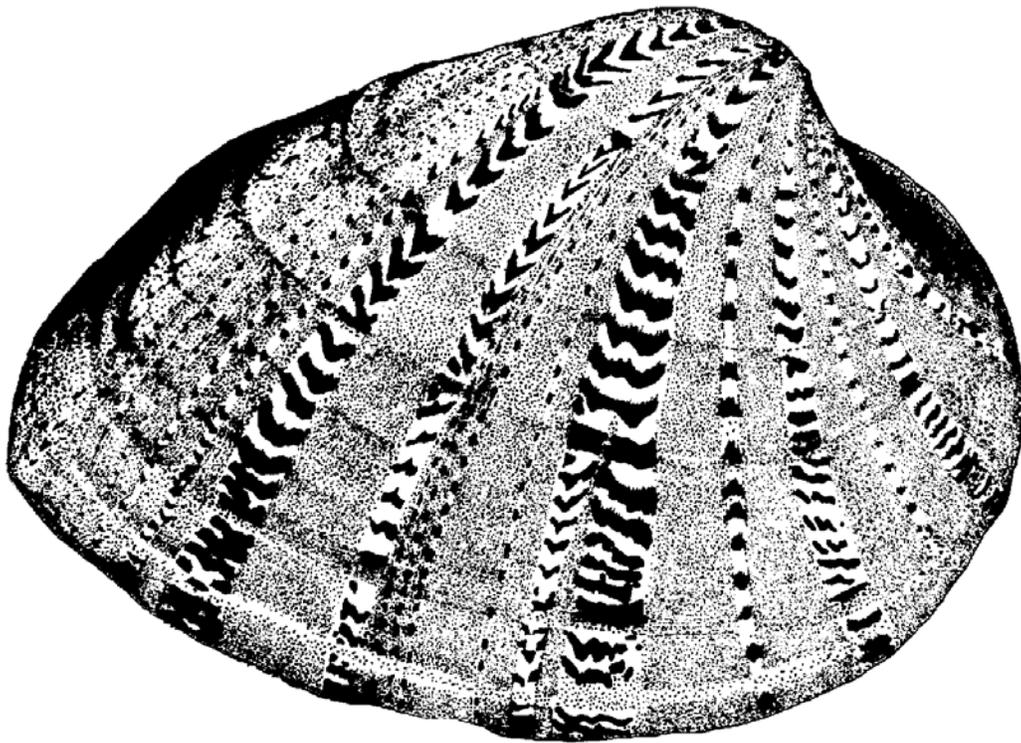


Ellipsaria

The Newsletter of the Freshwater Mollusk Conservation Society

Volume 10 - Number 3

December 2008



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FMCS dues are collected in January of each year. If a renewal form isn't included with this newsletter, you may download one from the Society's website.

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Submissions for the April 2009 issue of *Ellipsaria* may be sent to the editor at any time but are requested by **March 6, 2009**. 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 Note that submissions are not peer reviewed, but are checked for content and general editing.

Please send change of address information to the Secretary.

Ellipsaria

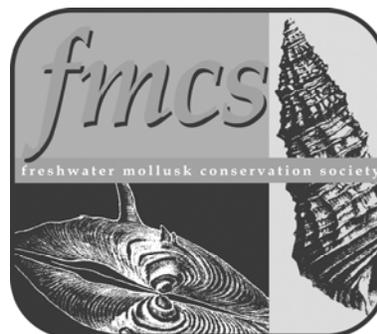
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Volume 10, No. 3

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

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President's Message

The holidays are probably behind us by the time you read this issue of *Ellipsaria*. I hope everyone had a great holiday season and all of us should be thankful for being employed and having a career as a biologist. These are tough economic times and we all have to be diligent and constantly on guard in order protect our natural resources.

During the past year, many FMCS committees and their members have been very active, especially the Environmental Quality and Affairs committee. Numerous environmental issues have been addressed that require FMCS support in the form of a letter. My feelings are that as a conservation society we have to continue to support legislation or environmental groups that seek to protect our natural resources. I would prefer to be pro-active rather than non-active on these matters.

Financially our society is in great shape and I want to give thanks to all for our careful management of FMCS funds...always thankful for Heidi Dunn. We made a profit at our July 2008 SCB/FMCS workshop/symposium, largely the result of World Wildlife Fund, The Nature Conservancy, and Tennessee Valley Authority sponsorship and careful negotiations by Rachel Muir. I can't stress enough the importance of gaining sponsorship monies when we have a workshop or symposium. I would encourage each and every one of you to continue to pursue new memberships, especially resource managers responsible for protecting our resources, and find sponsorship monies for the 2009 international symposium.

The National Strategy for the Conservation of Freshwater Mollusks will be updated. The board decided that Rachel Muir will chair this committee. Rachel has been requested to form a committee to help her with this task and have a draft that can be presented to the board next April 2009 at the international symposium. Anyone that would like to help her with this process please contact her.

The 2009 international symposium will be held in Baltimore, Maryland and hosted by Catherine Gatenby. Catherine and her committee have done an excellent job with this and I hope all FMCS members and non-members will attend. The costs associated with hosting a symposium keep accelerating and we need to offset those costs with sponsorship monies. The money generated by sponsorship helps to defray hotel costs, registration fees, and coffee breaks which are very expensive. One final note, we need quality items for the auction so please consider what the auction monies go towards...student sponsorship.

Steve Ahlstedt, FMCS President

~~ FMCS Officer Nominations – President-Elect and Secretary ~~

The FMCS is seeking nominees for two offices: president-elect and secretary. Nominees must be current FMCS members in good standing. You will receive a ballot in early 2009; both positions will be voted on before the April meeting in Baltimore. The new **president-elect** will take office in April of 2009, become president in 2011, and then serve as past-president until 2014 for a total of **six** years of service. The **secretary** will take office in April 2009 and serve for **two** years.

The deadline for nominations is January 9, 2009. 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. Position statements from the candidates will be mailed out with the ballots after nominations close. Send nominations to Leroy at **Leroy_Koch@fws.gov** or Leroy Koch, USFWS, J.C. Watts Federal Building, Room 266, 330 West Broadway, Frankfort, Kentucky 40601

FMCS 2009 SYMPOSIUM
LAST CALL FOR ABSTRACTS
**** Due January 16, 2009 ****

The 6th Biennial Symposium of the Freshwater Mollusk Conservation Society will be held at Marriott Waterfront Hotel in Baltimore, Maryland from April 19 - 24, 2009. The theme is **Healthy Mollusks = Healthy Rivers = Healthy People**. A plenary session will open the meeting and provide a variety of international and ecosystem perspectives on freshwater mollusk conservation. Platform and poster session topics covering all taxa of mollusks (gastropods and bivalves) are welcome, and include:

- Advances in Propagation of Mollusks
- Pearl Culture
- Life History & Population Ecology
- Physiology and Reproductive Biology
- Systems and Community Ecology / Freshwater Mussel Ecosystem Services
- Habitat Restoration/ Fish Passage/ Connectivity
- Maritime, Roads, and Rail: Transportation, Impacts and Opportunities
- Water Quality and Ecotoxicology
- Status of Mollusks on Tribal Lands
- Conservation of Margaritiferidae
- World Atlas of Freshwater Mussels
- Evolution and Systematics
- Outreach that Works

Visit <http://www.cpe.vt.edu/fmcs2009/> for current information on the symposium.

INSTRUCTIONS FOR AUTHORS

Submittal form: Abstracts should be submitted as an email attachment in Microsoft Word® or Rich Text format to Patricia Morrison (patricia_morrison@fws.gov). **File name should include presenter's last name and initials (e.g., jonesjm.doc).** Acknowledgment of abstract receipt, if requested, will be provided by e-mail. Limit abstracts to 300 words or less (including title, authors and affiliations). Abstracts with greater than 300 words will be edited.

Submittal format: The abstract should contain the title in **BOLD, CAPITAL** letters, followed by the author(s), and address(es). Underscore the presenter's name. Skip one line and begin the text including a clear summary of presentation including objectives, results, and conclusions. Example:

AN EXAMINATION OF FEED QUANTITY REQUIREMENTS FOR RIFFLESHELL MUSSELS (*EPIOBLASMA* SPP.) HELD AT WHITE SULPHUR SPRINGS NATIONAL FISH HATCHERY, WEST VIRGINIA

A. L. Bush¹, R. J. Neves¹, C. M. Gatenby², and D. A. Kreeger³. ¹Department of Fisheries and Wildlife, Virginia Polytechnic Institute and State University, MC 0321, Blacksburg, VA 24061. ²White Sulphur Springs National Fish Hatchery, 400 East Main St., White Sulphur Springs, WV 24986. ³Delaware Estuary Program, Box 7068, 25 State Police Drive, West Trenton, NJ 68628.

Knowledge of feed quantity requirements is essential to successful captive care of freshwater mussels. An optimum ration was determined for riffleshell mussels *Epioblasma* spp. held at White Sulphur Springs National Fish Hatchery, West Virginia. Cumberlandian combshell *E. brevidens*, oyster mussel *E. capsaeformis*, snuffbox *E. triquetra*, and northern riffleshell *E. torulosa rangiana*, along with the rainbow mussel *Villosa iris* were fed one of four rations (20,000 cells ml⁻¹, 40,000 cells ml⁻¹, 80,000 cells ml⁻¹, or 120,000 cells ml⁻¹) of the alga *Neochloris oleoabundans* for two-hour trials in June (15°C), August (18°C), and December (11°C), 2006. Measurements of filtration rate and absorption rate were used to determine milligrams of feed mussels absorbed per hour (net absorption rate). Optimum rations were based upon observed net absorption rates, and were compared among *Epioblasma* spp., *Epioblasma* vs. *Villosa*, between sexes, and among seasons. No differences were observed among *Epioblasma* spp. ($P > .05$), nor between genera ($P > .05$), or sexes ($P > .05$). Net absorption rates in June were significantly lower than in August ($P < .05$). Scheduled tests will determine net absorption rates of mussels in December. Optimum rations for *Epioblasma* spp. fed *N. oleoabundans* were 40,000-80,000 cells ml⁻¹ in June (15°C), and 80,000-120,000 cells ml⁻¹ in August (18°C).

