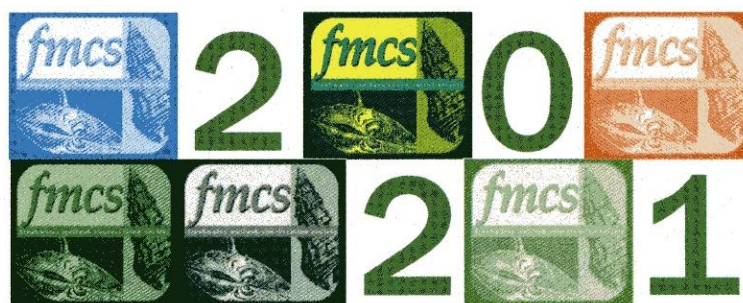


Ellipsaria



Newsletter of the Freshwater Mollusk Conservation Society
Vol. 22 – No. 4 ISSN 2689-2936 December 2020

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2021 FMCS Virtual Symposium

Back to the Future: The Virtual Unknown

Due to the global COVID-19 pandemic, the 2021 FMCS Symposium will be held virtually from Monday, April 12 through Wednesday, April 14, 2021. This is a new concept for many of us and we will be interested in what members think about it. We thank the Portland Symposium Committee for the hard work they have already put into planning an exciting meeting and we look forward to them hosting a “normal” FMCS Symposium in 2023. Also, we thank the Michigan Symposium team for being willing to slide their standing proposal to host one of our symposia back to 2025.

Symposium Format

The 2021 Virtual Symposium will consist of a mixture of live (synchronous) and web-posted (asynchronous) contributed oral and poster presentations and events. Live events via ZOOM will occur between 11 am and 5 pm Eastern time (U.S.)

each day. Participants **MUST** be registered for the Symposium to attend live events via ZOOM. Registered participants will be given ZOOM meeting ID's and passwords for each ZOOM session and event prior to the meeting.

The live ZOOM events will include a Board Meeting, a plenary session, two breakout-room committee meeting events, two theme-based networking and social breakout-room events, and the Business Meeting. During the registration process, we will be asking participants to propose topics for the theme-based networking/social breakout-room events. Networking or social events proposals can include mollusk research topics associated with contributed oral and poster sessions (e.g.: Conservation, Contaminants & Ecotoxicology, Ecology, Genetics & Phylogeny, Life History, Methods, Monitoring, Propagation, Status, & Trends, etc.), or social topics that could enhance virtual interactions (e.g. music, beer making, mentoring). We will be seeking breakout-room moderators for research topic during the registration process; social event proposers will be asked to moderate their breakout-rooms. We also are exploring the idea of having a live auction to help support future student travel. More information about these activities and the rest of the Virtual meeting will be posted on the Symposium webpage once it is activated.

Contributed Oral Presentations and Posters

The asynchronous contributed oral presentations and posters (videos and images) will be posted on the Symposium web page during this virtual meeting. All presenters will be asked to record their presentations and convert the videos to YouTube for posting. The contributed presentations will be organized by traditional areas of mollusk research (e.g. Conservation, Contaminants & Ecotoxicology, Ecology, Genetics & Phylogeny, Life History, Methods, Monitoring, Propagation, Status, & Trends, etc.); however, the planning committee also is encouraging the presentation of recorded videos of facility tours and/or field trips.

Contributors of oral and poster presentations will have three options: 1) a traditional 12-minute YouTube video presentation, 2) a 5-minute lightning YouTube video presentation, or 3) a traditional poster presentation JPEG image with an associated 3-minute YouTube video. FMCS will provide instructional handouts on how to create presentation videos, posters, and poster 3-minute messages, and how to convert the videos to unlisted YouTube postings.

The Symposium web page with the contributed presentations will only be visible from 8 am Eastern (U.S.) on Monday, April 12 through 5 pm Eastern (U.S.) on Wednesday, April 14, 2021. Presenters and registered attendees will be able to view the presentations 24 hours a day during that time. Registered attendees will be able to post questions or comments on all recorded videos. Presenters will be asked to monitor those comments or questions and respond to them several times a day during the Symposium.

Intellectual Property Disclosure Concerns

The risk of intellectual property disclosure during this meeting will be similar to the risk during a traditional meeting. The opening and closing of the Symposium web pages and the "unlisted" privacy setting of YouTube posting will add additional intellectual property protections. Somewhat separately, however, the Outreach Committee is interested in having some YouTube presentations from the Symposium available for posting on the FMCS website after the Symposium. Thus, during the submission process, authors will have the option to "opt-in" to allow later Society use of their videos.

Registration

Registration for the 2021 FMCS Virtual Symposium will open on the Events/Symposium page of the FMCS website in late December/early January and will close at 11:59 pm Eastern time (U.S.) on **April 1, 2021**. Registration fees for this virtual symposium will be nominal, approximately \$20 for regular members/\$5 for students, with proceeds going toward student

travel awards for future workshops and symposia. There also will be the traditional option to join the Society or renew your Society membership during registration.

Abstract and Presentation Deadlines

A request for abstracts will be sent out by email in late December/early January and also will be posted on the FMCS Events/Symposium page. Abstracts for this Virtual Symposium will be due by 11:59 pm Eastern time (U.S.) on **Monday, February 1, 2021**. Submission of pre-recorded ("unlisted" YouTube) contributed oral and poster presentation URLs will be due by 11:59 pm Eastern time (U.S.) on **Sunday, March 28, 2021**.

Student Judging and Awards

Judging of student presentations will occur as in the past. Beginning students (i.e. first year students with no or limited datasets) are encouraged to present their ideas or early findings in any of the three presentation options, but especially either a poster with a 3-minute video or in a 5-minute lightning talk video. Students will be asked to identify themselves as students during the abstract submission process for award consideration.

The 2021 Virtual Symposium Local Committee

The 2021 FMCS virtual Symposium local committee consists of Steve McMurry and Alan Christian as co-chairs, and the remainder of the committee includes Alexa Maine, Patty Morrison, Matthew Patterson, and Jeremy Tiemann. If you have questions, comments, or suggestions about this new-to-FMCS concept, please contact Alan Christian at adchrist@clarkson.edu.

Society News

World Climate Statement Issued

In mid-September 2020, 110 aquatic scientific societies -- representing more than 80,000 scientists around the world -- sounded an alarm about climate change by releasing the **World Climate Statement**. Development of this Statement was spearheaded by the American Fisheries Society, and FMCS was proud to add input concerning freshwater mollusks and be listed among the signatories. Together, the societies call for drastically curtailed global greenhouse gas emissions to avoid the worst impacts of man-made climate change to fish and aquatic ecosystems. Unless urgent action is taken to reduce emissions, scientists predict catastrophic impacts to commercial, recreational, and subsistence fisheries and human health and global economies.

Across the globe, incomes, food security, and livelihoods of aquatic resource-dependent communities are already at risk. Climate change threatens food security by endangering fish, an essential source of protein for many across the globe.

Freshwater mollusks and fish are especially threatened by the impacts of climate change. Today, at least seventy percent of freshwater mollusks and forty percent of all freshwater fish species in North America are imperiled as a result of pollution, habitat loss, water withdrawals, and invasive species. Climate change coupled with these existing stressors will lead to



significant declines in freshwater mollusks and fish, with devastating consequences for cultural, recreational, and economic value of freshwater systems.

In addition to reductions in emissions, aggressive policies and programs are required to mitigate the effects of climate change to freshwater species and to preserve habitat essential for resilience. If we are to avoid losing countless species that provide immeasurable benefits to society, we must also mitigate the impacts of climate change on fish and fisheries and plan for adaptation required to ensure the long-term health of our freshwater, coastal, and marine ecosystems and the many economies that depend upon them. Intact, healthy habitats can help to provide resilience for fish and store carbon.

