponsors, benefactors, contributors, advisers or friends of the Society or such other title as they deem appropriate. Such persons shall serve in an honorary capacity and, except as the Directors shall otherwise designate, shall in such capacity have no right to notice of or to vote at any meeting, shall not be considered for purposes of establishing a quorum, and shall have no other rights or responsibilities.

ARTICLE V

BOARD OF DIRECTORS

5.1 Management. The affairs of the Society shall be managed by a self-perpetuating Board of Directors consisting of not less than three (3) nor more than twenty-one (21) persons (as decided, from time to time, by the Board of Directors) elected by a majority of the Board in a manner specified in Section 5.3 hereof.

The affairs of the Society shall be managed by the membership through the Board of Directors in accordance to the By-laws.

5.2 Qualifications and Number of Directors. The number of Directors may be increased or decreased, but to no fewer than three, from time to time by amendment to the Articles or By-laws. A Director must be a member in good standing.

The Board of Directors shall consist of the President as the presiding officer, the President-Elect, Past President, Secretary, and Treasurer (Executive Committee), and Chairs of Functional and Technical Committees defined in the By-Laws. Committee chairs are to be selected by members of that committee at the biennial symposium held in odd numbered years and shall hold no more than three consecutive terms. A committee may have subcommittees and subcommittee chairs, but that committee has only one vote on the Board of Directors. A person may be Chair of only one Committee at any given time.

The Board of Directors shall determine the number, times and places of full Society meetings.

The first slate of officers will be selected by the Board of Directors.

5.3 Term and Election of Directors. Each Director shall consist of officers as per Article VI.

5.4 Tenure. Each Director shall hold office until the next biennial meeting of members and until his successor is elected and qualified, or until he sooner dies, resigns, is removed or becomes disqualified.

5.5. Vacancies occurring on the Board of Directors, including vacancies due to an increase in the number of directors, may be filled by the Directors then in office. Any Director may succeed himself or herself indefinitely. Each successor shall hold office for the unexpired term or until he sooner dies, resigns, is removed or becomes disqualified. The Directors shall have and may exercise all of their powers notwithstanding the existence of one or more vacancies in their number.

5.6 Suspension or Removal. A Director may be suspended or removed with or without cause by vote of two-thirds of the members. A Director may be removed with cause only after reasonable notice and opportunity to be heard.

5.7 Resignation. A Director may resign by delivering his/her written resignation to the President, Treasurer or Secretary of the Society, to a meeting of the Members or Directors or to the Society at its principal office. Such resignation shall be effective upon receipt, unless specified to be effective at some other time, and acceptance thereof shall not be necessary to make it effective unless it so states.

5.8 Meetings. The Annual Meeting of the Board of Directors shall be held at a time fixed according to the By-laws. These By-laws provide the Chairperson of the Board of Directors shall schedule an annual meeting by giving the members of the Board of Directors at least 90 days written notice. The annual meeting may be held at the principal office of the Society or at such other place, either within or without the State of Missouri, as the Chairperson of the Board of Directors shall determine or if not designated by the Chairperson then as determined by the Board of Directors. The annual meeting shall be held for the purpose of transacting such business as may come before the meeting. Special meetings of the Board of Directors may be called by or at the request of the Chairperson, or in the Chairperson's absence or by any two Directors.

5.9 Special Meetings. Special meetings of the Directors may be held at any time and at any place and shall be designated by the person(s) calling such meeting, when called by the Chairperson of the Board of Directors, or if there be no such Chairperson, the President, or by two or more Directors.

5.10 Members of the Board of Directors, or of any committee designated by the Board of Directors, may participate in a meeting of the Board or committee by means of conference telephone, electronic mail or similar communications equipment whereby all persons participating in the meeting can communicate with each other, and participation in a meeting in this manner shall constitute presence in person at the meeting.

5.11 Any action which is required to be or may be taken at a meeting of the Directors, or of any committee of the Directors, may be taken without a meeting if consents in writing, setting forth the action so taken, are signed by all of the members of the Board or of the committee as the case may be. The consent shall have the same force and effect as a unanimous vote at a meeting duly held, and may be stated as such in any certificate or document. The Secretary shall file the consents with the minutes of the meetings of the Board of Directors or of the committee as the case may be.

