

MUDDY WATERS

News from the Missouri Cooperative Fish and Wildlife
Research Unit

Volume 7 Issue 2

FALL 2013



INSIDE THIS ISSUE:

<i>New Students/Staff</i>	2
<i>New Projects</i>	3
<i>Outreach and Awards</i>	5
<i>Publications</i>	6
<i>Presentations</i>	7
<i>Directory</i>	8

Missouri Cooperative Fish and Wildlife Research Unit

302 ABNR Building,
Department of Fisheries and
Wildlife Sciences
University of Missouri
Columbia, MO 65211
573-882-3634

COOPERATORS



RIDING THE STORM



Least bittern nestlings at Squaw Creek National Wildlife Refuge

Let's face it. It has been a tough year to be a federal employee. Budgets are always tight with the threat of more cuts always looming. This past year also brought on a federal shutdown and threats of furlough due to extreme budget cuts. But let's look on the bright side—I have learned a few new terms this year. Now if I ever participate in a spelling bee I can spell 'sequester' or 'furlough.' Heck—I can even use them in a sentence (although the sentence would include a few choice words I probably shouldn't mention here!). However, one main concern about these tough times is how it affects our students. I have talked to several students or young professionals that recently have indicated they may not want to work for the federal government because of these headaches. Although I understand their concerns, I really hope these bumps in the road do not have a long term impact on training future biologists. I have been with USGS for about 12 years, and, in talking to the old timers, they always assure me there are ebbs and flows.

I hope we can maintain a positive attitude that we can project to the students that every job has its pros and cons, and a federal job is no different. The one issue that doesn't change is our passion and desire to help terrestrial and aquatic resources. I bet these least bittern nestlings (above) don't care if we are in a government shutdown! We work to protect resources like these bitterns, and to train the future biologists that will manage these species for years to come. So, after I accepted my notice of proposed furlough (still have it hanging in my office), it is nice to stop by the grad student's offices, or meet with one of our cooperators and talk about science and management. Hopefully Amanda, Lisa, and myself will be able to focus more on the science in the coming year.

Craig Paukert
Unit Leader

NEW STUDENTS AND STAFF

Corey Dunn is a new Ph.D. student with **Craig Paukert**. He was born, raised, and educated in Virginia. As a graduate student at Virginia Tech, he studied the mechanisms leading to the decline of an imperiled fish species in the Appalachian Mountains. In Missouri, Corey will be developing sampling protocols for mid-sized rivers – systems that have been overlooked but are undoubtedly fundamental to the ecosystem function for Missouri's stream networks and sources of habitat for its rich freshwater fauna. Other than the prospect of exploring and working in the sister-region of the Appalachians – the Ozarks – Corey looks forward to exploring the culture, environment, and other recreational opportunities in the Show-Me State for the next four years.



Brian Hidden began his graduate research assistantship with **Lisa Webb** in August 2013. In May 2012 Brian received his B.S. in Natural Resource Ecology and Management with an emphasis on wildlife at Oklahoma State University. While at OSU, he worked with small mammals, bluebirds, mussels and eventually managed a small wetland outside of Stillwater, Oklahoma. Brian's research at Mizzou will focus on developing a standardized aerial survey for waterfowl across Missouri's ecoregions as well as developing ways to predict wetland habitat conditions for dabbling ducks. Brian is currently wrapping up his first field season of collecting moist-soil habitat and waterfowl population data.



Ethan Kleekamp is a new graduate research assistant working on his master's degree with **Craig Paukert**. A native of Marthasville, Missouri, Ethan earned a B.S. in Biology from Truman State University in 2012, and has worked several years for the Missouri Department of Conservation and other private conservation groups on stream assessments and habitat restoration. His project will focus on determining least-impaired

stream conditions to be used in statewide stream habitat and fish community assessments.

Damon Krueger is a post-doctoral fellow under the direction of **Craig Paukert** where he is leading a team of researchers in the development of a decision support mapper for conserving stream fish habitats of the Northeast Climate Science Center region. He previously worked at Michigan State University to determine the effects of climate change on stream fishes in the Midwest and Pacific Northwest. Damon is interested in working to conserve vulnerable and valuable freshwater resources at local, regional, and national scales. Damon was born in Flint, Michigan, but grew up in Middleton, Wisconsin. He received his B.S. from the University of Wisconsin in Wildlife Ecology, his M.S. from the University of Minnesota-Duluth in Biology, and his Ph.D. from the University of Michigan in Resources and Ecosystems Management. Damon is a father of two young children and



when not at work, he enjoys his reef aquarium, working around the house, and training for and racing in Ironman triathlons.