The full World Climate Statement is available here: <https://climate.fisheries.org/world-climate-statement/>. FMCS has shared this Statement through our email list, as well as on Facebook and Twitter. We encourage all members to read this Statement, share it with others, and to have open conversations about the effects of man-made climate change on freshwater species, their habitats, and the rest of life on Earth.

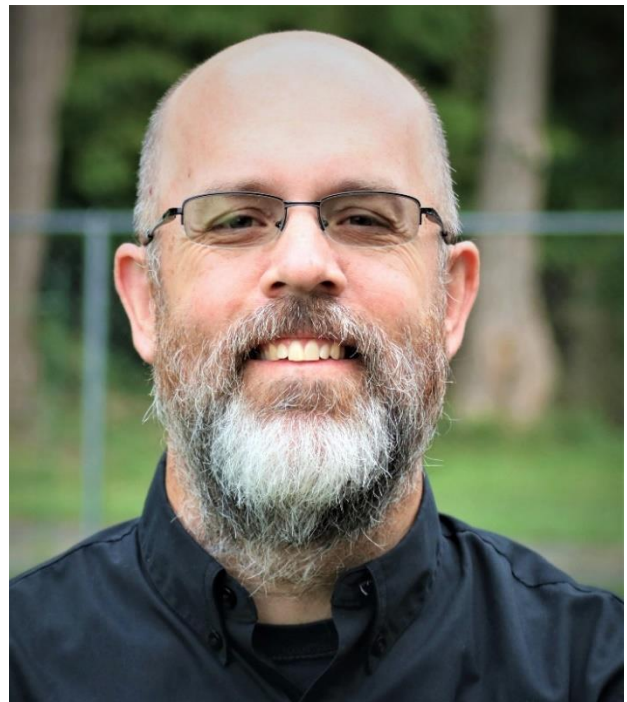
FMCS Officer Election 2021

Every other year, our Society elects members to serve in three Executive Committee positions: President-elect (who, after two years, goes on to serve as President for two years, then Past President for two years), Secretary (for a 2-year term), and Treasurer (also for a 2-year term). This time, we have two candidates for President-elect, one candidate for Secretary, and one candidate for Treasurer. Photographs and statements from each of the candidates are presented on the next few pages. Voting instructions are posted on Page 7.

Candidates for President-elect



Megan Bradley



Matthew Patterson

Megan Bradley Statement

There is nothing like watching life on the bottom of a river. I am driven by curiosity about that world. I have been a freshwater mussel biologist for more than a decade; first, working for the Commonwealth of Virginia and now with the USFWS at Genoa National Fish Hatchery. I have degrees in music performance from Virginia Tech (as well as most of a Bachelor of Science in Fisheries) and a Master of Science in Biology from Missouri State University. I've gotten to dive and snorkel in creeks and rivers across the Eastern half of the United States, from the Atlantic Slope of Virginia to the Cumberland basin to the Mississippi River. I've propagated more than 100 freshwater mussel, snail and amphibian species, reintroduced endangered species, surveyed to assess their status and written and collaborated on Site Plans, Recovery Plans and Status Assessments. I was brought into FMCS service as a graduate student, first as Outreach Committee Chair, then in support of our website. I hosted a mussel propagation workshop at the 2015 Symposium, contributed to the 2017 National Strategy, and the mollusk section of the Investigation and Monetary Values of Fish and Freshwater Mollusks book. I also co-hosted the International Workshop on Freshwater Mollusk Health and Disease Assessment in 2018, and I am currently acting as the managing editor of *Freshwater Mollusk Biology and Conservation*.

How the society chooses to invest its time and money will determine which goals we achieve. Freshwater snails have received too little of our attention, even as we have come to recognize their imperilment; opportunities to invest and spotlight their conservation must become an equal priority. The rising cost of attending meetings along with decreasing department budgets has shut out many members. This year's virtual meeting may present a path to making future meetings more accessible for new professionals, young citizen scientists, retirees, and others. Only by investment in

Matthew Patterson Statement

While I spent my formative years along the Ohio River, I wasn't introduced to the world of freshwater mollusks until age 22. While completing a Biology degree at Eastern Kentucky University, Guenter Schuster recommended completing an internship with the Kentucky State Nature Preserves Commission. Searching for fishes and mollusks all over the state left me hooked on everything freshwater.

After completing a B.S., I studied freshwater mussels with Dick Neves at Virginia Tech. My M.S. thesis focused on the impacts of zebra mussels on the feeding physiology of native mussels. I also spent an additional year working at the Freshwater Mollusk Conservation Center, propagating Clinch River mussels.

I joined the U.S. Fish and Wildlife Service in 2005 as a Fisheries Biologist at the White Sulphur Springs National Fish Hatchery. After propagating endangered mussels for five years, I accepted a Course Leader position at the National Conservation Training Center (NCTC). Over the past ten years, I have worked with FMCS members to design the first-ever formal training curricula on freshwater mussels, including the Freshwater Mussel Conservation Webinar Series (co-sponsored by the FMCS). One of the highlights of my career at the NCTC has been publication of *Freshwater Mussel Propagation for Restoration* with Cambridge University Press in 2018 (sold over 400 copies in 24 countries).

I have been actively involved in FMCS publications, committees, workshops, and symposia. I co-authored the 2016 update to "A National Strategy for the Conservation of Freshwater Mollusks". I chaired the Outreach Committee from 2007 through 2009. I served as assistant symposium coordinator and program designer for the first International Symposium in Baltimore in 2009. In 2007, I moderated a symposium at the Midwest Fish and Wildlife Conference entitled "Freshwater Mussels: Ecosystem Functions to Provide Healthier Fisheries".

Bradley (continued)

the fullness of possibilities will we bring the ideas that are most needed to our small corner of conservation. May we seek that path toward the future together! As a colleague likes to say, “no mussel is recovered without a community.” The opportunity to serve as your president and collaborate with you to achieve our conservation goals for freshwater mollusks would be a great pleasure. My nomination to stand among colleagues who have both worked so hard to advance the science and who have shared a vision for the future is an honor.

Patterson (continued)

I am honored to be nominated President-elect of the FMCS and I would relish the opportunity to give back to a Society that has been so supportive of my career. As the father of an African American boy, I was so proud when this Society took a stand against social injustice and committed to developing “plans and resources to infuse our institution with equity and inclusiveness actions”. So, if elected, I will be dedicated to implementing the National Strategy and continuing all the great work that has allowed FMCS to grow into the amazing organization it is today, but I also will be dedicated to the commitment offered in this statement against social injustice. Thank you for your consideration.

**Sarah Veselka**

AmeriCorps Volunteer in Service to America with a non-profit watershed group in Morgantown, West Virginia, and as their Executive Director for four years. There I gained invaluable experience in non-profit management, grant writing, fundraising, community organizing, and environmental education, securing funding and developing an award-winning Youth Advisory Board. I also continued applied research in aquatic sciences with a focus on acid mine drainage and stream restoration.

I was brought into the fascinating world of freshwater mussels by Janet Clayton and, for the past ten years, have been working as an environmental consultant conducting freshwater

Candidate for Secretary

I graduated from the University of Georgia (UGA) in 2000 with a B.S. in Biology, and from West Virginia University (WVU) in 2004 with a M.S. in Wildlife and Fisheries Resources. I have been residing in the beautiful Mountain State ever since. My love of ecology, and aquatic resources specifically, began at UGA where I worked in an analytical laboratory and then as a fish community assessment field crew leader. At WVU, I continued research in stream ecosystems studying fish, macroinvertebrates, biofilm, and water chemistry. This research was published in *Ecological Applications*. During that time, I also served as President of the WVU Chapter of the American Fisheries Society and received awards for best student paper and outstanding graduate student.

After graduate school, I served as an

mussel, fish, crayfish, and macroinvertebrate surveys across the Midwest, Mid-Atlantic, and Appalachian regions. Currently, I work as a Senior Scientist / Project Manager for EnviroScience in our Morgantown, West Virginia office. I am a PADI certified Master Diver and absolutely love being underwater, even on the bottom of low-visibility large rivers, looking for mussels. I also enjoy mountain biking, kayaking, skiing, and camping with my family.