At the bottom of the page, please type:

1. The name, address, telephone, fax, and e-mail of the presenting author;
2. Preference for Platform or Poster presentation and willingness (yes or no) to convert from one format to another; and
3. Regular or Student* attendee

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

Oral Presentation Requirements

Not to exceed 20 minutes (15 for talk and 5 for questions and answers). Slides and LCD projector visual aids only (no overheads).

Poster requirements

The poster should be readable from 5 feet, titles from 10 feet, and the poster should not exceed a size of 4 feet high by 8 feet wide. Authors must be present at the designated poster session.

ABSTRACTS MUST BE RECEIVED BY JANUARY 16, 2009

2009 FMCS Professional Award Nominations

Do you know someone who has made worthwhile contributions to mussel conservation or to the Society either through donating their professional time or expertise or through their scientific endeavors? Consider nominating them for one of the three FMCS Professional Awards. Nominations and supporting documentation are due on **December 31, 2008**. For more details see: <http://ellipse.inhs.uiuc.edu/FMCS/Awards/index.html>
Contact Dr. Teresa Newton, tnewton@usgs.gov, 608-781-6217 or Dr. Greg Cope, greg_cope@ncsu.edu, 919.515.5296 for more information.

Student Travel Awards for 2009 FMCS Symposium – *deadline extended!*

CALLING ALL STUDENTS — To facilitate your participation in the 6th Biennial Symposium to be held April 19-24, 2009 in Baltimore, Maryland, travel awards are being offered by the Society. Support is provided via Society paid lodging accommodations for the duration of the meeting at the host hotel (Marriott Waterfront). It is anticipated that approximately 4-5 awards will be made for 2009. A complete application package must be submitted to Dr. Teresa J. Newton, FMCS Awards Committee, U.S. Geological Survey, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Rd., La Crosse, WI 54603 on or before **January 30, 2009**. See <http://ellipse.inhs.uiuc.edu/FMCS/Awards/> for more details. Contact Dr. Teresa Newton, tnewton@usgs.gov or 608-781-6217, for more information.

FMCS Board Meeting Lloyd Gates Wildlife Center, Crittenden, KY November 19, 2008 1PM

A quorum was present for the official meeting of the Board of Directors of FMCS.

Attendees:

Steve Ahlstedt – President

Heidi Dunn - Treasurer

Greg Cope – President Elect (Via Phone)

Greg Zimmerman – Secretary

Tony Brady, Leroy Koch, Bob Butler, Janet Clayton, Patricia Morrison, Kevin Cummings, Ryan Evans, Craig Fortenbery, Monte McGreggor and via phone: Catherine Gatenby, Chuck Howard, Andy Roberts

Secretary's Report – We should continue to work to convert membership maintenance to a self – maintained web-based system. Per last meeting Tom Jones had volunteered to design / host the website but no progress as of yet. The current system between the Treasurer / Secretary / Ellipsaria is difficult to maintain. Kevin proposed putting an option of an electronic copy of Ellipsaria which would save a lot of money on printing / mailing costs. All were in favor.

Treasurer's Report – Total society assets: \$61,357.82. Banking was revised to a better system. A spreadsheet of the current P&L is available from Heidi. Motion to accept by Greg Cope.

FMCS Memberships: Again, 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 and the Awards Committee for details. Student awards for the 2009 Symposium will consist of 4-5 awards, and a slightly higher amount of money per student/. Students submitting on-time, complete, and a strong data set already completed (e.g., dissertation, thesis) will be weighted slightly higher.

Propagation, Restoration, and Introductions – Report from Tony Brady. Not much to report from Genoa Fish Hatchery. This past year few gravid winged mapleleaf were recovered and staff changes have limited new work. Zebra mussels forced them to move their cages to a new location. Tony is working with WV on fabricating new rearing cages for WV.

Monte McGreggor, KY said they are working to provide a "stockable" size of mussels in <12months. They have expanded their facilities. In vitro culture has been very successful >80% transformation on carp and rabbit serum. Control of contaminants is the biggest challenge but major advances have been made. The future will be universal – controlled closed techniques. They have seen rapid growth – 2-3mm / week. Overall, there have been major advances in propagation in the last 5years

Genetics – no report.

Symposium 2009 – Most of the budget and details are being finalized. Things are looking good but we still need to raise \$8500 to break even. All FMCS members are urged to contact potential sponsors for the final monies. Rachel Muir is working on raising USGS funding. Virginia Tech is working on food and beverage details. Deadline for abstracts will be extended to January 16th 2009 and then the program should be put up on the website when possible. Working out details of a possible mixer at the Baltimore Aquarium. Awards will occur at the luncheon and not at the auction night to save time.

The Auction Committee is headed by Christi Bishop. All members are strongly encouraged to donate items. This year companies / agencies / members will get recognition for donated item in the form of a sign next to item. 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.

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 Center for Biological Diversity - Snail listing agreeing to support their listing. See Ryan Evans for details.

Awards Committee – A letter went out regarding ammonia and recommended limits. See Ryan Evans for details.

Mussel Status and Distribution – Cumberlandian Mussel Restoration Plan: waiting for Tennessee Mollusk Group comments. Developed out of need to work with advances in propagation. Streamlined for legal defensibility. Eastern Gulf Slope group will base their doc on the Cumberlandian Plan. Cons of gastropods - Paul Johnson, in progress.

Art Bogan is working on bringing Pleurocerid type specimens together. Ongoing photography project of Smithsonian gastropod type specimens and growth series. Working on nailing down the original type locality for species accounts. Jim Williams, Jeff Garner, and Art Bogan - the Alabama Field Guide is complete.

Jim Williams is chair of mollusk committee with Canada and Mexico, working on synonymy for 65% of bivalves of North America. Janet Clayton and others said she would like them to check with states on distribution and status of mollusks before going out to public comment.

Guidelines and Techniques – Janet Clayton and Chuck Howard are working on surveyor / malacologist qualifications. Similar to NABS which has been working on this with taxonomy issues. Greg Z. suggested we see if the NABS program has been a success. Art Bogan says standards need to be put out to public comment and published to be accepted.

Outreach – Andy Roberts. There is some money available to update website but the subconsultant has been taking too long. Andy said he will take it out of the consultant's hands and work on it with Tom Jones.

Nominations Committee – Leroy Koch. We are requesting nominations for Secretary and President. Leroy is still chair.

Old Business

FMCS Chapters – At the last meeting the issue had been tabled. After re-discussion, it was decided FMCS should

reach out to smaller local mussel groups to get them involved (no chapters yet). Ryan Evans made a motion for outreach committee to contact local / state mussel groups such as TN mussel group, etc. All in favor.

Walkerana Update – Heidi Dunn and Steve Ahlstedt. Walkerana was signed over to FMCS. There was a back tax issue and Society for exp biology doesn't exist – so they are trying to get the society re-instated. The society will pay back taxes and we have ownership of all back issues. Tom Watters and Al Buchanan put together a business plan, we will also need an Editorial Committee.

National Strategy – Next step, per last meeting, was that the Conservation Strategy FMCS guiding document needs revision. We had agreed to have committees take their piece of conservation strategy and revise and present in March 2008 – this has not been done. 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. Will contact Rachael Muir to see status. Rachel Muir needs to have a deadline for national strategy – present to board results of the national strategy logistics.

Fish Habitat Initiative – There have been some meetings; focus still includes mussels. See Barbara Douglas for info.

Restoration Plans – See notes above regarding Cumberlandian Mussel restoration plan.

Workshop 2008 – Society for Conservation Biology joint workshop was a success but attendance was low - probably due to timing during the middle of field season.

Board Meeting – Next Board Meeting will be during the Symposium.

NiSource Pipeline Project – No update was provided.

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

2010 Workshop – Many ideas were thrown around, Snails, National Strategy, Toxicity, Health and Safety... The health and safety aspect seemed to have the most interest and could be taught as a course possibly at NCTC. Patty Morrison looked into NCTC, Shepherdstown, WV as a workshop location but we are looking for other sponsors, like Columbus Zoo. We need a local sponsor for the workshop for best results. March or April 2010 at NCTC – no lodging available – weekends are open. Lodging would be \$121/night including meals. Facility rental more than 60 people (we est. \$4,000 / day).

New Business

Ryan Evans and others are working to document the history/documents of past FMCS presidents and post on the website.

Motion to adjourn by Steve, second by Greg Z., all in favor.
Submitted by Greg Zimmerman, FMCS Secretary

Environmental Quality and Affairs Committee

The Environmental Quality and Affairs Committee recently developed two letters for the FMCS Presidents signature (copies of these letters are at the end of this newsletter):

In September the committee submitted a letter outlining concerns with the proposed amendments to the Endangered Species Act. The proposed changes would amend regulations governing interagency cooperation under the Act. The Society's concerns with the proposed amendments in general focused on two main points. First, our concern was that the proposed regulations would weaken the Act by preventing numerous federal activities from receiving an impartial, scientific review using the best available science, and staff working for action agencies may be put in the unenviable position of a conflict of interest between the requirements of the Act and the mission of their agency. Second, we were also concerned with the inadequate 30 day public comment period on the proposed amendments, amendments that could raise novel legal issues..

The FMCS Environmental Quality and Affairs Committee recently submitted a letter of support towards a petition package seeking USFWS listing action for 42 species of western US desert springsnails being prepared by the Center for Biological Diversity. This petition lobbies for federal listing of these freshwater snails that are being threatened by water allocation projects and habitat impacts in the Las Vegas metro area. FMCS has urged for federal protection of more freshwater snails. Approximately $\frac{3}{4}$ of the snails of the family Hydrobiidae (of which these springsnails belong) are considered imperiled. This is largely due to the fact that many of these hydrobiids have extremely restricted ranges (in many cases found in only 1 spring or 1 aquifer). FMCS supports an action to list these species due to impending water development projects that threaten the very existence of several species.

Submitted by Ryan Evans & Steve McMurray

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.

Announcements & News

First Biennial Eastern Gulf Slope Mollusk and Crayfish Meeting Spanish Fort, Alabama – 20-22 January 2009

The first Biennial Eastern Gulf Slope Mollusk and Crayfish Meeting in Spanish Fort, Alabama, is meant to serve as a review and update of current mollusk and crayfish conservation and research activities in eastern Gulf of Mexico drainages. Watersheds in this area encompass portions of Louisiana, Mississippi, Alabama, Florida and Georgia. Anyone working with freshwater bivalves, snails and crayfishes in these drainages are encouraged to attend and share their research and ideas in an informal setting.

