



Newsletter of the Freshwater Mollusk Conservation Society
Volume 19 – Number 2 June 2017

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Implementing the New Strategy

Heidi Dunn, FMCS President

It is an honor and privilege to be President of such an enthusiastic group. FMCS has accomplished many projects these past few years and new projects have been initiated, which I hope to keep moving forward.

The committees have always been the backbone of this Society and they have achieved many of the goals set forth in the previous National Strategy for the

Conservation of Freshwater Mussels. We now have a new Strategy, broadened to include all freshwater mollusks, and some new goals and objectives for our committees to tackle. Toward that end, now Past-president Teresa Newton tasked the committees with developing new scope and focus statements based on the new Strategy. Within the next few months, we hope to review those suggestions and determine if we need to revise, combine, or develop new committees to meet the challenges set forth in the new National Strategy.

This year, we have established an ad hoc International Committee that, we hope, will work to pull together freshwater mollusk enthusiasts from around the globe. A meeting is currently being planned for September 2018 in Northern Italy. Our European members have invited us to present FMCS to European malacologists to determine if they want to join our society and how that might be structured. We also have set up an ad hoc committee that is exploring the creation of a professional certification program which could set standards and reward professional achievement.

This past year, we have participated in a major revision of the American Fisheries Society publication *Monetary Values of Fish and Mussel Kills*. Both propagation techniques and sampling methods for freshwater mollusks have improved considerably since the 2003 edition of that document was published, and it has been quite a challenge working on this revision. Although not perfect, the new edition is an improvement and we formed an ad hoc committee at the 2017 Symposium to work on how we can improve the methods and values for the next revision of that important book.

We have also started forming relationships with other societies that foster similar goals. We have joined the Consortium of Aquatic Sciences (CASS) which will strengthen our position in responding to environmental issues and give us more opportunities for outreach. That group of societies is also working on tackling the issue of diversity within their memberships, an issue we would like to tackle but about which we could use some guidance.

So, we have interesting tasks to work on these next few years. I would like to see our committees become more active and include as many members as possible in accomplishing the things they do. Unfortunately, with the new political climate in the United States, we will likely have less political support and fewer funds to work with. But we still have a responsibility to our molluscan friends. Fortunately, our Society is blessed with a wide range of expertise and experience, a good knowledge base from those who have been around awhile, and a growing contingent of young professionals and students ready to take on leadership rolls. So, let's keep our spirits up, our heads under water, and do the best we can with the talents and resources we have. We can't just clam up when we get disturbed. Keep on siphoning!

Society News

2017 Cleveland Symposium We Did It! Thank You!

Becca Winterringer and Greg Zimmerman
Cleveland Symposium Co-chairs

The Symposium Committee would like to send out a big, sincere **"THANK YOU"** to the membership for making the 2017 Cleveland Symposium a resounding success!!! One of our biggest issues was dealing with the overwhelming attendance at the Symposium and the mussel and snail Workshops. We appreciated your patience and understanding as we worked through the hiccups during the week. Beyond those minor issues, we've had overwhelmingly positive feedback on the event in terms of content, venue, and location. This success was accomplished

despite travel restrictions on federal and state employees and budget limitations. We know many members bridged this gap using their personal funds and resources, and we would like to thank those members for making it happen.



Finland, Germany, Italy, Luxembourg, Poland, Portugal, and Sweden. The two Sunday Workshops were met with enthusiasm; 44 attended the gastropod workshop and 33 attended the unionid workshop.

This Symposium also featured our first-ever student/mentor mixer. Over 35 students and 50 professionals gathered on Sunday evening, enjoying an opportunity for students to interact with professionals and discuss what a professional position in mollusk biology and conservation can entail.

While we had our official symposium theme (*The Roles of Freshwater Mollusks in a Changing Environment: Ecosystems, Engineering, Valuation, and Practice*), communication was the consistent unofficial focus of this meeting. At every break and at every social event, the halls and rooms were abuzz with lively discussions. The Sunday night welcoming reception was packed to capacity; old friendships were refreshed, new friendships were made, and collaborations were planned. Throughout the week, we made full use of the hospitality suite for conversations and field tales, and needed every spare room for committee meetings and special project sessions. The food was delicious, and there was plenty to go around. We don't think many of us knew a box lunch could taste so good. The conference t-shirts and hoodies were flying off the shelves, and we ordered more to keep up with demand.

We were particularly impressed by the quality and synergy of all the talks and posters. The keynote and plenary speaker talks were especially relevant, informative, and thought provoking. We would like to recognize each of those individuals one more time for their efforts:

- Keynote Speaker - Dr. Jeffery Reutter
- Plenary: Valuation - Mr. Tom Wilmoth
- Plenary: Ecosystems - Dr. David L. Strayer
- Plenary: Practice - Dr. Gregory Cope
- Plenary: Mollusks as Ecosystem Engineers - Dr. Timothy Hoellein

The FMCS Symposia are great opportunities to bring together mollusk biologists, researchers, and managers from diverse geographical locations and backgrounds, and the 2017 Symposium certainly did not disappoint. Participants traveled from far and wide to make this one of the best-attended FMCS meetings to date. Nearly 300 members attended the Symposium, including over 60 students. North American members hailed from 31 of the United States and one Canadian Province, from Maine to New Mexico, and from Ontario to Florida. Beyond that, nearly 20 attendees traveled from abroad, representing



In addition, we would like to formally recognize the panel members during our plenary sessions for their excellent insight, comments, and questions for our speakers. As they were not listed in the program, we wanted to recognize them here:

Monday Session: Keynote, Valuation, and Ecosystem Engineers

- Ms. Patty Morrison, U.S. Fish and Wildlife Service
- Dr. Heather Galbraith, U.S. Geological Survey
- Dr. Caryn Vaughn, University of Oklahoma
- Dr. Lyubov Burlakova, Great Lakes Center, Buffalo State, The State University of New York
- Dr. Alexander Karatayev, Great Lakes Center, Buffalo State, The State University of New York



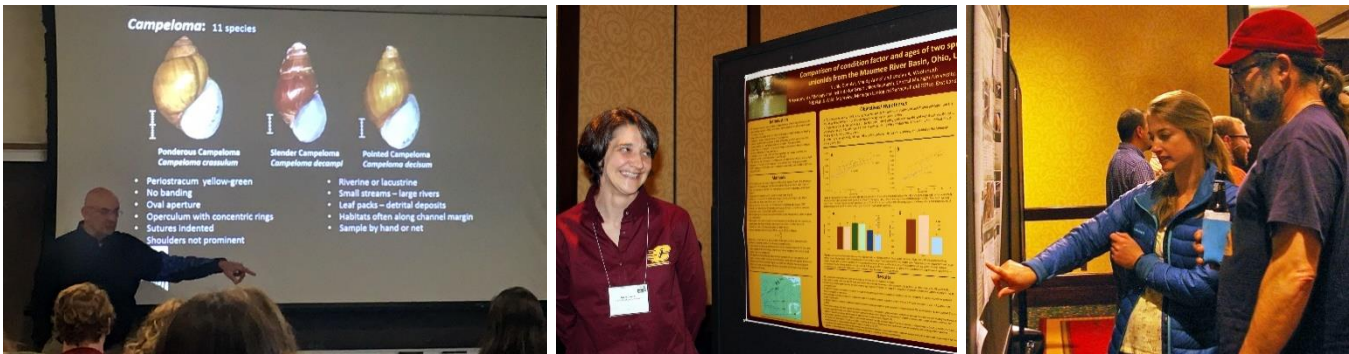
Tuesday: What is the Value of Mollusks in Ecosystems, and Practice

- Dr. Wendell Haag, Southern Research Station, U.S. Forest Service
- Ms. Heidi Dunn, Ecological Specialists, Inc.
- Dr. Chris Barnhart, Missouri State University



For us, hosting this Symposium was a big effort all around, with a big payoff. Some last special acknowledgements are due to the FMCS Board, Cleveland 2017 Committee members Dave Zanatta and Phil Mathias, Symposium Committee Chair Heidi Dunn, FMCS Treasurer Emily Grossman, and FMCS webmaster Sophie Binder. Substantial thanks also are due to Janet Clayton and Mark Hove for taking nearly all of the formal and informal pictures of the Cleveland meeting presented in this issue of our newsletter.

Candid shots from the formal sessions, auction, and casual discussions in Cleveland



Minutes of the Spring 2017 FMCS Board Meeting Cleveland, Ohio Sunday, March 26, 2017

In the absence of President Teresa Newton [because of an airline flight delay], the Spring 2017 FMCS Board Meeting was conducted by Heidi Dunn, President-elect, starting with a Roll Call. In attendance were: Heidi Dunn, Emily Grossman, Janet Clayton, Patty Morrison, Greg Cope, Jeremy Tiemann, Art Bogan, Manuel Lopes-Lima, Tyler Hern, Braven Beaty, Tom Watters, Wendell Haag, Clint Robertson, Charles Randklev, Kentaro Inoue, Neil Ford, Ryan Schwegman, Leroy Koch, Rachael Hoch, John Harris, Emy Monroe, Dave Berg, Greg Zimmerman, Becca Winterringer, Gary Pandolfi, Steve McMurray, Lisie Kitchel, Megan Bradley, Nathan Eckert, Mark Hove, Michael Hart, and Jennifer Archambault. A quorum of Board members was determined to be present.



A motion to approve the December 8, 2016 Board Meeting Minutes (published in March 2017 *Ellipsaria*) was made by Greg Cope with a second by Emy Monroe. The minutes were approved unanimously.

Treasurer's Report – Emily Grossman

2017 Symposium update as of 3/22/17

Currently 273 people are pre-registered and we are expecting a few more as walk-ins. We are also up to 17 sponsors (awesome!!).

Income (totals so far; note this overlaps slightly with last treasurer's report):

- Registration: \$92,181.25
- Sponsorships: \$11,002 (have ~\$2,000 more pledged; awaiting funds)
- Workshops: \$6,060
- Field trips: \$1,950
- T-shirts, etc.: \$1,527

Total symposium income to date: \$112,720.25

Expenses:

- Event insurance: \$300
 - Deposit for poster panels: \$2,460
 - Deposit for Wednesday entertainment: \$900
- Total symposium expenses to date: \$3,691
Estimated remaining expenses: ~\$110,000

Bottom line: It looks like we are on track to at least break even on the symposium.

Other income and expenses: 12/1/16 – 3/22/17

Income

- Memberships: \$19,240
 - T-shirts, hats, etc.: \$10.00
- Total non-symposium income: \$19,250.00

Expenses

- Allen Press/FMBC costs: \$151.20
- Regional meetings: \$300 (Maryland, Northeast Region, VA Atlantic Slope)
- iPad and accessories for credit card system: \$459.63
- PayPal fees: \$2,533.33
- Square (new CC system) fees: \$358.75
- Bank fees: \$24 (misc. service charges)
- Other transaction fees: \$15 (eVA system)
- File 2016 1099s: \$14.99

Total non-symposium expenses: \$3,856.90

Current bank balance

- Checking: \$135,164.27
- Savings: \$125,005.94
- PayPal: \$4,565.08
- Total: \$264,735.29

Other items

The treasurer is currently using Intuit QuickBooks 2011 for Mac to manage the Society's finances. Software has not been updated as newer versions are not particularly Mac friendly. Conversion to Windows operating systems will be conducted shortly and suggest consider purchasing an updated version of QuickBooks for Windows once that transition happens. QuickBooks Pro Desktop 2017 is currently priced at \$199.95 (per Intuit's website). Heidi made a motion to approve spending up to \$250 on the purchase of QuickBooks. Seconded by Braven Beaty. All approved.

Heidi reminded the Board that FMCS had agreed to provide the balance of \$40,000 for the publishing of the AFS Monetary Values document which is to include mussels. Currently \$10,000 from UMRCC, \$10,000 from Genoa National Fish Hatchery, \$2500 from the Ohio River NRDA fund have been obtained which leaves FMCS to make up the other \$17,500. This was previously voted on and we are still committed to making the payment.

Secretary's Report – Janet Clayton

Janet stated that each of the standing committee co-chairs was sent a list of active members who had said they wanted to be on the committee on their on-line membership profile. The membership database is undergoing spring cleaning and lapsed members as of January 1, 2015

were sent a final notice to rejoin by March 15 or they will be removed from the mailing list. Their information has been moved to the archives and can always be retrieved if they re-join later.

Committee Reports

Symposium Committee

2017 Symposium in Cleveland

Becca Winterringer and Greg Zimmerman are heading up the symposium that is getting underway. They reported some signage issues and, following some room adjustments, things are looking good and the hotel staff has been responsive. They are using an App at the conference center that gets staff quickly where needed. This has been very useful and highly suggested for use at future meetings. They encouraged folks to stay through Wednesday night as they have an amazing band lined up. They are considering offering \$20 tickets to some watershed groups to fill some seats. They are also offering a one hour open bar incentive following dinner in order to get better participation. They had 273 pre-registrants. There was overwhelming interest for the gastropod workshop with 44 people. Workshop instructors permitted those on the waiting list to also attend. There was a total of 36 participants in the mussel workshop. Extra drink tickets may be for sale at a reduced rate.

2018 Workshop

Heidi presented information on the 2018 Workshop on Diseases and Mollusks to be held in La Crosse, Wisconsin. That March 12-15 Workshop will be spearheaded by Diane Waller and will concentrate on freshwater mollusk health and disease assessment. Initial planning meetings were held in January – March with Teresa Lewis and Corey Puzach, FWS Midwest Fisheries Office in La Crosse; Megan Bradley, Genoa NFH; and Diane Waller, USGS-UMESC to discuss potential venues for the meeting and compare costs between conference centers. Staff from all three facilities will assist with workshop arrangements. Teresa Lewis and Ken Phillips have offered use of Fish Health facilities and assistance of staff for the hands-on portion of the workshop. Fish Health staff conduct a yearly course on fish disease and are experienced with accommodating groups of people for training. Jay Levine, North Carolina State University, was contacted and is willing to help develop the hands-on training portion of the workshop. A full program committee has not yet been established though a few individuals have been contacted. Other FMCS members wishing to assist should contact Megan or Diane. A list of potential speakers and participants is underway. Several people have been contacted and are interested in presenting. We hope to hear from FMCS with specific suggestions for the program, based on interests and concerns from people working in propagation programs and those responding to mussel die-offs. It is hoped the full program committee will encompass the range of viewpoints and interests. Poster, sponsorship, and field trip committees have not yet been established; however,; Megan Bradley offered to host tours of the Genoa NFH for the optional field trip.