I was formerly a Board Member of the Association of Mid-Atlantic Aquatic Biologists and am engaged with the West Virginia Women's Energy Network. I have been involved with FMCS since 2015 attending symposiums and workshops and continue to be impressed by the organization and its members. I hope to contribute more to the Society and am honored to be nominated to serve FMCS as Secretary.

Candidate for Treasurer

I wish to continue to contribute to FMCS and would be happy and honored to serve a second term as Treasurer if elected by my peers. I have been involved with FMCS since 1992 when I attended the Upper Mississippi River Conservation Commission in St. Louis as a graduate student at Arkansas State University and have been active in FMCS ever since. My participation includes presenting at meetings and workshops, serving on committees, judging presentations, bringing students to meetings, and hosting meetings and workshops. John Harris and I hosted the 2007 Symposium (Directions in Freshwater Mollusk Conservation: Molecules to Ecosystems) and Workshop (Habitat Restoration; Led by Heidi Dunn) in Little Rock, Arkansas. I also helped Mary McCann and Rebecca Winterringer organize and host the 2014 Workshop (Mussel Studies and Regulatory Process Associated with Dam Removals) in Portland, Maine.



Alan Christian

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

Now that you have reviewed their statements, we encourage you to **vote** for your candidate of choice for each office. Voting will occur online and is **open now** at the following site: <https://forms.gle/kMhnt7WA8vbWhLEQA>. **The last day to vote will be January 31, 2021.** The winners will be announced in the March issue of *Ellipsaria*.

Minutes of the Fall 2020 FMCS Teleconference Board Meeting Thursday, November 19, 2020

Call to order and roll call for attendance was conducted by President Jeremy Tiemann. In attendance were: Jeremy Tiemann, Janet Clayton, Jennifer Archambault, Heidi Dunn, Alan Christian, Megan Bradley, Steve McMurray, Amy Maynard, Dave Berg, Wesley Daniel, Emilie Blevins, Nathan Whelan, Tamara Smith, Ryan Schwegman, Lisie Kitchel, Becca Winterringer, Carla Atkinson, Dave Zanatta, John Jenkinson, Braven Beaty, Daelyn Woolnough, Robert Bringolf, and Rachael Hoch. A quorum was established. The meeting was called to order at 10:05 am EST.

Heidi Dunn made a motion to approve the April 2020 Board Meeting Minutes (published in the June 2020 *Ellipsaria*). A second was provided by Dave Zanatta and all approved.

Treasurer's Report – Alan Christian

As of September 2020, we have a balance of \$104,756.37. This report is for January through September. A total income of \$3,989.96 was received. On a side note, today an additional \$4500 was downloaded from PayPal and is not included below. Major expenses for the period included a down payment and logo development for the 2021 Symposium/Workshop (\$6,410.00), Webpage (\$5,253.60) and FMBC (\$11,883.14) for a net loss of \$20,251.59 since last reporting.

Income

2020 Workshop	\$ 480.70
Donations (Tom Watters Memorial)	805.00
Interest Income	4.26
Memberships	
2021	80.00
<u>2020</u>	<u>2,520.00</u>
Total Income	\$ 3,989.96

Expenses

PNW Regional Meeting	\$ 466.40
CBFMW Regional Meeting	100.00
Webpage	5,253.60
Bank charges	62.21
PayPal fees	66.20
Symposium/Workshop expenses	
FMCS 2021 Symposium	6,410.00
<u>FMBC (Walkerana) costs</u>	<u>11,883.14</u>

Total Expenses **\$ 24,241.55**

Net Income **\$ -20,251.59**

Assets

BofA Savings	\$ 10,007.81
BofA Checking	92,702.34
Paypal	2,046.34
<u>Paypal income</u>	<u>-0.12</u>

Total Checking/Savings **\$ 104,756.37**

TOTAL ASSETS **\$ 104,756.37**

Liabilities & Equity

Equity	
Retained Earnings	\$ 125,007.96
Net Income	-20,251.59
Total Equity	\$ 104,756.37
Total Liabilities & Equity	\$ 104,756.37

Secretary's Report – Janet Clayton

Committee membership spreadsheets were sent to each committee chair so they had up to date lists to contact about restructuring. There are currently 417 active members but, as you know, many of those expire at the end of December. As most members join when registering for a symposium, it will be interesting to see if this number is maintained into 2021. Of those 417, 298 are regular members, 96 are student/retirees, 5 contributing, and 18 Lifetime.

Dave Berg suggested Jeremy send an email to encourage folks to join since no symposium. He noted that they were still in discussions about potential small fee for the virtual symposium which may take care of that need.

OLD BUSINESS**Restructuring of Committees** – Jeremy Tiemann, Heidi Dunn

The final committee restructuring document was provided by Jeremy Tiemann and Heidi Dunn to the Board for approval. Tamara Smith requested a name change of the Diversity & Inclusiveness Committee to the Diversity, Equity, and Inclusion (DEI) Committee. A motion to accept the document as amended was made by Wesley Daniel and a second provided by Heidi. All approved. [The list of approved standing committees is presented on Page 14.] It was suggested that the old committees would work within their groups to reorganize as needed and that the new committee structure would be put into effect during the 2021 Virtual Meeting.

Update on JASM – Daelyn Woolnough, David Zanatta

Daelyn noted that the first Joint Aquatic Science Meeting (JASM) which included the Society for Freshwater Sciences, American Fisheries Society, and others was in 2014 and had about 3500 attendees. The second meeting is planned for May 16-20, 2022 in Grand Rapids, Michigan. JASM is looking to see how much of a commitment FMCS will make. FMCS was drawn into this group due to membership in CASS. Thus far, FMCS's involvement has been monthly planning meetings attended by Dave and Daelyn. They are seeking permission to send a survey to the FMCS membership to see how many members might attend the JASM meeting. One consideration is that 2022 is a workshop year. The intent is not necessarily to replace the 2022 FMCS workshop. There were several options brought forward by the Board concerning the workshop and the potential for even making it a part of the JASM meeting. A series of questions and options will be sent to the membership to help make informed decisions on how to move forward.

Scanning and uploading of miscellaneous mollusk journals to FMCS website – Jeremy Tiemann

Still trying to put old mollusk-related journals and the proceedings of the two Upper Mississippi River Conservation Committee mussel meetings on the FMCS website. Everything in hand as been scanned and, hopefully, will be uploaded soon.

NEW BUSINESS

2021 Virtual Symposium – Alan Christian

Alan Christian, Steve McMurray, Matt Patterson, Alexa Maine, Patty Morrison, and Jeremy Tiemann are heading the committee for the upcoming 2021 virtual symposium. Due to COVID-19, the Portland meeting was cancelled for 2021 and is now being rescheduled for 2023. This will provide various options for presentations and virtual committee meetings. Details and options are still being worked out, but things are coming together. [See article on Page 1.]

AFS Climate Ambassador Program – Jeremy Tiemann

Only one member, Kate Holcomb, expressed interest to work with AFS on climate change.

Submission guidelines for *Ellipsaria* – John Jenkinson, Nathan Whelan

Nathan Whelan noticed recently that some Contributed Articles in *Ellipsaria* are now findable on Google Scholar. This was unexpected for our informal, non-peer-reviewed newsletter. Nathan also recognized that some recent articles in the newsletter include the analysis of data and/or what could be viewed as proposed taxonomic revisions. In a series of emails, monitored and, occasionally, participated in by the Executive Committee, Nathan and *Ellipsaria* Editor John Jenkinson agreed that articles including data analysis and/or taxonomic revisions should be peer-reviewed and, therefore, are outside of the intended scope and purpose of our newsletter. To avoid future exceedances in these areas, John and Nathan also have agreed on the wording of the following proposed addition to the guidelines for submissions to *Ellipsaria*:

“Articles contributed to *Ellipsaria* should be preliminary or initial observations of note (e.g., natural history observations, meaningful new distribution records, interesting finds, etc.) concerning freshwater mollusks, their habitats, and/or their conservation. Articles that include quantitative analyses, draw conclusions based on analyses, or propose taxonomic revisions will not be accepted for posting in *Ellipsaria* and, instead, should be submitted to a peer-reviewed journal such as FMBC.”