This is a joint meeting with the Alabama Department of Conservation and Natural Resources (DCNR) Mollusk and Crayfish Meeting. Discussions of activities in the Tennessee River drainage will occur on the morning of January 20th. The Eastern Gulf Slope Mollusk and Crayfish meeting will begin at 1:30 p.m. on Tuesday the 20th and wrap up noon Thursday the 22nd.

To RSVP and receive additional meeting and lodging information, please contact either Jim Williams with Florida FWC (fishwilliams@gmail.com) or Jeff Garner with Alabama DCNR (Bleufer@aol.com).

Location: The Alabama Department of Conservation and Natural Resources, 5 Rivers Delta Resource Center, Spanish Fort, Alabama.

Tentative Schedule:

Tuesday 20 January

8:30 a.m. to 12:00 p.m. – Tennessee River Drainage activities in Alabama

1:30 p.m. to 5:00 p.m. – Eastern Louisiana Florida Parishes, Mississippi Gulf, and the Mobile Basin

Wednesday 21 January

8:30 a.m. to 2:45 p.m. – Mobile Basin continued to Escambia and Choctawhatchee River basins

3:00 p.m. to 5:00 p.m. – Shell and crayfish show and tell.

Thursday 22 January

8:30 a.m. to 12:00 p.m. – Apalachicola to Peninsula Florida Gulf Drainages

Special Session at NABS 2009 Annual Meeting, May 17-22, Grand Rapids, Michigan

Freshwater mussel conservation: Pathways for recovery in the Great Lakes Basin

Freshwater mussels (unionids) have experienced significant declines in the Great Lakes Basin. The unionids in the region (50+ species) continue to endure invasive species, acute toxic contaminants, chronic effects of agriculture,

habitat alteration, and urbanization. This special session will bring together researchers from the Great Lakes Basin and beyond to speak on the conservation status, ecology, toxicology, and genetics of these important sentinels of the benthic community. The state of conservation science and knowledge on unionids has expanded greatly since the invasion of dreissenid mussels. As such, this session will give rise to discussion of synergistic basin-wide strategies for the recovery of species and habitats.

Co-organizers:

Dr. Daelyn Woolnough, wooln1d@cmich.edu

Dr. David Zanatta, zanat1d@cmich.edu

Biology Department, Central Michigan University

We still might have some space for presenters in the session. Contact us ASAP if you are interested in presenting. Abstracts are due online at <http://www.benthos.org> by January 21, 2009.

A Brief Report Concerning the 2nd National Malacology Congress of Turkey

Henk K. Mienis

National Collections of Natural History, Dept. Zoology, Tel Aviv University, IL-69978 Tel Aviv, Israel, and

National Natural History Collections, Berman Bldg., Hebrew University of Jerusalem, IL-91904 Jerusalem, Israel.

mienis@netzer.org.il

The 2nd National Malacology Congress of Turkey took place at the Çukurova University in Adana on 8-10 October 2008. During the first two days 20 lectures and 10 posters were presented, including six lectures with freshwater molluscs.

Your reporter opened the congress with an invited talk about "Exotic freshwater molluscs in Israel". Serap Köksal Şahin introduced us to the mollusk fauna of Büyükçekmece Gölü, a reservoir lake near Istanbul. Alaeddin Bobat talked about the interaction between *Astacus leptodactylus*, known better as the Danube, Galician, Turkish or Narrow clawed crayfish, and Zebra mussels *Dreissena polymorpha*. Hülya Şereflişan presented three talks about various aspects of the biology of Turkish freshwater mussels in general and *Unio terminalis* in particular and their possible economic exploitation.

The congress provided a new generation of Turkish malacologists a first opportunity to present the results of their mollusk studies. These congresses have turned also into an important event where young Turkish students have the opportunity to meet in a relaxed atmosphere with colleagues with some more experience in the field of malacology. International cooperation between some of the participants has been established during the informal talks during and after the congress.

The congress finished with a tour in the region south of Adana where the Çukurova University carries out part of its teaching and research: the Marine-Biological Fisheries Station near Yumurtalik, the Agricultural High School in Yumurtalik, the Nature Reserve and fishing village of Deveciüşağı Dalyan in the Yumurtalik Lagoon and the

Department of Tourism and Hotel Management in the brand new Magarsus Hotel near Karataş.

Congratulations to Dr. Cem Çevik and his team for organizing this important event.

Ohio River Basin Consortium for Research and Education Symposium

Some of the Marshall University mussel contingent attended the Ohio River Basin Consortium for Research and Education (ORBCRE) symposium at Carnegie Mellon University in Pittsburgh, PA in October. David Sovic and I attended and presented a poster:

Kovatch, J.J., Sovic, D.M., and Jones, T.G. 2008. "Non-lethal soft tissue estimation in freshwater mussels using shell morphometrics"

David worked on the project while an undergraduate at Marshall. For his efforts, he received the best student poster award. He is currently working on his PhD at Ohio State, and for his dissertation he is investigating potential endocrine disruption in *Elliptio complanata* throughout the Cacapon watershed in West Virginia. I am encouraging David to become a FMCS member and attend the meeting in the spring. Also involved in the project is FMCS Outreach Committee Co-Chair, Tom Jones (Marshall University, Department of Integrated Science and Technology).

As the title suggests, the procedure offers a relatively simple and non-lethal alternative to estimating the physiologically active biomass of individuals and populations. The indirect estimation method uses non-invasive and easily obtainable morphometric predictors for Unionids. Tissue density in living mussels can also be derived. The work is being written up for publication and should be submitted by the year's end.

Jeff Kovatch, Ph.D.; kovatch@marshall.edu, 304-696-7147
Marshall University, Department of Biological Sciences
Huntington, WV 25701

Publications

Ramakrishna, and A. Dey. 2007. Handbook on Indian Freshwater Molluscs. Zoological Survey of India, Kolkata. 399 pp

Chong, J.P., J.C. Brim Box, J.K. Howard, D. Wolf, T.L. Myers & K.E. Mock. 2008. Three deeply divided lineages of the freshwater mussel genus *Anodonta* in western North America. Conservation Genetics. 9:1303-1309.

Abstract The surprising diversity and recent dramatic decline of freshwater mussels in North America have been well documented, although inventory efforts to date have

been concentrated in the eastern United States. Unlike their eastern counterparts, western freshwater mussels have received comparatively little attention. The accurate identity of western lineages is a necessary component for future inventory, monitoring, and ecological work involving these taxa. Here we initiate a study involving the most speciose genus (*Anodonta*) in western North America, incorporating information about type localities and type specimen morphology and describing the discovery of three highly divergent lineages among four western *Anodonta* species. In a limited phylogenetic analysis, we find (1) that *A. californiensis/nuttalliana* and *A. oregonensis/kennerlyi* are distinct, highly divergent clades, and (2) that *A. beringiana* is more closely allied with *A. woodiana*, an Asian species, than either of the other two western North American clades. We were largely unable to resolve the placement of these three clades with respect to other anodontines, and suggest the need for a broader phylogenetic framework. We recommend, however, that the existence of these three deeply divergent groups be considered in the development of regional monitoring, conservation and research plans despite the taxonomic uncertainty.
<http://www.springerlink.com/content/602565427n1012p8/>

A new web site of interest to FMCS members has postings of PDF's of the Miscellaneous Publications and Occasional Papers on Mollusks of the University of Michigan Museum of Zoology (UMMZ), including classic papers on freshwater and land mollusks including papers by H.B. Baker, W. Clench, C. Goodrich, H. van der Schalie, and B. Walker. A donation for this service is also appreciated...see web page for details.

<http://www.ummz.umich.edu/mollusks/publications.html>

Mollusk Miscellaneous Publications (16 papers):

<http://www.ummz.umich.edu/mollusks/publications/misc-pubs.html>

Mollusk Occasional Papers (~100 papers):

<http://www.ummz.umich.edu/mollusks/publications/occapers-mollusk.html>

Contributed Articles

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.

Status of Freshwater Mussels in the Coal Mining Basin of the New River (Big South Fork Cumberland River Drainage) in Portions of Scott, Anderson, Morgan and Campbell Counties, Tennessee (2006-2008)

Steven Ahlstedt, P. O. Box 460, Norris, TN 37828;

bigshelldaddy@bellsouth.net

Craig Walker, Office of Surface Mining, Knoxville, TN;

37902; cwalker@osmre.gov

Steve Bakaletz, National Park Service, Oneida, TN 37841

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ABSTRACT

This study presents the results of a freshwater mussel survey of the New River basin, Tennessee (Big South Fork Cumberland River drainage) at 78 sampling sites from 2006-2008. Historically, mussels are reported from the drainage in 1924, and 1938-1939. The 1938-1939 sampling years consisted of an intensive chemical and biological study of the drainage assessing coal mining wastes entering the river from deep mine portals. This represents the only information on what pre-existing conditions were in this isolated drainage prior to strip-mining that followed World War II. Thirteen mussel species are documented (9 pre-1940 and 4 new distribution records). New distributions were found for Buffalo and Brimstone Creeks, and Smith Fork including live federally listed *Alasmidonta atropurpurea* in Buffalo Creek. A new drainage record for a rare previously unrecognized mussel, *Anodontoides denigrada*, occurs in Buffalo and Smith Fork. Mussels in the drainage are rare and exist in isolated pockets separated by past and present resource extraction that affects water quality and their host fish. Mussels measured consisted of larger individuals (indications of limited reproduction and recruitment). Naturally occurring environmental conditions (i.e. stream gradient, seasonal low flows, and low calcium levels) may account for low mussel diversity but the New River had/had access to mussel populations present in the Big South Fork and main-stem Cumberland River. However, biological communities and water quality was severely impaired prior to 1940 and the only identified perturbation was coal mining wastes. Logging around the turn of the 20th century and the construction of a railroad was not an issue prior to 1940. Continued ongoing resource extraction for coal, oil and gas, land development, recreation (i.e. ATV's, dirt bike motorcycles) and haul road construction adds pollutants to the drainage basin. Freshwater mussels have shown only limited biological recovery from past disturbances.