2019 Symposium in Texas

Charles Randklev is heading up the 2019 Symposium and is currently looking into Austin or San Antonio, Texas, as the meeting site. Austin will likely be at least 10 to 15% more expensive if we have it in March which could conflict with scheduling of a local event, “South by Southwest”. San Antonio has a lively river district and similar amenities as Austin. It won’t be as expensive, easier to get to river walk, hotel and airport. A presentation will be given to the membership at the business meeting. San Antonio will probably be more amenable to working with state and federal government. Lodging at one of the nearby universities may be available for students. Heidi suggested taking a vote following the presentation at the business meeting. Charles also requested information on how the cash flow goes for the symposium. He would

like some ballpark figures to know what to expect. Emily is to provide this. Becca also noted that she would provide a list of lessons learned following the Cleveland symposium. There is also a planning section in the Operations manual on Symposia.

2020 Workshop

Topic and location still open. Ideas that have been mentioned for this Workshops include:

- Sampling protocols, state by state with a panel discussion
- New tools, like genomics, acoustic Doppler current profiler
- Standardized sampling: are there minimum guidelines
- Water quality and toxicology- may want to check with folks in Columbia
- Snail identification and sampling

We are looking for people who would like to organize 2020 with any of the above or other topics they think might interest the group. Anyone with ideas for future workshops and venues for future symposia, please contact Heidi Dunn or Jeremy Tiemann.

2021 Symposium

Heidi Dunn approached the Pacific Northwest mussel group about their interest in hosting the 2021 Symposium in either Portland or Seattle. They only have six species of freshwater mussels but are passionate about them. The idea was discussed in their March meeting. Heidi provided them with a link to the Symposium and Workshop guidelines in our protocol manual. They had questions on how this would be funded, how many people would attend, and if there was any monetary incentive to the group (share of the proceeds). The general tone of the group was favorable but they wanted to get input from more of their members and set up a SurveyMonkey. They plan to get results to Heidi before March 26.

We have tried to encourage the Pacific Northwest group into participating in FMCS activities before but it is hard for them to travel. They are interested in hosting and Heidi asked for any objections. Seattle or Portland would most likely be the host city. Many Board members voiced their approval and said it sounded great. A concern was brought forward that we might lose a lot of participation but it was noted that the American fisheries Society has hosted in both cities before and were some of their best-attended meetings. Heidi said that she would ask the membership about this at the Business Meeting to determine interest in moving forward.

Awards Committee -- Emy Monroe, Greg Cope and Teresa Newton

Student Travel Awards: The Awards Committee announced and solicited applications for student travel awards to assist students in attending this biennial symposium. Similar to past years, travel awards were made in the form of pre-paid rooms at the symposium hotel. A total of 29 students (3 BS, 14 MS, and 12 PhD) applied for travel awards. Based on the allotted funds for all awards from the Society and the cost of rooms, nine student awards were presented. Of these students, seven are earning their M.S. and two are earning their PhDs.

Best Student Platform and Poster Awards: There were 19 students that asked to have their platform presentations judged and 19 students who asked to have their poster presentations judged. We have secured four judges for each platform presentation and three judges for each poster presentation. Heidi and others brought up that the line on the sample abstract asking students if they wanted their presentation judged was left off. This needs added to the procedures manual.

Professional Awards: The Awards committee solicited nominations and applications from the membership for professional awards to be presented at the biennial symposium. In 2017, we received one nomination for the William J Clench Memorial Award, one application for the Meritorious Service Award, and three applications for the Lifetime Achievement Award.

Environmental Quality and Affairs Committee -- Braven Beaty and Steve McMurray

The committee has responded to four issue topics raised by the membership since our last biennial meeting in 2015. These response letters have addressed the following issues:

- April 26, 2016: Comments to the Federal Energy Regulatory Commission and U.S. Fish and Wildlife Service regarding freshwater mollusk impacts from the proposed Atlantic Coast and Mountain Valley natural gas pipeline projects. The comments focused on direct impacts of the proposed pipeline routes and construction on specific mussel species and the effects of excess sedimentation and potential contaminants on the overall mollusk assemblages.
- April 29, 2016: Comments to the U.S. Army Corps of Engineers and U.S. Fish and Wildlife Service regarding additional permitted mining operations in the Locust Fork drainage, Black Warrior River system, Alabama. Comments were focused on the cumulative effects of mining activity on mollusks, especially imperiled species, and the evidence base supporting long-term mining effects.
- May 11, 2016: Requesting that the impacts of flow alteration on freshwater mollusks are considered in the final EPA/USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration. The draft report did not include analyses of hydrologic flow alteration on freshwater mollusks even though they are a critical component of many freshwater systems and play key ecological roles. The comments suggested assessing impacts from emersion, contaminant concentration, displacement during flooding, hypoxia, hypothermia, spawning timing, and juvenile habitat suitability. In addition, the ecosystem services provided by freshwater mollusks were referenced.
- Feb. 5, 2017: Suggest that impacts on freshwater mollusks are considered during development of the Environmental Impact Statement for the proposed Pat Harrison Waterway District and George County Proposed Big Cedar Creek and Little Cedar Creek Dams. The society requested that freshwater mollusk impacts from the proposed dams be included in the EIS. Key topics to be addressed were flow alteration impacts, habitat inundation, and the disruption of a rare free-flowing Gulf Coast Drainage river system.

In addition, we are working on a letter supporting continued/increased support of natural history collections and the role they play on understanding mollusk resources and ecology. This letter would be general in nature and could be used by the membership to solicit support for their local collections curators or grant funding.

We have taken 'baby steps' towards drafting a template 2-page issue statement format that could be used for outreach or support funding and policy requests by members and their agencies/organizations. A draft example will be available on the committee's webpage.

Heidi noted that there was a lot of key legislation out there that could undo what we have done over the years and questioned if we needed to put some additional information out to inform. We can't lobby but we definitely can put forth facts on what legislation has done. Is this something we want to do or should we stay out of the political mix? Braven thinks this is something that we as a professional society should undertake but need commitments from other folks to help draft. This committee does provide an outlet for individuals that work for organizations that do not allow them to have a voice. Need to try and pick the top few issues to start.

Genetics Committee -- Dave Berg and Curt Elderkin

We are still "recovering" from the Genetics Workshop held at NCTC in February 2016. By the numbers: there were 73 in attendance 10 oral presentations and nine poster presentations, six sponsors contributed a total of \$7238, total income from the Workshop was \$19,763, total expenses amounted to \$13,440, and we ended up with a net profit of \$6323'.

An agenda for next week's committee meeting was prepared and includes setting priorities for the next year.

Guidelines and Techniques Committee -- Mary McCann and Ryan Schwegman

The committee will meet on Tuesday, March 28, 2017 from 12:30-2:00 pm. The location will be announced in the FMCS conference program. Anyone interested in guidelines and techniques is encouraged to attend the meeting. We will be providing an update on the AFS Mussel Kill Evaluation. We will also be reviewing and revising the committee's future goals.

Mussel Survey Guidelines and Protocols The committee created and continues to maintain a list of mussel survey guidelines and protocols organized by state or government agency. Any new information that is available to list is welcome and should be forwarded to the committee chairs.

Mussel Photo Guide It has been one of the committee's goals to adopt a mussel photo guide to post on the website. Nevin Welte of PAFBC has recently completed a guide that will be considered. Input from Art Bogan, John Harris, and Tom Watters have also been compiled as to what the guide should cover.

Update on Mussel Kill Evaluation The Guidelines and Techniques Committee main role in this process was to assist in the formation of a steering committee which provided information on mussel value estimates for the American Fisheries Society's Investigation and Monetary Values of Fish and Freshwater Mussel Kills publication. Further detail is provided under Old Business (See Page 16).

Mussel Status and Distribution Committee -- Art Bogan and John Harris

J. D. Williams *et al.* Conservation assessment of freshwater mussels of United States, Canada and Mexico is a revision of Williams *et al.* (1993). It was submitted to Freshwater Mollusk Biology and Conservation in August 2015. Following substantive comments from the editor and reviewers in December 2015, it was decided that the manuscript should be divided in two. The first revised manuscript will cover taxonomy and nomenclatural issues and an update of Turgeon *et al.* 1998. There have been long discussions on what to recognize and how to best present the evidence for the multiple changes. The US and Canada mussel names manuscript should be completed and submitted in early-mid April 2017. Art noted that there are many name changes and if you have an objection you need to publish. Species changes need to be in a peer-reviewed journal and the list will be up for review every two years.

After the taxonomy paper is published, or is in press, a companion version addressing conservation status will be submitted to Freshwater Mollusk Biology and Conservation. Authors and areas of responsibility include James D. Williams (Eastern Gulf and south Atlantic), Jayne Brim-Box (Western US), Sarina J. Jepsen (Western US), Terry L. Myers (Southwestern US and Mexico), Alberto Contreras-Arquieta (Mexico), Robert Howells (Western Gulf and lower Mississippi), Charles R. Randklev (Western Gulf and adjacent states), Nathan A. Johnson (Gulf Coast), Jeffrey T. Garner (Gulf Coast and Tennessee Basin), John L. Harris (Ozarks and central Mississippi Basin), Kevin Cummings (Ohio Basin, upper Mississippi and Midwest), Jason M. Wisniewski (Atlantic Coast, Georgia to North Carolina), Arthur E. Bogan (Atlantic Coast, North Carolina north to Maine), Bob Butler (Tennessee - Cumberland + Ohio Basins), Todd Morris (Canada). The major hurdle facing the conservation status manuscript is to devise a system to evaluate conservation status of species across a broad geographic area. This was the most critical comment from reviewers of the initial conservation status manuscript. The fact that there were no well-defined methods (metrics) to support status determinations was a major criticism. While that is a valid point, there is no simple solution. Nevertheless, we will attempt to better standardize our techniques of evaluation to make them more compatible across the US, Canada, and Mexico.

Going forward, action items during the first half of 2017 for manuscript revision will include: 1) Request co-author input on a revised methodology for conservation status determinations using the taxonomy adopted in the names manuscript, 2) Update status information for the geographic areas of responsibility to include examination of all the state threatened and endangered mussel lists or equivalent documents (SGCN - species of greatest conservation need), 3) Revise and update distribution and conservation status information and complete the text revision from the previous submission, and 4) Assuming the names manuscript has been accepted for publication, submit the conservation manuscript to Freshwater Mollusk Biology and Conservation.

Atlas of Freshwater Mussels of North America - 159 of the approximately 362 taxa addressed in the Atlas have volunteer authors for species accounts. We have received 22 first draft accounts as of March 21, 2017. External review and subsequent revisions are complete for one species (*Lasmigona costata*) and the account is posted to the website. We are proceeding with preliminary and external reviews of the remaining draft species accounts and will post those as they are completed. Please contact Art or John if you are interested in becoming a volunteer author for a species.

Development of Mussel ID App - Susan Oetker indicated the App was tested at the Texas mussel identification workshops hosted by Charles Randklev in August and October 2015. The App did not perform to our expectations or satisfaction, and we performed an extensive QA/QC and revision to the character database during winter 2015 and spring 2016. Revisions to the app character matrix are complete, and the development team is now reviewing and testing the app as we continue to improve and augment the photo archive and illustrations. The team continues to search for and solicit high quality photos to complete the North American set. Additional funding has been received through Endangered Species Act Section 6 allocations to the state of Texas. When the contracts are finalized, the App developer will be ready to release a new build for peer review and testing. Art noted that the App is on hold until the new taxonomic list comes out.

Nominations Committee -- Leroy Koch

Election of officers was held with a better voter turnout this year than in the past. Jeremy Tiemann is new President-elect, Emily Grossman remains Treasurer, and Janet Clayton continues as Secretary.

Outreach Committee -- Megan Bradley, Jennifer Archambault

The Outreach committee has continued to work on keeping the website updated over the past year. We have added a section to the website where job and internship opportunities are posted. Please continue to forward these announcements to Megan and Jennifer. As these announcements come and go quickly they are considering moving them from the website to the Facebook page.

We have collaborated to keep the Facebook page up to date and active, where we have over 730 followers and sometimes reach more than 2,000 people with the content we post. The committee has worked to coordinate participation in the first FMCS student/professional mixer on Sunday (87 signed up) and a Symposium BINGO game to award and foster engagement in activities and with other attendees.

Heidi emphasized to all the need to keep information on our sites as up to date as possible.

Propagation, Restoration, and Re-Introduction Committee -- Rachael Hoch and Dan Hua

The Committee will meet on Tuesday, March 28, 2017, from 12:30-2:00pm. Anyone interested in propagation and restoration is encouraged to attend the meeting. We need to look at our goals and redefine how we are going to capture data and distribute information. Who is

propagating what and where? We currently have over 100 members. Rachael emphasized that this committee is now much bigger than just a propagation committee and it should be addressed in future planning.

FMCS Mollusk Propagation and Restoration Facilities Database The committee is continuing to maintain a propagation/stocking/relocation database. The database is active and updates to the facility contact list have been completed. The committee plans to update the species and restoration activities following their committee meeting in Cleveland. Any facilities actively propagating freshwater mollusks are encouraged to contact Rachael Hoch to add their contact information to the facilities database.

Update on the Mussel Kill Evaluation A subset of committee members is assisting the Techniques and Guidelines Committee to provide information on mussel value estimates for the American Fisheries Society's Investigation and Monetary Values of Fish and Freshwater Mussel Kills publication. More detail is provided below under Old Business (See Page 16).