5.12 Notice. Notice of any annual or special meeting shall be given by mail or electronic mail to each Director at such Director's business or home. If mailed by post, such notices shall be deemed to be delivered when deposited in the United States mail in a sealed envelope so addressed, with postage thereon prepaid. Any Director may waive notice of any meeting. The attendance of a Director at any meeting shall constitute a waiver of notice of such meeting, except where a Director attends a meeting for the express purpose of objecting to the transaction of any business because the meeting is not lawfully called or convened. Neither the business to be transacted at, nor the purpose of, any regular or special meeting of the Board of Directors need be specified in the notice or waiver of notice of such meeting.

5.13 Quorum. Fifty Percent (50%) of the members of the Board of Directors, including two officers as defined in these by-laws, shall constitute a quorum for the transaction of business at any meeting of the Board of Directors.

5.14 Adjournment. Any meeting may be adjourned by a simple majority of the votes cast upon the question, whether or not a quorum is present, and the meeting may be held as adjourned without further notice.

5.15 Duties of the Board of Directors. The duties of the Board of Directors shall be:

- A. To manage the business, functions, programs, and activities of the Society.
- B. To establish dues and support levels for Regular Members, Student Members, Retired Members, Lifetime Members, and Contributing Members.
- C. To establish policy and promote the objectives of the Society.

5.16 Manner of Acting. The act of a simple majority of a quorum of the Directors present shall be an act of the Board of Directors.

5.17 Action by Writing. Any action required or permitted to be taken at any meeting of the Directors may be taken without a meeting if all the Directors consent to the action in writing, which is by electronic mail or otherwise, and the written consents are filed with the records of the meetings of the Directors. Such consents shall be treated for all purposes as a vote at a meeting.

5.18 Committees. Committees shall be of three types; Functional, Technical, and Ad hoc. *Functional Committees* will take care of the day to day functions of the Society. Functional committees shall include, but are not limited to:

- Outreach (e.g., website, social media, event tools)
- Awards

- Nominations
- Symposia and Workshops,
- Publications (Ellipsaria, FMBC)
- Diversity and Inclusiveness
- National Strategy.

Technical Committees will be established to meet the goals and objectives of the National Strategy. Broad committees will be formed that consist of subcommittees that function to address specific projects outlined in the current National Strategy. The National Strategy Committee will recommend changes to these committees based on their five-year evaluation. These recommendations will be voted on by the Board of Directors and communicated to the membership before the symposium following the review.

The President and the Board will form *ad hoc Committees* to explore specific issues or answer specific questions. These committees will be dissolved when their task is complete. They will be evaluated by the Executive Committee at least every five years and either dissolved (if task is complete) or made into a Functional or Technical subcommittee.

ARTICLE VI

OFFICERS

6.1. Number and Election.

- A. The officers shall be four (4): President, President-Elect, Secretary, and Treasurer.
- B. The President will assist the Nominations Committee Chair and at least two (2) other members, neither of whom are members of the Board of Directors. Nominations for the officers will be made by the Nominations Committee or by petition of at least three Society members. The list of nominees prepared by the Nominations Committee will be submitted to the Board of Directors for validation. The Secretary shall submit all valid nominees to the membership for election.
- C. Provisions for Electing the Officers. The Officers shall be elected by the members by mail, electronic mail, or a secure internet voting site during a specified time period for the vote to be received by the committee in charge of counting the votes. This committee may assign vote counting to the Secretary upon a majority vote of the Board of Directors.
- D. The President shall serve a two-year term in this office; however, this term will be preceded by a two-year term as President-Elect, and followed by a two-year term as Past-President to assist with Society functions as needed. An Active Member shall be elected to this sequence of offices at the beginning of the President-Elect year, and, automatically advance to President and Past-President without the necessity of a vote at either change of office.

E. The Secretary and Treasurer shall be elected for two (2) year terms (except for the first year of the Society's establishment, when the Treasurer will serve for 3 years). The Secretary and Treasurer shall be elected in odd years. There is no limit to the number of consecutive terms the Secretary or Treasurer may hold.

F. Vacancies. If a vacancy, except that of President, occurs between terms, the Board of Directors shall appoint a successor to serve the remainder of the term. Should the post of President become vacant for any reason the President-Elect shall assume the post of President and serve the remainder of the term as acting President and shall succeed to the Presidency. In addition, a special election will be held to elect a new President-Elect.

