



Fall '04 — Spring '05

Pathways to the future of Environmental Research and Education:

- *Coupled Natural and Human Systems*
- *Linked Observing Systems for Enhanced Research Capacity*
- *Multi-scale Science and the Human Context*
- *Water and Complex Environmental Systems Research*
- *Knowledge for Use/Effective Communication*



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DIRECTOR'S MESSAGE

JERRY L. FARRIS



This academic year has seen some drastic changes in our resources at Arkansas State University. The way you ponder that simple statement may convey something of your predisposition to consider your surroundings as half full or half empty. Certainly, visionary researchers and scientists realize what's at their **disposal**—which may represent a term of contrast in association with folks working with science-based information for **sustainable** environmental solutions. If our research is to be effectively used to help understand risks, uncertainties, and potential consequences of action and inaction, then we hope this effort would involve an informed group capable of optimizing their proximal resources. Our available resources, as both human

and physical infrastructure, are so critical to growth and sustainability of existing programs, that new programs are often sensed as threatening, rather than joined for collaboration of inquiry and learning. Such synergism can not only increase research value to other parts of society, but also prove critical to justifying current University and State investments.

The outcomes of those investments now seem evident throughout our campus in:

- elaboration of the ways we communicate between departments, across colleges, and within research groups and regional associations
- new means of securing research agreements and planning through our Office of Research and Technology Transfer
- strategic planning for the way programs and offices realize their worth
- the support and means to ac-

complish research through IT services, improved library acquisitions and cooperation, improved online search options for literature, added physical space and equipment, collaborations with other regional laboratories or affiliates, financial support for faculty and students through reassignments and tuition fellowships.

These resources are being realized by a growing number of researchers that attempt to make the best use of what is there, while constantly identifying what is needed to insure an efficient approach to science that's embodied in the new phrase 'sustainability science'. I hope you'll sense some of those activities in the newsletter features and feel comfortable to extend a conversation to someone affiliated with the program. You might find a way to enter one of those collaborations and begin to collectively share or nurture our growing resources.

NEW PH.D STUDENTS

Spring 2005 welcomes four new Ph.D students -

Arriving during the holiday break and beginning the spring semester was **Moytri R. Chowdhury** from Calcutta, India. She will be working with Dr. Greg Phillips.

Kevin W. Custer relocated from Tipp City, OH. Kevin recently defended his masters thesis at Wright State University in Ohio. He will be working with Dr. Jerry Farris.

Erin T. Macchia recently arrived from Keller,

TX by way of the University of Florida to work with Dr. Jim Bednarz.

Ricky D. White, an employee of Jonesboro City Water and Light will begin the semester working with Dr. Ricky Cliff.

EVS MASTERS STUDENTS

The Environmental Sciences Program welcomes the first **Master of Science students** into the EVS MS Program.

Nikki Enger-Luster received her BS in Biology from ASU in 2001. She serves as the culture and maintenance technician at the Ecotoxicology Research Facility. Her research, directed by Dr. Jerry Farris, focuses on intralaboratory variability of biomonitoring organisms and relationship with associated food sources. She is incorporating public environmental education within her research objectives.

Russel Howard received

his BS in Biology from ASU in 2004. He is working with Dr. Robyn Hannigan to determine the environmental life history of Walleye in Greers Ferry Lake, Arkansas, using otolith chemistry with analytical comparisons to site-specific water chemistry as an analytical tool.

Matthew Horton received his BS in Chemistry from ASU in 2004.

His project will involve the development of an analytical method using laser ablation coupled to a gas chromatograph-mass spectrometer for sample introduction and analysis of chemical weapons. His work is supported by a grant from the US Space and Missile De-

fense Command with Dr. Robyn Hannigan.

Traci Hudson received her BS in Biology from Philander Smith College, Little Rock, AR. She is the reference toxicity technician at the Ecotoxicology Research Facility and has participated in fish community assessments. Her internship with the Audubon Society of Arkansas has stimulated her interest in educational outreach and she plans to incorporate ichthyology and toxicology into her educational plans.

EVS welcomes four MS students into the newly approved program

EVS has expanded to include a MS degree



Nikki Enger-Luster



Russel Howard



Matthew Horton



Traci Hudson

Ph.D student **Lisa Gilbreath** was recently selected to receive the William D. Hatfield Award by the Arkansas Water Environment Association (AWEA) in recognition of outstanding performance of wastewater operations and knowledge of water pollution control. She also received the AWEA President Award for outstanding service to the association.