Information Exchange Committee -- Tom Watters, Greg Cope, and Wendell Haag

Greg Cope reported that FMBC is moving forward nicely and the transition to Allen Press is going well. The committee has not heard of any issues from those submitting papers and appears that a smooth process is in place. They have decided to add an additional service from Allen Press, copy editing, which was approved at the Board meeting. This will take a lot of pressure off the editors. Timing is on track, with March and September being the two planned issue dates. They see a need to expand the editorial board membership and ask current members if they want to retain editorship on their categories. Some categories do not have an editor and they are looking to fill those. It was suggested that maybe a note on website that they are in need of an editor in conservation, ecology and biology. Now that we have a record of consistent issues, we can make application to be included in BioOne. Wendell has put together a procedure for transitioning to new editors and it is ready to go into the procedures manual. Tom noted that IUCN does not allow taxonomic changes to be made in online publications. These need approval by Zoobank but, thus far, they have not provided any response to questions. Wendell also noted that with most journals, editorial boards generally handle the manuscript. Our board handles manuscripts on a regular basis within categories. Do we really need an editorial board? Greg Cope believes they do. If the category editor gets a manuscript in a subject that they are not really familiar with, they can go to someone on the board with that expertise. The group needs to have some turnover to get those that are truly interested in reviewing. Dave Berg wanted to know about getting an "impact factor" on the journal. He said this was important for academics. Maybe consider investigating.

Gastropod Status & Distribution Committee -- Nathan Whelan and Jeremy Tiemann

The committee is leading a one day introduction to aquatic gastropods Workshop at the FMCS meeting in Cleveland. This workshop will provide a background on the ecology of aquatic gastropods, sampling techniques, and taxonomic skills for commonly encountered species. The course has been well-received and over 40 people have registered for the workshop.

We also are working with the Mussels Status & Distribution Committee on reviewing and updating our committees' goals based on the updated National Strategy and subsequent revision of the operations manual. While the gastropod and mussel committees are independent from one another, we have similar goals and are attempting to have that reflected in the manual.

The Gastropod Scientific and Common Names subcommittee is continuing to work with the Mussel Scientific and Common Names subcommittee on establishing organizational criteria for the subcommittees (e.g., number of members, length of term, frequency of meetings), as well as maintaining a consensus checklist of names on the FMCS website, periodically printing checklists in *Freshwater Mollusk Biology and Conservation* (FMBC), and establishing a process

for reviewing proposed name changes. Discussions have lapsed in recent months, but we hope to potentially resurrect them during the FMCS meeting.

Our committee is working with Sophie updating the snail pages as issues arise.

We are preparing to transition to new leadership during the 2017 FMCS meeting. Jeremy is stepping down because of his new role as President-elect and Nathan has expressed an interest in stepping down as co-chair too, although both will remain active in the Society at some level.

Prioritizing the Center for Biological Diversity's snail listing package Tierra Curry of the Center for Biological Diversity (CBD) attended our committee meeting in St. Charles, Missouri. The committee worked with her to help CBD prioritize their list of candidate species for listing under the Endangered Species Act. In December 2015, CBD withdrew the petitions for eight snails: Shortspire Hornsnail, *Pleurocera curta*, Mud Elimia, *Elimia alabamensis*, Ample Elimia, *Elimia ampla*, Caper Elimia, *Elimia olivula*, Helmet Rocksnail, *Lithasia duttoniana*, Compact Elimia, *Elimia showalteri*, Cobble Elimia, *Elimia vanuxemiana*, and Smooth Mudalia, *Leptoxis virgate*. In March 2016, CBD sued the U.S. Fish and Wildlife Service (FWS) for failing to propose protection for Beaverpond Marstonia (*Marstonia castor*). The FWS agreed to issue a final decision on that species by September 30, 2017. Also due by September 30, 2017, are final FWS decisions on four species of Great Basin springsnails (Bifid Duct Pyrg, *Pyrgulopsis peculiaris*, Flag Pyrg, *Pyrgulopsis breviloba*, Hardy Pyrg, *Pyrgulopsis marcida*, and Lake Valley Pyrg, *Pyrgulopsis sublata*) threatened by the Las Vegas water grab. FMCS was a co-petitioner on that petition, filed in 2009. In June 2016, CBD petitioned for ESA protection for the Oblong Rocksnail (*Leptoxis compacta*). They are waiting on the initial finding on that petition. In 2016, USFWS released a five year workplan to address petitions, but left many species unscheduled. CBD is advocating that two unscheduled snails (Corpulent hornsnail, *Pleurocera corpulenta*, and Reverse Pebblesnail, *Somatogyrus alcoviensis*) be given higher priority in the workplan. If FWS doesn't add them, they won't get a final finding before 2023 at the earliest.

Ad Hoc Committees:

Ecosystems Services ad hoc Committee -- being dissolved due to lack of interest.

International ad hoc Committee -- Art Bogan and Kevin Cummings

Members of this new committee now include: Manuel Lopes-Lima, Lyubov Burlakova, Juergen Geist, Nicoletta Riccardi, Alexander Karatayev, John Pfeiffer III.

Purpose FMCS has realized that the Society is primarily serving members from the United States and Canada, with only a few members from Europe. The purpose of this committee is to explore avenues to expand the membership, share research and data with international colleagues, develop a series of FMCS sponsored international meetings focusing on freshwater mollusks, and foster wiser collaboration.

Goals:

1. Provide incentives for non-North American freshwater malacologists to become members of FMCS and participate in planned activities, Symposia, publications and Workshops.
2. Hold joint international/United States meetings around the world. The first FMCS International Freshwater Mollusk meeting is being planned for 2018 and will be held in northern Italy. Nicoletta Riccardi will be the host. She is working with Manuel Lopes-Lima to plan this meeting. They are currently getting together program topic and costs. The first two international freshwater bivalve meetings, Bragança, Portugal 2012 (140 participants) and Buffalo, NY 2015 (100 participants) were both exciting and fun with good participation.
3. Set up a subcommittee of local malacologists (e.g. initially from Europe, but to be expanded to other continents around the world) to provide structure and communication about resources, questions, lobbying, and collaboration. This will facilitate answering problems

and developing techniques to address the same or similar problems encountered across freshwater molluscan research. Europe has been chosen because of the large number of active freshwater malacologists working in a number of countries.

4. Explore new opportunities for international collaboration with our journal and newsletter. There is already a good variety of international contributions in each issue of *Ellipsaria*.
5. Encourage guest editing of special issues on specific topics, techniques or problem areas in the FMCS journal.

Manuel (new co-chair) talked further about FMCS being international but truly only works in the United States. There is a need for a European committee. The Board began discussing informally about formalizing though Teresa previously noted that they could use FMCS as a basis. We should take the Italy meeting as an opportunity to present FMCS to Europeans. They have many problems that are completely different from the ones encountered in the United States. So what can FMCS bring to Europeans? Art thought that being involved in South East Asia may be a little more difficult due to difference in cultures but thinks that, if we can get there, it can be done. The Europeans will get together to form goals. Someone from our Executive Board should plan to go to Italy to present benefits of FMCS to them. Heidi brought up our history of originally wanting to be international and inclusive of all mollusks. Art noted getting a lot of questions on methods for translocations and propagation which we have a long history of dealing with, and also the need for expanding our journal to include non-North American papers. It was brought up of the possibility to include an international member on editorial board or possibly produce a special issue with guest editors. Greg Cope noted that the Society of Environmental Toxicology and Chemistry (SETAC) has “geographic units” that appear to be a great way to coalesce the process. Heidi suggested we look at the SETAC model and Dave Berg noted Society for Conservation Biology was also doing this.

Professional Development ad hoc Committee -- Becca Winterringer

Becca noted that the committee plans to revisit their action items. They have an outline of objectives and purpose. They plan to bring them up at the Business Meeting. There are still having some questions with American Fisheries Society certification and still looking to produce something by the end of this year. Greg Cope asked if the committee was still going to send a questionnaire out to total membership as to how many would be interested in it and what the benefits would be.

Old Business

Consortium of Aquatic Science Societies (CASS) -- Jeremy Tiemann

CASS membership includes AFS, ASLO, Coastal Research Foundation, SFS, and Society for Wetland Scientists. We are going to propose that FMCS join this group. Under CASS, these groups come together for a single voice. As such, it becomes a letter from 22,000 scientists rather than just 2,000 scientists. The goals of CASS are to promote scientific study, education and outreach. They occasionally do lobby in Washington, D.C., and have a fee based on membership. Since we are a relatively small Society, the fee would most likely not be that much. They do have a presence on the hill. Jeremy was not sure if they have any activities currently planned. They did send a letter to then President-elect Trump outlining who they are. They are pushing for clean water, sustainable fish for food and recreation, repairing fractured ecosystems, and improving lakes and streams. All six presidents of the member societies signed it. Does FMCS want to proceed with joining CASS and look into further? Their Board meets the 19th of every month. CASS is excited that we are interested. Heidi emphasized that they did a lot outreach as well, and they have a really good webpage. She believes joining would be worthwhile. Jeremy's best guess was the membership fee would be less than \$600 per year. It

would depend on how much they need to lobby on the hill. He also voiced that it would be a good idea because it gives us a bigger voice. Jeremy made a motion that FMCS become a member of CASS. A second was provided by Greg Cope. Braven asked about any downsides to joining and do we need to appoint a representative?. Jeremy is currently the FMCS liaison to AFS and thought he would be a CASS representative and, possibly, one or both co-chairs of Environmental Quality & Affairs committee. It was agreed that we should have at least two representatives. The vote was unanimous to join CASS. Jeremy Tiernann and Braven Beaty are to serve as representatives, with Steve McMurray as the alternate.

Update on AFS Monetary Values of Fish and Freshwater Mussels -- Rachael Hoch

In January 2017, after two years of comments, the revised propagation cost survey was distributed by Southwick Associates to participating freshwater mollusk propagation facilities. The consultants have compiled the results of that survey, and a meeting will be held with the steering committee soon to review the results and revisions to Chapter 6 of the publication. The consultants are hoping to have a final version of the document in the next seven weeks. Notable changes from the 2003 approach include increasing the recommended stocking and production age to "taggable size" defined as mussels greater than 15mm in length or two years of age. Due to limited production data on certain species, a decision was made to summarize production costs by genus. Members of the subcommittee and the FMCS Executive Board plan to meet during this Symposium to discuss the revisions and efforts to date. Anyone interested in the process is welcome to attend the discussion on Tuesday, March 28, 2017, from 5:00-6:00pm.

Rachael noted that these values are not for endangered species and that people calculating costs for mussel kills should first work with federal and state agencies as well as local propagation facilities. The book provides values that can be used when better information is not available. It was also noted that the updated species list is needed for this publication or it will be sorely out of date immediately upon publication. Heidi brought forward that maybe the Society needs to establish a committee to start looking at this in preparation for the next revision so that we are not behind the 8 ball again and Rachael emphasized the need to incorporate ecosystem services. **The Board expressed great gratitude and thanks to Rachel Hoch for taking on this daunting task.**

New Business

AFS-FMCS Collaboration on Diversity Issues

Not much was presented on this. It was noted that this is also a CASS item. They are still trying to figure out what questions to ask.

Lifetime Dues

Heidi Dunn said the Society originally thought they would wait to address this issue until the journal was established and its associated costs could be determined. Now, we may be ready to move forward. Jeremy noted that from other societies it appears that 2-10% of the membership generally takes advantage of lifetime dues. Some discussion on the proposed cost was brought forward, such as 15-25 times the annual dues or, possibly, proposing \$800 for lifetime memberships. Greg Cope said there should be some type of incentive, while Leroy Koch suggested maybe a reduced price based on six years or the like for some of the older members. This led into the discussion of providing retiree rates. Rachael Hoch emphasized that, as people retire, it is going to be hard to keep them involved and retiree rates would provide an incentive. Much discussion ensued but no proposal or motion was brought forward.

Other Items

Dave Berg brought up that the **March for Science** is on April 22, as a way for the Society to become more active and it is not political. Rachael Hoch indicated that she liked the idea of supporting the March. Dave Berg suggested bringing this item to the general membership during the Business Meeting. The only thing really needed would be to put a statement on our website supporting the March and linking to the March for Science website. We need to contact those organizers and let them know we support them. Patty Morrison said to be sure and wear your FMCS garb if participating in the March.

Heidi noted the committees need to make a statement of direction and goals at the general Business Meeting.

Janet Clayton made a motion to adjourn, Rachael Hoch provided a second, and the meeting was adjourned at 6PM.

Respectfully submitted by Janet Clayton, FMCS Secretary

Spring 2017 FMCS Business Meeting Minutes Wednesday, March 29, 2017 Cleveland, Ohio

President Teresa Newton called the meeting to order at 12:39 PM EDT. Symposium Co-chair Greg Zimmerman made a few announcements concerning the symposium.

Emily Grossman provided a brief Treasurer's Report. She noted that the current Symposium had in the neighborhood of 290 registrants and was on track for breaking even, especially with the assistance of 17 sponsors who contributed \$13,000. Non-symposium income since December 1, 2016 was approximately \$19,000, and there we had approximately \$3800 in expenses, including providing funding for three regional meeting. "Money in the Bank, Life is Good". For a complete Treasurer's report, please see the Spring 2017 FMCS Board Meeting Minutes (Page 6).

Teresa thanked all the folks for their auction donations this year and those who were liberal with their wallet contents. She highlighted some of the Society's accomplishments over the last two years which included the revision of the National Strategy. The previous version of the Strategy was published in 1998 and provided the basis for the formation of the committees to help meet the Society's goals. She further noted the committees should align with the new strategy. If anyone has comments on this, please send them to Teresa and Heidi Dunn. This was followed by each of the committees providing a brief oral update on their activities.

Continuing with the highlights of the Society's accomplishment since 2015, Teresa noted the formation of two ad hoc committees.