6.2. President. The President shall be the chief executive officer of the Society. The President shall preside at all meetings of the Board of Directors, unless a Chairperson of the Board of Directors is selected, shall have the power to transact all of the usual, necessary and regular business of the Society as may be required and, with such prior authorization of the Board as may be required by these By-laws, to execute such contracts, deeds, bonds and other evidences of indebtedness, leases and other documents as shall be required by the Society; and, in general, the President shall perform all such other duties incident to the office of President and chief executive officer and such other duties as may from time to time be prescribed by the Board of Directors. The President may appoint an Executive Assistant as necessary.

6.3. President-Elect. The President-Elect shall act as chief executive officer in the absence of the President and, when so acting, shall have all the power and authority of the President. Further, the President-Elect shall have such other and further duties as may from time to time be assigned by the Board of Directors.

6.4. Secretary. The Secretary shall record and preserve the minutes of the meetings of the Board of Directors. The Secretary shall have the authority to order the Chairs of all committees of the Board to maintain minutes satisfactory to the Secretary. The Secretary shall cause notices of all meetings of the Board of Directors and committees to be given, and shall perform all other duties incident to the office of Secretary or as from time to time directed by the Board of Directors or by the President. The Secretary shall record and maintain records of all proceedings of the Members and Directors in a book or series of books kept for that purpose, which shall be kept by the Secretary at a place decided by the Board of Directors by resolution. Such book or books shall be open at all reasonable times to the inspection of any member. Such book or books shall also contain records of all meetings of incorporators and the original, or attested copies, of the Articles of Incorporation and By-laws and names of all Members and Directors and the address of each.

6.5. Treasurer. The Treasurer shall have charge and custody of and be responsible for all funds of the Society, shall deposit such funds in such bank or banks as the Board of Directors may from time to time determine, and shall make reports to the Board of Directors as requested by the Board. The Treasurer shall see that an accounting system is maintained in such a manner as to give a true and accurate accounting of the financial transactions of the Society, that reports of such transactions are presented promptly to the Board of Directors, that all expenditures are presented promptly to the Board of Directors, that all expenditures are made to the best possible

advantage, and that all accounts payable are presented promptly for payment. The Treasurer shall further perform such other duties incident to the office and as the Board of Directors or the President may from time to time determine.

6.6. Removal and Resignation. Any officer may be removed, with or without cause, by the vote of a two-thirds majority of the entire Board of Directors at any meeting of the Board. Any officer may resign at any time by giving written notice to the Board of Directors, the President or the Secretary. Any such resignation shall take effect at the time specified therein; and unless otherwise specified therein, the acceptance of a resignation shall not be necessary to make it effective.

ARTICLE VII

GENERAL PROVISIONS

7.1. Contracts, etc., How Executed. Except as in these By-laws otherwise provided or restricted, the Board of Directors may authorize any officer or officers, agent or agents to enter into any contract or execute and deliver any instrument in the name of and on behalf of the Society, and such authority may be general or confined to specific instances; and, unless so authorized, no officer, agent or employee shall have any power or authority to bind the Society by any contract or engagement or to pledge its credit or to render it liable pecuniarily for any purpose or in any amount unless in the ordinary course of business.

7.2. Loans. Unless in the ordinary course of business, no loans shall be contracted on behalf of the Society and no negotiable paper shall be issued in its name, unless and except as authorized by the Board of Directors in accordance with the provisions of these By-laws. To the extent so authorized, any officer or agent of the Society may effect loans and advances at any time for the Society from any bank, trust company, or other institution, or from any firm, society, corporation or individual, and for such loans and advances may make, execute and deliver promissory notes, bonds or other evidences of indebtedness of the Society, and when authorized as aforesaid, may pledge, hypothecate or transfer any and all stocks, securities and other personal property at any time held by the Society as security for the payment of any and all loans, advances, indebtedness and liabilities of the Society, and to that end may endorse, assign and deliver the same.

7.3. Deposits. All funds of the Society shall be deposited from time to time to the credit of the Society with such banks, bankers, trust companies or other depositories as the Board of Directors may select or as may be selected by any officer or officers, agent or agents of the Society to whom such power may be delegated from time to time by the Board of Directors.

7.4. Checks, Drafts, etc. All checks, drafts or other orders for the payment of money, notes, acceptances or other evidence of indebtedness issued in the name of the Society, shall be signed by the Treasurer or such officer or officers, agent or agents of the Society, and in such manner as shall be determined from time to time by resolution of the Board of Directors in accordance with the provisions of these By-laws. Endorsements for deposit to the credit of the Society in any of its duly authorized depositories may be made without countersignature, by the President,

President-Elect or Treasurer, or by any other officer or agent of the Society to whom the Board of Directors, by resolution, shall have delegated such power, or by hand-stamped impression in the name of the Directors.