Congratulations: Dr. Jennifer L. Bouldin

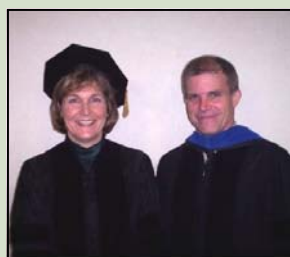
Jennifer L. Bouldin was awarded a Ph.D in Environmental Sciences on December 17th. Her hooding by Dr. Jerry L. Farris marked the first female Ph.D graduate from Arkansas State University.

Jennifer received her BS in Medical Technology from the University of Arkansas School for Medical Sciences in Little Rock and worked as a Blood Bank Supervisor prior to entering the Environmental Sciences Program. Her interest in ag-

riculture led to her dissertation titled *Interaction of Agricultural Runoff with Vegetated Aquatic Systems to Reduce Potential Toxicity*.

Jennifer's dissertation chapters have been published in *Chemosphere*, *Environmental Pollution* and *Environmental Toxicology* as peer-reviewed manuscripts in international journals. She has recently presented her research at the Society of Environmental Toxicology & Chemistry World Congress in Portland, OR.

She is the Quality Assurance/Quality Control officer for ASU's Ecotoxicology Research Facility, a position she's maintained full-time for three years while completing her degree.



Drs. Jennifer L. Bouldin & Jerry L. Farris

Masters in Environmental Sciences

The Arkansas Department of Higher Education announced the approval of a **Masters of Science in Environmental Sciences** at Arkansas State University. Acceptance began in January, 2005, with four students included in the inaugural class.

Prior to application, potential students must apply to the graduate school and secure a sponsoring graduate faculty member within Arkansas State University as an advisor; open applications cannot be accepted. Funding for MS EVS students must then be secured by advisors within their first semester.

Degree options available to candidates vary to include thesis, practicum, or internship.

The master's degree program accepts students with a variety of undergraduate and graduate majors, including the humanities, social sciences, natural sciences, and engineering. Preparation for the required program coursework should include the following courses:

- Mathematics – applied statistics and introductory calculus.
- Sciences – three quarters or two semesters in any combination of chemistry, biology, physics, earth science, or atmospheric science with at least one semester/quarter in chemistry.

Core curriculum includes:

- Environmental Policy/Law
- Environmental Economics
- Topical Seminar in Environmental Sciences
- Biology, Chemistry, or equivalent
- Statistical Analysis
- Independent Research

Additional information for interested students or faculty is available through the Graduate School <http://graduateschool.astate.edu/> or the Environmental Sciences Website <http://evs.astate.edu/index.html>

*December
commencement included
the first female Ph.D
granted from Arkansas
State University*

FEATURED INSTRUCTOR



Dr. Stan Trauth examines an Ozark hellbender during a recent amphibian survey.

Stanley E. Trauth, Professor of Zoology in the College of Sciences and Mathematics received his BS and MS in Zoology from the University of Arkansas in 1970 and 1974 and his Ph. D in Zoology from Auburn University in Auburn, AL. Stan began a tenure-track position at ASU in 1984. Since coming to the university, he has served as Director of the Center for Microscopy and Electron Microscope Facility and Curator of the Herpetological Museum.

The microscopy facility houses a Vega TS 5136 XM Scanning Electron Microscope and an Epi-Fluorescence Microscope with a Digital Imaging System where he and his students examine the reproductive histology and spermatozoan ultrastructure of amphibians and reptiles. Courses offered through these facilities include Techniques in Electron Microscopy and Microtechniques

for Histology.

The Herpetological Museum is a CITES (Convention on the International Trade in Endangered Species) certified museum and houses 28,800 species of reptiles and amphibians.

Conservation of selected Arkansas amphibians and reptiles and their natural history are also among his research interests. His students learn field, analytical, and policy-related methods for the assessment of population status and health of endemic amphibians and reptiles.