- International Committee: at the Board Meeting, this committee submitted a plan for an international conference in northern Italy in September 2018. The co-chairs are Art Bogan and Manuel Lopes-Lima.
- Committee for Professional Development: spearheaded by Becca Winterringer.

President Newton dissolved the National Strategy ad hoc committee due to the completion of the revision noted above. That committee would be formed again for the next 10-year revision.



President Newton also dissolved the Ecosystem Services ad hoc committee. The Board supports this concept but dissolved the committee due to lack of support. No chairperson stepped forward to take the lead.

Jennifer Archambault presented awards to the three Symposium BINGO winners: Nikki Dennis, Kelly McNichols, and Jeremy Tiemann.

April 22 is Earth Day. Teresa brought forward that the Board was in favor of the Society supporting the March For Science on that day. Our role would involve posting information on the website and on Facebook. She asked for a show of support from the membership. All were in favor.

As Chair of the Symposium Committee, Heidi Dunn presented information on the 2018 Workshop. Diane Waller and Megan Bradley will be heading this up Workshop that will be held March 13-15, 2018, at the Radisson Hotel in La Crosse, Wisconsin. A field trip to the U.S. FWS La Crosse Fish Health Center is also planned. [More information about this Workshop is presented on Page 26.]

Heidi indicated that FMCS members in the Pacific Northwest were being approached about sponsoring the Symposium in 2021. She asked the membership for a show of hands to indicate their approval to proceed with planning for that Symposium. The idea of a Pacific Northwest Symposium received overwhelming support.

Charles Randklev provided a presentation on the 2019 Symposium to be held in Texas. It will be called "Life on the Edge: Reconciling River Management." He provided information on two locations: San Antonio and Austin. A show of hands selected San Antonio as the preferred location.

Jeremy Tiemann presented information on the Consortium of Aquatic Science Societies (CASS), noting that it had a voice of 22,000 members. He indicated that the Board had voted to notify the membership that FMCS would be notifying CASS as to our desire to become a member.



Leroy Koch presented the results of our recent election. Emily Grossman and Janet Clayton were unopposed and will be continuing as Treasurer and Secretary, respectively. Jeremy Tiemann was elected President-elect. Leroy also extended his thanks to Todd Morris for his willingness to step up and run for this office.

Members of the Awards Committee presented the student and professional awards (See article on Page 19).

Passing the Viking hat has become the traditional form of passing the FMCS torch to the incoming President. Especially in recent years, each president has added something to the hat and, with the most recent presidents being female, this has included the addition of jewels (Caryn Vaughn) and pigtails (Patty Morrison). This time Teresa Newton added the symbol of the Triquetra, the symbol of female empowerment.



This symbol represents the 3-fold nature of a Goddess as a (1) maiden, (2) a mother, and (3) a

crone. OR, in our language, it might represent the 3-fold nature of a malacologist. The newly-embellished hat was passed to the new President, Heidi Dunn. Following Heidi's acceptance speech, the meeting was adjourned.

Respectfully submitted,
Janet L. Clayton, FMCS Secretary

2017 FMCS Awards Presentations

Student Awards

The Awards Committee solicited applications for student travel awards to assist students in attending the biennial symposium. Similar to past years, travel awards were made in the form of pre-paid rooms at the symposium hotel. A total of 29 students (3 BS, 14 MS, and 12 PhD) applied for travel awards and, based on the allotted funds for all awards from the Society and the cost of rooms, nine student awards were presented. Seven of these students are earning their M.S. and two are earning their PhDs. The following students were selected to receive these travel awards: Susan Geda (Appalachian State University), Verena Huber (Technical University of Munich), Jennifer Morton (Texas A&M University), Anakela Popp (North Carolina State University), Joseph Salerno (University of Guelph), Brandon Sansom (University of Buffalo), Mariah Scott (Central Michigan University), Leslie Sneed (Kentucky State University), and Rebecca Tucker (Auburn University).



The nine Student Travel Award Recipients

Best Student Platform and Poster Awards

A total of 38 student presentations required judging at the 2017 Symposium (19 platforms and 19 posters). Each platform presentation was judged by four separate judges and each poster was judged by three separate judges, which meant that 46 FMCS members volunteered to get the job done! The Awards Committee thanks every member who helped us judge student presentations—we could not present these awards without you.

The **Best Student Platform Paper Award** went to **Kayla Key** of the University of Missouri (co-authors Garth Lindner, Amanda Rosenberger, and Kristen Bouska) for her talk entitled “Hierarchical approach to mussel conservation: from niche modeling to field monitoring”. The honorable mention platform award went to Ankeka Popp of North Carolina State University (co-authors W. Gregory Cope, Monte McGregor, Leroy Koch, Thomas J. Kwak, Tom Augspurger, and Jay F. Levine) for her talk entitled, “Is juvenile mussel chemical sensitivity influenced by propagation method and age? A comparison of *in vitro* and *in vivo* propagated juveniles”.



Best Student Platform Paper Award winner Kayla Key (center) with Honorable Mention Platform winner Ankeka Popp (left) and Awards Committee Presenter Eny Monroe (right).

The **Best Student Poster Award** went to **Mark Kugler** from SUNY Cobleskill (co-authors Paul Lord and Andrew Gascho Landis) for his poster entitled, “Populations on the brink: predictive estimates of time since recruitment for *Elliptio complanata* by thin-section aging of deceased individuals”. The honorable mention poster award went to Steven Hein from Miami University (co-author David Berg) for his poster entitled, “Modeling population connectivity of an imperiled freshwater mussel, *Popenaias popeii*, through the use of next generation sequencing”. Congratulations to all the fine student presentations at this year’s symposium!

Professional Awards

The Awards Committee solicited nominations and applications from the membership for professional awards to be presented at the biennial symposium. In 2017, we received one nomination for the **William J Clench Memorial Award**. This year’s award went to **Tim Savidge** (Three Oaks Engineering) for his 24-year non-academic career as an aquatic ecologist and malacologist working for various state agencies and independent environmental consulting firms. Tim has an extensive knowledge of the biology, ecology, life history, and habitat requirements of native freshwater mussels of the southeastern US, but especially those difficult to sample and identify taxa of Atlantic Slope drainages.



Tim Savage (center) with members of his nomination team.

We received one application for the **Meritorious Service Award**. This year's award went to **Steve McMurray** (Missouri Department of Conservation) for his numerous years of service



Steve McMurray (center) with members of the team that nominated him.

directed at the conservation of freshwater mollusks. Steve has been a member of FMCS since the beginning, and has assisted with or co-chaired symposiums and workshops since 2005, and co-chairs the Environmental Quality and Affairs Committee. Steve has also contributed to the conservation and advocacy of freshwater mollusks through his work as Missouri's state malacologist. He has developed a mussel conservation plan and a propagation plan for Missouri, conducted many basin-wide surveys, and conducted numerous training and educational seminars throughout the state.

We recognized three individuals for their lifetime achievement with freshwater mollusks. One 2017 **Lifetime Achievement Award** went to **Bob Butler** (U.S. Fish and Wildlife Service, North Carolina) for a long career aimed at determining the current status and distribution of native freshwater mussels in the southeastern US. Bob has worked within the Endangered Species Act Listing and Recovery program in Region 4 and has prepared proposed and final rules for listing of aquatic species and designation of critical habitat in the eastern US. Bob also was instrumental in creating the Tennessee and Cumberland Mollusk Restoration Plan, which is a model for prioritizing the recovery of critically rare species in both drainages.



Bob Butler (center) with members of his nomination team.



The second 2017 **Lifetime Achievement Award** went to **Dan Hornbach** (Macalester College) for a lifetime of research on fingernail clams, Asiatic clams, gastropods, and unionids. His work on fingernail clams includes studies on population energetics, behavior, physiology, ecology, reproduction, taxonomy, and life history. Dan has authored or co-authored 21 peer-reviewed papers on population dynamics, ecology, distribution, physiology, sampling, life history, and modelling in unionids. In addition, Dan has educated hundreds of students at Macalester College, where he currently teaches courses on aquatic ecology and environmental science.

The third 2017 **Lifetime Achievement Award** went to **Patty Morrison** (U.S. Fish and Wildlife Service (FWS), West Virginia) for a 30-year career as a champion of native freshwater mussels. Patty was the first biologist hired at the Ohio River Islands National Wildlife Refuge and, shortly thereafter, developed a mussel program for the Refuge. In 2002, she received the River Keeper Award from the Ohio River Basin Consortium for Research and Education in recognition of her contributions for protection of the quality of the environment in the Ohio River Basin. She also received a Certificate of Special Appreciation from the FWS for outstanding dedication and commitment to natural resource management and support as Team Leader for the Ohio River Valley Ecosystem Team. Last, but not least, Patty served as FMCS President during 2013-2014.



Patty Morrison (center) with members of the team that nominated her.

Summaries of Committee Meetings Held During the 2017 Symposium

Environmental Quality and Affairs Committee

The Environmental Quality and Affairs Committee (EQAC) met on Tuesday, April 28 during the 2017 Biennial Symposium in Cleveland, Ohio, with 10 members attending. The committee is co-chaired by Stephen McMurray, Missouri Department of Conservation, and Braven Beaty, The Nature Conservancy. Braven gave an update on the committee's activities since the last symposium in St. Charles (See committee report in Board Meeting Minutes on Page ____). We discussed several topics during our meeting:

EQAC e-mail – Committee members discussed (lamented?) the general lack of knowledge about all of the FMCS committees. To that end, the members decided to draft an e-mail that explains that our committee is here to serve as an advocacy voice when members (or non-members) can't do it on their own due to employment restrictions. This e-mail is intended to be targeted to the entire FMCS membership.

Issue Statements/Letters – It was decided to continue attempting to draft Issue Statements, starting with the 2-3 statements we already have in process and then move to others, including climate change (Fred Pinkney volunteered to lead this) and Outreach and Economics. Braven and Steve will work with the authors of the existing Issue Statements to get those finalized and out for use.

Got an Issue? – The membership also discussed proposing to work with the Outreach Committee to develop a website link where members and the public could go to alert the committee of possible issues, regulations, permits, etc., that the committee might want to address.

Co-chairs – It was decided that Steve and Braven would stay on for at least one more term as co-chairs. The members present did decide; however, that it would be beneficial to develop some sort of rotation so that new co-chairs would replace the chair with the most tenure, therefore ensuring continuity at the helm.

Information Exchange Committee

The committee met on March 28, 2017, in Cleveland, Ohio. Attendees were: Greg Cope, Tom Watters, Wendell Haag, John Jenkinson, Teresa Newton, Caryn Vaughn, and David Strayer

Ellipsaria Newsletter Discussion: John Jenkinson lamented that the number of contributed articles is declining. He wondered about inviting student platform and poster winners to post articles about their projects in the newsletter. Caryn Vaughn pointed out that many journal editors would reject submissions if the subject had been published elsewhere. The group discussed strategies to solicit articles for *Ellipsaria* from the membership, including possibly creating new sections in the newsletter and making a pitch for more submissions at the Business Meeting.

Freshwater Mollusk Biology and Conservation Journal Discussion: The group discussed the transition plans for Co-Editorship of the journal and the need to expand our Editorial Board membership. It was decided that an announcement would be made at the Business Meeting to ask for members who would be interested in serving on the Editorial Board to contact one of the existing co-editors. Messages also will be sent to the existing Editorial Board Members to see if they are willing to continue service, recommend others, or wish to rotate off. We will also be applying to BioOne for potential inclusion in their journal holdings for library distribution.

This committee performs essential editorial functions for the Society; however, it differs from the other standing committees because our functions do not vary from time to time and their effectiveness could be disrupted by frequent changes in leadership. As the Executive Committee considers adjustments in the structure of our Society associated with implementing the Revised National Strategy, some of us suggest they consider recognizing these editorships as Administrative Appointments from the Board and not the functions of a Standing Committee.

Mussel Status and Distribution Committee (includes updates through May 7, 2017)

The 2017 meeting of the Mussels Status and Distribution Committee was convened on March 28 at 12:30 p.m. by Art Bogan who then gave an update on the three major projects the Committee has been working on since 2015. Details of all three of these topics are presented in the Minutes of the Board meeting, (presented on Page 11).

1. Mussel Status Paper. The revised conservation status manuscript will be submitted to *Freshwater Mollusk Biology and Conservation*. Authors and areas of responsibility include: Todd Morris (Canada), Alberto Contreras-Aquieta and Terry Myers (Mexico), Art Bogan and Jason Wisniewski (Atlantic Coast drainages, Altamaha River, GA north to ME), Sarina Jepsen, Jayne Brim-Box and Terry Myers (Pacific Coast drainages, AZ and CA north to Canada), Charles Randklev, Bob Howells and Alberto Contreras-Arquieta (Western Gulf drainages, Rio Grande in Mexico and TX east to Red River, LA), John Harris (St. Francis, White, Arkansas and Ouachita River drainages), Steve McMurray (Missouri River drainage), Kevin Cummings (Upper Mississippi River basin, Cairo, IL upstream including Lakes Michigan and Superior), Jim Williams, Nate Johnson, and Jeff Garner (Eastern Gulf drainages, Lake Ponchartrain east to FL including Atlantic drainages of peninsular FL and Satilla River), Bob Butler, Jeff Garner and Tom Watters (Ohio River basin, including Tennessee and Cumberland drainages and U.S. drainages of Lake Erie and Lake Ontario). Going forward, action items during the first half of 2017 for manuscript revision will include: 1) develop a revised methodology for conservation status determinations based on the taxonomy adopted in the names manuscript.

2. Development of Mussel ID App. Revisions to the app character matrix are complete, and the development team is reviewing and testing the app as we continue to improve and augment the photo archive and illustrations. The team continues to search for and solicit high quality photos to complete the North American set. Additional funding has been received through ESA Section 6 to the state of Texas. When contracts are finalized, the App Developer will be ready to release a new build for peer review and testing.