Freshwater Mollusk Database a Priority for the Upper Tennessee River Basin

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We are developing a web-based freshwater mollusk database as part of an initiative to study the spatiotemporal relationships between mussel assemblages and human disturbance patterns within the upper Tennessee River basin (UTRB). The database, named the Upper Tennessee River Mollusk Database (UTRMD), was created to collate the extensive field data that has been collected throughout the basin over the past several decades. Initially, we will use the UTRMD to evaluate past mussel species distributions and to model how land use changes are affecting current distributions and potential restoration sites. The ultimate goal of our efforts is to have a central archive that will house a complete history of mussel bed sites within the basin available to researchers and managers working within the UTRB.

The UTRMD has had positive feedback from agencies as well as NGOs working within the upper Tennessee River basin because of its comprehensiveness and security features. It goes beyond presence/absence information of officially imperiled species to also include as much biological information as is available for all freshwater mollusks, regardless of status. Also, data collected by various methods are included to provide a comprehensive collection history. The UTRMD interface is user-friendly, web-based, and has essential security safeguards to prevent corruption and misuse.

The initial construction of the database was funded by the World Wildlife Fund and it is housed at Virginia Tech. We foresee this effort as being a resource for the Clean Rivers Initiative. Our partner in this endeavor, the Conservation Management Institute at Virginia Tech, is renowned for its technical expertise in developing databases for natural resources, and has recently completed a similar project in the Midwest.

We consider it imperative for researchers and managers who address mollusk conservation issues to have access to ecologically relevant data from all essential parties. If you have relevant data to contribute to the database, or would like more information on database access, please contact Brett Ostby (bostby@vt.edu) or Kimberly Mattson (mattsonh@vt.edu).

***Ferrissia* on the Island Terschelling, the Netherlands: the Water Lily Connection, 2**

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In previous issues of 'Ellipsaria' I have reported on the presence of the invasive freshwater gastropod *Ferrissia clessiniana* (Jickeli, 1882) on the Wadden Sea island Terschelling, the Netherlands (Mienis, 2004 & 2007).

In the autumn of 2004, I collected that exotic species from loose leaves of a Water Lily *Nymphaea* species which were found floating on the surface of the water in the 'Doodemanskisten', a small lake in the dunes near the village of West-Terschelling. Three years later, autumn 2007, I found this gastropod in huge numbers in a small ditch in the dunes near Lies. On previous occasions I had searched in vain for any freshwater mollusc in that isolated aquatic biotope. Here too we could point out a direct relation between the presence of *Ferrissia* and a recent introduction of Water Lilies *Nymphaea alba* in that ditch. This snail was still present in very large numbers on 24 September 2008, where it turned out to be again the only gastropod.

A short search for freshwater molluscs in the shallow water of the so-called ice-rink in Noord-Midland in the autumn of 2006 was without success. A Dutch entomologist, who happened to look at the same time for aquatic bugs, failed also to notice any gastropods. However, on 25 September 2008 I tried my luck again and to my surprise I caught several dozen specimens of adult specimens of *Ferrissia clessiniana* within a time span of several minutes. I found them adhered to the stems and leaves of Reeds *Phragmites*, Rushes *Juncus*, Bur-reeds *Sparganium* and of course the Water Lily *Nymphaea alba*, which had been planted in the shallow water early that same year.

Ferrissia clessiniana is now known from three different aquatic biotopes on Terschelling. These three localities have one thing in common: recently introduced Water Lilies. Size and shape of the shells of *Ferrissia* were more or less the same at all these localities and they fitted in full detail the description of *Ferrissia clessiniana* as presented in the monograph by Hubendick (1970).

As I have pointed out in the past (Mienis, 2001) Water Lilies (*Nymphaea* species and *Nuphar luteum*) are being imported from all over the world to the Netherlands (Mienis, 2001). Often minute shells are adhered to the underside of the leaves of these exotic plants, escaping the eyes of inspectors of the Ministry of Agriculture, and in this way more than one invasive *Ferrissia* species may arrive and settle in the Netherlands and elsewhere.

Although there is currently a wave going on in which all the identifications of European *Ferrissia clessiniana* (Jickeli, 1882) or its junior synonym *F. wautieri* (Mirolli, 1960) are being changed into *Ferrissia fragilis* (Tryon, 1863) in wake of the study by Walther et al., 2006, I prefer to stick for the meantime to *F. clessiniana* until more data become available.

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New Information Concerning the Presence of the Invasive Species *Haitia acuta* on the Wadden Sea Island Terschelling, the Netherlands

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The invasive freshwater snail *Haitia acuta* (Draparnaud, 1805), Fam. Physidae, a species of North-American origin, has become widely distributed in the Netherlands since the middle of the 20th Century (Gittenberger & Janssen, 1998). Its distribution in Europe was in the beginning more or less confined to the Mediterranean region, but today it has been recorded from all over Europe. Without doubt this northern expansion drift has been boosted by a slow but steady change in the climate of Europe. The globally warming up enabled this species to establish viable populations in northern regions where it was once too cold for this species.

However, other factors exist which helped this species get a foothold so quickly. This and other species of Physidae are easily distributed by aquatic birds. For example, in Israel *Haitia acuta* is often encountered in temporary winter rain pools and in isolated desert pools high in the mountains. It is also a well-known aquarium and garden pond species. Since these snails and the plants on which they live can quickly become a nuisance, from time to time superfluous material is dumped in a nearby ditch, stream, or lake.

From Terschelling, one of the Wadden Sea or Frisian Islands in the north of the Netherlands, it has been recorded for the first time by Tanis (1963). He found a single specimen in a stand of *Potentilla anserina* near the NW-border of the 'Groede' on the 'Boschplaat' on 17 July 1958. At the same spot he collected several specimens in the summer of 1962. Although several other specimens had been found in a similar nearby area in 1960 (Mienis, 2004a), any efforts to find this species again after 1962 remained without result.

Since these localities are situated in the middle of a nature reserve covering the whole eastern part of the island, miles away from the nearest civilisation, *Haitia acuta* most likely reached that spot by means of aerial distribution, i.e. probably it hitchhiked among the feathers of an aquatic bird to that spot. It managed to establish for several years a small, viable population, which after some time was destroyed when the area was flooded with sea water during an event of extreme high water in the Wadden Sea.

In the autumn of 2003 I discovered a large population of *Haitia acuta* in a small lake called 'Doodemanskisten', near the village of West-Terschelling (Mienis, 2004a). During that year the summer had been extremely dry and hot and the water level in the lake had dropped by about 1 meter. The species was extremely abundant and the only other snail encountered were several specimens of *Bithynia tentaculata* (Linnaeus, 1758), Fam. Bithyniidae. In the following years it has remained the dominating gastropod in that lake (Mienis, 2004b, 2005, 2007b; van Leeuwen & van Peursen, 2005).

Last autumn I spent again a week on Terschelling and during fieldwork I encountered *Haitia acuta* to my surprise at four new localities:

- 1: in a ditch near the 'Groene Strand', NW of West-Terschelling, 21.09.2008;
- 2: in a similar ditch north of the first locality, but not directly connected to it, NW of West-Terschelling, 21.09.2008;
- 3: small ditch, 50 m E. of 'Duinhof', Seeryp, 25.09.2008;
- 4: small ditch, 100 m NE of 'Duinhof', Seeryp, 25.09.2008.

The first two localities are situated at a distance of only 0.5 km west of the lake 'Doodemanskisten', an area frequently used as a dump of excessive inhabitants of aquaria and ponds (Mienis, 2004b, 2005 & 2007a). I do not rule out the possibility that aquatic birds were involved in the dispersion of these snails to the wetlands formed by the 'Groene Strand'.

The localities near Seeryp are much more interesting because they are situated in the neighbourhood of 'Duinhof', a garden centre! I had visited that garden centre the day before in order to buy some flower seeds. Of course I had a look at the aquatic plants which were offered for sale and were standing outside in trays. All the plants were infected with either numerous snails belonging to *Haitia acuta* or with their batches of eggs.

In my opinion there is no doubt that the snails discovered in ditches east and northeast of that garden centre had their origin in 'Duinhof'. The arrival of *Haitia acuta* in two ditches, which form an integral part of the water level regulation in the polder area between the dunes in the north of the island and the Wadden Sea-dyke in the south, means that we may expect this invasive species in the whole area covered by the polder in the near future.

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New Malacological Observations in the Arapey River Region, Salto Department, Oriental Republic of Uruguay, Southern Cone of South America

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About two years after our first regional malacological registration (Agudo 2006:10; Agudo-Padrón 2008:78-Fig. 1), in July 14-16 2008, we had the opportunity to visit the Arapey River, tributary of the Uruguay River located in Salto Department, Oriental Republic of Uruguay, an immediate geographical neighbor of southernmost Brazil. The material obtained in the field and supporting the present report deposited in the Malacological Collection of the University of Santa Catarina's State (ECZ/CCB/UFSC), Florianópolis and previously, in February 2006, in the Augusto Ruschi Zoobotanical Museum (MUZAR), Passo Fundo University (UPF), Rio Grande do Sul State - RS, its specific determination was based on the contribution of Simone (2006), with consultation of the regional contributions of Scarabino (2003 c, 2004 c) and Scarabino & Mansur (2007).

In this new opportunity, the occurrence of the following environmental circumstances and species of mollusks was verified:

1. In the secondary local rivers Arapey Chico and Arapey Grande (Agudo 2006:10) (Fig. 1), high densities of the

little limnic snail *Potamolithus cf. lapidum* (d'Orbigny, 1835) were found on the basaltic rocks of the riversides, presenting abundant slime and waters with very little current, as well as isolated little specimens of *Pomacea canaliculata* (Lamarck, 1822), *Corbicula fluminea* (Müller, 1774), and some *Biomphalaria* spp.

Some dead Asian Golden Mussel, *Limnoperna fortunei* (Dunker, 1857), shells were found in some points of the riversides, not observing the typical colonies installed in the basaltic rocks (Agudo 2006; Agudo-Padrón 2008:78-Fig. 1) mostly submerged. It is worth noting that the water level of the river in this opportunity was quite low, due to the rains.