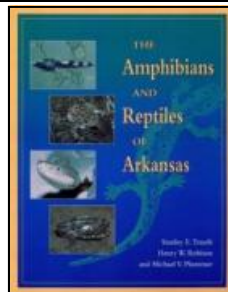
Stan is currently working on projects including the status of the Caddo and Fourche Mountain salamanders, the distribution and abundances of mussels, crayfish, and aquatic salamanders of the Spring River, Arkansas, and the effects of prescribed fire on terrestrial plethodontid

salamanders in the Ouachita Mountains. Other research interests include population dynamics of alligator snapping turtles (*Macrochelys temminckii*), population analysis and status of the Ozark hellbender (*Cryptobranchus alleganiensis bishopi*) and the development of an assessment plan for two US Fish and Wildlife Service sensitive species (Ozark hellbender and the queen snake, *Regina septemvittata*).

In addition to authorship of "The Amphibians and Reptiles of Arkansas" (see full article below), Stan contributed several descriptive excerpts to "The Conservation Status of United States Species", a book in publication from the University of California Press.

His primary research funding is through grants from the AR Game and Fish Commission and the US Forest Service.

"AMPHIBIANS & REPTILES OF ARKANSAS"



A unique, comprehensive, and modern reference book entitled "The Amphibians and Reptiles of Arkansas" was recently published by **Dr. Stanley E. Trauth**. The life history, distribution maps, species descriptions and color photos makes the

book an asset to researchers and naturalists throughout the South. This work encompassed 20 years of Trauth's career and is co-authored by fellow herpetologists, Henry W. Robison and Michael V. Plummer.

Book signings have been held at the ASU Bookstore, Crowley's Ridge Nature Center, That Bookstore in Blytheville, The Cherry Tree in Mountain Home, and the Arkansas Native Plant Workshop in Ferndale. Partial funding for the book was through the Arkansas Game and Fish Commission.

Dr. Trauth is currently a professor of zoology at ASU and has been associated with the Environmental Sciences Program since its inception. He also serves as Editor-in-Chief of the Journal of Arkansas Academy of Sciences and is active in such organizations as The Southwestern Association of Naturalists, American Society of Ichthyologists and Herpetologists, Herpetologist's League, Society for the Study of Amphibians and Reptiles, Arkansas Herpetological Society, and Sigma Xi.

NSF FELLOWSHIP GRANTED

'04 Graduate Receives NSF Postdoctoral Fellowship

Dr. Nate Bickford recently received a National Science Foundation Postdoctoral Fellowship in Polar Regions Research. The coveted fellowship is offered by [NSF's Office of Polar Programs](#) to highly qualified individuals in U.S. host organizations to support training and research on any aspect of scientific study of the Antarctic and/or the Arctic.

Bickford's interdisciplinary investigation, in collaboration with Dr. Brenda Norcross, will assess the life histories of flatfish species in the eastern Bering Sea. These outer-shelf winter spawners have distinct spawning strategies and thus unique habitat needs and life histories.

The proposed research will explore the utility of otolith

(fish ear stone) chemistry in the reconstruction of past habitat use, the identification of essential habitat, and the connectivity between flatfish populations within the eastern Bering Sea. The identification of essential spawning habitat and the ability to assess recruitment within major commercial flatfish populations will have profound consequences for these arctic fisheries.

The results will assist in the prioritization of restoration of essential habitats as well as in the continued management and sustainability of flatfish fisheries.

Dr. Bickford received his Ph.D in Spring, 2004 under the supervision of **Dr. Robyn Hannigan**.



Dr. Nate Bickford

EVS Achievement Awards

Drs. Debra Ingram and **Stanley Trauth** were named recipients of the 2004-05 **Board of Trustees Faculty Achievement Awards**. Ingram received the achievement award for excellence in teaching and Trauth received the faculty award for excellence in research/scholarship.

Dr. Ingram was recognized for teaching in a style that is conducive to learning, while demonstrating genuine interest in her students' success. She was cited for her dedication and enthusiasm about teaching math effectively and for her accessibility to students.

Dr. Trauth was cited for his extensive publications and a scholarly book (see article on page 4). He published six articles in peer-reviewed journals with 12 additional articles "in press." He also was awarded five grants, totaling more than \$300,000.

The Environmental Sciences **Doctoral Research Awards** were presented to **Drs. Robyn Hannigan** and **Jennifer Bouldin** at the College of Sciences & Mathematics Convocation of Scholars.

The **EVS Faculty Research Award** was granted to **Dr. Hannigan** whose work includes numerous peer-reviewed, presentations, and grants totaling \$2 million from such agencies as the US Space and Missile Command and NSF.

Dr. Bouldin received the program's **Student Research Award**. During her student career she is credited with eight peer-reviewed publications and six technical reports.