To avoid any future uncertainty about the source of this clarification, the Newsletter Editor requests that the Board formally approve this addition to the submission guidelines for *Ellipsaria*. If approved, the addition will be included in the submission guidelines now posted on the FMCS Officers page of the newsletter. A motion was made by Alan Christian to approve, second was provided by Dave Berg, and all approved.

Dave Berg also suggested maybe putting a “not peer reviewed” watermark on submissions. This suggestion will be considered by the Editor.

COMMITTEE REPORTS

Symposium – Emilie Blevins, Steve McMurray

The 2021 Symposium has now transitioned into a 2021 virtual meeting. As a result, the Portland Planning Committee negotiated with the DoubleTree Hotel to amend the contract and transition the event to 2023 following discussion with Jeremy. All other terms remain the same, and the contracted dates are now April 9-12, 2023. A motion was made by Alan Christian to accept the Portland venue for the 2023 Symposium. A second was provided by Wesley Daniel and all approved. It is hoped that everything the Portland Committee had planned for 2021 will be carried forward to 2023.

Guidelines/Techniques – Ryan Schwegman, Lisie Kitchel – Workshop

Workshop from 2020 was postponed again for 2021 due to concerns for COVID-19 extending into next year and limitations on participation, as well as the ability of participants to plan for travel. Committee members will be notified of FMCS reorganization of committees and status and explanation as subcommittee. Henry Horton returned the deposit. We are currently

thinking about rescheduling the Sampling Workshop in 2022. One option is to tag it onto the JASM meeting; the Grand River runs through Grand Rapids and could be used as a field site. Dave Zanatta noted that there are several wadable streams within about half an hour from Grand Rapids that could also be used as field sites. There has been no other activity of the Committee at this time.

Awards – Emy Monroe, David Hayes, Curt Elderkin, Susan Oketer

No committee members were in attendance. Jeremy will work with the Committee to discuss options for the upcoming Virtual Symposium as no travel will be needed.

Nominations – Wesley Daniel

The nomination period is closed. He is currently working with John Jenkinson to provide nominee's information for *Ellipsaria*. Running for President-elect are Megan Bradley and Matthew Patterson. Running unopposed is Sarah Veselka for Secretary, and Alan Christian for Treasurer. Voting will be conducted via Google. [The election article starts on Page 4.]

Outreach – Jennifer Archambault, Amy Maynard

The committee has submitted a draft revision of the outreach section of the FMCS Procedures Manual. The proposed updates reflect changes to our role in the Society and further details our responsibilities. We have also submitted a revision to the committee's statement of organization and purpose that appears on our section of the website.

Outreach Committee membership has been informed that we are searching for persons interested in leading the group as a co-chair. Jennifer Archambault will reach her term limit as committee co-chair after the 2021 Symposium. We continue to update and maintain the website and are seeking a qualified replacement for Megan to take on coordinating these tasks with webmaster Sophie Bender. Members have been involved in recent Symposium calls and looking into ways to be involved in the upcoming meeting as our committee usually hosts the student mixer.

Mussel App update – Susan Oetker

No report. Jeremy noted the App might not be supported on certain platforms. He just upgraded his cell phone, and the App is no longer working. Emilie has upgraded her cell phone, too, but the App continues to work. Susan is checking into it.

Gastropod Status and Distribution – Nathan Whelan, Wesley Daniel

Nothing to report

Mussel Status and Distribution – Gerry Dinkins, Jason Wisniewski

Nothing to report

Names Subcommittees

The bivalve and gastropod names subcommittees will meet virtually in later winter or early spring of 2021, around the same time as the Virtual Symposium. Members of the subcommittees are putting together petitions associated with changes to the current FMCS names list. Most of these petitions involve newly described species and non-controversial taxonomic changes. The current lists of names can be accessed from the FMCS website at: https://molluskconservation.org/MServices_Names-Bivalves.html and https://molluskconservation.org/MServices_Names-Gastropods.html. Information on how to submit a name change petition also can be found on the website. [Also, see article on Page 16.]

Environmental Affairs – Braven Beaty, Mickey Matthews – updates on CASS

Jeremy noted the Committee has been involved in a lot of Consortium of Aquatic Science Societies (CASS) discussions.

Genetics – Kevin Roe, Dave Zanatta

The genetics committee had nothing new to report.

Information Exchange

Ellipsaria – John Jenkinson

The newsletter continues to be posted quarterly, on schedule.

Freshwater Mollusk Biology and Conservation (FMBC) – Editors: David Berg, Robert Bringolf, and Wendell Haag; Managing Editor: Megan Bradley

Recent and current issues

Volume 23(1) was published on April 1, 2020. The issue had five papers.

Volume 23(2) was published on October 26, 2020. The issue had eight papers. We were on track to publish it in September, but there was an inexplicable delay in receipt of page proofs from Allen Press.

We are still working hard to try to make our publication deadlines (March 31 and September 30).

Upcoming issues

Volume 24(1) will consist of at least three papers, but more likely five or six.

Volume 24(2) has a number of manuscripts that are likely to be ready.

We will need to decide whether we wish to limit the number of papers in an issue in order to smooth out the number per issue or to continue publishing as soon as possible (and except differences in number of papers per issue).

An article in *FMBC* Volume 22(2) by Serena Ciparis and colleagues was recognized by BioOne for being a highly cited work. Please encourage members and non-members to submit their work to *Freshwater Mollusk Biology and Conservation*.

Early View We have now implemented Early View on the FMCS website. Once final page proofs are approved, articles are posted on the Society's website and the corresponding author is notified. The Early View articles are taken down once the papers are published as part of an issue. At this point, we do not have any Early View manuscripts, although several have been sent to Allen Press for completing of page proofs.

Impact Factor We are still working to submit materials in order to receive an impact factor from Clarivate Analytics. Once we request tracking to do this, however, we have to be certain that we publish issues on time.

Copy editors We continue to be pleased with copyediting service provided by Two Herons Consulting. Our copyediting procedures are running smoothly and effectively.

Propagation – Rachael Hoch, Tim Lane, Maddie Pletta

Rachael and Tim will be stepping down as co-chairs. Significant changes will be coming with the restructuring of committees and we will be working on that soon.

AD HOC COMMITTEES

Chapters – Manuel Lopes-Lima, Emilie Blevins

During 2020, members of the committee, representatives from the ExCom and interested regional mussel groups met on various occasions to review possible structures for developing regional subunits under the FMCS umbrella. These included interviews with representatives of

the American Fisheries Society (AFS) (national and Western Division), the International Association of Landscape Ecology, and a nonprofit lawyer, Michelle Anderson. The issues considered include liability, fiscal agency, administrative burden, independence of units, and participation. Five legal and fiscal structures were evaluated for these issues. The recommendation of the committee is to pursue establishment of committees, referred to as “Divisions,” to parallel the AFS unit structure, rather than to establish legally separate “Chapters” that would be subject to IRS scrutiny. If it is agreed upon by the board to proceed with Division formation, the Chapters ad hoc committee could next draft language for the Society’s bylaws using the AFS template constitution as a template: <https://fisheries.org/about/governance/constitution-and-rules/>.