3. Atlas of Freshwater Mussels of North America. Currently, 159 of the approximately 362 taxa addressed in the Atlas have volunteer authors for species accounts. We have received 22 first draft accounts. We are proceeding with preliminary and external reviews of draft species accounts and will post them when completed. A request for additional species account authors is made to FMCS members so that progress can continue on the Atlas.

Nominations were requested for Chairperson(s) of the Mussel Status and Distribution Standing Committee for 2017-2019. Arthur Bogan and John Harris were elected for another 2-year term.

Outreach Committee

We had a successful committee meeting with 15 members in attendance. We discussed the updated National Strategy and how our committee fits in. Our mission largely supports needs of Issue 7 (Strengthen advocacy and build support for conservation of mollusks and their habitats), and strategies outlined within Issue 7. To focus our actions for the next 2 years, we specifically discussed addressing Issue 7, Strategies 1 (develop a formal communication plan), 2 (tools for local decision makers (e.g., material about the National Strategy to help states understand how their goals fit); and 3 (develop communication and outreach materials targeting general public).

We also discussed how Outreach can partner with other FMCS committees to enhance and aid communication (e.g., Environmental Quality and Affairs – potential to help address needs in response to issues; Information Exchange – potentially help us disseminate and let members know about materials as they are produced; share style guide/any templates with all committees wishing to create materials).

Finally, we discussed continued outreach within FMCS, including updates to the website, future student/mentor mixers, Symposium BINGO, evaluating how those activities were received, and co-opting the journal style guide for society-wide guidance on communication materials for a seamless brand image.

Specific tasks and goals we plan to work on in the coming year include:

- coordinating with Board to sketch and draft a communications plan as called for in the National Strategy,
- continued website updates,
- looking into an FMCS cloud account (e.g., Google Drive) to house and curate photos, videos, and other content that could be used across communication materials,
- creating outreach content for the public (posters, infographics, digital slide deck, one-page fact sheets),
- outreach content for recruiting members (e.g., poster, brochure), and
- content for contextualizing the National Strategy for potential users (e.g., state agencies).

Propagation, Restoration, and Introduction Committee

The Committee met at the FMCS Symposium in Cleveland, Ohio. The room was packed with over 50 people in attendance. The Committee reviewed and approved the 2015 FMCS Symposium meeting minutes. Dan Hua stepped down as co-chair and the Committee elected Nathan Eckert and Tim Lane to fill her vacancy. The current co-chairs are Rachael Hoch, Nathan Eckert, and Tim Lane. The Committee focused on drafting goals and a new mission statement for the next two years. The mission statement is still in discussion.

The Committee made plans to tackle four main goals in the next two years:

GOAL 1. Maintain the FMCS facilities database. The Committee agreed to continue maintaining a database that summarizes information from freshwater mollusk propagation facilities including contact information, species, propagation techniques, and targeted restoration

areas. Specific actions items include making the contact information and a species summary available on the FMCS website. The Committee committed to making the contact information available in May 2017.

GOAL 2. Summarize and publicize protocols and best management practices through the development and use of an integrated bibliography. The Committee identified six major categories that needed focus: propagation, translocation and handling, quarantine and biosecurity, health and disease, restoration planning, and genetic guidelines. Volunteers were assigned to compile information for each category. The Committee plans to work with other committees, such as the Genetics and Techniques and Guidelines committees, to help build these bibliographies.

GOAL 3. Prioritize and publicize research needs. The Committee hopes to build on the bibliography efforts to identify and prioritize research needs and publish the results of these efforts in a white paper.

GOAL 4. Increase collaboration and outreach national and internationally.

Due to the large attendance, discussion occurred at the end of the meeting about dividing this Committee into two separate committees: one focused on propagation, and the other on restoration. The discussion of this topic was brief due to time constraints. A motion was made to discuss creating an ad hoc committee focused on dam removal and/or restoration to the Executive Committee. The group plans to revisit this discussion in the next Committee meeting.

International ad hoc Committee

The committee met in Cleveland, Ohio, in March 2017. Co-Chairs: Arthur E. Bogan and Manuel Lopes-Lima.

We reviewed the draft purpose of the Committee and the four goals set out in the report to the FMCS Board. Kevin Cummings stepped down as co-chair of the committee. An election was held and Arthur Bogan and Manuel Lopes-Lima were elected co-chairs for the next two years.

We noted the first FMCS International Freshwater Mollusk meeting is being planned for September 2018 and will be held in northern Italy. Nicoletta Riccardi is the host. She is working with Manuel Lopes-Lima to plan this meeting. The first two international freshwater bivalve meetings, Bragança, Portugal 2012, and Buffalo, New York 2015, were both exciting with good participation.

We are working to develop an international subcommittee of local malacologists, e.g. initially from Europe, but to be expanded to other continents around the world to provide structure and communication about resources, questions, lobbying and collaboration. This will facilitate answering problems and developing techniques to address the same or similar problems encountered across freshwater molluscan research. Europe has been chosen for the test case because of the large number of active freshwater malacologists working in different countries.

We are encouraging our international members to continue to contribute to our newsletter, *Ellipsaria*. The editors of *Freshwater Mollusk Biology and Conservation* would like to encourage guest editing of special issue on specific topics, techniques or problem areas.

Professional Development Ad hoc Committee

The Committee met on March 28, 2017. In Attendance were: Becca Winterringer – co-chair, Amanda Rosenberger – co-chair, Todd Morris, Greg Zimmerman, Janet Clayton, and Heidi Dunn.

Becca provided an overview of the purpose of the Professional Development ad-hoc Committee to the group and reviewed action items from the last call. The group had open discussion related to:

- Program development and administration
- Integrate elements of existing programs (e.g.: AFS, TWS)
- Discussed the criteria; considering AFS Certified professionals already have a level of certification that may not warrant as much review.
- How the committee may establish a review panel for applicants
- Setting up a Survey Monkey to the membership for interest and elements that the Program should consider
- Fee structure (how to implement, how funds would be used)
- Identify maintenance costs

Action Items:

- Draft criteria, Draft Purpose and Objective, and Define Implementation
- Develop Survey to membership – Greg Z to draft
- Amanda R to talk with Steve McMillin of Virginia Tech on how AFS certification works and get his input on FMCS setting up a similar program

Announcements

2018 FMCS Workshop Freshwater Mollusk Health and Disease Assessment La Crosse, Wisconsin March 12-15, 2018

Health assessment and diseases of freshwater mollusks are important concerns for propagation, relocation, and conservation programs. The 2018 FMCS Workshop will provide background on disease organisms and their transmission. This Workshop also will include information on mussel health assessment tools, sampling procedures for health assessments, a case study of a mussel die-off, and a laboratory session covering necropsy, sample collection and examination, and histology. The Workshop will be accompanied by a poster session and mixers to encourage discussion among participants, and an optional field trip to the mussel propagation facility at Genoa National Fish Hatchery.

More details about this Workshop and how to register will be posted on the FMCS website and in future issues of *Ellipsaria*. If you would like to assist in the planning for this Workshop or have questions about its scope or content, please contact Diane Waller (dwaller@usgs.gov) or Megan Bradley (megan_bradley@fws.gov).

New Publication Available

McMurray, S. E., J. S. Fairman, and A. C. Buchanan. 2017. Distribution and status of the freshwater mussel fauna of the Salt River basin, Missouri. *Great Plains Research*, 12:21-33.

Abstract—We quantitatively surveyed freshwater mussels in the Salt River basin, Missouri, during 1977— 86 and 2005— 7. A cumulative sample of 6,234 live individuals representing 31 species was recorded during both periods; six additional species were recorded only as shell material. *Amblema plicata* was the dominant species recorded, representing 31.3% of the total live animals. There were no significant differences in average species richness, Brillouin's index values, or relative abundances of the tribes amblemini-pleurobemini-quadrulini between the two surveys. The most notable change was the complete loss of the mussel fauna in the South Fork Salt River. We also observed significantly higher probabilities

of local extirpation in the mainstem Salt River, North Fork Salt River, Middle Fork Salt River, and South Fork Salt River. At the tribe level, the amblesini had a higher probability of local colonization and the lampsilini had a higher probability of local extirpation.

Reprints of this paper are available from Stephen.mcMurray@mdc.mo.gov

Another Recent Publication Available

Beaume, N., Pasco, P.Y., Ribeiro, M., Dury, P., Rostagnat, L. and Beauvils, B. 2016. *Freshwater Pearl Mussel Conservation in the Rivers of Brittany and Normandy: LIFE+ Nature «Freshwater Pearl Mussel Conservation in the Armorican Massif, 2010–2016. Bretagne Vivante / CPIE des Collines / FDPPMA 29 / SIAES / PNRNM. Brest. 72 p.*

Introduction

The European freshwater pearl mussel conservation programme was launched on 1 September 2010 and continued for 6 years, ending on 31 August 2016. The goal of the programme as it was rolled out in Brittany and Normandy was to breed this species, which is endangered in the Armorican Massif, and to maintain and develop the living rivers which are necessary for its survival there. Numerous studies have described a similarly urgent situation for mussels in both Brittany and Normandy, due to progressive disappearance and ageing populations. The strong heritage significance of the freshwater pearl mussel, a living witness to the development of the valleys of the Armorican Massif, as well as its bio-indicator qualities, its living requirements and its status as an umbrella species, make it an excellent candidate for conservation with regards to the current state of its populations in the Armorican Massif. The project was carried out in harmony with both the freshwater pearl mussel National Action Plan and the European Water Framework Directive, which aimed to reach the goal of healthy watercourses by 2015.

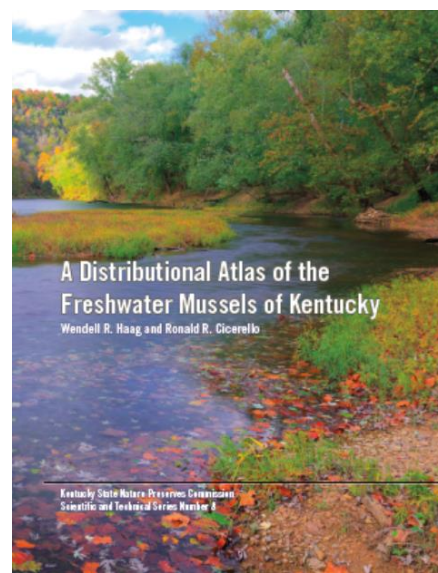
A pdf of this publication is available at: <https://goo.gl/u8MjqM>

Kentucky Mussel Atlas Now Available Online

Haag, W.R. and R.R. Cicerello. 2016. *A distributional atlas of the freshwater mussels of Kentucky*. Scientific and Technical Series 8. Kentucky State Nature Preserves Commission, Frankfort, Kentucky. 299 pp.

This book was published last year and a hard copy is available free of charge from the Kentucky State Nature Preserves Commission (see *Ellipsaria*, Vol. 18, No. 3, September 2016, Page 7). A free, downloadable pdf version of the book is now available. Because of its size, the book is divided into two parts for download. Go to <http://naturepreserves.ky.gov/pubs/Pages/bookstore.aspx> to download the book or request a hard copy.

Kentucky State Nature Preserves Commission
801 Teton Trail
Frankfort, KY 40601-1403
502-573-2886
naturepreserves@ky.gov



Freshwater Mussel Workshop at Ohio State

A four-day workshop on freshwater mussel identification and sampling techniques will be held October 2-5, 2017, at the Division of Molluscs of the Ohio State University, 1315 Kinnear Road, in Columbus, Ohio. The workshop will cover upper Ohio River and Great Lakes species. The Division's collection of nearly 500,000 specimens of freshwater mussels will be used for hands-on training on how to tell one living rock from another, including those pesky "Fuscobemas." Attendance is limited to 30 people.

For more information, follow the link here: <http://www.biosci.ohio-state.edu/~molluscs/OSUM2> or contact Dr. G. Thomas Watters at Watters.1@osu.edu.

2017 Freshwater Mussel Training Courses at NCTC

During 2017, the U.S. Fish and Wildlife Service (FWS) will be offering three training courses concerning freshwater mussels at the National Conservation Training Center (NCTC) in Shepherdstown, West Virginia, USA. Here are descriptions of each of these three courses:

Conservation Biology of Freshwater Mussels CSP 1101

This is an introductory course on the biology and ecology of freshwater mussels and the conservation issues facing this highly-endangered group of animals. Topics to be covered include anatomy, physiology, life history, health, ecosystem services, mussels as biomonitors, conservation status, population impacts, conservation measures (relocation, propagation, conservation genetics), legal issues (permits and the ESA, Section 7 consultations, critical habitat), and field techniques (survey techniques, sampling techniques, habitat assessment). This course will address key characters for identification of freshwater mussels and will provide opportunities in the laboratory to practice with dichotomous keys; however due to time constraints and the regional nature of mussel assemblages; this is **NOT** a mussel identification course.

Objectives:

Upon completion of this course, you will be able to identify:

- ✓ why mussels matter to FWS
- ✓ why so many mussel species are endangered
- ✓ the skills and tools available for mussel conservation
- ✓ the legal issues related to mussel conservation
- ✓ the genetic concerns associated with mussel conservation

Date: August 7 – August 11, 2017

Instructors: Dr. Chris Barnhart and Heidi Dunn

Who Should Attend: Anyone who works with freshwater mussels (biologists, environmental educators, etc.) but has little formal knowledge of their biology.

Course Length: 4.5 days **College Credit:** 2 semester hours

Tuition: Prepaid for FWS, NPS, and BLM employees; \$1,195.00 for participants from other agencies and organizations.

Freshwater Mussel Propagation for Restoration CSP 1102

Freshwater Mussel Propagation for Restoration is an introductory course designed to explore all culture activities associated with freshwater mussels. Participants will explore the latest culture techniques as they follow freshwater mussels through their entire life cycle in a culture facility, from the collection of gravid females to stocking cultured juvenile freshwater mussels. Following a basic introduction on mussel biology and the goals of mussel propagation, the course will cover the basics of building a culture facility, collecting and maintaining brood stock, collecting host species, infesting host species with larval mussels, collecting and culturing juvenile mussels, and releasing juveniles to the wild.

