

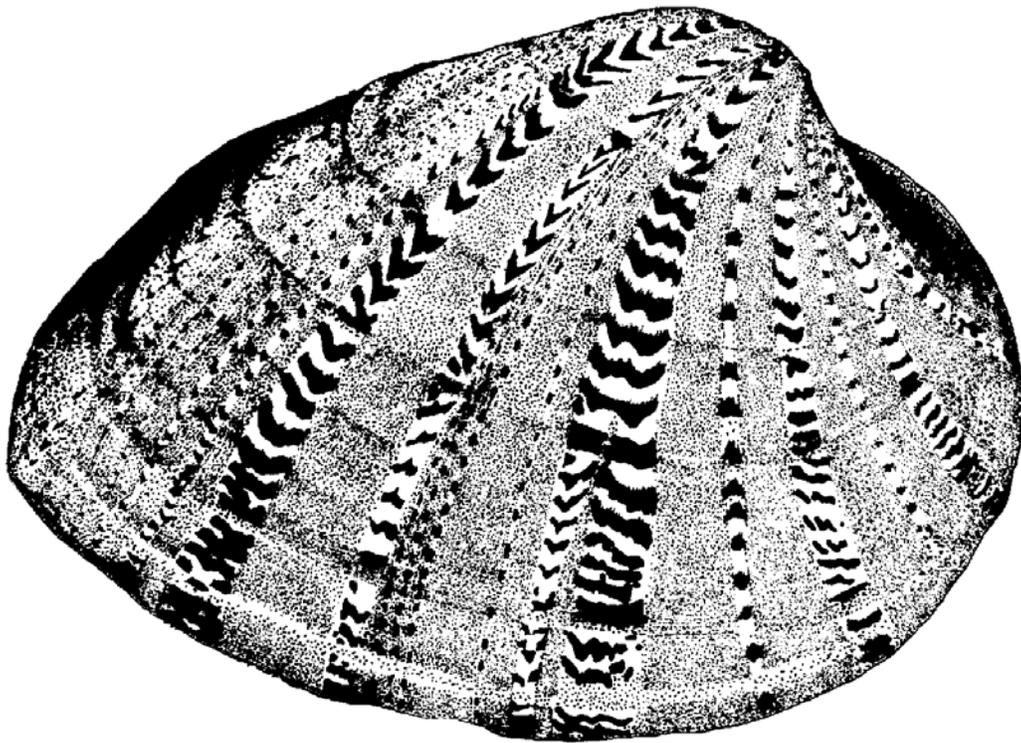
# *Ellipsaria*

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The Newsletter of the Freshwater Mollusk Conservation Society

Volume 9 - Number 3

December 2007



*In this issue:*

November Board Meeting Minutes

Call for Nominations for Treasurer

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### *Ellipsaria* Editor

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Submissions for the April 2008 issue of *Ellipsaria* may be sent to the editor at any time but are requested by **March 25, 2008**. Anyone may submit an article but you must be a member of FMCS to receive *Ellipsaria*. Please limit submissions to about one page. Categories for contributions include news, new publications, meeting announcements, current issues affecting mollusks, job postings, contributed articles (including ongoing research projects), abstracts, and society committee reports. Electronic submissions are preferred; contact the editor with any questions. Note that submissions are not peer reviewed, but are checked for content and general editing.

Thanks to Jeremy Tiemann for help assembling and mailing this newsletter.

Please send change of address information to the Secretary.

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# Ellipsaria

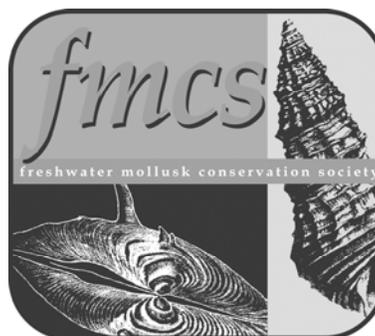
NEWSLETTER OF THE FRESHWATER MOLLUSK CONSERVATION SOCIETY

Volume 9, No. 3

<http://ellipse.inhs.uiuc.edu/FMCS/>

December 2007

FMCS News .....	1
Announcements.....	6
Publications.....	6
Contributed Articles .....	7



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## President's Message

Just a few items before we close out a very historically dry year. We will be represented at the Society for Conservation Biology symposium next July 13-17, 2008 in Chattanooga, Tennessee. John Jenkinson prepared a brief announcement for the December printing of *Ellipsaria* but there wasn't enough time for more details since our printing deadline is December 12. Thanks to Rachel Muir, we will have a 1-day workshop and thanks to Ryan Evans, John Jenkinson, and Judy Takats we will have a 4-hour symposium consisting of eight invited speakers. More details will be provided in the April *Ellipsaria* including emails to FMCS members, FMCS website, and listing on the unio list server.

During our board meeting at the Ohio River Islands National Wildlife Refuge in West Virginia (thanks to Patty Morrison for hosting), it was brought to our attention by our treasurer (Heidi Dunn) that we lost money during the 2006 workshop and 2007 symposium. We need to raise registration rates by 21% in order to break even for future workshops and symposia. A solution to this since many of our members are employed by state, federal, and non-governmental agencies is to put a line item in their budgets for monetary support of our activities. It doesn't have to be a lot of money and/or one agency providing most of the support, but multiple \$500 sponsorships spread out over our membership would really help out.

Our Society is driven by our standing committees that basically identify issues for advancing mollusk conservation. I would welcome each committee to be working on goals that reflect advancing our molluscan knowledge to all groups. One major task, The National Strategy for the Conservation of Mollusks, needs to be updated to reflect current technological progress and/or streamline it to make it work. I will be asking each committee chair and their members to review this document and provide input per their committees for revision. I intend on addressing progress on the new National Strategy document at our next March board meeting in Dry Ridge, Kentucky. I will notify board members with the date and particulars for the board meeting.

I would like our Society members to be thinking about future symposium/workshop topics and locations. We need to have a workshop in place (2010) immediately following the symposium in Baltimore (2009). One topic discussed by Greg Cope and I concerns what we as biologists are being exposed to when we are searching for mussels. Obviously, our water is loaded with pathogens that have made a number of us sick. This topic might be attractive to a wider audience across the country.

Our FMCS website will be updated and become the responsibility of the Outreach Committee. Tom Jones from Marshall University volunteered to update and run the website with input from a number of individuals: Matt Patterson, Andy Roberts, Stephen McMurray, Chris Barnhart. This presents a great opportunity for our Society to showcase what we are doing to conserve our resources. A special thanks to Christine Mayer for her dedicated service in maintaining the current website.

We are still in the process of transferring *Walkerana* over to the FMCS as the official journal of our Society. Hopefully this can be accomplished by the end of December. It was mentioned at the board meeting to keep *Ellipsaria* as a newsletter possibly via email. This will be addressed at the next board meeting.

Leroy Koch is requesting nominations for treasurer in this issue of *Ellipsaria*. Heidi Dunn has been an exceptional treasurer and founding member of our Society. She is the glue that held many things together over time. I know she is not going away, but Heidi is one individual that has given countless hours of her time for our Society while managing a consulting firm. Thanks Heidi!

I want to wish everyone a wonderful Christmas and Happy New Year, and am very proud of all of you for your dedicated service protecting America's most endangered fauna...freshwater mollusks!