EVS Doctoral Research Award winners Robyn Hannigan & Jennifer Bouldin



Faculty Achievement Award winners Stan Trauth & Debra Ingram

CANEY CREEK FIELD WORKSHOP

Dr. Rich Grippo, Associate Professor of Environmental Biology, organized and led a field workshop for the Southern Group of State Foresters during their regional Best Management Practice meeting.

This workshop emphasized the use of bioassessment for determining best management practices by the silviculture industry. He illustrated the use of benthic macroinvertebrates from the regional forested

streams for this assessment.

The workshop took place at Caney Creek near Hollis, AR. The Ouachita Mountain region in Arkansas is an area of intensive silviculture practice. Logging practices which include temporary equipment roads have the potential to impact these mountainous streams.

Changes in structure of resident communities within these streams may indicate impact from harvested areas. Bioassess-

ments can be useful tools to assess such impacts.



Dr. Rich Grippo sorting benthic macroinvertebrates from Caney Creek.

Imagine a society where environmental decisions are based on an accurate understanding of the underlying science, its meaning, and its limitations.

PRESENTATIONS

Grippe, R.S. *Assessment of silviculture best management practices using biomonitoring.* Southern Group of State Foresters Regional BMP meeting, Lake Degray State Park Resort, AR. Invited talk.

Hannigan, R.E. *The chemistry of tobacco smoke.* Center for Addiction Studies, University of Arkansas-Pine Bluff, Pine Bluff, AR. Invited talk.

Elobeid, M., Y. Chai, D. Clarke, R. Hannigan, J. Russ. *Speciation analysis with GC-ICP-MS: Organometal detection in tobacco smoke.* The 9th International Conference on Plasma Source Mass Spectrometry. Durham, CO.

Srivatsan, M., B.M. Prabhu, C. Cavanaugh, L. Mommsen, E.E.

Shotts. *Nicotine influences survival and neurite growth differently in neonatal sympathetic neurons.* Annual Meeting of Society for Neuroscience, San Diego, CA.

Srivatsan, M. *Searching the sequence of AChE for clues on the mechanism of its neurotrophic action.* Mid-South Society for Bioinformatics and Computer Science, Little Rock, AR.

Wheeler, B. A., C.T. McAllister, S.E. Trauth, S.F. Barclay, Z.D. Ramsey, W.R. Hiler. *Use of the BioMark® tagging system on the Ozark hellbender, *Cryptobranchus alleganiensis bishopi* Amphibia: Caudata, in northern Arkansas.* 2nd Annual TAMU Pathways Research Symposium, Texas A&M University-Corpus Christi, TX.

Wheeler, B. A., C.T. McAllister, S.E. Trauth, S.F. Barclay, Z.D. Ramsey, W.R. Hiler. *Use of the BioMark® tagging system on the Ozark hellbender, *Cryptobranchus alleganiensis bishopi* (Amphibia: Caudata), in northern Arkansas.* Oklahoma Academy of Science.

Trauth, S. E., B.A. Wheeler, W.R. Hiler. *Status of the Ozark hellbender on the Spring River, AR and comments on the presence of tumors.* Ozark Hellbender Working Group. St. Louis, MO.

Farris, J.L., J.L. Harris, B.L. Posey, A.D. Christian. *Prioritizing regional research initiatives for the conservation of Arkansas' freshwater mussels.* Aquaculture 2004 Conference, Honolulu, Hawaii

RECENTLY PUBLISHED & IN PRESS

The following publications appeared in the 2004 **Journal of the Arkansas Academy of Science:**

Bouldin, J.L., Bickford, N.A., Stroud, H.B., Guha, G.S. *Tailwater recovery systems for irrigation – benefit/cost analysis and water resource conservation technique in Northeast Arkansas.*

Ogendi, G.M., R. E. Hannigan, J.L. Farris, D.L. Smith. *The impact of black shale weathering on sediment quality: Preliminary findings.*

Trauth, S. E., and R. G. Neal. *Geographic range expansion and feeding response by the leech *Macrobdella diplotertia* (Annelida: Hirudinea) to wood frog and spotted salamander egg masses.*

The following articles were published in the **Herpetological Review:**

McDowell, C. R., **B. A. Wheeler, S. E. Trauth.** 2004. *Terrapene carolina triunguis (Three-toed Box Turtle).* *Aquatic Behavior.* 35:265-266.