2. In the local enterprise Termas del Arapey (Arapey Thermal Resort & Spa), a famous Uruguayan tourist thermal complex inaugurated July 6, 2001 by the Barceló Arapey Thermal Resort (Fig. 1), they were detected in abundance and it activates in the dams, aquatic gardens and artificial lakes area (that still form a permanent stream of lukewarm waters connecting the thermal complex area with the bed of the river Arapey, Fig. 1), densely populated by submerged and riversides aquatic plants, the limnic snails *Pomacea canaliculata* (Lamarck, 1822), *Biomphalaria tenagophila tenagophila* (d'Orbigny, 1835), *Biomphalaria tenagophila guaibensis* Paraense, 1984, and the invasive asiatic clam *Corbicula fluminea*, forming dense colonies in some points of the main lake where it is serving as food for wild aquatic birds close to the snail *Pomacea canaliculata* (Fig. 1), proliferating with the aid of the differentiated temperature of the water of the thermal pools from the tourist complex, aggressive invasion activity not observed in our previous visit two years ago (Agudo 2006). A similar situation was observed previously and described by us for another tourist thermal complex, Termas de Jurema Hotel Resort, located at the geographic Third Plateau of the State of Paraná - PR, southern Brazil (Agudo 2007:5; Agudo 2008:12-Fig. 5).





Figure 1.- The Arapey River basin, outlet of the "stream" from the tourist thermal complex (top photo); permanent stream formed by the waters that spring from the hot pools and that for its time fill the small artificial lakes, aquatic gardens and dams of the tourist complex (second photo); view of the local tourist complex Termas del Arapey and of the lake whose cold (lukewarm) thermal waters originate in the stream (third photo); shells of *Pomacea canaliculata* and *Corbicula fluminea* on the shores of the artificial lake, caught and consumed by wild aquatic birds (bottom photo).

It seems that the occurrence of exotic freshwater clams *Corbicula* spp precedes the entrance of the mussel *Limnoperna fortunei* (Dunker, 1857) in the ecosystems invaded (Agudo 2007:5; Agudo-Padrón 2008:87). No terrestrial mollusks were sighted in the inspected area, domain of the environment of open fields known as Pampas.

In general, for the territories of Salto Department and the immediate neighbor Artigas Department, they are quite scarce the well-known information concerning freshwater (15 forms - 8 mussel naiads, 2 freshwater clams & 5 snails) and terrestrial (8 forms - 3 slugs & 5 snails) mollusks species, everybody contained in the examined available regional technical literature, produced for SCARABINO (2003c: 204, 207, 211; 2004 a: 269; 2004 c: 348, 351-352), CAMPOS & CALVO (2006:75-76) and SCARABINO & MANSUR (2007:91-95).

Results - Systematic Species List

BIVALVIA

UNIONOIDA

Family HYRIIDAE (4)

- *Castalia martensi* (Ihering, 1893)*
- *Castalia psammoica* (d'Orbigny, 1835)**
- *Diplodon rhuacoicus* (d'Orbigny, 1835) (+)**
 - (+)Scarabino & Mansur (2007: 92) they refer the species as *Diplodon piceus* (Lea, 1860), considered synonymy for Simone (2006: 262)
- *Diplodon wymanii* (Lea, 1860) (+)**

(+)Scarabino & Mansur (2007: 92) they refer the species as *Diplodon uruguayensis* (Lea, 1860), considered synonymy for Simone (2006: 264) ...

Family MYCETOPODIDAE (4)

- *Anodontites trapezeus* (Spix, 1827)**
- *Fossula fossiculifera* (d'Orbigny, 1835)*
- *Mycetopoda legumen* (Martens, 1888)**
- *Monocondylaea corrientesensis* d'Orbigny, 1835**

VENEROIDA

Family SPHAERIIDAE (2)

- *Eupera doellojuradoi* Klappenbach, 1962**
- *Eupera klappenbachi* Mansur & Veitenheimer, 1975**

GASTROPODA

CAENOGASTROPODA (= PROSOBRANCHIA)

Family AMPULLARIIDAE (1)

- *Felipponea iheringi* (Pilsbry, 1933)**

GYMNOPHILA

Family VERONICELLIDAE (2)

- *Belocaulus angustipes* (Heynemann, 1885)*
- *Phyllocaulis variegatus* (Semper, 1885)**

PULMONATA

Family PLANORBIDAE (4)

- *Drepanotrema anatinum* (d'Orbigny, 1835)
- *Drepanotrema depressissimum* (Moricand, 1839)
- *Drepanotrema pfeifferi* (Strobel, 1874) (+)
- (+)Scarabino (2004 c: 352) refer to the species as *Antillorbis nordestensis* (Lucena, 1954), considered synonymy for Paraense (1975: 124) & Simone (2006: 105)
- *Biomphalaria straminea* (Dunker, 1848)

Family AGRILIMACIDAE (1)

- *Deroceras laeve* (Müller, 1774)**

Family SUBULINIDAE (1)

- *Lamellaxis gracilis* (Hutton, 1834)

Family BULIMULIDAE (1)

- *Drymaeus* sp*

Family STROPHOCHEILIDAE (1)

- *Anthinus albolabiatus* (Jaeckel, 1927)*

Family MEGALOBULIMIDAE (2)

- *Megalobulimus globosus* (Martens, 1876)**
- *Megalobulimus musculus* (Bequaert, 1948) (+)**
 - (+)Scarabino (2003 c: 211) refer to the species as *Megalobulimus oblongus musculus* (Bequaert, 1948), situation sustained for Oliveira & Almeida (1999: 31), not considered valid for Simone (2006: 214)

* Just referred in the literature consulted for "Artigas Department"

** Just referred in the literature consulted for "Salto Department"

Located in the Southern cone of South America, Uruguay borders Brazil to the North and Northeast, the Atlantic Ocean to the Southeast & the Río de la Plata Estuary (River Plate) to the South, and the Argentina Republic to the West. It is the second country with the smallest surface in the continent (176.215 km²). The Uruguay River clearly marks its border with the Republic of Argentina. Uruguay's border is partially composed of 193 km along the Atlantic coast and 813 km along the river bank (area close to the Uruguay river); 435 km along the Uruguay river and 378 km along the River Plate. The forest prevails along the riverbanks.

The Río Negro river is the largest river in the interior of the country and can only be navigated through its estuary. The Uruguay river can be navigated from its estuary through Salto City. The Southern area consists of undulating plains covered with pasture except the marshy region that borders the Atlantic coast. The Haedo hill range is a low plateau located in the central and northern region where also a 400 m height small hill range is extended. Uruguay has a mild climate. In January and February (summer), temperatures average 21.7°C, and in June (winter), it decreases to 10°C. Uruguay has an average annual rainfall of approximately 1000 mm. During winter, a strong wind called *pampero* sometimes blows from the Southeast cooling up the atmosphere. Frosts are hardly seen in most areas of the country.

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Year 1 Update of Freshwater Mollusk Monitoring in the South Fork Kentucky River system

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This project is focused on identifying the best remaining freshwater mussel hotspots in the South Fork Kentucky River watershed. In addition, basic inventory is being done for freshwater snails as recent information on the group is generally lacking within the basin. This project was made possible through the award of a State and Tribal Wildlife Grant from the Kentucky Department of Fish and Wildlife Resources.

In 2008, 28 sites in the basin were qualitatively sampled utilizing snorkeling or aquascopes from July through September, with 1 site quantitatively sampled using (34) 1 m² excavated quadrats. To date, the project has located 16 species of freshwater mussels, including records of the round hickorynut (*Obovaria subrotunda*), a species of conservation need in Kentucky. Freshwater mussels were absent from 6 sites, 5 of which had previously reported records. In addition, shell materials or live individuals were not located of snuffbox (*Epioblasma triquetra*) or the little spectaclecase (*Villosa lienosa*), 2 species of state concern that previously have been reported in the basin. We will be returning to selected sites with known records of snuffbox during spawning periods when surface encounters will be more likely. KSNPC is still compiling information and identifying snail specimens but field data indicates no state special concern species have been found to this point. We will be qualitatively sampling approximately 29 stations on the mainstem South Fork Kentucky in the upcoming field season.

Our initial observations indicate that the Redbird River is the best remaining tributary in the system for freshwater mollusks; however, this does not infer that this watershed is without threats. Strip mining has taken an obvious toll on the upper sites in the Redbird as no freshwater mussels were located in the 4 upstream-most sites despite intensive search effort. Further, quantitative sampling data at one of the higher quality sites in the lower Redbird River identified during qualitative sampling indicates a low density mussel population (1.26 /m²; SE = 0.26; precision of mean = 26.5%) with virtually no recruitment. This information is troubling, as the Redbird Ranger District of the Daniel Boone National Forest (DBNF) is one of the most intensively utilized for gas and mineral extraction in the Daniel Boone. Other tributaries showed moderate to serious sedimentation likely attributable to runoff from coal mining and poor agricultural practices.

Because the South Fork Kentucky River watershed is generally regarded as the best quality of the three forks of the Kentucky River, future projects to abate issues from sediment runoff and mining effluent should be identified in order to protect the remaining aquatic resources.

Summary of 2008 Field Data:

Species	No. of Qualitative Sites (Live/FD)	Present - Quantitative Sampling
<i>Actinonaias ligamentina</i>	7	x
<i>Amblema plicata</i>	13	x
<i>Elliptio dilatata</i>	9	x
<i>Fusconaia flava</i>	8	x
<i>Lampsilis cardium</i>	10	x
<i>Lampsilis fasciola</i>	8	
<i>Lampsilis siliquoidea</i>	11	x
<i>Lasmigona costata</i>	1	
<i>Megalonaias nervosa</i>	8	x
<i>Obovaria subrotunda</i>	2	
<i>Pleurobema sintoxia</i>	4	x
<i>Potamilus alatus</i>	1	
<i>Ptychobranchus fasciolaris</i>	10	x
<i>Quadrula pustulosa</i>	7	x
<i>Tritogonia verrucosa</i>	8	x
<i>Villosa iris</i>	3	

What came first, the mussel or the host? Co-occurrence of stream fishes with *Elliptio fisheriana* in Maryland

Matt Ashton, Maryland Department of Natural Resources, Monitoring and Non-tidal Assessment Division, 580 Taylor Avenue, C-2, Annapolis, MD 21401

The Northern lance, *Elliptio fisheriana* Lea, is a rare species in the State of Maryland and considered by the American Fisheries Society to be of special concern. Little is known about its life history, ecology, and taxonomy (Johnson 1970, Sepkowski and Rex 1974). O'Dee and Watters (2000) found glochidia of *E. fisheriana* from the Tar River, North Carolina to successfully transform on four species of fish. While bluegill and largemouth bass have been present on the Atlantic Slope for well over 100 years, they are not native. Johnny darter is not sympatric with *E. fisheriana* in Maryland and white shiner is also not native to the state. This lack of native and sympatric fish hosts suggest that *E. fisheriana* in Maryland may use a currently undocumented host.