Steve Ahlstedt, FMCS President

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## ~~ FMCS 2008 WORKSHOP ~~

[Probably] JULY 14, 2008  
Chattanooga Convention Center  
Chattanooga, Tennessee

The 2008 FMCS Workshop will be held at the Chattanooga Convention Center, probably on Tuesday, July 14, 2008. This one-day Workshop will be conducted in conjunction with the 4-day Annual Meeting of the **Society for Conservation Biology (SCB)**. FMCS also will conduct a half-day Symposium during the SCB Meeting, probably on Monday, July 13, 2008. Registration details for this Workshop are still being discussed with SCB; however, we anticipate that the [modest] registration fee will allow attendees to participate in one full day of the SCB Annual Meeting and the one-day workshop.

### *Workshop Theme: The Road to Recovery: Science to Secure Freshwater Mollusk Biodiversity*

The purpose of this Workshop is to address the major science needs for conservation actions to recover freshwater mollusks that are imperiled, including species listed under the U.S. Endangered Species Act. The session will feature invited speakers who will:

1. Provide an information "toolkit" of resource managers and practitioners who have responsibility for freshwater ecosystems.
2. Update resource managers on the state of the science for freshwater mollusk recovery that can be applied to the ESA recovery process, including genetics, propagation, life history, effects of physical, chemical and hydrological changes on populations and their role in ecosystem function.
3. Provide a forum for discussion of the interplay of genetics and propagation in species recovery.
4. Identify research and monitoring gaps and needs.
5. Provide input for a revision of the FMCS National Conservation Strategy.

### *Symposium Theme: Beneath the Surface: The Freshwater Mollusks of the Southeastern United States*

This Symposium is being designed to generate an appreciation for – and the challenges associated with – conserving the mussels and snails living in the southeastern United States. Talks have been designed to introduce the diversity of species, life history strategies, habitat requirements, and responses to stream modifications that make conserving freshwater mollusks both an imperative and a daunting challenge. The concluding talk also provides tangible examples of how these animals can recover under proper stream management practices.

Registration details about this Workshop will be sent (via e-mail) to FMCS members and will be posted on the UNIO Listserve as soon as they are finalized. Additional information about both sessions will be included in the April 2008 issue of *Ellipsaria*.

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## FMCS Officer Nominations

The FMCS is seeking nominees for the position of **Treasurer**. Any member may nominate any other member. Nominees must be current FMCS members in good standing who agree to be nominated.

The new **Treasurer** will take office in March of 2008 and serve for **two years**.

**The deadline for nominations is January 11, 2008.**

The nominations committee will select the two candidates for each office who receive the most nominations and who are willing to run for that office. Ballots and position statements from the candidates will be mailed out to all members after nominations close.

Send your nominations to:

Leroy Koch  
U.S. Fish and Wildlife Service  
J.C. Watts Federal Building - Room 265  
330 West Broadway  
Frankfort, KY 40601  
502.695.0468 ext. 106  
leroy\_koch@fws.gov

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### Membership Renewals

*Membership dues are collected annually at the beginning of each year. Please complete the enclosed renewal form and return it with your dues to Heidi. Additional forms are available on the FMCS website.*

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## FMCS Board Meeting Ohio River Islands NWR Williamstown, WV November 8, 2007 1PM

A quorum is present for the official meeting of the Board of Directors of FMCS. Attendees:

Steve Ahlstedt – President  
Greg Cope – President Elect (via phone)  
Robert Anderson – Past President  
Greg Zimmerman – Secretary  
Tony Brady, David Berg, Leroy Koch, Bob Butler, Tom Jones, Catherine Gatenby, Ryan Evans, Rachael Muir (via phone)

Secretary's Report – All FMCS files and lists have been transferred from the past secretary (Patty Morrison) to Greg Zimmerman.

Treasurer's Report – Total society assets: \$54,704.58.

- 1) We lost approximately \$15,000 between the 2006 Columbus OH Workshop / 2007 Little Rock AK Symposium. We will need to charge 21% more for registration to break even. This should be kept in mind

when setting the fees for the next symposium and workshop.

- 2) Awards: Total expenses for awards (plaques and monetary awards) was \$5,963.13. Total auction income for 2005 was \$4,070. This year we took in \$5,774. Heidi put together a ledger for this labeled auction; we really only have \$2568 left in this budget. We originally estimated \$4000 per year for awards, and if we stick to the \$4,000 per year we should be fine, as we can expect \$5,000 plus from future auctions.
- 3) The loss of \$12,599 for 2007 includes the expenses for the workshop in 2006 (\$10,346). At the end of 2006, we were at \$14,507 profit. So, the true bottom loss to date for 2007 is really -2253.20 despite symposium overruns.
- 4) A worksheet was created showing donation expenses. We contributed \$500 to for Malcolm Pearce memorials. Thanks to Stewart for taking care of that. We received thank you letters from both organizations.

We also have \$880 from proceedings for the 2005 workshop. No one has asked for a refund. These funds could be returned, or converted to a donation with permission. Taxes for 2006 (Form 990) and corporation registration for 2007 are filed.

FMCS Memberships: Many people are interested in a 2 year, 5 year, or lifetime membership. We received many 2 year payments. When we work out Walkerana costs we should consider this.

### Committee Reports

All members are encouraged to join and be active in FMCS committees. You don't have to wait until the next meeting! See the FMCS website for the respective committee chair's contact information.

Awards – All members are encouraged to submit nominations for the professional awards. Contact Greg Cope for details.

Propagation, Restoration, and Introductions – A method is needed to standardize the way we are reporting mussel propagations and introductions. This is something that is beginning to be requested by agencies and legislators. Examples include quantifying mussel releases by weight (mussels / lb), by age, etc. Please see Tony Brady for details. A *Controlled propagation plan for augmentation of freshwater mussels in the Green River, Mammoth Cave National Park* by James Layzer and the USGS TN Cooperative Fishery Research Unit has been completed. The Genetics Committee is now its own group (see below).

Genetics – The 1<sup>st</sup> meeting of this group was at Little Rock. We need an updated list of Genetics Committee people. Greg Z. provided a list to the chair and co-chair but the workshop categories grouped propagation and genetics into one list. If you would like to be a part of the genetics committee please contact David Berg and cc Greg Z. The idea for the creation of a "stud book" for captives was raised. David's group has recently been able to obtain

genetics out of glochidia – which raises unanswered questions for cons. genetics, census size, etc. Quantitative genetics is now an option w/ captive propagation. Questions of subspecies remain: How to protect and get around ESA for protection. Future avenues could include developing a “lab rat” unionid or snail for a “complete genome project”. David B. will put out more info soon.

Symposium 2009 – Will be held in Baltimore, MD. Symposium dates are probably mid-march dates. RFP for hosting has gone out for event. Youth / students are key – so a top priority is to negotiate a good rate for hotel rooms for students.

Presently, all members should make a concerted effort to procure donations / sponsors for the symposium. Consider agency funds as well as corporate sponsors and watershed groups. We are looking for sponsors for catered events. Catherine Gatenby has received agreements of 10K to symposium from FWS region 5, Fisheries Chief of Division may donate as well. Auction – usually brings in about 5K. A special account will be set up at Virginia Tech – they will underwrite and handle all FMCS finances regarding the symposium.

Symposium agenda is being developed and may include issues such as tribal lands and global / international mussel issues. Katherine is working on information regarding travel grants. A letter for sponsorship requests is pending; see Catherine G. and the Symposium Committee for details.

An issue raised regarding the past symposium was that more time was needed for committee meetings. One solution may be to meet in the morning, before the symposium similar to SETAC. The Board’s consensus was that adequate time should be allotted to committee meetings.

A symposium outreach event is being considered. Possible locations include the Baltimore Aquarium or a local University. One issue from past symposiums was that there were few actual freshwater mollusk samples (mussels / gastropods) available for students and other new members. A suggestion was made to have a “Show and Tell for Shells” for members to bring in some regional collections / displays (don’t forget your permits). The symposium committee would have to arrange adequate space / time. See Catherine Gatenby for more information.