Objectives:

Upon completion of this course, you will be able to:

- ✓ describe the internal and external anatomy of a freshwater mussel
- ✓ collect and maintain freshwater mussel brood stock in captivity
- ✓ collect and maintain host species in captivity
- ✓ harvest freshwater mussel larvae and infest host species
- ✓ collect newly metamorphosed juvenile mussels and culture them for release
- ✓ describe the advantages and disadvantages of the various techniques, equipment, and culture units used in freshwater mussel propagation throughout the United States.
- ✓ release and monitor cultured juvenile freshwater mussels
- ✓ maintain accurate records and publish results

Date: September 18 – September 22, 2017

Instructors: Rachel Mair, Nathan Eckert, Tony Brady, Jess Jones, and Matthew Patterson

Who Should Attend: Biologists interested in freshwater mussel biology and freshwater mussel culture techniques.

Course Length: 4.5 days **College Credit:** 2 semester hours

Tuition: Prepaid for FWS, NPS, and BLM employees; \$1,195.00 for participants from other agencies and organizations.

Freshwater Mussel Identification CSP 1103

The purpose of this course is to develop the participant's freshwater mussel identification skills and knowledge of regional freshwater mussel species. Participants will learn an overall system for identifying mussels and characteristics of major taxonomic groups within the families Unionidae and Margaritiferidae and will provide the basis to approach species-level identification. Although emphasis will be placed on the Ohio River fauna (including the Tennessee River) specimens will be available from across the country. This course is "hands on" and laboratory and field exercises will provide shells and fresh specimens for identification.

Objectives:

Upon completion of this course, you will be able to:

- ✓ identify unknown freshwater mussels by following methods as described in the course
- ✓ use proper freshwater mussel collection-labeling and preservation techniques
- ✓ use distributional maps as an aid to freshwater mussel identification
- ✓ use dichotomous keys,
- ✓ discuss identification tricks-of-the-trade

Date: June 26 – 30, 2017

Instructors: Kevin Cummings, Jess Jones, Bob Anderson, and Nate Johnson

Who Should Attend: Anyone who works with freshwater mussels (biologists environmental educators, etc.) and would like to be able to identify shells and live specimens in the field.

Course Length: 4.5 days **College Credit:** 2 semester hours

Tuition: Prepaid for FWS, NPS, and BLM employees; \$1,195.00 for participants from other agencies and organizations.

To Register for any or all of these courses:

Department of Interior (DOI) employees: Log in to DOI Learn, enter the course title in the search box, click scheduled classes, click submit request.

Non-DOI employees: If you do not have a DOI Learn account, please contact Matthew Patterson (304/876-7473 matthew_patterson@fws.gov) for instructions on how to create an account and register.

NCTC has lodging and meal plans for course participants at the standard government per diem rate for Shepherdstown, West Virginia, USA. Other lodging and eating facilities also are available in the area. Please contact Matthew Patterson (304/876-7473 matthew_patterson@fws.gov) with any questions about these courses or the venue.

Regional Meetings

FMCS Regional Mollusk Meeting Assistance Award Program

As described in the December 2012 issue of *Ellipsaria*, the FMCS has established a Regional Mollusk Meeting Assistance Award Program to facilitate regional mollusk meetings that address local and regional concerns with freshwater mollusk conservation and management. Our interest in assisting with these meetings is to bring people together who work with freshwater mollusks to exchange information on how to conserve and protect this faunal group. These meetings are often attended by a variety of individuals, including agency personnel, academia, private citizens, scientists, and others, some of whom may not be FMCS members. Therefore, a secondary goal of this program is to increase the awareness of, and membership in, FMCS among individuals in these groups. Support is provided via a cash award of \$100 to the regional group to help defray the costs (e.g., meeting room rental, speaker travel, break refreshments, etc.) associated with holding their meeting. It is anticipated that about 15-20 awards will be made in a given calendar year.

The complete program description and application form may be obtained from the Awards Committee website at http://www.molluskconservation.org/Mservices_awards.html. One copy of the completed application must be received by the Chair of the Awards Committee at least two months prior to the Regional Mollusk Meeting to allow for application and payment processing.

Chesapeake Bay Freshwater Mussel Workgroup Meeting Annapolis, Maryland January 31, 2017

The annual Chesapeake Bay Freshwater Mussel Workgroup meeting convened in Annapolis, Maryland on January 31, 2017. Meeting attendance and participation was the highest in the group's short history. In person attendance increased to 26 people and at least 29 people participated via web and teleconferencing. Meeting participants represented state and federal resource agencies, river basin commissions, non-profit organizations, consultants, and academia. The topics included:

- Range-wide status assessment of Brook floater
- Propagation at Harrison Lake National Hatchery,
- Mussel relocation, environmental DNA, and tidal-freshwater surveys in Maryland
- Species status assessment and status review timelines
- eDNA applications in West Virginia
- American eel and Eastern elliptio restoration in the upper Susquehanna River
- Delaware River basin mussel restoration program update
- Dwarf wedgemussel population estimate, habitat, and life history studies
- Estimating ecosystem services of Atlantic slope mussel beds
- Chronic effects of chloride exposure to mussels
- Eastern elliptio contaminant bioaccumulation study in the Anacostia River
- James spinymussel mark-recapture study

Financial assistance for this regional meeting was graciously provided by FMCS through the Awards Committee and supported refreshments and a working lunch for attendees. Presentations, with permission of the author, can be obtained from Julie Devers along with more detailed meeting notes. For information on this and future meetings contact Julie Devers julie_devers@fws.gov or Matt Ashton at matthew.ashton@marylnd.gov.

Northeast Regional Freshwater Mussel Meeting, March 7, 2017
U.S. Fish and Wildlife Service Region 5 Headquarters, Hadley, Massachusetts
Peter Hazelton¹ and Laura Saucier²

¹ Massachusetts Division of Fisheries & Wildlife, Natural Heritage & Endangered Species Program, Westborough, Massachusetts.

² Wildlife Diversity Program, Bureau of Natural Resources, Connecticut Department of Energy & Environmental Protection, Burlington, Connecticut.

The Massachusetts Division of Fisheries & Wildlife, Connecticut Department of Energy & Environmental Protection, and the United States Fish & Wildlife Service Region 5 hosted a regional symposium on mussel research and conservation on March 7, 2017. This is the second meeting of this renewed effort to provide a regional avenue for networking and sharing experiences on Unionoida conservation. Approximately 40 participants from state and federal agencies, academia, and consulting firms attended the meeting and engaged in discussion on Northeastern issues. Despite some technical difficulties, another 10-12 folks tuned-in via Webex.

The focus of the meeting has been on work conducted in New England and New York, but we welcome participation from other neighboring areas. We hope to continue to meet on a two-year cycle, and will again advertise in the Unio Listserve. We thank FMCS for refreshments, made possible through a Regional Mollusk Meeting Award.

Contributed Talks:

A new freshwater mussel collaborative in the Northeast. David Perkins¹, Peter Hazelton², Allison Roy³.

¹U.S. Fish & Wildlife Service, Richard Cronin Aquatic Resource Center, Sunderland, MA;

²Massachusetts Division of Fisheries & Wildlife, Natural Heritage & Endangered Species Program, Westborough, MA; ³U.S. Geological Survey, Massachusetts Cooperative Fish and Wildlife Research Unit, Department of Environmental Conservation, University of Massachusetts, Amherst, MA. Email: david_perkins@fws.gov

A terrifying tale of compounding stressors: an American Shad's desperate attempt to overcome a glochidial infestation. Kerstin Cody, Kevin Cheung, and Shane Hanlon. USFWS, North Attleboro National Fish Hatchery. Email: shane_hanlon@fws.gov

Freshwater mussel survey for Roebling Bridge upgrade project over the Delaware River Pike County, Pennsylvania and Sullivan County, New York. Philip T. Mathias and Gregory F. Zimmerman, EnviroScience, Inc. Stow, OH. Email: pmatias@enviroscienceinc.com

Range contraction of the Brook Floater *Alasmidonta varicosa*: how do we protect remaining populations? Barry J. Wicklow¹, Tina A. Cormier², Jesse Bishop², Susi von Oettingen³ and Julie Devers⁴. ¹St. Anselm College, Manchester, NH; ²Woods Hole Research Center, Woods Hole, MA; ³USFWS, New England Field Office, Concord, NH; ⁴USFWS, Maryland Fisheries Resource Office, Annapolis, MD. Email: BWicklow@Anselm.edu

Status of Dwarf Wedgemussel populations in the Delaware River watershed: a within-basin and rangewide assessment of status and trends. Jeff C. Cole, USGS, Leetown Science Center, Northern Appalachian Research Laboratory, Wellsboro, PA. Email: jccole@usgs.gov

Update on freshwater mussel training curriculum at NCTC. Matthew Patterson, USFWS, National Conservation Training Center (NCTC), Shepherdstown, WV. Email: matthew_patterson@fws.gov

Baseline qualitative and quantitative mussel surveys associated with dam removals in the Mill River watershed, Massachusetts. Alan D. Christian, School for the Environment, University of Massachusetts Boston, Boston, MA. Email: Alan.Christian@umb.edu

Habitat use and translocation of rare mussels prior to dam removal. Peter D. Hazelton. Massachusetts Division of Fisheries & Wildlife, Natural Heritage & Endangered Species Program, Westborough, MA. Email: peter.hazelton@state.ma.us

Investigating the thermal biology of freshwater mussels: advances in methodology and future applications. Carrie J. Blakeslee, USGS, Leetown Science Center, Northern Appalachian Research Laboratory, Wellsboro, PA. Email: cblakeslee@usgs.gov

Status of the Brook Floater (*Alasmidonta varicosa*) in Maine. Ethan Nedeau¹ & Beth Swartz²,
¹Biodrawiversity LLC., Amherst, MA; ²Maine Department of Inland Fisheries and Wildlife, Bangor, ME;
 Email: ethan@biodrawiversity.com

What's next? Brook Floater rangewide conservation and restoration initiative. Allison H. Roy^{1,2},
 Peter D. Hazelton³, Sean Sterrett², Ayla Doubleday^{2,4}, Andrew Fisk⁴, Lisa Holst⁵, Michael Marchand⁶,
 David Perkins⁷, Michelle D. Staudinger^{1,8}; Beth Swartz⁹, and Brian Watson¹⁰. ¹USGS, ²Massachusetts
 Cooperative Fish and Wildlife Research Unit, UMass, Amherst, MA; ³MA DFW, Westborough, MA;
⁴Connecticut River Watershed Council; ⁵New York State Department of Environmental Conservation,
 Albany, NY; ⁶New Hampshire Fish & Game Department, Concord, NH; ⁷USFWS, Cronin Aquatic
 Resource Center, Sunderland, MA; ⁸Northeast Climate Science Center, UMass, Amherst, MA; ⁹Maine
 Department of Inland Fisheries and Wildlife, Bangor, ME; ¹⁰Virginia Department of Game and Inland
 Fisheries, Richmond, VA. Email: aroy@eco.umass.edu

For more information about this Northeast Regional Freshwater Mussel Meeting, please contact Peter
 Hazelton (peter.hazelton@state.ma.us) or Laura Saucier (Laura.Saucier@Ct.gov).

Virginia Atlantic Slope Mollusk Recovery Group (MRG) 11th Annual Meeting

On March 9, 2017, Brian Watson (Virginia Department of Game and Inland Fisheries) convened the
 11th annual meeting of the Virginia Atlantic Slope Mollusk Recovery Group in Charles City, Virginia (VA).
 The VA Atlantic Slope MRG was formed in 2006 to discuss and address conservation and recovery issues
 pertaining to freshwater mollusks in VA's Atlantic Slope waterways. The Group is comprised of members
 from the VA Department of Game & Inland Fisheries (DGIF), U.S. Fish and Wildlife Service (FWS), VA
 Department of Conservation and Recreation's Heritage Program (DCR), Virginia Tech (VT), The Nature
 Conservancy (TNC), U.S. Forest Service, private consultants, and other universities and NGOs. Thirteen
 people attended the 2017 meeting, while nine others participated by phone and thru GoToMeeting.

The morning session included updates on propagation at the VA Fisheries and Aquatic Wildlife Center
 (VFAWC) at Harrison Lake National Fish Hatchery and the Freshwater Mollusk Conservation Center
 (FMCC) at Virginia Tech, brook floater status assessment update and an eDNA project at VA
 Commonwealth University (VCU). In 2016, the VFAWC propagated over 1.1 million juvenile mussels from
 six species and released over 24,000 tagged mussels in the Nottoway, Meherrin, and Rappahannock
 rivers. The FMCC continued annual streamside infestations with the endangered James spinymussel
 (*Parvaspina collina*; JSM) as part of a FWS Biological Opinion with the VA Department of Transportation
 (VDOT), releasing nearly 270 infested cyprinids to Craig Creek and Johns Creek, Craig County. Barry
 Wicklow, Saint Anselm College, provided information showing the decline of brook floater (*Alasmidonta
 varicosa*) across its range, including its stronghold in the northeast. It appears brook floater is particularly
 sensitive to riparian buffer loss and associated impacts such as eutrophication and water temperature
 increases. The morning session wrapped up with Bonnie Roderique, graduate student at VCU, updating
 the MRG on her eDNA project targeting JSM. VDOT is funding the project in hopes of being able to detect
 the presence of JSM as part of their project reviews. The eDNA project also will attempt to determine the
 relative abundance of JSM populations based on eDNA signal strength.