Neal, R. G., **M.L. McCallum, C.R. McDowell, S. E. Trauth.** 2004. *Alligator mississippiensis (American alligator). Nest and nesting ecology.* 35:379.

Additional publications from EVS students and faculty included:

Stroud, H.B. and J. Warrick. 2004. *Eminent domain proceedings as a crucial final step in the acquisition of environmentally sensitive land in South Florida.* The Florida Geographer, Vol. 35, pp. 29-49.

Moore, M.T., J.R. Pierce, and J.L. Farris. 2004. *Water Quality Analysis of an Intensively Used Agricultural Reservoir.* Mississippi Water Resources Research, Raymond, MS.

Abanda, P.A. and **R. Hannigan.** *Laboratory study of chemical weathering of Middle Ordovician black shales.* Water-Rock Interaction, Richard Wanty and Robert Seals (eds.), Wiley and Sons, vol. 1, 793-796.

Bickford, N.A. and **R. E. Hannigan.** In Press. *Stock identification of Walleye (*Stizostedion vitreum*) using otolith chemistry in the Eleven Point River, AR.* American Journal of Fisheries Management.

Dorval, E., C. Jones, **R. Hannigan.** In Press. *Can the chemistry of surface waters be used to distinguish habitat use for estuarine and estuarine dependent fish?* Limnology and Oceanography.

Sako, A., C.M. O'Reilly, R. Hannigan, N. Bickford, R. L. Johnson. In Press. *Stock identification of two clupeid species, *Stolothrissa tanganyica* and *Limnothrissa miodon* in Lake Tanganyika using otolith microchemistry.* Geochemistry: Exploration, Environment, Analysis.

Baral, A. and **R.D. Engenken.** In press. *Modeling, Optimization, and Comparative Analysis of Trivalent Chromium Electrodeposition from Aqueous Glycine and Formic Acid Baths.* Journal of the Electrochemical Society.

Bouldin, J.L., J.L. Farris, M.T.

Moore, S. Smith Jr, W.W. Stephens, C.M. Cooper. In press. *Evaluated fate and effects of atrazine and lambda-cyhalothrin in vegetated and unvegetated mesocosms.* Environmental Toxicology.

Stephens, W.W., M.T. Moore, J.L. Farris, J.L. Bouldin, C.M. Cooper. In press. *Considerations for assessments of wadeable drainage systems in the agriculturally dominated deltas of Arkansas and Mississippi.* Ecological Indicators.

Milam, C.D., **J.L. Farris, F.J. Dwyer, D.K. Hardesty.** 2005. *Acute toxicity of six freshwater mussel species (glochidia) to six chemicals: implications daphnids and *Utterbackia imbecillis* as surrogates for protection of freshwater mussels (Unionidae).* Arch. Environ. Contam. Toxicol. 48:166-173.

Maul, J.D. and **J.L. Farris.** 2004. *Monitoring exposure of passerines to acephate, dicrotophos, and malathion using cholinesterase reactivation.* Bull. Environ. Toxicol. Chem. 73:682-689.

Cooper, C.M., **M.T. Moore, E.R. Bennett, S. Smith, Jr., J.L. Farris, C.D. Milam, F.D. Shields, Jr.** 2004. *Innovative uses of vegetated drainage ditches for reducing agricultural runoff.* Water Science and Technology 49 (3):117-123.

Lee, K. and **D.F. Gilmore.** 2004. *Formulation and process modeling of biopolymer (polyhydroxyalkanoates: RHAs) production from industrial wastes by novel crossed experimental design.* Process Biochemistry 40: 229-246.

HIGHLIGHTS- CONFERENCES & PRESENTATIONS



Geological Society of America (GSA)

The **Geological Society of America** held its annual meeting November 7-10 in Denver, CO and was attended by the following EVS students and faculty: **George Ogendi, Robyn Hannigan, Carolyn Dowling, and Matt Horton.**

As an invited speaker, **Dr. Robyn Hannigan** presented the a talk entitled: *What goes around comes around: Today's environmental biogeochemistry.*

Hamilton, B., **N.A. Bickford, R. Hannigan.** *Elemental chemistry of endolymph and otolith: passive recorder or active writer?*

Clarke, D. and **R. Hannigan.** *Analysis of riverine metal-organic complexes by gas chromatography-inductively coupled plasma mass spectrometry.*