Information Exchange – The Walkerana journal may be a good outlet for field surveys. There are few places to publish surveys that have appropriate reviewers or where it will be accepted. The idea was raised to set up minimum survey standards, even though not hypothesis-driven research. The consensus was to keep Ellipsaria as a newsletter, perhaps offer an electronic version. Tom Jones brought up the idea of a mollusk textbook. The FMCS web page will likely be revised; Tom J. will contact Andy Roberts (see New Business). Chris Mayer agreed to turn over the website. We need to research maintenance fees, construction, etc. Tom Jones will take the lead. Tom runs an

IT / technology section that could create and potentially host the website. Options could be that members manage their own account information, pay dues online, etc. All board members were in favor of pursuing this further.

Environmental Quality and Affairs – A letter went out regarding Ammonia and recommended limits. See Ryan Evans for details.

Mussel Status and Distribution – Art Bogan: We have had no further communication from the Nature Conservancy about our proposal to raise money for the compilation of mussel distribution data for our atlas project. We are currently pursuing other avenues of funding as well as innovative outlets that will facilitate wide access to the maps.

Jim Williams, Jeff Garner, and Art Bogan are in the final indexing stage of the mussel atlas of Alabama, also known as the Alabama fieldguide. The volume will be over 900 printed pages.

We have scanned Isaac Lea's forth edition of his Synopsis and the first paper on conchology by an American, Thomas Say, (1817) in Nicholson's Encyclopedia. We found a friend with an original set of this encyclopedia who has allowed us to scan the cover page, text and all of the original plates. These two titles are now in pdf format. Tom Watters has another early volume scanned and available. The NCSM is working on the revision of the website where these files will be made available as part of the FMCS project.

Art Bogan provided Steve with a copy of the recent note published in the NC Shell Club Newsletter by Cindy Bogan et al. regarding the move, storage and re-housing of the H.D. Athearn, Museum of Fluvial Mollusk collection. They moved the collection from Cleveland Tennessee in June 2007 and it is now completely housed at the NCSM. This collection consists of 23,344 cataloged lots of freshwater mollusks, over 800 unsorted collections, 2,100 lots of duplicate materials, over 2,000 topographic sheets to supplement his field notes and the 3 x5 card files of cross indexes to the collection. Herb also donated about 1000 reprints and photocopies of freshwater mollusk papers. Cindy Bogan has been re-housing the cataloged sphaeriid and gastropod collection and has completed the transfer of 6200 lots at this time. Jamie Smith is currently finishing a short note on this collection to submit to Ellipsaria.

Gastropod Status and Distribution – Two papers regarding the development of a conservation assessment for North American freshwater gastropods have been published. Paul Johnson, in coordination with AFS Committee members, is working on the creation of an AFS Gastropod Checklist for G-Ranks and AFS conservation rankings for 680 species of North American freshwater gastropods. The purpose of the database will be the completion of an AFS status article for NA gastropods similar to one recently developed for crayfishes (Taylor et al.); contact Paul for more information. The anticipated 2<sup>nd</sup> draft will be submitted to the committee

by the end of the year. While the database is in final review, Paul will begin to draft the final article and assign certain sections of the article to committee members to draft. Art Bogan presented a poster on the findings of the database at the UNITAS mollusk meeting in Belgium last July. The Committee would like to post the database and other information through the FMCS website to solicit comments before final publication. Also, more general gastropod information as time allows.

Of all the groups, Physidae continues to be contentious due to several recent reviews. Other families will be easy by comparison.

Guidelines and Techniques – Possible future endeavors include a list of coursework and important publications, a Best Survey Practices Document, and training / recognition of taxonomic skill levels for permits. FMCS email contact information for Chuck Howard should be chowardoh@yahoo.com

Outreach – Matt Patterson noted outreach efforts in the Clinch River and for coal mining in the Cumberland. See Matt or Tom Jones for details. Regarding outreach materials, Steve suggested to put a proposal together for outreach materials and look for corporate sponsors.

Nominations Committee – Leroy Koch: The committee is seeking nominations for FMCS Treasurer to begin in March 2008.

### Old Business

FMCS Chapters – Chapters that have asked include the Pacific, AK, Interior Highlands, and OH Valley. Greg C. said SETAC has something similar but it becomes a very complicated and formal process. Formal affiliation with the society?, agree w/the bylaws?, tax free status? Benefits vs. cons? If we are an affiliate, they could use our logo as a mechanism to increase interest / attendance. We could lose members to local chapters as well. Outreach Group (try Charlie Stern) will develop a list of groups around the country to see how many are actually out there. The issue of FMCS Chapters was temporarily tabled.

Walkerana – Journal will be transferred to the Society. Jack Burch should have the official document to sign when he gets back from out of town. Because of copyright issues it is a legal document and all 3 partners of the journal need to release it. Journal Structure – Tom Watters will be editor and Al Buchanan co-editor. Kevin Cummings will not be involved at this time. Bill Henley may be involved editing manuscripts. It was believed that setting up an editorial board would not be a problem.

National Strategy – Next Step on the Conservation Strategy FMCS guiding document needs revised. It was agreed to have committees take their piece of conservation strategy and revise and present in March 08. We also need a synopsis of what has been accomplished, this could be included as an appendix. Need electronic version of the

original document in pdf / word format. We will send a mass email out regarding number of action items for each committee.

Fish Habitat Initiative – Would FMCS consider becoming a partner in the Fish Habitat Initiative? This is different from the Ohio River Valley Level. Considering a second workshop regarding mussels and drought.

Restoration Plans. – Steve A.: Restoration Plan for the Mobile Cumberlandian and TN River system is almost complete and can be used as a template for other basins / states.

Workshop 2008 – Rachel Muir: Chattanooga TN joint workshop with the Soc. for Cons. Biology – with the theme “The road to recovery; science to secure mollusk biodiversity”. Workshop has been accepted by Soc. Cons Biol., no confirmation on symposium (but sounds likely). Up to two full days of the workshop. Rachel needs to determine if students / others can present. We are not planning on reimbursing invited speakers for this to keep costs down. We are looking for additional ideas for speakers / agenda. Probable <130\$ for 2-day attendance to meeting which is an excellent price. Possible topics could be: Pipeline’s and Mussels? Transportation and mussels? Energy and mussels? We are investigating weather students / others will be able to present at the conference. Time of year (July) may be an issue due to field schedules. See Rachel Muir, Ryan Evans, Dr. John Jenkinson, Greg Cope, or Bob Anderson, for details and the submitted workshop outline.

### New Business

Website – Andy Roberts with the USFWS is constructing a website for the general public on freshwater mussel conservation. The original plan was to have it stand alone on the internet, but they would like to offer the site to FMCS for use as an outreach tool. The USFWS has enough money to manage the site for the next 1-2 years. After that, the site could be hosted elsewhere for a minimal cost. The site could be combined with the FMCS site or linked alongside.

Greg Z., Heidi D., and Chris M. also are interested in revising the FMCS website so that members can manage and check their own contact information and pay for memberships as this is becoming more and more difficult as the membership grows. Tom Jones’ group at Marshall can design and possibly host the sites through their student program, which is extremely advanced and actually designed the school’s registration system. Steve / Heidi agreed that it was something that was worth pursuing as the membership has grown. Tom Jones will spearhead the effort through the Outreach Committee and work with the Information and Exchange Committee.

Board Meeting – Next Board Meeting will be in Dry Ridge KY in March 2008.