The afternoon session shifted toward environmental-related issues and field surveys. Sarah McRae
 (FWS) presented on the Species Status Assessment (SSA) for the petitioned yellow lanced (*Elliptio
 lanceolata*) and Atlantic pigtoe (*Fusconaia masoni*). Yellow lance was proposed for federal listing as
 threatened, while a listing determination for the Atlantic pigtoe was delayed until 2018 to meet the
 deadline. DGIF and Environmental Solutions and Innovations, Inc. provided updates on two natural gas
 projects, the Atlantic Coast and Mountain Valley pipelines, which will cross nearly 3,000 streams between
 the two projects. DGIF and FWS provided an update on the South River/DuPont Natural Resource
 Damage Assessment and Restoration case and the Dan River coal ash spill. A draft settlement was
 reached for DuPont/South River with \$4 million dollars proposed for mussel restoration, which would be
 shared between VFAWC and FMCC. VFAWC was awarded a \$600,000 grant thru the National Fish and
 Wildlife Foundation as part of the mussel restoration work for the Dan River coal ash spill. Over three

years, restoration work with triangle floater (*Alasmidonta undulata*), yellow lampmussel (*Lampsilis cariosa*), green floater (*Lasmigona subviridis*), eastern elliptio (*Elliptio complanata*) and JSM will be targeted in the Dan River upstream of Danville. The meeting concluded with a review of significant mussel surveys in 2016 and planned surveys in 2017, including Conservation Management Institute, VA Tech, surveys in the New River as part of the Fries Dam relicensing; DCR surveys in Tye River for JSM; and the long-term mark-recapture surveys at 7 sites across the Piedmont. The meeting wrapped up with attendees touring the VFAWC.

For more information, contact Brian Watson at brian.watson@dgif.virginia.gov or (434) 525-7522, x 114.

Upcoming Meetings

June 4 – 9, 2017 – Society for Freshwater Science Annual Meeting, Raleigh, North Carolina, USA
Theme: *Designing our Freshwater Futures* <http://sfsannualmeeting.org/>

July 16-21, 2017 – American Malacological Society 83rd Annual Meeting, University of Delaware, Newark, Delaware, USA Theme: *Mollusk research in a digital world: creating, integrating and mining large datasets* <http://www.malacological.org>

August 20 – 24, 2017 – American Fisheries Society 147th Annual Meeting, Tampa Convention Center, Tampa, Florida, USA Theme: *Fisheries Ecosystems: Uplands to Oceans* <http://fisheries.org/events-page/future-afs-meetings/>

September 10 – 14, 2017 – 8th European Congress of Malacological Societies, Kraków University of Technology, Kraków, Poland. <http://www.euromal.pl/>

March 12 – 15, 2018 – FMCS Workshop, Freshwater Mollusk Health and Disease Assessment, La Crosse, Wisconsin, USA.

July 21 – 26, 2018 – Society for Conservation Biology North American Sectional Meeting, Westin Harbour Castle Conference Centre, Toronto, Ontario, Canada. Theme *Conservation Science, Policy, and Practice: Connecting the Urban to the Wild* <http://conbio.org/groups/sections/north-america/meetings/>

September 2018 -- First FMCS International Freshwater Mollusk Meeting, Northern Italy, Details and precise location yet to be determined.

March 18 – 22, 2017 – National Shellfisheries Association 110th Annual Meeting, Renaissance Hotel, Seattle, Washington, USA Theme: [not posted] <https://shellfish.memberclicks.net/annual-meeting>

March 2019 – FMCS Symposium, San Antonio, Texas, USA. Theme: *Life on the Edge: Reconciling River Management*.



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.

***Ligumia subrostrata* Metamorphose on Centrarchids, Esocids, Fundulids, and Some Cyprinids in the Laboratory**

Jeffrey Tillery¹, Alex Franzen¹, Mike Davis², Mark Hove¹, Kyle Johnson¹, Sabrina Marconie¹, Shelby Marr², Madeline Pletta², Avery Sampson¹, Bernard Sietman², Cameron Swanson¹, and Tricia Wagner²

¹ University of Minnesota, 2003 Upper Buford Circle, St. Paul, Minnesota 55108,
(mark_hove@umn.edu)

² Minnesota Department of Natural Resources, 2109 North Lakeshore Drive, Lake City, Minnesota 55041

Ligumia subrostrata (Say, 1831) is listed as a threatened species in the state of Minnesota; however, specimens in the state might represent the most substantial population remaining in the upper Midwest (Sietman *et al.*, 2003). This study adds to our previous work (Hove *et al.*, 2016a) on suitable hosts for *L. subrostrata*.

We collected gravid *L. subrostrata* from the Rock River, Pipestone County, Minnesota, and infested fishes using standard methods (Hove *et al.*, 2016b). Fishes were grouped by species and held between 20-24 °C. For each trial, we counted the number of glochidia and juveniles released by the fish to calculate metamorphosis success, an indicator of fish species productivity for juvenile propagation purposes.

All species of Centrarchidae, Esocidae, and Fundulidae that were tested facilitated *Ligumia subrostrata* glochidia metamorphosis in at least one trial (Table 1). Tested species on which glochidia metamorphosis was not observed (number of trials, number of survivors) were: *Amia calva* (1,1), *Lepisosteus osseus* (2,2), *Campostoma anomalum* (2,8), *Cyprinella lutrensis* (2,5), *Cyprinus carpio* (2,3), *Luxilus cornutus* (1,3), *Notropis dorsalis* (1,10), *N. stramineus* (1,7), *Pimephales notatus* (2,14), *P. promelas* (2,10), *Rhinichthys atratulus* (1,5), *Carpoides cyprinus* (1,2), *Catostomus commersonii* (2,5), *Ictiobus bubalus* (1,7), *Moxostoma macrolepidotum* (2,8), *Ameiurus melas* (1,6), *A. natalis* (1,1), *A. nebulosus* (1,1), *Ictalurus furcatus* (1,2), *Noturus gyrinus* (3,23), *Percopsis omiscomaycus* (2,6), *Etheostoma caeruleum* (1,3), *E. exile* (1,2), *E. nigrum* (1,2), *Perca flavescens* (1,5), *Percina caprodes* (1,6), *P. maculata* (1,12), *P. phoxocephala* (1,2), *Sander vitreus* (1,2), *Aplodinotus grunniens* (2,3), *Necturus maculosus* (1,1) (only amphibian tested)

The results from this study were similar to earlier host suitability research. Centrarchids, esocids, fundulids, and gastroteids supported much higher transformation rates than amiids, cyprinids, catostomids, and ictalurids (Hove *et al.*, 2016b, this study). While most centrarchids supported relatively high rates of glochidia metamorphosis, results for *Ambloplites rupestris*, *Lepomis gulosus*, and *Pomoxis nigromaculatus* were variable between trials, and *Micropterus dolomieu* consistently produced a low number of juveniles.

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Table 1. Results from *Ligumia subrostrata* glochidia host suitability trials. No. of fish = number inoculated/number of survivors, Period (d) = juvenile release period in days, Metamorphosis success (%) = percentage of recovered glochidia that metamorphosed into juveniles.

Fish Species	No. of fish	Period (d)	No. of juveniles	Metamorphosis success (%)
<i>Notemigonus crysoleucas</i> (1)	3/3	13-20	194	8
<i>N. crysoleucas</i> (2)	4/3	13	3	1
<i>Rhinichthys cataractae</i>	3/3	13-16	17	1
<i>Semotilus atromaculatus</i> (1)	2/1	13	2	0.3
<i>S. atromaculatus</i> (2)	8/8	3	0	0
<i>Esox lucius</i>	1/1	11-14	25	56
<i>Umbra limi</i>	5/5	16-37	1467	74
<i>Fundulus diaphanus</i>	3/0	17	4	7
<i>F. sciadicus</i>	2/1	16-29	70	41
<i>Ambloplites rupestris</i> (1)	2/2	13-20	258	21
<i>A. rupestris</i> (2)	2/2	3	0	0
<i>Lepomis cyanellus</i>	4/2	15-24	115	67
<i>L. gibbosus</i> (1)	4/2	14-31	1849	76
<i>L. gibbosus</i> (2)	14/13	11-21	136	80
<i>L. gulosus</i> (1)	1/1	16-37	445	54
<i>L. gulosus</i> (2)	2/2	13-20	82	10
<i>L. gulosus</i> (3)	4/4	10-21	47	28
<i>L. humilis</i> (1)	21/21	15-21	878	75
<i>L. humilis</i> (2)	3/3	16-24	863	49
<i>L. humilis</i> (3)	8/4	14-17	517	60
<i>L. macrochirus</i> (1)	5/4	13-27	589	53
<i>L. macrochirus</i> (2)	14/9	14-25	58	50
<i>Micropterus dolomieu</i> (1)	2/2	16-27	114	6
<i>M. dolomieu</i> (2)	2/2	14-17	15	0.6
<i>M. dolomieu</i> (3)	5/2	7	0	0
<i>M. salmoides</i> (1)	3/3	16-34	1045	40
<i>M. salmoides</i> (2)	15/14	11-18	390	34
<i>Pomoxis nigromaculatus</i> (1)	5/5	14-35	954	61
<i>P. nigromaculatus</i> (2)	12/12	15-24	19	8

Additional Information Concerning the Conquest of Europe by the Invasive Chinese Pond Mussel *Sinanodonta woodiana*, 44. News from Austria, Belgium and France, but what about Israel?

Henk K. Mienis, The Steinhardt Museum of Natural History – Israel National Center for Biodiversity Studies, Tel Aviv University, IL-6997801 Tel Aviv, Israel, and National Natural History Collections, Berman Building, Hebrew University of Jerusalem, Edmond J. Safra Campus, IL-9190401 Jerusalem, Israel. mienis@netzer.org.il

Here again is some information concerning various studies dealing with the invasive Chinese Pond mussel in Europe. This time, the information comes from Austria, Belgium, and France with a note on an odd trial to grow *Sinanodonta woodiana* in Israel.

Austria

Billinger (2016) studied the presence of large mussel species in the impounded parts of the lower reaches of the river Inn in Upper Austria. According to his observation, the invasive Chinese Pond mussel preferred the shallow waters of the impoundments characterized by a high rate of organic detritus. Since the level of nutrients in alpine rivers is usually rather low, *Sinanodonta woodiana* does not seem to be a threatening competitor of local species like *Unio pictorum*, *Anodonta cygnea*, and *Anodonta anatina*.

Belgium

On the website waarnemingen.be [observations.be], Jan Soors placed an observation of *Anodonta cygnea* from Zonhoven, Wijvenheide Zuid, in the province of Limburg, carried out on 24 April 2017. The accompanying photographs, however, (one of which is reproduced here as Figure 1), showed a still juvenile specimen of the Chinese Pond mussel. A few days later, this record was indeed changed to *Sinanodonta woodiana*. This invasive freshwater mussel turns regularly up in commercial fish ponds stocked with various species of carps in Belgium.



Figure 1. A juvenile Chinese Pond mussel from Zonhoven, Belgium. Photograph by Jan Soors.

France

The Chinese Pond mussel has been known to occur in France for more than 30 years. Henri Callot-Girardi (2017) has given some brief information concerning these first finds. In addition, he showed some particular forms of this invasive species which have been encountered in France. Elsewhere in this lavishly illustrated second volume of "Avenionia," he has inserted other interesting photographs of *Sinanodonta woodiana*, not only from France but also from Hungary.

And what about Israel?

I was baffled by a page in the article by Callot-Girardi (2017) which contained a letter written by one of my colleagues in Israel with the request for a large quantity of living specimens of *Sinanodonta woodiana*. I know that at the time he wrote that letter (1991,) a new immigrant from the former U.S.S.R. was associated with the Department of Life Sciences of the Bar-Ilan University in Ramat Gan where he carried out trials of growing pearls in several species of freshwater bivalves. Also for that reason, living specimens of *Cristaria plicata* (Leach 1815) had been imported from China, without a license. The latter were even released in one of the commercial fish ponds for breeding carps in Israel. Fortunately for the local fauna, both trials failed. The mussels belonging to *Sinanodonta woodiana* arrived in Israel dead, while the specimens of *Cristaria plicata* died in the open fish pond. These examples, however, show a lack of responsibility to intentionally introduce a highly invasive species. Since then, the person involved with growing freshwater pearls has left Israel for a country in South America.

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Some Information Concerning *Theodoxus (Neritaea) octagonus* Eichhorst, 2016, an Endemic Subterranean Species from Israel

Henk K. Mienis¹ and Oz Rittner²

- ¹ National Natural History Collections, Berman Building, Hebrew University of Jerusalem, Edmond J. Safra Campus, IL-9190401 Jerusalem, Israel, and the Steinhardt Museum of Natural History – Israel National Center for Biodiversity Studies, Tel Aviv University, IL 6997801 Tel Aviv, Israel. mienis@netzer.org.il
- ² The Steinhardt Museum of Natural History – Israel National Center for Biodiversity Studies, Tel Aviv University, IL 6997801 Tel Aviv, Israel. israelbutterflies@gmail.com

Recently Tom Eichhorst (2016) has described a new Neritid species from Israel as *Theodoxus (Neritaea) octagonus*. Although we fully agree with his description, we add here some further details. *Theodoxus (Neritaea) octagonus* Eichhorst, 2016 was described from specimens collected during the period 1966-1968 in the Octagon Pool near Tabgha on the north-western shore of the Sea of Galilee (Lake of Tiberias) by Dr. Moshe Tournamal (Tournamal and Por, 1968). This warm sulfuric and saline spring -- water temperature 29.5°C, and high salinity 2300-3000 mg Cl/lit.-- flows into a Byzantine 4th Century tower-like octagonal reservoir, where the water is being mixed with freshwater from two other nearby springs. The Octagon Pool is better known as 'En Nur or Birket 'Ali-Ed-Dhaheer'. The photograph of the pool in Eichhorst's publication is, therefore, not correct. In fact, the new *Theodoxus* is confined in its distribution to the subterranean tract of 'En Nur.

Theodoxus (Neritaea) octagonus differs from the two other *Theodoxus* species living in the neighbourhood [*Theodoxus (Neritaea) jordani* (Sowerby, 1836) and *Theodoxus (Neritaea) michonii* (Bourguinat, 1852)] by the very deep suture separating the whorls. Its color may be described as of a uniformly pale rose (lavender in Eichhorst). Some rare specimens, however, show white dots on the pale rose background, which is quite different from the axial zigzag markings usually seen in *Theodoxus jordani* and often hiding under a uniformly black layer in *Theodoxus michonii*. Interestingly, when snails are kept alive in an aquarium with UV-illumination, they become black all over.