Ryan Lueckenhoff is a new Senior Research Specialist with **Craig Paukert** on Lower Osage River Dissolved Oxygen Monitoring and Fish Community Assessment project. Ryan graduated from Mizzou with a B.S. in Fisheries & Wildlife in Dec. 2006 and a M.S. in Aquatic Science from the University of Nebraska – Lincoln in May 2011. Since graduation, he has been working for the Missouri Department of Conservation Resource Science Division dealing with many projects working on ecological stream flows around the state of Missouri. Ryan will be a great asset to our team and we look forward to working with him on this project, even though he is only a Packer's fan because Aaron Rodgers is on his fantasy football team.



Jacob Schwoerer, a native of Wisconsin, graduated from the University of Wisconsin-Stevens Point with a BS in Water Resources. He arrived at MU in the fall of 2013 to begin his MS project under **Craig Paukert** to develop measures of aquatic community vulnerability to climate change and disturbance in the Heartland Network National Parks. Prior to arriving at MU, he has worked as a hydrologic technician for the USDA Forest Service and as a stream ecology technician at South Dakota State University.



Matt Schrum is a new master's student studying under **Dr. Amanda Rosenberger**. Hailing from Bismarck in southeast Missouri, Matt graduated from the University of Missouri with a B.S. in Fisheries and Wildlife Sciences. He has formerly worked for the Missouri Department of Natural Resources as a state park naturalist, and the Missouri Department of Conservation conducting surveys of threatened benthic stream animals including freshwater mussels, darters, and madtom catfishes. Matt's project will focus on development of standardized sampling protocols for assessing freshwater mussel populations.



MOVING ON...

Jessi Tapp completed her M.S. in December 2013 with **Lisa Webb** evaluating the effects of management on waterbird use at private wetlands in the Lower Mississippi Alluvial Valley. She is currently preparing manuscripts based on her thesis research and moving to Iowa to begin work as a Private Land Habitat Specialist.



NEW RESEARCH PROJECTS

(SEE PREVIOUS NEWSLETTERS FOR ONGOING AND PAST PROJECTS)

<http://www.riverstudies.com/newsletter.html>

Linking thermal and dissolved oxygen dynamics to river flow in the Lower Osage River, Missouri.

PI: C. Paukert

Funding: Missouri Department of Conservation

Stream flow regimes that meet the ecological needs (including sufficient dissolved oxygen; DO) for the entire aquatic community are vital in supporting healthy, sustainable sport fisheries in flow regulated systems. Seasonal and annual flow variability that provides habitat to support spawning, recruitment, and growth of fish and their prey are needed to maintain or restore fish community integrity. The Missouri Department of Conservation has continued fish sampling in the highly altered (through dams and river regulation) Lower Osage River to evaluate fish community response to the improved flow and water quality conditions. Another long-term goal was to develop methods for measuring and assessing fish community changes resulting from changes in dam operations. Such methods would be useful in developing in-stream flow policies and managing fisheries resources in other regulated systems in Missouri. This project will link water quality metrics such as dissolved oxygen, water temperature, and other metrics to the existing fish community sampling by MDC. Therefore, the objectives of this study are to link ongoing fish sampling by MDC with water quality and habitat metrics to 1) document long-term trends in fish community health and sport fish populations in response to flow management, 2) help determine at what flows and under what conditions key habitat availability becomes a limiting factor in the lower Osage River, 3) empirically demonstrate lower Osage River fish community response, including response of sport fish forage species and YOY sport fish, to dam operations, 4) develop knowledge to manage dam releases to maximize fisheries benefits, and 5) refine knowledge of fish community and sport fish response to flow management for application to other riverine systems. Senior Research Associate **Ryan Lueckenoff** started on this project, which is expected to last at least five years.



Assessment of available ecological flow data.

PIs: C. Paukert and E. Tracy-Smith

Funding: Missouri Department of Conservation

In recent decades the science of ecological flows has shifted from a focus on minimum flows to a range of flows that account for seasonal and inter-annual variation in the magnitude, timing, frequency, duration, and rate of change of stream flows. A current limitation of using this approach is the lack of appropriate biological data that are linked to flow data so that accurate ecological response relationships can be determined. Biological and flow data (from gage stations) are often collected for different objectives from different agencies so they are rarely collected in the same locations, which makes comparisons problematic. If the appropriate data can be collected they will be used not just to make site specific recommendations, but also to develop approaches that allow decision makers to make recommendations at a regional level. The focus of the project is to characterize the degree of hydrologic alteration in Missouri. To achieve this we need to understand and organize the current data