Waldron, B., J. Anderson, **C. Dowling, R. Hannigan, K. Johannesson, V. Lakshmi, D. Larsen, K. Mace, G. Tick, L. Urbano, C. Zhang.** *Boundary and scale: a hydrologic observatory in the Mississippi Embayment.*

Ogendi, G., A. Abanda, R. Hannigan, J.L. Farris. *Chemical weathering of black shales and their ecological impacts on streams.*

Horton, M. and R. Hannigan. *The role of crayfish in terrestrial aquatic metal biogeochemical cycles.*

North American Benthological Society (NABS)

The annual NABS conference was held in New Orleans, LA, May 22-27 with the following presentations:

Christian, A.D., D.J. Berg. *Freshwater mussel ecological stoichiometry: C, N and P relationships.*

Bouldin, J.L., J.L. Farris, M.T. Moore, S. Smith Jr, C.M. Cooper. *Hydroponic uptake of atrazine and lambda-cyhalothrin in aquatic macrophytes.*

Hiler, W.R., **B.A. Wheeler, S.E. Trauth, A.D. Christian.** *Examination of the trophic interactions between a species in decline, the Ozark Hellbender *Cryptobranchus allegniensis bishopi*, and a prey base composed of multiple crayfish species using stable isotope analysis.*

Matthews, M.W., F. Usrey, S.E. Seagraves, S. Hodges, M.J. Gambill, **A.D. Christian.** *Assessment and habitat evaluation of native freshwater mussel resources of Buffalo National River*

McIntyre, H.E., J.L. Farris, A.D. Christian. *Evaluation of Freshwater Mussels (Mollusca: Unionoidea) fitness pre- and post-relocation efforts.*

Peck, A.J., J.L. Harris, A.D. Christian. *A reach scale comparison of fluvial geomorphological conditions of freshwater mussel (*Bivalvia: Unionoidea*) beds: Differences between the haves and have nots.*

Seagraves, S.E. J.L. Harris, **J.L. Farris, A.D. Christian.** *Conservation of the special concern Ouachita Creekshell [*Villosa arkansasensis* (Lea 1852)]: life history, ecology, and conservation implications.*

Wheeler, B.A., W.R. Hiler, S.E. Trauth, A.D. Christian. *Comparison of the reach scale habitat characteristics of historic and current Ozark Hellbender (*Cryptobranchus allegniensis bishopi*) localities using standardized assessment protocols.*

McCord, S.B., and R.S. Grippio. *The effect of subsampling effort on macroinvertebrate community variables in streams of the interior highlands, (Arkansas, USA).*

Ashcraft, E.A., **J.L. Farris, B.L. Walker, R. Hannigan.** *Use of relic shells to determine time since mortality.*

Walker, B.L., **J.L. Farris, E.A. Ashcraft, M.A. Nelson.** *Storm event and multipoint longitudinal sampling with Biomonitored responses to turbidity in a NE Arkansas River.*

American Geophysical Union (AGU)

Robyn Hannigan, Carolyn Dowling attended the **American Geophysical Union** annual meeting in San Francisco, CA on December 13-17 and made the following presentation:

Hannigan, R., P.A. Abanda, R. Chakrabarti, R. Basu. *The impact of diagenesis on the Sm-Nd isotope systematics of black shales.*

Association of American Geographers (AAG)

Bill Stroud chaired a session at the **Association of American Geographers (AAG)** April 5-9 in Denver, CO entitled *Issues in Urban Planning in the West* and also a talk entitled *Oregon's Land Rush Creates Legacy.*

Freshwater Mollusk Conservation Society (FMCS)

Jerry Farris chaired a session at the annual FMCS meeting in St. Paul, MN on May 15-18 where the following presentations were made:

McIntyre, H.E., J.L. Farris, A.D. Christian. *Evaluation of Freshwater Mussels (Mollusca: Unionoidea) fitness pre- and post-relocation efforts.*

Peck, A.J., J.L. Harris, **A.D. Christian.** *A reach scale comparison of fluvial geomorphological conditions of freshwater mussel (*Bivalvia: Unionoidea*) beds: Differences between the haves and have nots.*

Seagraves, S.E., J.L. Harris, **J.L. Farris, A.D. Christian.** *Conservation of the special concern Ouachita Creekshell [*Villosa arkansasensis* (Lea 1852)]: life history, ecology, and conservation implications.*

Scott, M.C., **J.L. Farris, J.L. Harris, A.D. Christian.** *Population dynamics, reproductive behaviors, and habitat use by a threatened endemic Arkansas mussel, *Lampsilis powellii* (Lea, 1852)*

Ashcraft, E.A., **J.L. Farris, R. Hannigan.** *Use of relic shells to determine time since mortality.*

Society of Environmental Toxicology & Chemistry (SETAC)

4th SETAC World Congress
Portland, OR.