Monetary Values of Mollusks – Megan Bradley, Janet Clayton

AFS has not reached out to reinstate the planning. Nothing to report

Ecosystem Services – Carla Atkinson

Nothing to report

Diversity, Equity, & Inclusion (DEI) – Tamara Smith

Ad- hoc Committee: Tamara Smith, Jeremy Tiemann, Neil Ford, Megan Bradley, Kentaro Inoue, Sara Andree, Erin McCombs, and John Pfeiffer. The last group meeting via phone call was September 30, 2020. We continue to meet via calls/Teams/Zoom. Our next call is November 23, 2020. Anyone is welcome.

Committee Tasks:

- Develop and implement an anonymous, optional diversity and inclusiveness survey for FMCS members to get baseline data to help us identify needs or areas of concern and to provide baseline data to help measure our success.
 - The committee finalized and distributed the questionnaire via email. Thank you to everyone who participated (N=122)! Is it OK to post an optional link to membership renewal page? Next – analyze the data!
- Help write a statement on racial equity after the killing of George Floyd.
 - Completed – worked with FMCS leadership to develop and publish the statement on several platforms, including the June issue of *Ellipsaria*.
 - Note: As an outcome of this effort, the committee and others committed to some specific actions including reading specific books, developing resource guide (see below), keeping diversity issues on the forefront of FMCS activities (see below), and other actions.
- Keeping DEI issues on the forefront.
 - Develop short social media posts to keep diversity issues on the forefront. In progress. Several developed. None yet posted to social media.
 - Develop DEI content for *Ellipsaria*. In progress. One brief article for a 2020 issue of *Ellipsaria* that discussed best practices for diversity and inclusiveness in scientific meetings. Additional article ideas in progress.
 - Develop resource guide and links that people interested in racial equity, diversity and inclusiveness issues can access that will be available on the FMCS DEI webpage. Progress: Developed a resource links. Ready to publish on page.
- Foster a welcoming environment for FMCS members (and other interested people).
 - Continue to add photos of people on the FMCS main webpage. Sent out calls over the unio listserve and social media to request photos and quotes to be featured on the website! Progress: Received roughly 30+ responses from the latest call for photos in late

2019/early 2020. The photos and quotes have been compiled and submitted to Sophie. Waiting on getting them on the website, with the request to randomize the photos.

- Continue to develop a presence on the FMCS website (of the ad-hoc committee) by adding a photograph of committee (completed) and mission statement (completed) to the web page.
- Improve accessibility of FMCS website. In progress.
- Explore ways to make future meetings/symposiums/workshops more inclusive.
 - Progress: Added a DEI committee member to the symposium planning committee. Considering adding a workshop or featured speaker at the Virtual Symposium.
 - Participate in DEI committees of other scientific societies to share resources and ideas. Progress: Erin has been attending CASS meetings.
 - Review the ExCom Committee FMCS certification document. Completed review.
- With restructuring of FMCS committees, it was suggested that the ad-hoc committee become an official committee. Suggestion to add equity to our committee name -- DEI.
- In 2021, we hope to revisit our draft strategic plan and draft a strategy for our committee with stepdown goals and actions.
- Last, but not least, Neil retired in 2020! Thank you for all that you brought to the DEI committee – you will be missed. Best wishes on a happy retirement Neil!

Alan Christian made a motion that was seconded by Jennifer Archambault to include the “opt in” demographic survey with the symposium registration form. All approved. John Jenkinson encouraged Tamara to put results of the diversity and inclusiveness survey in the March *Ellipsaria*.

Professional Development – Becca Winterringer

The Professional Development Committee continues to make progress on the draft of the Mollusk Professional Certification Guidelines. We expect the draft guidelines to be ready for FMCS Executive Committee review this winter. We are hoping to roll out the certification program to the FMCS membership in 2021. Recent review by DEI committee and they provided some good comments.

Motion to Adjourn was made by Jennifer Archambault with a second by Alan Christian. All approved.

Respectfully Submitted by Janet L. Clayton, Secretary

New FMCS Committee Structure

The ExCom outlined their proposal to restructure the Society’s standing committees in the December 2019 issue of *Ellipsaria* and the full Board of Directors discussed these proposed changes during their Winter 2019 and Spring 2020 meetings. Based on those discussions, at their Winter 2020 Meeting the FMCS Board voted to restructure the Society’s standing committees as follows:

Functional Committees:

- **Awards** (e.g., student awards, professional awards)
 - **Chapters** (including International chapters)
 - **Diversity, Equity, and Inclusion**
-

- **Elections**
- **Finance**
- **National Strategy** (e.g., setting the Society's future direction in strategy development and committee structure)
- **Outreach** (e.g., website, social media, event tools)
- **Professional Development**
- **Publications** (*Ellipsaria*, *FMBC*)
- **Symposia and Workshops**

Technical Committees:

- **Conservation and Restoration**
- **Environmental Quality and Advocacy**
- **Field Studies and Ecosystem Services**
- **Genetics**
- **Mollusk Status and Distribution**

Only the chairs (or their designees) of the Functional and Technical committees will be required to report to, and have formal votes on, the Board of Directors. Society members are reminded that our Board meetings are open so that anyone can attend and address topics they believe are pertinent.

Both the Functional and Technical Committees are encouraged to establish subcommittees to conduct specific projects within their purview. Each subcommittee should develop its own goals and operating procedures and elect a chair who reports to the chair of the parent committee, and through that person, to the Board. The by-laws state that committee chairs can serve no more than three consecutive 2-year terms, but do not dictate term limits for subcommittee chairs. Term limits were placed on committee chairs to provide more opportunities for Society members to participate in leadership roles. The ExCom recommends that the terms of subcommittee chairs also be limited to three terms (six years), but if there is a good reason to extend a subcommittee chair's term when working on a specific project, the committee is free to allow it.

These revised committees will begin functioning and elect their respective chairs during the Virtual Symposium in April 2021.

FMBC Published a BioOne Top and Trending Article

On September 3 2020 BioOne Complete highlighted a selection of 15 [Top and Trending articles](#) published recently in BioOne journals. This collection is being featured for institutional subscribers and shared on social media, with the aim of encouraging readership and driving engagement with BioOne member publications. These articles represent broad cross-sections of subjects, species, and regional interests.

One of those articles -- Exposure to Elevated Concentrations of Major Ions Decreases Condition Index of Freshwater Mussels: Comparison of Metrics by Serena Ciparis, Garrett Rhyne, and Ty Stephenson -- was published in our journal *Freshwater Mollusk Biology and Conservation* [22(2):98-108 (2019)]. Congratulations to the authors *and* to the editors for producing this highly regarded article.

Call for Formal Change Petitions Concerning Scientific and Common Names

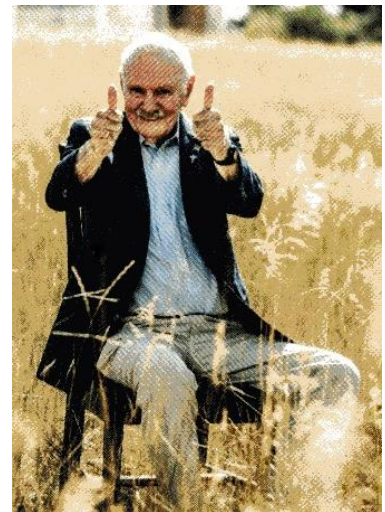
The Gastropod and Bivalve working groups of the FMCS Common and Scientific Names Subcommittee will review proposed changes to their respective lists of scientific and common names for the United States and Canada during a virtual meeting to be held in mid-April 2021. For names to be considered, a formal petition must be received by 15 January 2021 (~ 90 days before the committee meetings). Any FMCS member may submit a proposed new name or name change following the committee rules and using the submission form found on the Names page on the FMCS website (https://molluskconservation.org/MServices_Names.html). If multiple petitions are received for the same name or names, the working group chairs may require petitioners to combine their submittals for the sake of brevity. Questions or comments can be submitted to the working group chairs: John Harris (omibob1@gmail.com) chairs the bivalve subcommittee, and Paul Johnson (paul.johnson@dcnr.alabama.gov) chairs the gastropod subcommittee.