Since 2006, chemical, physical habitat, and biological data were collected from 399 Maryland Biological Stream Survey (MBSS) sites following standardized protocol. Stream fishes were collected using backpack electrofishers within 75-m segments that had block nets at either end. Two-pass depletion was employed to ensure detection of all species present. We visually searched for mussels (≥15 min) within sites and also noted incidental observations. We examined the frequency of occurrence for fishes collected concomitantly with *E. fisheriana* and at other sites throughout its range in an ongoing effort to determine if host limitation may affect mussel populations. Fishes we examined included those that successfully and unsuccessfully metamorphosed *E. fisheriana* glochidia (O'Dee and Watters 2000), congeners found in Maryland, and other commonly collected species. We defined range as watersheds (Maryland 8-digit HUC) in which we encountered at least one *E. fisheriana*.

We collected live and fresh dead *E. fisheriana* from 32 of 67 sites (48%). Bluegill and largemouth bass were frequently found with *E. fisheriana* (Table 1). They were less common at sites where *E. fisheriana* was absent. Redbreast sunfish were also commonly collected with *E. fisheriana*, though other fishes that unsuccessfully metamorphosed were rare or absent. Congeneric fishes were collected at half or more of the sites where *E. fisheriana* was also encountered with the exception of common shiner and river chub. Other stream fishes that commonly co-occurred at sites throughout the range of *E. fisheriana* were indicative of Coastal Plain assemblages. They were also collected in similar frequencies between sites where *E. fisheriana* was present and absent.

Table 1. Frequency of occurrence for fishes collected at sites throughout the range of *E. fisheriana* (EF) in Maryland. An asterisk (*) indicates previously identified host.

Fishes examined by O'Dee and Watters (2000)	Frequency of Occurrence	
	EF Present (N=33)	EF Absent (N=35)
Bluegill* (<i>Lepomis macrochirus</i>)	0.69	0.54
Largemouth bass* (<i>Micropterus salmoides</i>)	0.53	0.29
Redbreast sunfish (<i>Lepomis auritus</i>)	0.59	0.26
Creek chub (<i>Semotilus atromaculatus</i>)	0.00	0.00
Satinfin shiner (<i>Cyprinella analostana</i>)	0.13	0.06
Shield darter (<i>Percina peltata</i>)	0.03	0.00
Congeneric fishes found in Maryland		
Green sunfish (<i>Lepomis cyanellus</i>)	0.50	0.20
Pumpkinseed (<i>Lepomis gibbosus</i>)	0.81	0.60
Common shiner (<i>Luxilus cornutus</i>)	0.00	0.00
Fallfish (<i>Semotilus corporalis</i>)	0.50	0.26
River chub (<i>Nocomis micropogon</i>)	0.00	0.00
Tessellated darter (<i>Etheostoma olmstedii</i>)	0.91	0.57

Understanding life history requirements of freshwater mussels is critical for effective management. Not only were redbreast sunfish frequently found with *E. fisheriana*, but they were rare at sites lacking redbreast sunfish. In fact, frequencies of occurrence were similar to largemouth bass. While bluegill and largemouth bass were common at sites with *E. fisheriana*, seven sites had neither, and six sites had just one. Furthermore, we typically collected only a few largemouth bass at MBSS sites. Given the zoogeographic hypotheses of Atlantic Slope mollusks, lanceolate *Elliptio* relationships, and historical records (Rhoads 1904, Johnson 1970, Sepkowski and Rex 1974, Counts et al. 1991), an undocumented host of *E. fisheriana* in Maryland almost certainly exists. We hope our information can not only identify local mussel populations whose recruitment may be limited, but also highlight potential host fish that should be further investigated.

Counts, C.L., T.S. Handwerker, & R.V. Jesein. 1991. The naiads (Bivalvia: Unionoidea) of the Delmarva Peninsula. American Malacological Bulletin 9(1): 27-37.

Johnson, R.I. 1970. The systematics and zoogeography of the Unionidae (Mollusca: Bivalvia) of the southern Atlantic Slope region. Bulletin of the Museum of Comparative Zoology 140(6): 264-399.

Rhoads, S.N. 1904. A glimpse at the shell fauna of Delaware. Nautilus 43: 63-67.

O'Dee, S.H. & G.T. Watters. 2000. New or confirmed host identifications for ten freshwater mussels. pp. 77-82, In: Tankersley, R.A., Warmoltz, D.I., Watters, G.T., Armitage, B.J., Johnson, P.D., and R.S. Butler. Freshwater Mollusk Symposium Proceedings, Ohio Biological Survey, Columbus, OH.

Sepkowski, J.J., & M.A. Rex. 1974. Distribution of freshwater mussels: coastal rivers as biogeographic islands. Systematic Zoology 23(2): 165-188.

2008 St. Croix River Research Rendezvous Abstracts

The following abstracts were selected from presentations and posters given at the 20th annual meeting of the St. Croix River Research Rendezvous. This meeting brings together scientists, resource managers, agency staff, high school teachers and students, and interested public to learn about research plans and findings in the St. Croix River watershed. The meeting was held on October 21, 2008 at the Warner Nature Center near Marine on the St. Croix, Minnesota and sponsored by the Saint Croix Watershed Research Station. The next Rendezvous meeting will take place on October 22, 2009 at the same location. Abstracts from several previous meetings are available on the Saint Croix Watershed Research Station's web site (<http://www.smm.org/scwrs/programs/rendezvous/>).

Mark Hove, Macalester College, Mark_Hove@umn.edu

SURVIVAL AND GROWTH OF NEWLY TRANSFORMED *LAMPSILIS CARDIUM* AND *L. SILIQUOIDEA*, IN A FLOW THROUGH, CONTINUOUS FEEDING TEST SYSTEM

Jeffery R. Meinertz, Theresa M. Schreier, Karina R. Hess, and Michelle R. Bartsch; USGS, Upper Midwest Environmental Sciences Center, 2630 Fanta Reed Road, La Crosse, WI 54603; jmeinertz@usgs.gov

This work was conducted as part of the project, “Demonstration of an approach to assess the impact of emerging contaminants on aquatic invertebrates in national parks: A project for the St. Croix National Scenic Riverway”, and was funded, in part, by the USGS National Resources Preservation Program. The objectives of the overriding project included (1) determining the occurrence and concentration of emerging contaminants, pharmaceuticals and personal care products (PPCP), in water and bottom sediments in the St. Croix National Scenic Riverway (Riverway), (2) evaluating the effects of selected PPCP found in the Riverway on *Daphnia* with chronic toxicity trials, and (3) evaluating the effects of selected PPCP on juvenile freshwater mussels with chronic laboratory toxicity tests. Pharmaceuticals and personal care products are a group of compounds that include prescription and over-the-counter drugs, detergent by-products, fragrances, and cosmetics. These compounds are continually introduced into the aquatic environment largely through wastewater treatment plants. Many PPCP have been documented in streams throughout the U.S. (Kolpin et al. 2002) with some PPCP being found in the Riverway’s water and sediment.

The third objective was perceived to be the biggest challenge for the project, primarily because conducting chronic (28-day) toxicity trials with juvenile or newly transformed mussels was unprecedented. Before chronic toxicity trials could be initiated, a test system had to be developed that could provide suitable mussel survival and reproducibility in control groups.

A test system was constructed with guidance given in American Society for Testing and Materials Designation E 2455-05 (ASTM 2005). Largemouth bass (*Micropterus salmoides*) were infested with glochidia from fat mucket (*Lampsilis siliquoidea*) and plain pocketbook mussels (*L. cardium*). One day after transformation, mussels were transferred (40 per chamber) to test chambers (250 mL beakers, water volume, 200 mL) each containing a 4-mm layer of silica sand. The test system held 60 chambers, 30 chambers with *L. siliquoidea* and 30 with *L. cardium*. The 30 chambers assigned to a species were separated into 5 blocks of 6 chambers (each block in a 2 x 3 configuration) with each chamber in a block receiving 1 of the following 6 food types prepared with concentrated algal products: (1) *Nannochloropsis* (2) *Nannochloropsis* and *Tetraselmis*, (3) *Nannochloropsis*, *Tetraselmis*, and *Chlorella*, (4) *Nannochloropsis* and *Thalassiosira weissflogii*, (5) *Nannochloropsis* and *Pavlova* and (6) *Nannochloropsis*, *Thalassiosira weissflogii*, and *Pavlova*. After 28 days of continuous feeding in the flow through system, chambers were surveyed for live mussels. Only live mussels were retained for growth measurements. For *L. siliquoidea*, mean survival for each food type ranged from 35% (food type 6) to 81% (food type 3). For *L. cardium*, mean survival for each food type ranged from 12% (food type 5) to 66% (food type 1). Growth data are being summarized. The preliminary data indicate that *L. siliquoidea* may be a suitable species for conducting 28-day toxicity trials with PPCP if continuously fed a diet of *Nannochloropsis*, *Tetraselmis*, and *Chlorella*.

References

- American Standards for Testing and Materials Designation E 2455-05 (ASTM). 2005. Standard guide for conducting laboratory toxicity tests with freshwater mussels. ASTM International, West Conshohocken, Pennsylvania.
- Kolpin, D.W., E.T. Furlong, M.T. Meyer, E.M. Thurman, S.D. Zaugg, L.B. Barber, and H.T. Buxton. 2002. Pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams, 1999-2000: A national reconnaissance. *Environmental Science and Technology*, 36:1202-1211.