Hobbs, M., R. Grippio, J.L. Farris, B. Griffin, L. Harding. *Environmental effects of the aquaculture therapeutic potassium permanganate.*

Bouldin, J.L., J.L. Farris, M.T. Moore, S. Smith Jr., C.M. Cooper. *Laboratory biomonitoring and in situ biomarkers for the evaluation of diazinon toxicity in constructed wetlands.*

Stephens, W.W., M.T. Moore, J.L. Farris, J.L. Bouldin, C.M. Cooper. *Accounting for regional specific attributes in the bio-assessment of Wadeable agricultural drainage systems from the deltas of Arkansas and Mississippi.*

Maul, J.D., J.L. Farris, M.J. Lydy. *The interaction of a predator stress and two organophosphorous pesticides on *Ceriodaphnia dubia* survival.*

MidSouth SETAC May 16-18, Carbondale, IL

Hudson, T.C., J.L. Farris, J.L. Bouldin, W.W. Stephens, M.Y. Armstead. *Impact and recovery of a coal slurry spill in Appalachian streams.*

Bouldin, J.L., J.L. Farris, M.T. Moore, S. Smith Jr, C.M. Cooper. *Macrophyte uptake of atrazine and lambda-cyhalothrin in hydroponic laboratory exposures.*

Walker, B.L., **J.L. Farris, E.A. Ashcraft, M.A. Nelson.** *Storm event and multipoint longitudinal sampling with Biomonitored responses to turbidity in a NE Arkansas River.*

Drs. **Malathi Srivatsan** and Amy Pearce sponsored a Society for Neuroscience meeting where Drs. **Srivatsan, Pearce and Roger Buchanan** shared their research to ASU students interested in neuroscience.

Please send suggestions and comments to:



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THE EVS MISSION

To produce scientists with the knowledge needed to support the assessment, maintenance and recovery of environmental resources. This includes an appreciation of the economic, social, political and aesthetic context that shapes our interaction with and knowledge of the environment. Measuring and understanding the balance between environmental protection, sustainable resource management, and economic growth is a major integrating theme within the program.

SAVE A TREE - If you would like an electronic copy of the newsletter contact Marty Wolfe (mwolfe@astate.edu) or visit our website under News & Information.



FEATURED LABORATORY— AQUATIC ECOLOGY LABORATORY



Dr. Alan Christian

and the students associated with the Aquatic Ecology Laboratory (AEL) study the life history and ecology (behavior, population, community, and ecosystem) of aquatic organisms. Although his primary research is freshwater mussels, additional interests include nutrient cycling, aquatic macro-invertebrates, freshwater fish, and Ozark hellbenders.

Dr. Christian is involved with two Ph.D dissertation research projects. He is working with multiple stake holders to restore the endangered Fat Pocketbook mussel, *Potamilus capax*, in the Tyronza River Drainage as part of a recovery plan. He is also involved with a study of food web linkage between the Ozark hellbender, (*Cryptobranchus a. bishopii*) and crayfish.

Additional research projects in the Aquatic Ecology Laboratory include:

- relating geomorphological process freshwater mussel beds in the White and Buffalo rivers
- habitat characterization and assessment for the Ozark Hellbender in the Spring and Eleven Point rivers
- life-history, ecology, distribution, and genetics (population and systematics) of endangered, threatened, and special concerned freshwater mussels
- investigating the effects of construction and mitigation efforts on fitness and mortality of endangered mussel species
- investigating paternal contributions in freshwater mussels and spatial distribution of male and female mussels

Dr. Christian looks forward to working with members of the EVS program as opportunities arise for multi-disciplinary approaches to research and teaching.



Potamilus capax

Research for the AEL has been supported from the Arkansas Game and Fish Commission, Arkansas Highway and Transportation Department, Federal Highway Administration, USDA Forest Service, US Army Corps of Engineers, and the US Fish and Wildlife Service.



Cryptobranchus a. bishopii