Announcements

Establishment of the John B. Burch Malacology Fund

In recognition of Dr. John B. (Jack) Burch's vast contributions for over half a century to the field of malacology and to the training of malacologists, the Burch family recently established **The John B. Burch Malacology Fund** at The University of Michigan. The Fund, including any additions to it from donors or others, will be used to support the University of Michigan's Museum of Zoology (UMMZ) program in malacology, including, but not limited to support of students engaged in research on mollusks (including stipends, tuition and travel), maintenance or growth and development of the UMMZ's Mollusk Collection, acquisition of library or research materials, preparation and production of publications or presentations, and related needs appropriate to the functioning of a leading university program in malacology. Because the Fund expenditures will involve interest only, we anticipate that it will last indefinitely (a number of such UMMZ funds are approaching a century in age).

Jack's former students, friends, and colleagues are invited to contribute to the Fund. We hope that their interactions with Jack inspired them and, if that is the case, they will consider supporting the Fund and the long and distinguished UMMZ tradition of training future malacologists. Please submit your gift (no matter how small—it is the thought that counts) directly to the John B. Burch Malacology Fund at the website or mailing address given below. You will promptly be sent a formal receipt for your records.



Online donations: <https://leadersandbest.umich.edu/find/#!/give/basket/fund/701433>

Regular mail: Research Museum Center (RMC), Attn: UMMZ—John B. Burch Malacology Fund, 3600 Varsity Drive, Ann Arbor, MI 48108 Make check out to “The University of Michigan” and put “The John B. Burch Malacology Fund” in the Memo space.

Proposed Rule on Endangered Species Listing for Three Mussel Species

On September 29, 2020, the U.S. Fish and Wildlife Service published a Notice in the *Federal Register* concerning the possible listing of the purple lilliput (*Toxolasma lividum*), longsolid (*Fusconaia subrotunda*), and round hickorynut (*Obovaria subrotunda*). The Summary of this Notice reads as follows:

We, the U.S. Fish and Wildlife Service (Service), announce 12-month findings on a petition to list the purple lilliput (*Toxolasma lividum*), longsolid (*Fusconaia subrotunda*), and round hickorynut (*Obovaria subrotunda*) freshwater mussels as endangered or threatened species and to designate critical habitat under the Endangered Species Act of 1973, as amended (Act). We find that listing the longsolid and round hickorynut is warranted. Accordingly, we propose to list the longsolid and round hickorynut as threatened species with a rule issued under section 4(d) of the Act ("4(d) rule"). If we finalize this rule as proposed, it would add these species to the List of Endangered and Threatened Wildlife and extend the Act's protections to the species. We also propose to designate critical habitat for the longsolid and round hickorynut under the Act. For the longsolid, approximately 1,115 river miles (1,794 kilometers), all of which is occupied by the species, in Pennsylvania, Kentucky, West Virginia, Virginia, Tennessee, and Alabama fall within the boundaries of the proposed critical habitat designation. For the round hickorynut, approximately 921 river miles (1,482 kilometers), all of which is occupied by the species, in Pennsylvania, Ohio, Indiana, Kentucky, West Virginia, Tennessee, Alabama, and Mississippi fall within the boundaries of the proposed critical habitat designation. Finally, we announce the availability of a draft economic analysis of the proposed designation of critical habitat for the longsolid and round hickorynut. After a thorough review of the best available scientific and commercial information, we find that it is not warranted at this time to list the purple lilliput. We ask the public to submit to us at any time new information relevant to the status of purple lilliput or its habitat.

The full text of this *Federal Register* Notice is available at: <https://www.federalregister.gov/documents/2020/09/29/2020-17015/endangered-and-threatened-wildlife-and-plants-12-month-finding-for-purple-lilliput-threatened>. All comments concerning this Notice must be submitted by December 28, 2020.

NCTC Divers Test U.S. Fish and Wildlife Service COVID-19 Job Hazard Analysis

The U.S. Fish and Wildlife Service (FWS) National Conservation Training Center (NCTC) Dive Team has spent the last few weeks on the Potomac River in eastern West Virginia, testing the FWS SCUBA Job Hazard Analysis (JHA) protocols for COVID-19. The JHA was written to ensure the safety of all divers and surface support personnel, but written protocols always need a thorough field testing to ensure that all the bases have been covered.

The new protocols require social distancing and mask wearing during all surface activities (including donning and doffing of gear) and require all divers to keep regulators in their mouths when surfacing until a safe distance (6 feet) can be achieved. Buddy checks also are modified to maintain safe distancing, and alternate air sources are checked by purging instead of breathing through the regulator.

During the tests, all protocols seemed to work well. The only real issue the dive team struggled with was zipping and unzipping a dry suit. This can sometimes be difficult without assistance (especially for rear facing zippers), so the protocol was adjusted to have surface personnel wear disposable gloves and mask while assisting divers into and out of a dry suit. Anyone who would like to get a copy of the FWS COVID-19 JHA for SCUBA should send a request to Matthew Patterson at matthew_patterson@fws.gov.

While underwater, the divers got up-close and personnel with non-native flathead catfish. They also got a front row seat to the spectacle of the plain pocketbook (*Lampsilis cardium*) fall display. Starting in late September in this part of the Potomac, these female members of this species -- also introduced to this river long ago -- display a mantle lure that has evolved to attract host fish (primarily smallmouth bass in this stream). When a bass tries to take a bite of the fish-like lure, it gets a mouthful of larval mussels

instead. Those larval mussels complete metamorphosis to the juvenile stage while attached to the fish, then fall to the substrate to begin their journey to adulthood. This spectacle occurs every year just down the hill from the NCTC campus. Both photographs by Ryan Hagerty, NCTC.



Upcoming Meetings

March 21 – 26, 2021 – National Shellfisheries Association 113th Annual Meeting, Sheraton Charlotte Hotel, Charlotte, North Carolina, USA. <https://www.shellfish.org/annual-meeting>

April 12 – 14, 2021 – FMCS Virtual Symposium. Theme: *Back to the Future: The Virtual Unknown*. [website available soon] [See article on Page 2.]

May 23 – 27, 2021 – Society for Freshwater Science Virtual Meeting, Theme: *Freshwater Science in a Time of Transformation* <http://sfsannualmeeting.org/>

June 14 – 18, 2021 – American Malacological Society Annual Meeting, Sydney, Cape Breton Island, Nova Scotia, Canada <https://ams.wildapricot.org/AMS-2021>

August 8 – 12, 2021 – American Fisheries Society Annual Meeting, Baltimore, Maryland, USA Theme: *Investing in People, Habitat, and Science* <https://afsannualmeeting.fisheries.org/call-for-papers/>

September 5 – 9, 2021 – Ninth European Congress of Malacological Societies (EUROMAL 2@2@), Prague, Czech Republic www.euromal.cz.

October 17 – 20, 2021 – Southeastern Association of Fish and Wildlife Agencies 75th Annual Conference, Roanoke, Virginia, USA. <http://www.seafwa.org/conference/overview/>

May 16 - 20, 2022 – Joint Aquatic Sciences Meeting, JASM 2022, Grand Rapids, Michigan, USA. <https://jasm2022.aquaticsocieties.org/>

Summer (?) 2022 – FMCS Workshop [possible options still under discussion]

Summer (?) 2022 – Society for Conservation Biology North American Sectional Meeting, [dates and location not yet posted] <http://scbnorthamerica.org/index.php/nacsb>

April 9 – 12, 2023 – FMCS Biennial Symposium, Double Tree Hotel, Portland Oregon, USA. Theme: *Mountains to Sea and Mollusks Between*. [other details yet to be determined]

Spring (?) 2025 – FMCS Biennial Symposium, somewhere in Michigan, USA. [dates, location, theme, and other details yet to be determined]

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.