USING GIS TO ASSESS DAM IMPACT ON RIVER BATHYMETRY, ST. CROIX RIVER, MN/WI

Carolyn Loeb, Daniel J. Hornbach, Kelly R. MacGregor, and Mark C. Hove; Departments of Geology, Environmental Studies and Biology, Macalester College, St. Paul, MN 55105

This study uses Geographic Information Systems (GIS) in combination with field methods and historical maps to assess bathymetric changes to the St. Croix River above the St. Croix Dam over a 40-year period. During the summers of 2006 and 2008, a total of 30,000 sonar depth points were collected between the St. Croix Falls Dam and the Wild River boat launch. The depth data were read into GIS and interpolated to create a raster image of the hypothesized current riverbed. Data from 1968 and 1975 topographic maps were also reformatted for GIS and interpolated to create comparative raster data sets. Map Algebra was used to show how river depth gradients have changed between 1968 and 2008. Water velocity data collected in August 2008 was also mapped in GIS, creating a snapshot of how water velocity along the centerline of the river changes in this region. Our results indicate that there has been substantial sediment infilling behind the dam over the last 40 years. The river has deposited as much as 8 meters of sediment in some places since 1968. There is a region of reduced water velocities in the area where infilling appears to be highest. In many places, river shorelines are becoming deeper while the remainder of the channel becomes shallower. In 1968, the volume of the river between the dam and the Wild River boat launch was 10,987 km³. In 2008, the volume was 8,130 km³. This translates into a holding loss of 2,857 km³ of water, or a 26% holding volume decrease. Farther upstream, bathymetric changes appear more typical of an alluvial river. These results may have implications for sediment transport and source below the dam. It has been suggested that changes in sediment composition below the dam has had an impact on the biota of the river, especially on juvenile mussels.

SPATIAL AND TEMPORAL VARIABILITY IN SUSPENDED SEDIMENT IN THE ST. CROIX RIVER, MN/WI

Robin Major, Kelly R. MacGregor, Mark C. Hove and Daniel J. Hornbach; Departments of Geology, Environmental Studies and Biology, Macalester College, St. Paul, MN 55105

Suspended sediment in rivers is critical to controlling nutrient and contaminant transport, penetration of light into the water column, and fluvial ecosystem health. Quantifying suspended sediment over monthly to yearly timescales can be challenging. Though suspended sediment loads fluctuate by season, a reliable sediment load is essential for maintaining a stable ecosystem. Past research in the St. Croix suggests that changing patterns of sediment deposition may impact the diverse mussel community in the river. The goal of this project is to assess whether water discharge controls suspended sediment concentration in the St. Croix River. In particular, we are interested in variability in sediment concentrations above and below the St. Croix Falls Dam. For 6 months water samples were collected from four sites: two above and two below the St. Croix Falls Dam. Rating curves, showing the relationship between water discharge and suspended sediment concentration, show that suspended sediment concentration was sensitive to water discharge. A strong positive correlation exists above 2500 cfs between suspended sediment and discharge. Sediment concentrations varied with water discharge at all four sites, with the lowest concentrations at the National Park Headquarters within the reservoir above the dam, and the highest concentrations below the dam at the USGS gaging station. Hysteresis occurred at all four sites, with suspended sediment concentrations greatest on the rising limb of the annual hydrograph. Estimates of the annual suspended sediment loads at each of the four sites suggest sediment is deposited into the reservoir. Further sampling and analysis will focus on the source of increased sediment in suspension at Interstate Park (below the dam).

NEAR BED SEDIMENT TRANSPORT AS AN INDICATOR OF SUBSTRATE STABILITY AND SUITABLE MUSSEL HABITATS IN THE ST. CROIX RIVER

Leah Ritz, Kelly R. MacGregor, Mark C. Hove and Daniel J. Hornbach; Departments of Geology, Environmental Studies and Biology, Macalester College, St. Paul, MN 55105

The St. Croix River provides a pristine habitat for several mussel species including some federally endangered and threatened species. Suitable mussel habitats within the St. Croix are characterized by environments with low shear and frictional stresses allowing the buildup of stable, supportive substrate while providing sufficient food and other materials like oxygen and calcium. One objective of this study was to determine substrate stability and how it relates to mussel density at Wild River and Interstate Park. We measured near-bed sediment transport using a Helley-Smith bedload sampler at Wild River, a sandy habitat upstream of the St. Croix Falls dam and Interstate Park, a rockier habitat downstream of the dam. A significant relationship was found between water discharge and bed sediment transport at both high (>5000 cfs) and low flows. There was a difference in average grain size between Wild River and Interstate, and a difference in the relationship between water discharge and bed sediment flux at each location. Furthermore, there was a significant difference in the number of mussels found at Wild River and Interstate. Further measurements at higher water discharges (near peak annual flows) will be required to refine our understanding of how shear stress relates to sediment transport and ultimately to preferred mussel habitat.

A SURVEY OF MUSSEL MIDDENS ON THE ST. CROIX AND KETTLE RIVERS AT ST. CROIX STATE PARK (MN)

Lindsay E. Fulton¹, Bethany A. Walker¹, Mekel A. Wiederholt Meier²

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² Director, Advanced Environmental Field Education, Edgewood High School, 2219 Monroe Street, Madison, WI 53711. 608-663-2804. wiedmek@edgewood.k12.wi.us

Mussel middens were surveyed along the banks of the St. Croix and Kettle River in St. Croix State Park in spring, 2008. More middens were found along the banks of the St. Croix River than the Kettle River indicating that the St. Croix is a better habitat for muskrats. Middens along the St. Croix indicate a more diverse mussel population than the Kettle River. The most common species of mussels found at both sites were the Mucket (*Actinonaias ligamentina*) and Fat Mucket (*Lampsilis siliquoidea*), at 29.95% and 23.05% on the St. Croix and 8.42% and 21.98% on the Kettle River, respectively. Also common at both sites was the Spike (*Elliptio dilatata*) species, at 21.88% on the St. Croix and 5.13% on the Kettle River. Mussels found on both rivers in small numbers were the Round Pigtoe (*Pleurobema coccineum*) and Pink Heelsplitter (*Potamilus alatus*), at 2.73% and 0.91% on the St. Croix and 0.73% and 0.35% on the Kettle River. Mussels found only on the St. Croix River were the Wabash Pigtoe (*Fusconaia flava*), Pimpleback (*Quadrula pustulosa pustulosa*), Giant Floater (*Pyganodon grandis*), and Hickorynut (*Obovaria olivaria*).

DETERMINE THE EFFECTS OF FOOD QUALITY ON JUVENILE UNIONID MUSSEL SURVIVAL AND GROWTH IN THE ST. CROIX NATIONAL SCENIC RIVERWAY: AN UPDATE

Michelle Bartsch¹, William Richardson¹, Lynn Bartsch¹, and Brenda Moraska Lafrancois²; ¹U.S. Geological Survey, Upper Midwest Environmental Sciences Center. ²National Park Service, Midwest Region, St. Croix Watershed Research Station.

The St. Croix National Scenic Riverway (SACN) has been the subject of several nutrient and mussel investigations; however, additional information is needed to support current mussel preservation activities and nutrient management initiatives. Of particular interest are potential effects of the recent shifts in algal composition and on food quality for endangered mussels in the SACN. Our research objectives are to (1) characterize the current status of food resources available to native mussels in the river corridor and within the four basins of Lake St. Croix, (2) experimentally investigate the survival and growth of caged juvenile mussels positioned within the water column and on the sediment surface and (3) through quantitative analysis of fatty acids, provide baseline information on juvenile mussel diets, the nutritional quality of the consumed and assimilated food, and how this food is being affected by water quality among riverine and lacustrine reaches of the SACN.

Our accomplishments thus far include the deployment of 48 *in situ* exposure cages at eight locations (four riverine and four lacustrine), each containing two species of juvenile mussels (*Lampsilis cardium* and *L. siliquoidea*). Six cages (three positioned mid-water column and three on sediment surface), with two juveniles per cage (one of each species), were deployed for 28 d. Water quality monitors were deployed at six locations (upper and lower riverine reaches, and all four basins of Lake St. Croix) to continuously measure dissolved oxygen, pH, specific conductance, and temperature.

At all eight locations, four size fractions of seston (whole water, < 63, <32 and <10 microns) and three surficial sediment (top 1 cm) samples were collected to coincide with the presence of cyanobacteria. These samples will be analyzed for total lipid and fatty acid composition. Three additional sediment samples will be analyzed for carbon and nitrogen and pore water ammonia nitrogen. Additional depth-integrated whole water samples were collected and will be analyzed for chlorophyll *a*, total suspended and volatile solids, total phosphorus, soluble reactive phosphorus, total nitrogen, ammonia nitrogen, and nitrate-nitrite nitrogen, and carbon and nitrogen. To better characterize the composition of the algal community at each location, a whole water sample was collected and algae will be identified to the species level.

All cages were retrieved from the eight locations and all 96 juvenile mussels were recovered, with 95% survival. Prior to deployment and after retrieval, each individual mussel was measured for shell length, width, and height (mm) for analyses of growth. A subsample of foot tissue was collected before deployment and from each living mussel after deployment and will be analyzed for total lipid and fatty acid composition. A subsample of foot tissue from two juveniles from each position at each site (total of 32 samples) will be analyzed for bacterial fatty acid methyl esters to assess the importance of bacteria as a source of nutrition for juveniles.

CURRENT STATUS OF WINGED MAPLELEAF PROPAGATION IN MINNESOTA

R. Nicholas Rowse, Philip Delphey, and Gary Wege; Fish and Wildlife Biologists, Twin Cities Field Office, U.S. Fish and Wildlife Service, Bloomington, MN

The federally endangered winged mapleleaf (WML) is being propagated by the Fish and Wildlife Service's Twin Cities Field Office with the assistance of other agencies, including the Corps of Engineers, the Minnesota Department of Natural Resources, the University of Minnesota, and other interested persons. We will briefly review the population status of WML in particular over the past three years. This paper will detail winged mapleleaf propagation efforts, including numbers of host fish infested, numbers of females used, numbers of juveniles and subadults produced in cages. We'll also present information on the use of silos for winged mapleleaf propagation. Recently, a dozen juvenile winged mapleleaf are being housed in silos in the Mississippi River at Hidden Falls Park in St. Paul. We'll also update results of our genetics study, and give a status report on the completion of the Corps' Relocation Action Plan for winged mapleleaf. Finally, we'll report the results of winged mapleleaf propagation efforts in Lake Pepin near Frontenac and the adverse impacts of zebra mussels on propagation efforts.