7.5. General and Special Bank Accounts. The Board of Directors from time to time may authorize the opening and keeping of general and special bank accounts with such banks, trust companies or other depositories as the Board of Directors may select and may make such rules and regulations with respect thereto, not inconsistent with the provisions of these By-laws, as they may deem expedient.

AMENDMENTS

An amendment to the By-laws may be proposed in writing to the Board of Directors at least ninety (90) days prior to a scheduled Society annual meeting. If the proposed amendment is supported by at least one voting member of the Board of Directors, the proposed amendment will be distributed to all members sixty (60) days prior to the next annual meeting, and will be open for discussion and voted on at that meeting. The amendment is consummated and ratified when approved by at least two-thirds of the voting members, provided the number of voting members at the meeting constitutes a quorum.

ARTICLE IX

CORPORATE SEAL

The Board of Directors may elect to adopt a corporate seal, which, if one is adopted shall be in the form of a circle and shall have inscribed thereon the name of the Society and the words "Corporate Seal" and "Missouri".

ARTICLE X

FISCAL YEAR

The fiscal year of the Society shall begin January 1 and end December 30.

ARTICLE XI

INDEMNIFICATION

Each person who is or was a Director or Officer of the Society, including the heirs, executors, administrators, or estate of such person, shall be indemnified by the Society to the full extent permitted or authorized by the laws of the State of Missouri, as now in effect and as hereafter amended, against any liability, judgment, fine, amount paid in settlement, costs and expenses

including attorney's fees, incurred as a result of any claim arising in connection with such person's conduct in his or her capacity, or in connection with his or her status, as a Director or Officer of the Society. The indemnification provided by this By-law provision shall not be exclusive of any other rights to which he may be entitled under any other By-laws or agreement, vote of disinterested Directors, or otherwise, and shall not limit in any way any right that the Society may have to make different or further indemnification with respect to the same or different person or classes of persons.

ARTICLE XII

PERSONAL LIABILITY

The Members, Directors and Officers of the Society shall not be personally liable for any debt, liability or obligation of the Society. All persons, corporations or other entities extending credit to, contracting with, or having any claim against, the Society, may look only to the funds and property of the Society for the payment of any such contract or claim, or for the payment of any debt, damages, judgment or decree, or of any money that may otherwise become due or payable to them from the Society.

ARTICLE XIII

TRANSACTIONS BETWEEN DIRECTORS OR OFFICERS OF THE SOCIETY AND THE SOCIETY

Potential conflict of interest transactions between Directors or Officers of this Society and the Society may raise questions about the stewardship of Directors and Officers. Transactions between a Director or Officer of a not-for-profit corporation and the Society, or between the Society and another entity in which the Director or Officer has a direct or indirect financial interest, are not void or voidable because of the relationship or interest or because the Director or Directors are present at the meeting of the Board or a Committee which authorized, approved, or ratified the transaction or because the votes of the Director or Directors were counted. The contract or transaction shall presumably be authorized, approved or ratified by the Board of Directors of the Society. The fact of the relationship or interest shall be disclosed to the Board or Committee, or to the members of the Society, as needed, in advance of the voting on the matter. The Board of Directors approving the transaction must in good faith reasonably believe that the transaction is not unfair to the Society. The Board of Directors shall consider and approve by Resolution a method of dealing with such occurrences.

ARTICLE XIV

DEFINITION

Mail shall be defined as U.S. Postal mail, electronic mail, or facsimile transmission.

ARTICLE XV

PROCEDURES

Procedures and other items not specified in this By-laws or by action of the Board of Directors shall be in accordance with Robert's Rules of Order Revised.

ARTICLE XVI

DISSOLUTION

Upon the dissolution of this Society, and after paying or making provision for payment of all the liabilities of this Society, assets shall be distributed for one or more exempt purposes within the meaning of the Internal Revenue Code of 1986, as amended, or shall be distributed to a state or local government for a public purpose. Any such assets not so disposed of shall be disposed of by the Circuit Court of the county in which the principal office of the Society is then located, exclusively for such purposes or to such organization or organizations as said Court shall determine, which are organized and operated exclusively for such purposes.

These By-Laws adopted on this 23 day of June, 1999

and as amended by membership vote on:

14 March 2007

14 April 2011

To be voted on 19 April 2019

Secretary