Figures 1-3. *Theodoxus (Neritaea) octagonus* Eichhorst, 2016, from 'En Nur near Tabgha, Israel.

1. A normally-colored specimen.
 2. A specimen kept in an aquarium with UV-illumination.
 3. A specimen showing the mottled color pattern.
- Photograph by Oz Rittner.



Theodoxus (Neritaea) octagonus is not the only endemic species which lives in that sulfuric saline spring. It shares the habitat with a Blind prawn *Typhlocaris galilea* Calman, 1909, several peculiar worm-like invertebrates, and at least two other tiny gastropods: *Bithinella annandalei* [now *Heleobia annandalei*] (Preston, 1913), and *Bithinella vexillum* Preston, 1913, the generic position of which has, so far, remained unsettled (Preston, 1913; Annandale, 1916). *Heleobia annandalei* specimens have still been collected quite recently (Mienis, 2005).

The Octagon Pool and, even more the subterranean 'En Nur, are off limits to the public because the locality is situated within the compound of a religious institute lead by the German Association of the Holy Land and maintained by Benedictine monks from the Dormition Abbey of Mount Zion in Jerusalem. In addition to the impossibility to enter the subterranean spring of 'En Nur, all the endemic gastropods living in it fall, of course, under the law which protects all the mollusks in Israel.

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New Occurrence Records of the Little Invasive Neartic Freshwater Pulmonate Snail *Lymnaea columella* (Say, 1817) in the Territory of Santa Catarina State/ SC, Southern Brazil Region

A. Ignacio Agudo-Padrón and Jefferson Souza da Luz,

Project "Avulsos Malacológicos - AM", P.O. Box 010, 88010-970 Centro, Florianópolis, Santa Catarina/ SC, Brazil – ignacioagudo@gmail.com ; goodcatt30@gmail.com ; <http://noticias-malacologicas-am.webnode.pt/>

Recognized globally, invasive alien forms are the second major cause of extinction of native species, immediately behind the destruction of habitats by human intervention. Unfortunately, in Santa Catarina State/ SC, this worrisome situation is increasingly evident, in rampant form.

One of these alien species, present and rapidly gaining space in State, is the little nearctic freshwater pulmonate snail *Lymnaea columella* (Say, 1817). This snail is recognized in Brazil as an important vector of the veterinarian parasitic disease "Fascioliasis" (Medeiros *et al.* 2014, Agudo-Padrón 2016: 32).

On February 19, 2017, the second author of this report obtained several live specimens (Figure 1) in "Ponte Alta" (city and Municipal District) – 27° 29'14"S & 50° 23'32"W (Figure 2). The collection site is in the Canoas River Basin, at approximately 850 meters above sea level within the Araucária Forest environment, Highlands (malacological fourth region) of Santa Catarina State/ SC. The snails were found "semi-submerged" and adhered in the cement walls of a local artificial lake (Figure 1). An abundance of "spawning/eggs" of the species was observed at the site. The species probably was introduced "accidentally" in the region through aquaculture activities.

Additional information about this species, including recent geographical/spatial records in the Brazilian and regional literature, is available in Agudo-Padrón, *et al.* 2013; Medeiros, *et al.* 2014; and Agudo-Padrón 2016 (Figure 3).



Figure 1. Some of the specimens of *Lymnaea columella* (Say, 1817) found at “Ponte Alta”, Santa Catarina State/ SC, and a view of the habitat where they were found



Figure 2. Location of the “Ponte Alta” Municipal District (Map - red color) in the geographical territory of Santa Catarina State/ SC.

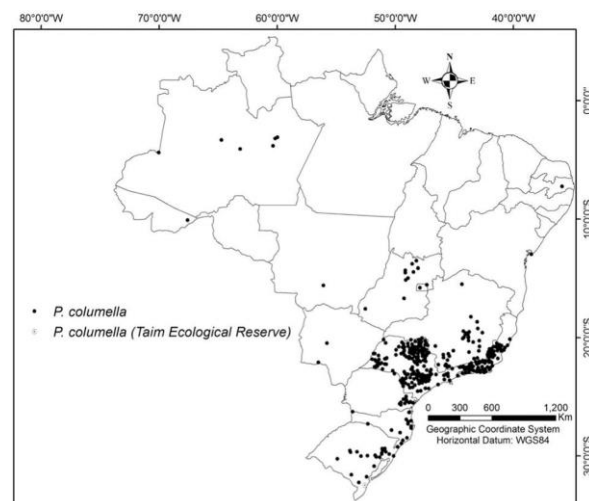


Figure 3. Known distribution of *Lymnaea columella* (Say, 1817) in Santa Catarina State/ SC and the Brazilian territory in general. Map from Medeiros *et al.* (2014)

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Field Records of Freshwater Mollusks in the Ariranha River Microbasin, Arvoredo Municipal District, Western Region of Santa Catarina State/ SC, Southern Brazil: A Brief Report

A. Ignacio Agudo-Padrón, Project “Avulsos Malacológicos - AM”, P.O. Box 010, 88010-970 Centro, Florianópolis, Santa Catarina/ SC, Brazil – ignacioagudo@gmail.com ; <http://noticias-malacologicas-am.webnode.pt/>

Continuing with our previous malacological research reports on the western region of Santa Catarina State/ SC (Agudo-Padrón 2017), on April 20, 2017, Emanueli Marin Albino, a local professional biologist, requested the identification of some limnic/freshwater mollusks illustrated in several field photographs that were found between February 27 and March 03 2017, in the bed of the Ariranha River, within the Municipality of Arvoredo (Figure 1). This river is a direct tributary of the great Upper Uruguay River Basin.

The Ariranha basin is next to Nova Teutônia Valley, located in the Western Santa Catarina State/ SC in the Seara Municipal District, today one of the most important regions of the swine breeding and, coincidentally, historical seat of pioneering malacological researches in the State and South America (Agudo-Padrón, 2011). Because of the intense use of the lands for agriculture, most of the natural vegetation areas have been deforested (Figure 1). The lack of an adequate sewage treatment has been responsible for an increase of environmental degradation and low standards of living of the local population.



Figure 1. The Ariranha River Basin (left), which drainage area is located within five municipalities in the Western section of the State, and the collection site of these species (right).

The species present on the photographs include three limnic forms (Figure 2): the exotic invasive freshwater Asian clams Corbiculidae/Cyrenidae *Corbicula largillierti* (Philippi, 1844) – confirming once again our forecast for the region (Agudo-Padrón, 2017), the native mussel/naiad Hyriidae *Diplodon*

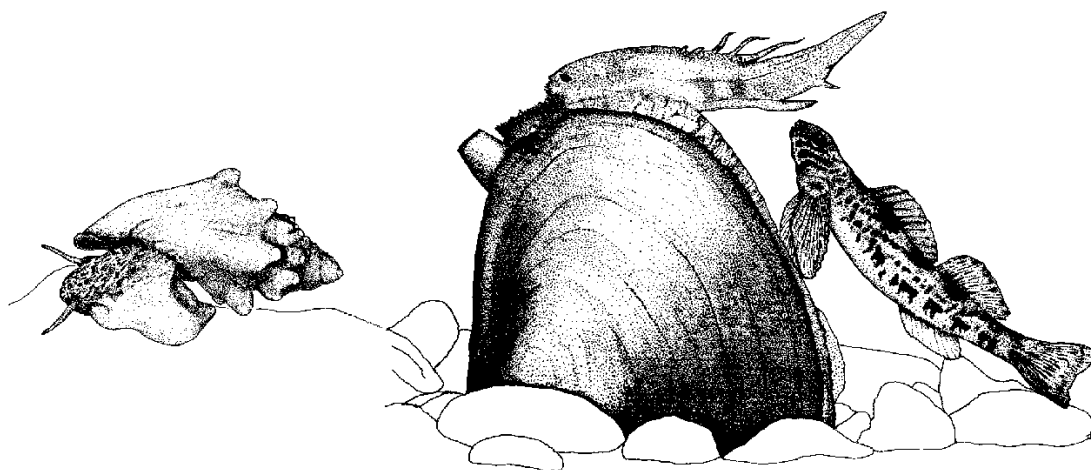
expansus (Küster, 1856), and the native freshwater pulmonate snail Phsidae *Aplexa* (*Stenophysa*) *marmorata* (Guilding, 1828). The pictures also include a beautiful little native forest snail Bulimulidae *Mesembrinus* (- *Drymaeus*) *interpunctus* (Martens, 1887) that was found in the foliage near the bed of the river, (see Agudo-Padrón 2011:13-16) for a regional species relationship).



Figure 2. Limnic mollusk forms found in the Ariranha River Basin: *Aplexa* (*Stenophysa*) *marmorata* (Guilding, 1828) (left), *Corbicula largillierti* (Philippi, 1844) (center), *Diplodon expansus* (Küster, 1856) (right).

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2016 Freshwater Mollusk Bibliography

Kevin S. Cummings,

Illinois Natural History Survey, 607 E. Peabody Dr., Champaign, IL 61820

The following are references to over 500 papers on freshwater mollusks that have been published up to and including 2016 that have not appeared in previous FMCS bibliographies. Citations for Aquatic Mollusca are split into five groups for the convenience of researchers: Unionoida, Sphaeriidae, Corbiculidae, Dreissenidae & other FW Bivalves, and Gastropoda. Those papers that include taxa from more than one of the above categories are included under each group. A web searchable database of over 25,500 references on freshwater mollusks (including all previous FMCS bibliographies on freshwater mollusks) can be found at <http://fms.inhs.illinois.edu/fmi/webd#Mollusk%20Bibliography> [a NEW ADDRESS !]. Only one user can access the bibliography at a time (we hope to remedy this in the near future) so be sure to exit when finished. To ensure that papers are cited correctly, researchers are encouraged to send pdfs to: Kevin S. Cummings, email: kscummin@illinois.edu.

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FMCS Officers

President

Heidi L. Dunn

Ecological Specialists Inc.
1417 Hoff Industrial Park
O'Fallon, Missouri 63366
636-281-1982; Fax: -0973
Hdunn@ecologicalspecialists.com

President Elect

Jeremy Tiemann

Illinois Natural History Survey
1816 South Oak Street
Champaign, Illinois 61820
jtiemann@illinois.edu

Secretary

Janet Clayton

West Virginia Division of Natural Resources
PO Box 67
Elkins, West Virginia 26241
304-637-0245
Janet.l.clayton@wv.gov

Treasurer

Emily Grossman

Ecological Specialists Inc.
1417 Hoff Industrial Park
O'Fallon, Missouri 63366
636-281-1982
egrossman@ecologicalspecialists.com

Past President

Teresa Newton

U.S. Geological Survey
Upper Midwest Environ. Science Center
2630 Fanta Reed Road
LaCrosse, Wisconsin 54603
608-781-6217
tnewton@usgs.gov

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. Those 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.

Awards

W. Gregory Cope
North Carolina State University
greg_cope@ncsu.edu

Teresa Newton
Upper Midwest Environ. Science Center
tnewton@usgs.gov

Emy Monroe
Midwest Fisheries Center
emy_monroe@fws.gov

Environmental Quality & Affairs

Steve McMurray
Missouri Dept. of Conservation
stephen.mcmurray@mdc.mo.gov

Braven Beaty
The Nature Conservancy
bbeaty@tnc.org

Gastropod Status and Distribution

Nathan Whelan
Auburn University
nwhelan@auburn.edu

Genetics

Curt Elderkin
The College of New Jersey
elderkin@tcnj.edu

Dave Zanatta
Central Michigan University
zanat1d@cmich.edu

Guidelines and Techniques

Ryan Schwegman
EnviroScience, Inc.
RSchwegman@EnviroScienceInc.com

Lisie Kitchel
Wisconsin Dept. Nat. Resources
lisie.kitchel@wisconsin.gov

Information Exchange

Newsletter

-- John Jenkinson
Clinton, Tennessee
jjjenkinson@hotmail.com

Information Exchange (continued)

Journal

-- W. Gregory Cope
North Carolina State University
greg_cope@ncsu.edu

-- Wendell R. Haag
U.S. Forest Service
whaag@fs.fed.us

-- Dave Berg
Department of Biology, Miami University
bergdj@miamioh.edu

Mussel Status and Distribution

Arthur E. Bogan
N.C. State Museum of Natural Sciences
arthur.bogan@ncdenr.gov

John L. Harris
Arkansas State University
omibob1@gmail.com

Nominations

Leroy Koch
U.S. Fish and Wildlife Service
leroy_koch@fws.gov

Outreach

Megan Bradley
U.S. Fish and Wildlife Service
Megan_Bradley@fws.gov

Jennifer Archambault
North Carolina State University
jmarcham@ncsu.edu

Propagation, Restoration, & Introduction

Rachael Hoch
North Carolina Wildlife Res. Commission
rachael.hoch@ncwildlife.org

Nathan Eckert
U.S. Fish & Wildlife Service
nathan_eckert@fws.gov

Tim Lane
Virginia Dept. of Game & Inland Fisheries
tim.lane@dgif.virginia.gov

Symposium

Jeremy Tiemann
Illinois Natural History Survey
jtiemann@illinois.edu

Parting Shot



Anyone who has attended the FMCS Auction during our biennial Symposia knows that the “Mystery Box,” one of the last items offered for bid, will contain a variety of valuable or not-so-valuable items, *AND* the Baby Head Tree. This tree, originally modeled after the collection of baby doll heads that Tennessee Valley Authority mussel biologists collected from area rivers, has grown in size and stature to become a [supposed] good luck charm for the successful bidder.

In this picture, the 2017 successful bidder, Patty Morrison, and our illustrious auctioneer, Steve Ahlstedt, add their mugs to the Baby Head Tree. We hope it brings Patty and the rest of us good luck until we get together again during 2019 in San Antonio, Texas. Photograph by Brant Fisher, Indiana Department of Natural Resources.

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.