MUSSEL DENSITY AT INTERSTATE PARK, ST. CROIX RIVER, MN AND WI: A NEW EQUILIBRIUM?

Daniel J. Hornbach, Mark C. Hove and Kelly MacGregor; Departments of Biology, Environmental Studies and Geology, Macalester College. St. Paul, MN 55105.

Interstate Park on the St. Croix River contains a dense and diverse assemblage of mussels. We have established a long-term monitoring program at one of the most diverse mussel beds, which is located just downstream of a hydroelectric dam. Since 1992 we have quantitatively sampled the mussel assemblage and habitat characteristics of a five-km stretch of the river at Interstate Park every 2-3 years.

The density of adult mussels was fairly constant between 1992-2000 (approximately 20 mussels/m²). From 2002-2008 adult density was about 25% lower (approximately 15.5 mussels/m²). Despite these differences there was no statistically significant difference in adult density over this period.

There were significant changes in juvenile mussel density over this period. The juvenile density was 4.8 mussels/m² in 1992. Since that time the highest juvenile mussel density was 2.8 mussels/m² in 2000, with densities ranging from 0.07 to 1.7 mussels/m² from 2002-2008. This reduced juvenile mussel density may be responsible for the new lowered level of adults found at Interstate.

The change in mussel density is not uniform across species. The four dominant mussel species at Interstate are *Truncilla truncata*, *Quadrula pustulosa*, *Actinonaias ligamentina* and *Fusconaia flava* constituting 52, 7, 6, and 4% of the community, respectively. For *T. truncata* and *F. flava* there were significant decreases in juvenile density while there was no significant difference in density for *Q. pustulosa* and *A. ligamentina*.

Substrate was coarsest in 1992 (average particle size 3.6 mm) and became steadily finer through 2002 (1.2 mm). In 2005 and 2008 the substrate was coarser (1.5 and 1.6 mm respectively). There was a period from 1986 to spring 1995 when the annual peak water discharge in the river did not exceed 30,000 cfs. This was the longest stretch in the last 50 years without peak flows exceeding 30,000 cfs. We are examining the decrease in peak flow between 1986 and 1995 as a possible cause of decreased grain size. We are also examining whether a period with low peak discharge may be related to the higher than normal mussel recruitment resulting in high juvenile and adult density in 1992. With the possible return of “normal” conditions of finer sediment, it is also possible that the adult and juvenile densities found since 1995 are actually more “typical” of this area and the high densities in 1992 are actually an anomaly.

Reminders

FMCS 2009 Symposium – Call for Papers & Registration
Symposium Website: <http://www.cpe.vt.edu/fmcs2009/>
Call for 2009 FMCS Professional Award Nominations
Student Travel Awards Available for 2009 FMCS Symposium
Membership Renewals Due January 2009

Helpful Hints from Hoppy:

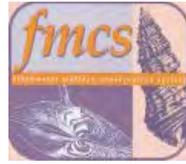


**Hoppy Says – Urgently need
auction items for the April 2009
FMCS International Symposium!**

Submitted by Steve Ahlstedt

Environmental Quality and Affairs Committee Letter #1 (from page 5 of this newsletter):

Freshwater Mollusk Conservation Society



September 12, 2008

Lyle Laverty
Assistant Secretary for Fish and Wildlife and Parks
Department of the Interior
c/o Public Comment Processing
Attention: 1018-AT50
Division of Policy and Directives Management
U.S. Fish and Wildlife Service
4401 North Fairfax Drive, Suite 222
Arlington, VA 22203

Dear Mr. Laverty,

On behalf of the membership of the Freshwater Mollusk Conservation Society (FMCS), I would like to provide comments on the proposal to amend regulations governing interagency cooperation under the Endangered Species Act of 1973, as amended (the Act) (docket FWS-R9-ES-2008-0093).

Founded in 1998, FMCS is dedicated to the conservation of and advocacy for freshwater mollusks, North America's most imperiled animals. The membership of FMCS consists of state, federal, academic, and private biologists, many of whom work directly with the nearly 150 endangered and threatened mollusks, and are considered experts in their conservation and recovery.

After review, our concern is that the proposed regulations will weaken the Act by preventing numerous federal activities from receiving an impartial, scientific review using the best available science, and staff working for action agencies may be put in the unenviable position of a conflict of interest between the requirements of the Act and the mission of their agency. We are also concerned with the limited amount of time that was allowed for public comment on these proposed amendments.

The proposed regulations modify what we believe to be the underlying intent of the consultation process, and that is to provide a fair, balanced, and impartial review of activities proposed by action agencies to ensure compliance with the Act. Section 7(a)(2) of the Act requires the use of best-available science; it is our concern that the proposed regulations violate this principle by removing the checks and balances afforded by requiring informal consultation.

We concur with the position that action agencies now have more endangered species expertise than in 1986, and are much more aware of the consequences of violating provisions of the Act. Indeed, many FMCS members are employed by and provide that expertise to action agencies. The missions of action agencies are often in direct conflict with the needs of imperiled species. This clear conflict of interest will result in the impossible position of employees of action agencies being unable to comply with the Act and follow the mission of their agency. Retaining an external, peer-review via the informal consultation process will continue to allow for a scientific, fair, unbiased review.

Finally, we are concerned with the inadequate 30-day comment period for these regulations. By the Service's own acknowledgment, the proposed regulations may "raise novel legal or policy issues." Such a short comment period does not allow the American public sufficient time to study the ramifications of the proposed regulations. In addition, the lack of public hearings on the proposed regulations, and the limited methods of receiving written comments, work only to minimize public involvement in the regulations development process.

After careful review, it is our conclusion that the proposed regulations should not be enacted, and that the Service and federal action agencies and their designees should continue to implement interagency cooperation under the Act in the current fashion.

Thank you for your considerations in this matter.

Sincerely,

Steve Ahlstedt, President
Freshwater Mollusk Conservation Society

Cc: American Fisheries Society
North American Benthological Society
American Malacological Society



November xx, 2008

To Whom It May Concern,

This letter is submitted in support of the petition by the Center for Biological Diversity (CBD) to list 42 species of freshwater snails under the United States Endangered Species Act. Given the restricted ranges, specific habitat requirements, and eminent threats to the very survival of these snails, we believe that listing action is warranted under the US Endangered Species Act. Our organization, the Freshwater Mollusk Conservation Society (FMCS), is a non-profit entity whose mission includes education, research, and protection of freshwater mollusks, North America's most imperiled group of animals. Our membership includes individuals affiliated with state and federal government, academia, as well as amateur collectors and citizen scientists.

The current count of known freshwater snail extinctions in the United States stands at 42; within the hydrobiid family, almost $\frac{3}{4}$ of the fauna is considered to be at-risk, a staggering total. Much of this high degree of imperilment stems from endemic western United States springsnail species. In the case of the hydrobiid springsnails being petitioned by CBD, all of the species are restricted to a single system or a small number of spring systems; without protection of their groundwater habitats, these species are at critical risk of extinction. The groundwater resources that are being targeted for pumping are largely to support the explosive growth of the Las Vegas metro area. Not only do these projects jeopardize the very existence of these springsnails but also threaten regional wetlands and isolated groundwater-dependent waterbodies. Additionally, several of these species will require action to reduce habitat disturbance and degradation due to existing intensive recreation impacts.

The FMCS requests that you give strong consideration to the CDB petition and act to list the species in the package. Without the intervention of the US Department of the Interior on this issue, we will likely stand witness to more species' extinctions due to the lack of adequate consideration for our nation's biodiversity.

Thank you for all considerations.

Sincerely,

Steven Ahlstedt, President
Freshwater Mollusk Conservation Society

Cc: Members of the FMCS

Freshwater Mollusk Conservation Society

Standing Committees and Chairs

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

Awards

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Gastropod Status and Distribution

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Guidelines and Techniques

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Mussel Status and Distribution

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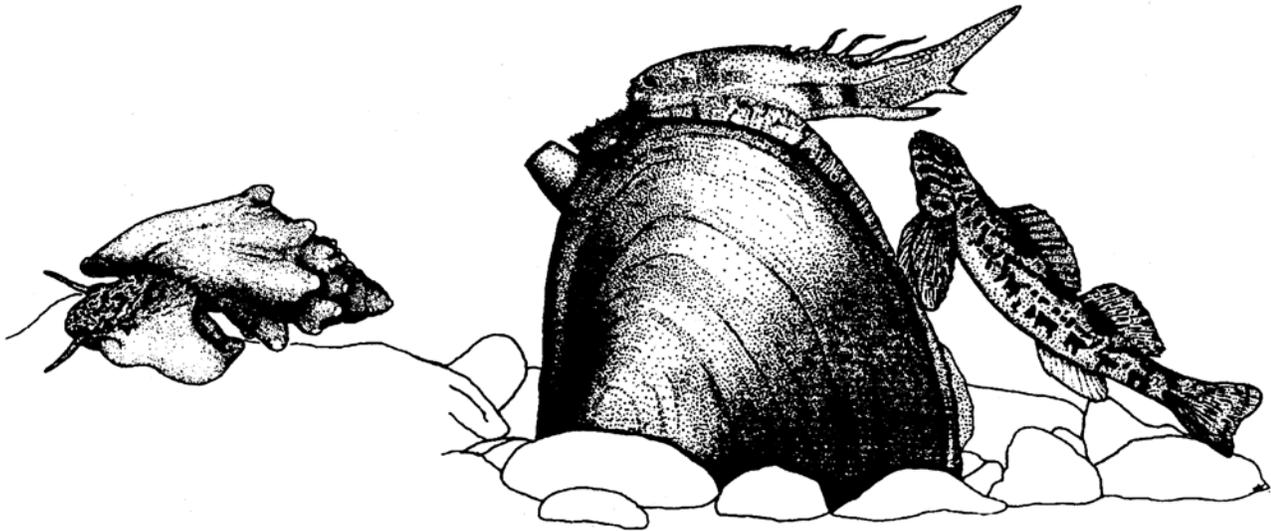
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