NiSource Pipeline Project. – Should the Society comment on the HCP being prepared for this large project? Test organisms are SHEEPNOSE, Indiana Bat, Bog Turtle. Bob B., Greg Z. and Leroy K. will follow up.

Future Activities / Workshops – Ryan Evans may organize a small “Snail Blitz” for gastropod sampling.

Motion to adjourn by Steve, second by Greg Z., all in favor.

*Submitted by Greg Zimmerman, FMCS Secretary*

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## Announcements

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### AMERICAN MALACOLOGICAL SOCIETY 74th Annual Meeting, 29 June - 3 July 2008 Southern Illinois University, Carbondale, IL Symposium on the Current State of Land Snail Conservation and Land Snail Identification Workshop

The American Malacological Society is pleased to announce the *Leslie Hubricht Symposium and Workshop on the taxonomy, distribution and conservation of terrestrial Gastropods*. The land snail symposium and workshop are aimed at AMS members, state and federal agency employees, and others who are seeking training in land snail collecting, identification, and ecology.

Two major goals of the symposium and associated workshop are to provide an opportunity for networking among established land snail researchers as well individuals who lack taxonomic experience, but are responsible for day-to-day land snail conservation and to offer an opportunity for non-land snail experts to receive training in basic aspects of land snail biology and identification. Workshop attendees are invited to bring their own shells to identify!

Workshop topics covered include:

- Introduction to land snail collecting strategies
- Introduction to ID terminology and literature
- The major families of land snails of North America
- Strategies for the conservation of Invertebrates with emphasis on terrestrial snails/slugs.
- Introduction to the identification of invasive snails and slugs

For more specific information on workshop registration, symposium topics, and accommodations, go to the meeting website: <http://www.malacological.org/meetings/next.html>

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### THE UNIVERSITY OF ALABAMA Department of Biological Sciences

We invite applications for a tenure-track Assistant Professor position in Systematic Invertebrate Zoology to begin August 2008. Candidates must have a Ph.D. and postdoctoral research experience whose research integrates modern molecular approaches to study the systematics,

biogeography, and evolution of freshwater invertebrates. Candidates working on systematics of any group of freshwater invertebrates will be considered. Candidates will be expected to curate one of the freshwater invertebrate collections of Biological Sciences (e.g., Malacology, Decapods, etc.). Candidates must provide evidence of curatorial experience and/or other relevant abilities. Applicants are advised to view a more detailed job description at [www.as.ua.edu/biology](http://www.as.ua.edu/biology) prior to submitting their application package. Successful candidates will have demonstrated excellence in research and will be expected to attract extramural funding. Candidates must be committed to excellence in teaching and training of undergraduate and graduate students. Opportunities for interactions exist through the Center for Freshwater Studies, Coalition for BioMolecular Products, and Alabama Museum of Natural History. Applicants should arrange to have three reference letters sent directly to the address below. In addition, applicants should mail hardcopies of *curriculum vitae*, statements regarding research goals, teaching philosophy and interests, evidence of curatorial experience, and copies of significant publications to: Invertebrate Systematist Search Committee, Department of Biological Sciences, Box 870344, The University of Alabama, Tuscaloosa, AL 35487. Review of applications will begin January 2, 2008, and will continue until the position is filled. *The University of Alabama is an Affirmative Action/Equal Opportunity Employer. Women and/or Minorities are encouraged to apply.*

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## Publications

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**Graf, D.L. & K.S. Cummings.** 2007. Review of the systematics and global diversity of freshwater mussel species (Bivalvia: Unionoida) *Journal of Molluscan Studies* 73: 291-314.

In this paper, Dan and Kevin counted up the currently recognized species of freshwater mussels from around the world. The mussel diversities of various regions and subregions are tallied, and a global checklist of the Unionoida is provided as an appendix. The attempt is made to classify all genera according to the phylogeny proposed by:

**Graf, D.L. & K.S. Cummings.** 2006. Palaeoheterodont Diversity (Mollusca: Trigonioidea + Unionoida): what we know and what we wish we knew about freshwater mussel evolution. *Zoological Journal of the Linnean Society* 148: 343-394.

To request a pdf of either, please email Dan at [graf@ansp.org](mailto:graf@ansp.org). More information is available on the MUSSEL Project Website (<http://www.mussel-project.net/>) under **Unionoida cum Grano Salis**.

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~ Don't forget to renew your membership! ~

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## Contributed Articles

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The following articles were contributed by FMCS members and others in the malacological community. The contributions are incorporated into the newsletter with minimal editing and the opinions expressed therein are those of the authors.

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### 2006 Status Report on the Accomplishments of the Mussel Coordination Team (MCT)

In cooperation with the  
St. Paul District, Corps of Engineers  
Army Corps of Engineers Centre  
190 Fifth Street East  
St. Paul, Minnesota 55101-1638

Prepared by: Gary Wege, Susan Oetker, Roger Gordon, Tony Brady, Dennis Anderson, Dan Kelner, Nicole McVay, Teresa Newton, Byron Karns, Mike Davis, Bernard Sietman, Dave Heath, Scott Gritters, Dan Sallee, and Mark Hove

#### Abstract

In 2003, the interagency Mussel Coordination Team (MCT) prepared a report "Saving the Higgins Eye Pearlymussel (*Lampsilis higginsii*) from Extinction: 2002 Status Report on the Accomplishments of the Mussel Coordination Team (Mussel Coordination Team 2003)." The following report summarizes MCT activities from 2003 through 2006 including winged mapleleaf and other species. Select information from the 2003 report is also included to provide continuity.

Since 2000, a variety of measures have been implemented for the federally endangered Higgins eye (*Lampsilis higginsii*) and winged mapleleaf (*Quadrula fragosa*) by the U.S. Army Corps of Engineers (Corps) with assistance from the MCT. These activities were required by a Biological Opinion for continued operation and maintenance of the federal 9-Foot Channel Project on the upper Mississippi River (UMR). Major accomplishments include: 1) identifying host fish for winged mapleleaf; 2) hatchery and cage propagation of Higgins eye and winged mapleleaf; 3) stocking adult, subadult, and juvenile Higgins eye into the UMR and tributaries to establish five new and viable populations; 4) collecting sexually mature Higgins eye at age 4 that were stocked as subadults; 5) collecting subadult Higgins eye at population establishment sites where infested fish were released; 6) developing marking techniques for stocked subadults; 7) testing a floating cage system; 8) developing a Geographic Information System mussel database and Internet web site; 9) determining thermal requirements for transformation of Higgins eye and winged mapleleaf glochidia; and 10) implementing measures for other native mussels.

The report is available on-line at the St. Paul District website, <http://www.mvp.usace.army.mil/>. Click on the Environment Tab, then on the left side scroll down to "Endangered Species - Conservation of Native Mussels". Then on the right side under Additional Information, click on "Mussel Coordination Status Report."

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### A New Population of Rayed Bean (*Villosa fabalis*) in a Small Tributary of the Maumee River, Lucas County, Ohio

Jeff Grabarkiewicz<sup>1</sup> and Todd Crail<sup>2</sup>

<sup>1</sup>No current affiliation

<sup>2</sup>The University of Toledo, Earth, Ecological, and Environmental Sciences

Swan Creek is a small tributary of the lower Maumee River, draining 204 mi<sup>2</sup> at the mouth in downtown Toledo, Lucas County, Ohio. The main stem originates in the agricultural headwaters of eastern Fulton County, measures 41 miles in length, and falls, on average, 2.1 feet/mile. To our knowledge, the unionid fauna of Swan Creek has not been systematically surveyed.