Cases of a Zebrine Color Pattern in Populations of *Physella acuta*

Henk K. Mienis, National Natural History Collections, Berman Building Room 119, 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

[Not Peer-reviewed]

Probably the most common freshwater gastropod in Israel is an exotic species of North American origin, the Acute bladder snail *Physella (Acutiana) acuta* (Draparnaud, 1805), Family Physidae. It occurs all over the country in springs, streams, ditches, canals, lakes, ponds, and even temporary pools (Milstein, Mienis & Rittner, 2012). It is also the most common snail species in almost any aquarium. It is a species which can survive in extremely polluted biotopes characterized with a very low level of oxygen, because it simply moves to the surface of the water and takes in air from the outside.

Usually, *Physella acuta* has a uniformly yellowish to light-brown colored shell, often with a darker colored rim with a reddish hue at the edge of the inner lip of the aperture. From time to time, specimens or entire populations are encountered in Israel showing a quite different color pattern. They are light brown with regularly spaced thin axial white streaks. Samples of such shells with a zebrine color pattern are present in the following collections:

Israel, Upper Galilee, Hula Nature Reserve, Eitan Pool, leg. R. Ortal, 2 June 1994 (HUJ MOL 39649 and SMNH MO 83608 - a huge population all showing a zebrine color pattern (Figure 1);

Israel, Upper Galilee, Hula Nature Reserve, Western Meadow, leg. R. Ortal, 2 June 1994 (HUJ MOL 39650 – all 29 specimens);

Israel, Northern Coastal Plain, south of Akko, Nur pool, an artificial pool in the dunes, leg. A. Almogi-Labin, 25 July 2001 (HUJ MOL 50815 – four shells among many normally colored ones);

Israel, Northern Coastal Plain, Haifa, Lower Qishon River, near the *Narcissus* wetland, leg. O. Kolodny, 8 December 2019 (HUJ MOL 55728 – one shell in a batch of seven specimens).

HUJ MOL - Hebrew University of Jerusalem, Mollusc Collection.

SMNH MO - Steinhardt Museum of Natural History, Mollusc Collection.



Figure 1. A zebrine color pattern in a sample of *Physella acuta* shells from the Hula Nature Reserve, Eitan Pool, in Israel.

A zebrine color pattern also is occasionally encountered in Lymnaeidae and Planorbidae (Hubendick, 1951). In spite of the fact that Hubendick collected all his zebrine shells on the same date and locality 70 years ago, it is still a riddle what triggered the appearance of such a striking color pattern.

The zebrine color pattern is also a rare event among *Physella acuta* lacking an explanation; however, it is not completely unknown among the Physidae. This pattern is, for example, well-known in species belonging to the genus *Mexinauta* and to a lesser extent in the genus *Mayabina* (Taylor, 2003).

During recent fieldwork carried out in the Netherlands I came across a juvenile dead shell of the Acute bladder snail with a zebrine like color pattern; however, the dark and white axial areas in that specimen are rather irregularly spaced. The full locality information reads:

The Netherlands, Friesland, Joure, heated cooling water basin of the J-DE coffee roasting factory at the Slachtedijk, leg. H.K. Mienis, 7 September 2020 (SMNH MO 83609 – one shell in a batch of three specimens, Mienis, in print, Figure 2).

I thank my colleague Oz Rittner (Steinhardt Museum of Natural History) for the excellent photographs.

References:

- Hubendick, B. 1951. Recent Lymnaeidae. Their variation, morphology, taxonomy, nomenclature, and distribution. *Kungliga Svenska Vetenskapsakademiens Handlingar*, (4) 3 (1):1-223, 5 plates.
- Mienis, H.K. in press. Een eerste verkenning van de mollusken aanwezig in het koelwaterbasin van de Jacobs-Douwe Egberts koffie fabriek in Joure. *Spirula*.
- Milstein, D., Mienis, H.K. & Rittner, O. 2012. [A field guide to the molluscs of inland waters of the Land of Israel.] 54 pp. Israel Nature and Parks Authority, Jerusalem and Tel Aviv University, Tel Aviv. [in Hebrew].
- Taylor, D.W. 2003. Introduction to Physidae (Gastropoda: Hygrophila). *Biogeography, classification, morphology*, *Revista de Biología Tropical*, 51 (Supplement 1):1-287.



Figure 2. An irregular zebrine color pattern in a shell of a juvenile *Physella acuta* from a heated cooling water basin in Joure, the Netherlands.

The Freshwater Bivalves of Santa Catarina State/ SC, Central Southern Brazil: Species Inventory

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/>

[Not Peer-reviewed]

Based on 24 years of systematic research, it is possible to compile an inventory of mollusks occurring in the little geographical territory of Santa Catarina State, Central Southern Brazil region. Overall, we have documented a grand total of 1,042 mollusk species for the State, of which 788 are marine (12 Polyplacophora, 475 Gastropoda, 15 Scaphopoda, 262 Bivalvia, 24 Cephalopoda) and 254 are non-marine (Agudo-Padrón 2018, 2020; Agudo-Padrón & Carneiro 2020). Of the non-marine species, 85 are limnic/ freshwater forms (45 Gastropoda and 40 Bivalvia ~ 36 natives and four exotics), 3 are amphibious/ limnophile Gastropoda, and 166 are land/ terrestrial Gastropoda.

The 40 species of limnic/ freshwater bivalves known from Santa Catarina State include representatives of five taxonomic families (Table 1). Most of these species are native mussels/ naiads in two families: 11 Mycetopodidae and 12 Hyriidae. The fauna also includes one exotic invasive mussel in the family Mytilidae, and two natives and three exotic invasive clams in the family Cyrenidae. Finally, the little “pea

clams” are represented by eleven species in the family Sphaeriidae. These species occur in what was characterized for the State 18 years ago (Agudo-Padrón 2002) as the six malacological regions in which the State's geography has been organized for the effects of their study (Agudo-Padrón 2014; Figure 1).

Table 1. The limnic/ freshwater bivalve species occurring in Santa Catarina State, Central Southern Brazil, and their known distribution in the six malacological regions identified in Figure 1.

Taxa	Malacological Regions					
	1	2	3	4	5	6
BIVALVIA Linnaeus, 1758						
UNIONOIDA Stoliczka, 1871						
Family Mycetopodidae Gray, 1840						
<i>Mycetopoda legumen</i> (Martens, 1888)			X		X	
<i>Mycetopoda siliquosa</i> (Spix, 1827) – ?						
<i>Anodontites elongatus</i> (Swainson, 1823)			X			X
<i>Anodontites tenebricosus</i> (Lea, 1834)	X		X		X	
<i>Anodontites ferrarisii</i> (d'Orbigny, 1835)			X			
<i>Anodontites cf. moricandi</i> (Lea, 1860)			X			
<i>Anodontites patagonicus</i> (Lamarck, 1819)			X			X
<i>Anodontites obtusus</i> (Spix, 1927)			X			
<i>Anodontites trapesialis</i> (Lamarck, 1819)		X	X		X	X
<i>Leila blainvilleana</i> (Lea, 1834)	X					
<i>Monocondylaea minuana</i> (d'Orbigny, 1835)			X			
Family Hyriidae Swainson, 1840						
<i>Diplodon aethiops</i> (d'Orbigny, 1835)	X		X	X	X	X
<i>Diplodon charruana</i> (d'Orbigny, 1835)						X
<i>Diplodon ellipticus</i> (Wagner in Spix, 1827)		X	X	X	X	
<i>Diplodon expansus</i> (Küster, 1856)	X	X	X	X	X	X
<i>Diplodon (Rhipidodonta) koseritzi</i> (Clessin, 1888)			X			
<i>Diplodon (Rhipidodonta) suavidicus</i> (Lea, 1856)						X
<i>Diplodon multistriatus</i> (Lea, 1834)			X			
<i>Diplodon delodontus</i> (Lamarck, 1819)			X			X
<i>Diplodon parallelipipedon</i> (Lea, 1834)				X		
<i>Diplodon rhuacoicus</i> (d'Orbigny, 1835)			X	X	X	
<i>Rhipidodonta hylaea</i> (d'Orbigny, 1835)				X		X
<i>Rhipidodonta rhombea</i> (Wagner, 1827)			X			
VENEROIDA Gray, 1854						
Family Cyrenidae Gray, 1847						
<i>Corbicula fluminalis</i> (Müller, 1774)			X			
<i>Corbicula fluminea</i> (Müller, 1774)		X	X		X	X
<i>Corbicula largillierti</i> (Philippi, 1844)	X	X	X		X	X
<i>Cyanocyclus limosa</i> (Maton, 1809)			X			
<i>Cyanocyclus paranacensis</i> (d'Orbigny, 1835)		X				