Quantitative and qualitative surveys were performed at 19 sites over a 3-year period (2005-2007) using view-buckets, snorkeling gear, and SCUBA equipment. A total of 20 river miles were sampled, with over 1,500 mussels found live representing 18 species. An additional 4 species were present as shell only. A total of 251 live *Villosa fabalis* were found, with strong recruitment documented over a 2.3 river mile segment. Outside of this reach, only subfossil valves of *V. fabalis* were recovered. A second mussel of conservation concern, the Ohio endangered snuffbox (*Epioblasma triquetra*), was present as shell only.

We would like to acknowledge and thank the Ohio DNR, Ohio Biological Survey, Toledo Naturalists' Association, and the Metroparks of the Toledo Area for funding this study.

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### More News About Quagga Mussels in Europe

Henk K. Mienis

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National Mollusc Collection, Dept. Evol., Systematics & Ecol., Hebrew University of Jerusalem, IL-91904 Jerusalem, Israel  
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In a previous note (Mienis, 2007), I mentioned the first report by Bij de Vaate (2006) about finding the Quagga mussel *Dreissena bugensis* (Andrusov, 1897) in the Netherlands on 19 April 2006. This surprise find near Willemstad in the Hollands Diep, part of the Rhine delta in

the Netherlands, received some more intensive coverage in Molloy et al., 2007. It was speculated that the invasion occurred by means of the Main-Danube Canal, which serves more-and-more as a pathway of aquatic species between the once separated drainage areas of the Danube and the Rhine.

In follow up fieldwork, Gerard van der Velde and Dirk Platvoet collected several specimens of the Quagga mussel in the river Main near Hörblach, east of Würzburg, on 25 May 2007 (Van der Velde & Platvoet, 2007). This find makes it very likely that the Quagga mussel used the southern passageway from the Danube via the Danube-Main canal to the Rhine, and settled in the river Main in Germany and the delta of the Rhine in the Netherlands.

If this is indeed the case, then many additional records of *Dreissena bugensis* may be expected from Central and Western Europe in the near future.

More information concerning the native range of *Dreissena bugensis* has recently been published by Son (2007). He reached the conclusion that the Dniepr Delta belonged to the native range of the Quagga mussel.

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## A Second Record of *Ferrissia* from the Isle of Terschelling, the Netherlands: the Water Lily Connection

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Three years ago I was able to report the first find of *Ferrissia clessiniana* (Jickeli, 1882) in the "Doodemanskisten", a small lake near West-Terschelling, on the isle of Terschelling, the Netherlands (Mienis, 2004).

Numerous specimens were found adhered to the underside of floating leaves of Water lilies (*Nymphaea* species) on 5 October 2004. Most probably these loose leaves had been thrown into the lake by the owner of a garden pond in the vicinity. The same *Ferrissia*, but this time in company of another freshwater limpet, *Acroloxus lacustris* (Linnaeus, 1758), was found clinging on the stems of Common Reed (*Phragmites australis*) in the "Doodemanskisten" on 4 October 2006 (Mienis, 2006).

On 2 October 2007 I visited the lake once again, but only for a few minutes. The situation had changed a little bit in the corner of the lake where I used to take the mollusk samples. The banks had been reinforced with wood and part of the organic debris had been removed. A brief look at some floating *Phragmites* stems and leaves resulted only in the recording of *Bithynia tentaculata* (Linnaeus, 1758), *Valvata cristata* Müller, 1774, *Haitia acuta* (Draparnaud, 1805), *Anisus vortex* (Linnaeus, 1758), and *Gyraulus albus* (Müller, 1774). However, I do not rule out the possibility that both limpets are still living in the lake.

Several days earlier (30 September 2007) I had discovered to my surprise a second population of *Ferrissia clessiniana* on Terschelling. In a small ditch with a width of about 2 meters and a length of about 20 meters in the dunes near Lies (Amersfoort coordinates 1505/6013), hundreds of limpets were present not only on the leaves of a lone White Water lily (*Nymphaea alba*), but also on Branched Bur-reed (*Sparganium erectum*) and on the leaves of Oak trees (*Quercus* species) which had fallen into the water. *Ferrissia* turned out to be the only aquatic mollusk present in that ditch. Most likely the limpet had reached that aquatic biotope by means of the Water lily, which had been planted in that ditch in the same year.

Exotic limpets belonging to the genus *Ferrissia* are turning up all over the Netherlands where Water lilies (*Nymphaea* species and *Nuphar luteum*) are being planted in ponds, lakes, ditches, and canals. In the past I have pointed out that probably more than one species is involved since the plants are imported from all over the world (Mienis, 2001). Although Walther et al., 2006 have shown recently that several European populations of freshwater limpets previously named *Ferrissia wautieri* (Mirolli, 1960) or *Ferrissia clessiniana* are conspecific with *Ferrissia fragilis* (Tryon, 1863) of the New World, I prefer to maintain the usage of the name *Ferrissia clessiniana* for specimens characterized by the presence of more-or-less straight sides as found in the Netherlands and the Middle East, until the whole complex of the Palearctic and Nilotic species belonging to *Ferrissia* (see Hubendick, 1970) has been compared with *Ferrissia fragilis*.

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## Additional Information Concerning the Conquest of Europe by the Invasive Chinese Pond Mussel *Sinanodonta woodiana*. 16. News from the Czech Republic, Germany, Poland, Romania, Serbia and Slovakia

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During the last months I came across nine additional articles reporting the Chinese Pond Mussel, *Sinanodonta woodiana* (Lea, 1834), from European waters. These papers not only deal with new distributional records, but also with such aspects like ecology, genetics, and conservation.

### The Czech Republic

During a survey of the Malá Bečva River in Central Moravia in 2007, *Sinanodonta woodiana* was encountered at three localities downstream Chropyně (Beran, 2007).

### Germany

Schoolmann et al., 2006, pointed out the danger of the sale of the Chinese Pond Mussel in pet shops and garden centres in south-western Germany. According to the authors this represents another example of negligence by the authorities in allowing the introduction and distribution of non-indigenous species through commercial trade.

### Poland

A genetic study of the Chinese Pond mussel populations in the heated Konin lakes revealed a strong genetic variation (Soroka, 2006). These results suggested either a massive colonisation by genetically diverse individuals or a multiple colonisation by founder populations coming from various water bodies.

Kraszewski & Zdanowski (2007) reported on the distribution of *Sinanodonta woodiana* in the same Konin Lakes. Mussels were found in four lakes, the cooling reservoir, and

in the intake and discharge canals of the Power Plant. A preferred habitat has moderate water flow and a relatively high water temperature (10-30° C). Mussel aggregations were especially found at depths of 1.5-2.5 m.

### Romania

New records are given by Popa et al., 2007, concerning the presence of this invasive mussel in Eastern Romania. An appendix enumerates the 19 localities where this species has been found in Romania since its initial discovery in 1979. All the main aquatic basins have now been colonized.

### Serbia

A general macro-invertebrate survey of the Danube upstream from the Iron Gate in Serbia (km 1083-1071) revealed that the Chinese Pond Mussel occurred frequently in silt dominated habitats (Paunović et al., 2005). The authors pointed out the threat this and other invasive species might form for the native aquatic fauna.

### Slovakia

Nagel et al. (2006) discussed and analysed the distribution of Unionids in Slovakia. Specimens of *Sinanodonta* have been recorded from five localities. Information is also given concerning the zones it inhabits in the rivers and its ecological preference. Quite rightly this exotic species is not included in the table dealing with endangerment and legal protection of the mussels in Slovakia.

Three introduced mollusc species, including *Sinanodonta woodiana*, were reported by Čerman & Šteffek (2006) from the southern part of the Východoslovenská rovina Plain, a Ramsar Treaty wetland, near the river Tisa.

In a list dealing with the status of endangerment and protection according to the categories and criteria proposed by the IUCN of the land and freshwater molluscs reported so far from Slovakia, the Chinese Pond Mussel is included as a non-native species which has become naturalized (Šteffek & Vavrová, 2006). No further evaluation of its status has been given.

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## Exotic Isolated Occurrence of the Mussel Naiad *Leila blainvilleana* (Lea, 1834) in a Freshwater Coastal Lagoon of the Santa Catarina Island, Southern Brazil

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The environment of Santa Catarina's Island and of Florianópolis city, in the central Atlantic marine coast of Santa Catarina State, general headquarters of our modest malacological work in the southern of Brazil, has six main basin systems of rivers and ponds (CECCA 1997: 15-20, 73-89): "Ratones (Mice River)" and "Saco Grande (Saco Grande Bay)" in the coastal marine estuary of the North Bay; "Itacorubí (Itacorubí River)" in the Central area of the same estuary; "Lagoa da Conceição (Conceição Lagoon)" in the East coastal marine Atlantic area; "Rio Tavares (Tavares River)" and "Lagoa do Peri (Peri Lagoon)" in the South coastal marine Atlantic area. Of these, Peri Lagoon basin system pond constitutes the largest natural reservoir of freshwater existent in the region (Cardozo et al 2007), located in "Municipal Park" with the same name ("Parque Municipal da Lagoa do Peri"), in the East-South coast of Santa Catarina's Island (27° 42' 59" S - 27th 46' 45" S; 48th 30' 33" - 48° 31' 59" W) (Fig. 1).

With a surface of 20,3 Km<sup>2</sup> and mirror of water with area of 5,1 Km<sup>2</sup>, it's the largest pond of existent freshwater in the coast of Santa Catarina's State, with a maximum depth between 11 and 12 meters and fed mainly by 2 notable tropical streams that run in a rocky bed defined by Atlantic Florest inter granitic great rocks ("matações"): "Rio Cachoeira Grande (Big Waterfall River)" and "Rio Ribeirão Grande (Big Ribeirão River)" or "Rio o Sertão (River of the

Interior)", that are born in the high of the hills and end in the pond (Cardozo et al. 2007).

Even with its proximity to the marine Atlantic South border (Figure 1), its liquid mass is not affected by the oceanic oscillations of the tides due to being about 3 meters above sea level, just maintaining intermittent contact with the sea through an out channel. This body of water is one of Santa Catarina Islands main ecosystems in preservation apprenticeship and regeneration of the Atlantic Forest regional original, besides serving as a source of public drinking water for approximately 60,000 human residences, from the East to the South of the island (Cardozo et al 2007).

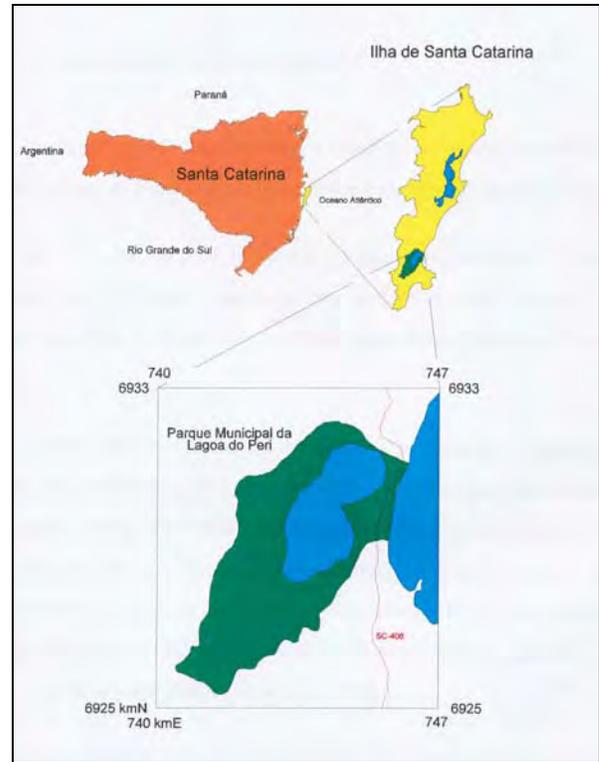


Figure 1. Location and panoramic view of "Peri Lagoon Municipal Park", Florianópolis, Santa Catarina Island

It is in this magnificent habitat where, historically, POLI et al (1978: 40-41) mentions for the first time the occurrence of "*Leila sp*" = *Leila blainvilleana* (Lea, 1834), confirmed by us as the "only species of freshwater mussel" with

occurrence noted in this portion of Santa Catarina State (Agudo 2007).

*Leila blainvilleana* is a typical and representative form of the Brazilian and South American freshwater malacofauna (Cummings 1999). It has been thoroughly studied and revised in the regional literature (Bonetto 1963; Mansur 1970:55-56; Bonetto & Mansur 1970:256; Veitenheimer 1973; Pitoni et al 1976:40-41; Mansur et 1987; Mansur et al 1988: 97-98, 107; Mansur et al 2003:65-66; Mansur & Pereira 2006:1139, 1141; Menegat et al 2006:72; Simone 2006:289-290); yet even so is considered exotic in the Peri Lagoon place, probably accidentally introduced via the african exotic fish of freshwater pisciculture *Tilapia rendalli* (Boulenger, 1896), infested with the larvar parasitic "lasidium" produced by the species (Agudo 2005; Mansur et al 2003:65), situation previously denounced in the regional literature to another places of Brazil involving similar naïd forms (Souza & Eiras 2002), specifically *Anodontites trapesialis* (Lamarck, 1819), a big freshwater bivalve present in all South American basins, to West of Andes (Simone 1994, 2006: 281-282; Cummings & Mayer 1997; Cummings 1999), also present in some continental river basin systems of the Santa Catarina State territory (Agudo 2004, 2007).

The european exotic terrestrial gastropod *Helix (Cornu) aspersa* Müller, 1774, was introduced intentionally in the Peri Lagoon Basin System and Municipal Park area for its reproduction and proliferation in the condition of "alimentary supply" of fish in the place. In the neighbor State of Rio Grande do Sul - RS (Poli et al 1978:41), it is a common species (Agudo-Padrón 2007).

In general, up to now there was a total of eight species of several mollusks (Agudo 2007; Cardozo et al 2007), including 3 aquatic limnic forms – 1 Bivalvia Unionoida, 1 Gastropoda Prosobranchia & 1 Pulmonata – and 5 terrestrial Gastropoda – 1 Prosobranchia & 4 Pulmonata, whole previously registered for Santa Catarina's State (Agudo 2004) and determined with support in the recent contributions of SIMONE (2006) and THOMÉ et al (2006), a very poor registration considering the environmental attributes of the place:

#### Systematic Species List:

##### Class GASTROPODA

##### Subclass Prosobranchia

Family AMPULLARIIDAE Gray, 1824 (1)

*Pomacea bridgesii* (Reeve, 1856)

Family HELICINIDAE Latreille, 1825 (1)

*Helicina brasiliensis* Gray, 1824

##### Subclass Pulmonata

Family AGRIOLIMACIDAE Wagner, 1935 (1)

*Deroceras laeve* (Müller, 1774)

Family BRADYBAENIDAE Pilsbry, 1934 (1)

*Bradybaena similaris* (Férussac, 1821)

Family LYMNAEIDAE Rafinesque, 1815 (1)

*Lymnaea columella* Say, 1817

Family MEGALOBULIMIDAE Leme, 1973 (1)

*Megalobulimus oblongus* Müller, 1775

Family HELICIDAE Rafinesque, 1820 (1)

*Helix (Cornu) aspersa* Müller, 1774

Class BIVALVIA = PELECYPODA

Order Unionoida

Family MYCETOPODIDAE Gray, 1840 (1)

*Leila blainvilleana* (Lea, 1834)

Finally, with regard to conservation status, *Leila blainvilleana* (Lea, 1834) is considered by the IUCN as "In Danger" (Mansur et al 2003:65-66; MMA 2004:137; Scarabino 2004:273) and included in the "National Plan of Recovery and of Administration for Species of Pisces and Aquatic Invertebrates" (MMA 2006:24).