Table 1. (continued)

Taxa	Malacological Regions					
	1	2	3	4	5	6
<u>Family Sphaeriidae</u> Deshayes, 1855						
<i>Eupera bahiensis</i> (Spix, 1827)		X				X
<i>Eupera klappenbachi</i> (Mansur & Veitenheimer-Mendes, 1975)	X					
<i>Eupera platensis</i> (Doello-Jurado, 1921)			X			
<i>Musculium argentinum</i> (d'Orbigny, 1835)		X				
<i>Pisidium</i> aff. <i>dorbignyi</i> (Clessin, 1879)			X			
<i>Pisidium globulus</i> (Clessin, 1888)	X		X	X		
<i>Pisidium observationis</i> (Pilsbry, 1911)			X	X		
<i>Pisidium pipoense</i> (Ituarte, 2000)			X			
<i>Pisidium taraguyense</i> (Ituarte, 2000)			X			
<i>Pisidium</i> aff. <i>vile</i> (Pilsbry, 1897)			X			
<i>Sphaerium cambaraense</i> (Mansur, Meier-Brook & Ituarte, 2008)			X			
<u>Family Mytilidae</u> Rafinesque, 1815						
<i>Limnoperna fortunei</i> (Dunker, 1857)		X	X			
Species Present	7	9	30	8	9	12

As indicated in Table 1, Malacological Region number 3 (Western domain of the Upper Uruguay River Basin Valley) has the largest documented number of freshwater bivalve species in the State, with 30 registered forms. Region number 6 (domain of the Itajaí River Atlantic Basin Valley) is second, with 12 species. Regions 2 (North) and 5 (South) are both known to have populations of nine species, while Region number 4 (Highlands) counts 8 species. Finally, the anthropically troubled Region number 1 (Greater Florianópolis, coastal and mountain) has the fewest recorded number of freshwater mollusk species in all in the State, with only seven species counted.

Rather curiously, only one of these freshwater bivalves, the native mussel/ naiad Hyriidae *Diplodon expansus* (Küster, 1856) (Figure 2), occurs in all of the six malacological regions established for the State (Agudo-Padrón 2018:60). Unfortunately, following the global trend, today they constitute the most endangered mollusks in the State, principally due to different anthropic causes (of all known), that act on detriment from their vulnerable and restricted (lotic and lentic) aquatic habitats (Agudo-Padrón 2016).

Figure 1. Malacological Regions of Santa Catarina State:

- 1) Greater Florianópolis coastal and mountain region,
- 2) Northern region,
- 3) Western region,
- 4) Highlands region,
- 5) Southern region, and
- 6) Itajaí River Valley region.

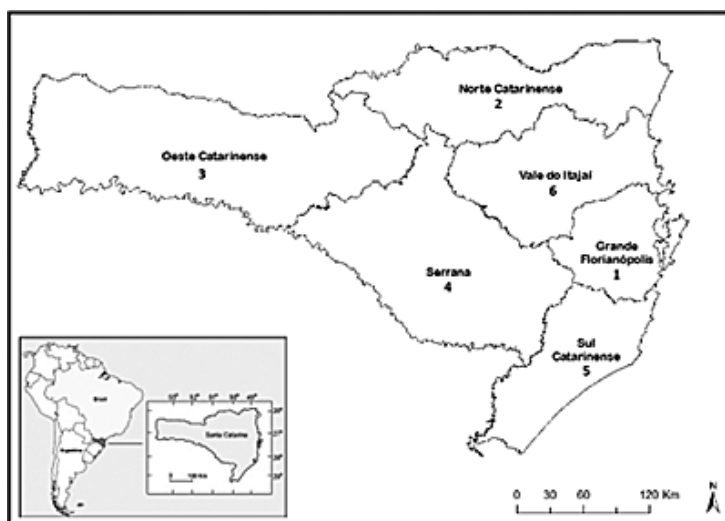




Figure 2. Native mussel/ naiad Hyriidae *Diplodon expansus* (Küster, 1856). Specimen (shell) found in the Couro River Microbasin Valley, Itaiópolis Municipal District (Map, red color), Malacological Region 2 (North) of Santa Catarina State/ SC, Central Southern Brazil. Field record and photographs by Germano Woehl, Junior

References:

- Agudo, A. I. 2002. Preliminary report on the freshwater mussels/ clams (Bivalvia: Unionoida & Veneroida) of Santa Catarina State, Southern Brazil. *Ellipsaria*, 4(2):10-11.
- Agudo-Padrón, A.I. 2014. Richness, regional distribution and conservation situation of freshwater and amphibian mollusks in Santa Catarina State/ SC, Central Southern Brazil: a preliminary evaluation. *Ellipsaria*, 16(1):20-23.
- Agudo-Padrón, A.I. 2016. The mollusk fauna of Santa Catarina State/ SC, Central Southern Brazil: a final general balance after two decades of research, with special emphasis on the freshwater species. *Ellipsaria*, 18(2):29-32.
- Agudo-Padrón, A.I. 2018. Revised and updated systematic inventory of non-marine molluscs occurring in the state of Santa Catarina/SC, central southern Brazil region. *Advances in Environmental Studies*, 2(1): 54-60. Available online at: <https://scholars.direct/Articles/environmental-studies/aes-2-007.pdf?jid=environmental-studies&fbclid=IwAR0jVKm3aMwsKV0gxiVCuJd2HT1pxo4xFjf4Y91atMhChKfmIYYqd9Ww3z4>
- Agudo-Padrón, A.I. 2020. Additions to the systematic inventory of non-marine molluscs occurring in the state of Santa Catarina/SC, central southern Brazil region. *Advances in Environmental Studies*, 4(1): 261-270. Available online at: https://scholars.direct/Articles/environmental-studies/aes-4-027.php?jid=environmental-studies&fbclid=IwAR3loMgNGxQK6kAwSHuOKw3_XgQvvjOYVkBh6FSBcxKjIC5KGV9lv6Q8mOs
- Agudo-Padrón, A.I. and Carneiro, F. 2020. First confirmed records of two limnic/ freshwater mollusks (Gastropoda and Bivalvia) in Santa Catarina State/ SC, Central Southern Brazil. *Ellipsaria*, 22(3):12-15.

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

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

Information for possible inclusion in *Ellipsaria* should be submitted via e-mail to the editor, John Jenkinson, at jjjenkinson@hotmail.com. Contributions may be submitted at any time but are due by the 15th of the month before each issue is posted. MSWord is optimal for text, but the editor may be able to convert other formats. Graphics should be in a form that can be manipulated using PhotoShop. Note that submissions are not peer-reviewed but are 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 Committees and Their Chairs/Co-chairs

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

Standing Committees

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Parting Shot



We get to close out this issue and this horribly stressful year with a fun picture. Jeremy Tiemann and Kevin Cummings found an apparent gargoyle buried in the mud of an Illinois stream and “just had” to dig it out. During the chore, Kevin took this fascinating picture of what was emerging. When the object was finally freed from the mud and cleaned, it turned out not to be some terrible, ominous object but a Disney villains snow globe! Anyway, freeing the object appears to have given Jeremy some good luck; one day he was elected FMCS President. Enjoy the upcoming Holidays and have a safe and much less stressful 2021.

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.