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## Museum of Fluvial Mollusks Collection Donated to North Carolina State Museum of Natural Sciences, Raleigh

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The Invertebrates Unit of the North Carolina State Museum of Natural Sciences (NCSM) is proud to announce the recent donation of the extensive collections held in the Museum of Fluvial Mollusks by Herbert D. Athearn of Cleveland, Tennessee. This mollusk collection contains over 23,000 cataloged lots of freshwater mollusks, including many specimens of bivalves and snails that are now considered endangered or extinct.

Herbert David Athearn was born in 1923 in Fall River, Massachusetts. He inherited his love of collecting from a long line of naturalists. Eleanor W. Athearn, his mother, was an avid birdwatcher and had an extensive marine mollusk collection that she maintained until her death. His father, Roy Coombs Athearn, collected arrowheads which were later donated to the Massachusetts Archaeology Society. William D. Athearn, Herb's brother, was a marine shell collector and his sister-in-law, Nadine Athearn, was a marine and freshwater mollusk shell collector who was formally employed by Woods Hole Oceanic Institution.

Herb started collecting freshwater mollusks at the early age of 16 in Massachusetts. After serving in World War II, he volunteered at the Museum of Comparative Zoology, Department of Malacology, Harvard University, Cambridge, Massachusetts, where he was exposed to the diversity of freshwater mollusks. From this point on, wherever he went, he collected. In 1954 he moved his family to Cleveland, Tennessee, as a central locality for his collecting, where he knew that within a short distance from his house was the highest diversity of freshwater mollusks in the country. This is where the Museum of Fluvial Mollusks began. The museum was established in his home within which he installed cabinets (Figures 1 and 2) to accommodate the collection, and trays were carefully crafted to house each individual lot. In addition to the specimens he gathered, many more were acquired through trading with other malacologists and institutions, and even the

Pakistan government. Many lots were bought from the Boston Society of Natural History when it closed, some of which dated back into the nineteenth century. As the collection expanded, a room had to be added to the house to contain its rapid growth.



Figure 1. Cabinet of Unionid bivalves, Museum of Fluvial Mollusks. Photographed by Jamie M. Smith.



Figure 2. Drawer of *Anodonta* to show lot arrangement. Photographed by Jamie M. Smith.

He spent his weekends and vacations in the field and was joined, at times, by his wife, son, and daughter. His collections from along the Cahaba, Coosa, Tennessee, Little Tennessee, and Duck rivers were quite extensive. These lots contain many important specimens of endangered and extinct species of freshwater bivalves and snails. He also collected in Mexico and Canada. Some of his Canadian collecting was for and with Arthur H. Clarke, of the Royal Ontario Museum. Those mollusks, of which Herb was allowed to retain some duplicate material, were subsequently used in the Freshwater Mollusks of the Interior Basin of Canada.

In June of 2007 we spent 11 days packing, boxing, shrink wrapping, and moving this collection in excess of 23,000 lots to Raleigh. Along with the specimens, we have also been given his impressive seven volume collection catalog, copies of his field notebooks, over 1,000 scientific reprints, his cross-index by species and states with catalog numbers (which are on 3x5 cards), and approximately 2,000 topographic maps. The maps further support the excellent locality data that is included with each lot because they have the localities marked on them. Currently more than 7,000 lots have been rehoused into new vials and archival trays. We have begun to systematically capture the locality data from Herb's catalog and have entered approximately 1,500 out of an estimated 9,000 localities. These initial localities are plotted in Figure 3 to give an indication of the coverage of the collection.

This collection was the largest privately held collection of freshwater mollusks in the country, including strong representation of Canadian taxa. Estimates of the collection consist of roughly 15,000 lots of gastropods and 8,000 lots of freshwater bivalves. The gastropods were collected from over fifty countries, including a few land and marine taxa, totaling approximately one hundred forth-five genera. This donation is extremely significant because it will extend the worldwide coverage of the North Carolina State Museum of Natural Sciences' Mollusk collection.

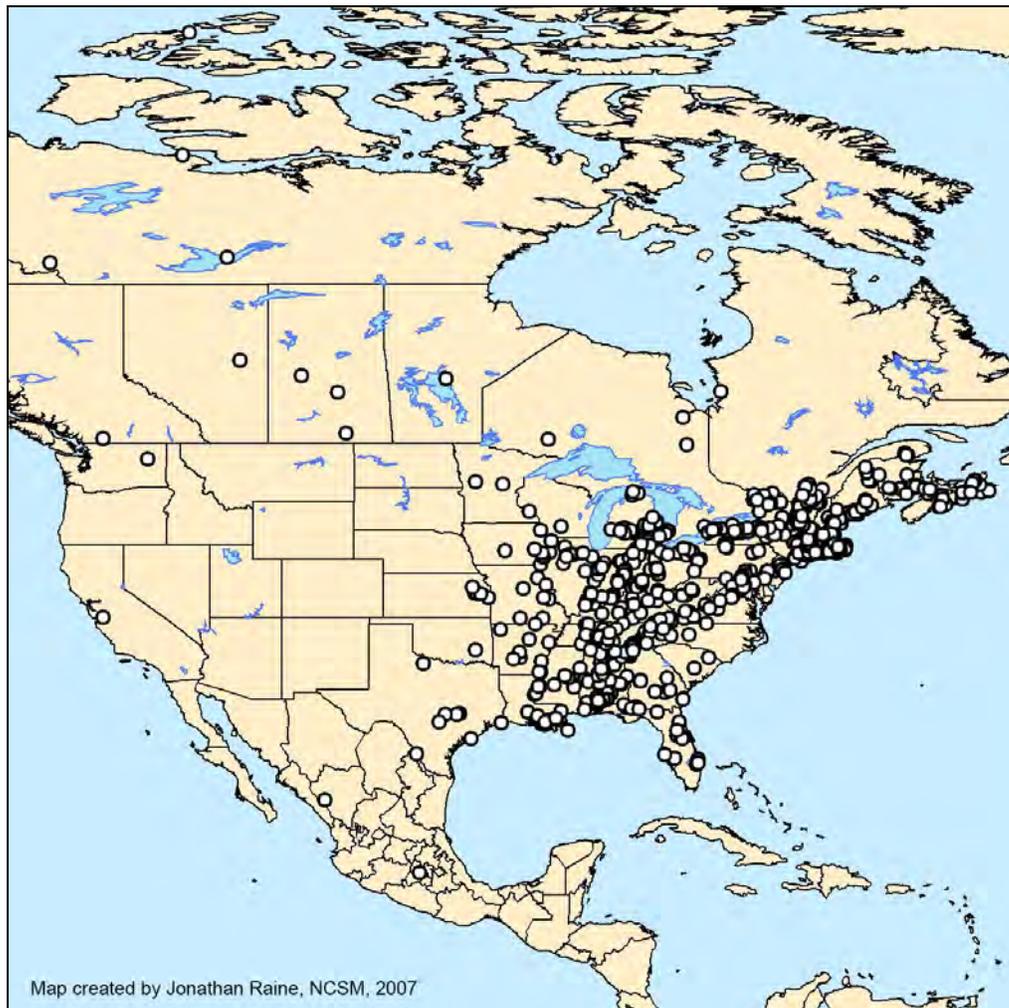


Figure 3. Map of the first 1,500 collection localities in the Museum of Fluvial Mollusks

## Development of a Mollusc Fauna in a Storage Reservoir for Run Off Rainwater on the Isle of Terschelling, the Netherlands, 5

Henk K. Mienis

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Last autumn I had the opportunity to sample for the sixth year in succession the storage reservoir for run off rainwater near Midsland on the isle of Terschelling, the Netherlands. The actual sampling of the site took place on 2 October 2007 and lasted for about two hours.

This time the water stood rather high in the reservoir and even flooded a normally dry drainage ditch over a distance of some six meters. This ditch was overgrown by a dense cover of various terrestrial weeds. In order to sample the latter area, I removed the plant cover at two spots over an area of 0.5 m<sup>2</sup>. The results were surprising because that small area yielded not less than five species I had never collected before in the reservoir: *Potamopyrgus antipodarum* (Gray, 1843), *Segmentina nitida* (Müller, 1774), *Pisidium nitidum* Jenyns, 1832, *Pisidium obtusale* (Lamarck, 1818), and *Sphaerium corneum* (Linnaeus, 1758). However, Mrs. Sylvia J. van Leeuwen had collected *Potamopyrgus antipodarum*, a highly invasive species originating from New Zealand, and a *Pisidium* species previously on 19 October 2006 (Mienis, 2007).

In 2002 only two species were present in the reservoir; now, 5 years later a total of 19 species have been recorded from it (Table 1). Only the tiny gastropod *Gyraulus crista* (Linnaeus, 1758) and the bivalve *Musculium lacustre* (Müller, 1774) were missed this year.

Table 1: Freshwater molluscs recorded from the storage reservoir near Midsland, Terschelling (2002-2007).

Scientific name	09.10.2002 H.K.M.	01.10.2003 H.K.M.	05.10.2004 H.K.M.	03.10.2005 H.K.M.	02.10.2006 H.K.M. & 19.10.2007 S.J.v.L.	02.10.2007 H.K.M.
<i>Potamopyrgus antipodarum</i>	-	-	-	-	+	+
<i>Bithynia leachii</i>	-	+	+	+	+	+
<i>Bithynia tentaculata</i>	-	-	-	+	+	+
<i>Valvata cristata</i>	-	-	-	-	+	+
<i>Lymnaea stagnalis</i>	+	+	+	+	+	+
<i>Radix balthica</i> *	-	+	+	+	+	+
<i>Radix species</i> **	-	+	+	+	-	+
<i>Anisus vortex</i>	+	+	+	+	+	+
<i>Anisus vorticulus</i>	-	-	-	+	-	+
<i>Gyraulus albus</i>	-	+	+	+	+	+
<i>Gyraulus crista</i>	-	-	-	-	+	-
<i>Hippeutis complanatus</i>	-	-	-	-	+	+
<i>Planorbarius corneus</i>	-	-	+	+	+	+
<i>Planorbis planorbis</i>	-	+	+	+	+	+
<i>Segmentina nitida</i>	-	-	-	-	-	+
<i>Pisidium nitidum</i>	-	-	-	-	?	+
<i>Pisidium obtusale</i>	-	-	-	-	?	+
<i>Musculium lacustre</i>	-	-	-	+	-	-
<i>Sphaerium corneum</i>	-	-	-	-	-	+

\* This species was previous known as *Radix ovata* (Draparnaud, 1805).

\*\* This species was previous known as *Radix peregra* auct.

Abbreviations: H.K.M. = leg. Henk K. Mienis, Tel Aviv/Jerusalem; S.J.v.L. = leg. Sylvia J. van Leeuwen, Bilthoven

Next year I hope to sample the reservoir in the same period. At least six other species occurring in the vicinity of the reservoir are still missing from the list: two strictly aquatic gastropods, *Physa fontinalis* (Linnaeus, 1758) and *Stagnicola palustris* (Linnaeus, 1758); one semi-terrestrial freshwater snail, *Galba truncatula* (Müller, 1774); and three semi-aquatic land snails from the family Succineaidae, *Oxyloma elegans* (Risso, 1826), *Succinea putris* (Linnaeus, 1758), and *Succinella oblonga* Draparnaud, 1801.

Part of the new material has been stored permanently in the Mollusc Collection of the Tel Aviv University (Israel).

## References

Mienis, H.K., 2006. Development of a mollusc fauna in a storage reservoir for run off rainwater on the isle of Terschelling, the Netherlands, 4. *Ellipsaria*, 9(2): 7.

## Reminders

***Send nominations for Treasurer to Leroy by January 11<sup>th</sup> (page 3)***

***Keep an eye out for more information regarding the Workshop in July (page 2)***

***Return your membership renewal form with dues to Heidi (insert)***

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## Membership List Updates

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### Helpful Hints from Hoppy:



**Hoppy Says — every major river system needs a recovery plan for mollusks...stay tuned for the Tennessee/Cumberland/Mobile River Basin Recovery Plan!!**

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*Submitted by Steve Ahlstedt*

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# Freshwater Mollusk Conservation Society

## Standing Committees and Chairs

*If you are interested in joining a committee, please contact one of the appropriate chairs.*

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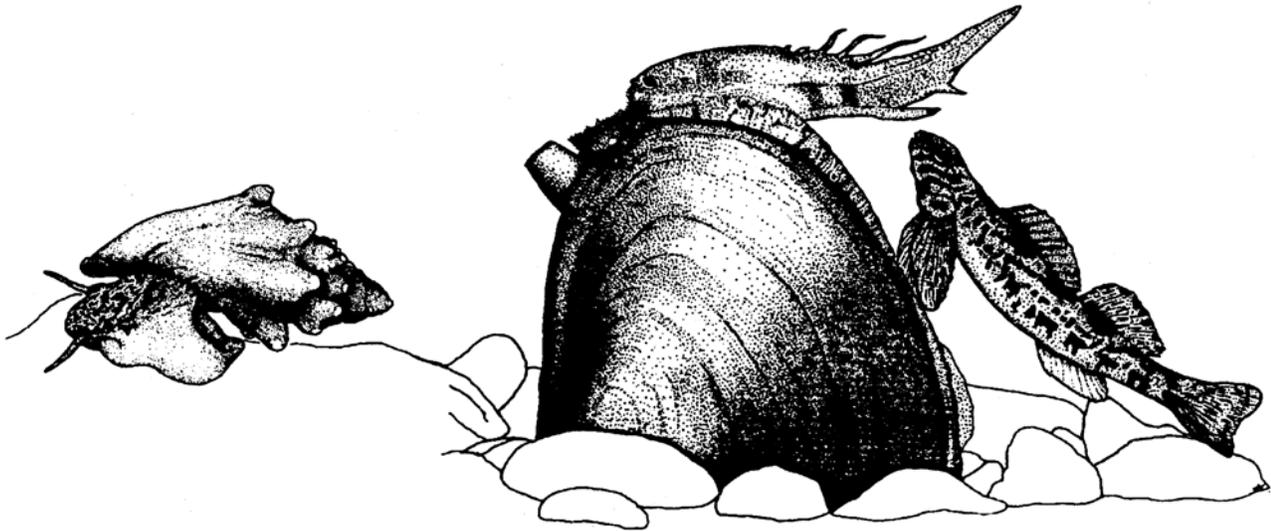
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# Freshwater Mollusk Conservation Society



*... dedicated to the advocacy and conservation science of freshwater molluscan resources*