that are available on alterations to our stream systems and link that information with the available flow and biological data for our streams. This will allow us a cost-effective and efficient way to identify sites in Missouri where alteration has occurred, and where we have additional data (e.g., stream fish community, mussel and crayfish locations, stream temperature, etc.) already collected to answer some of the flow ecology relationship questions. In addition, by organizing the available data we will be able to identify data gaps and guide future data collection and monitoring efforts needed to build meaningful flow alteration - ecological response relationships. The objectives of this study are to 1) develop a comprehensive geodatabase to determine the state of knowledge on where biologic, hydrologic, stream temperature, land-use, flow alterations, Integrated Aquatic Database, and fish community data exists, as well as data from ongoing and recent research on projected land use, stream temperature models, climate change variables, and precipitation and temperature patterns from climate change, and 2) use the geodatabase as a management tool to identify data gaps in occurrences of biological data, gage station data, and alteration data. This project will link closely with MDC biologists who are developing a pilot approach for using leveloggers to collect flow data at sites without stream gages. This 2-year project started in July 2013 and Senior Research Associate **Emily Tracy-Smith** will be spearheading this effort.

Conservation and management of Missouri's mid-sized rivers: development of sampling protocols and application to Priority Watershed rivers.

PI: C. Paukert

Funding: Missouri Department of Conservation

Substantial monitoring and research has and is currently conducted on mainstem big rivers such as the Missouri and Mississippi but little information exists for the mid-sized rivers in Missouri (e.g., tributaries of the Missouri and Mississippi Rivers and other non-wadeable rivers). Knowing how mid-sized rivers are used by big river and smaller-stream fishes, and to what degree these rivers have their own unique fish communities, will help the Missouri Department of Conservation (MDC) identify important rivers to target for conservation and restoration. However, managers need to know how to effectively sample mid-sized rivers and identify the fish communities in these under-sampled systems before many important questions about the management and ecology of fishes in these rivers can be addressed (e.g. fish seasonal movements, predator-prey dynamics, patterns of energy flow, and role of impoundments on fish communities). The methods developed and data collected by this project would provide a tool for developing standardized sampling protocols for fish communities in rivers for MDC priority watersheds and other watersheds. These protocols are the critical first step that can be used to test further hypotheses related to the conservation and management of fishes in these rivers. Therefore the objectives are to determine 1) what is the best combination of sampling gears that will determine the status of fish communities in mid-sized rivers throughout Missouri, and 2) what is the distribution of fishes in selected mid-sized rivers and does that differ seasonally. The project field work will start in Spring 2014. PhD student **Corey Dunn** started on the project in winter 2013.

(Continued on page 4)

NEW RESEARCH PROJECTS CONTINUED

(Continued from page 3)

Validation of methods used to obtain population and demographic metrics for freshwater mussels.

PI: A. Rosenberger

Funding: Missouri Department of Conservation

This project will assess the sampling efficiency of common methods used to sample unionoid mussels in Missouri using a double-sampling design (e.g., pairing low-efficiency, low-costs methods with high-efficiency, high-costs methods as baseline measures of animal presence and abundance of mussels). We will concentrate on areas with known mussel presence: areas of high diversity in the Meramec River drainage in Missouri. The efficacy and sampling efficiency of visual methods can be affected by 1) mussel behavior, which varies seasonally, by species, and by age class, 2) water turbidity, 3) habitat complexity, and 4) water depth. Baseline estimates of mussel composition will be obtained via collection of bulk sediment with a grab (allowing complete census of the entire mussel community). Although our focus is on the Meramec drainage, development of



MS student Matt Schrum and Leslie Crawford sorting mussels.

standardized methods with known sampling efficiencies and a known ability to assess community composition and population metrics will have a broader impact on statewide mussel surveys. This work is a companion project to ongoing

research examining the efficacy of visual methods for assessing whole community metrics, including species richness, detectability of rare species, and whole-community characteristics.

Life History of the freckled crayfish.

PI: A. Rosenberger

Funding: Missouri Department of Conservation

Endemic to only the Meramec River Basin, the Freckled Crayfish, *Cambarus maculatus*, has one of the smallest ranges of all crayfish species. After its description in 1988, research on *C. maculatus* has not taken place, so virtually nothing is known about its distribution, life history, population genetics or habitat requirements. Extinction risk of North American crayfish species is positively linked with specific life history traits; low fecundity, small egg size and small maximum body size, and longevity. Habitat specialization is identified as another trait that could influence extinction risk. Data on these life history traits, together with investigation of reproductive behavior and ecology, for Ozark crayfishes (particularly those with narrow ranges) are critical in the "listing" and recovery planning processes under the U.S. Endangered Species Act and would provide managers with required knowledge for conservation planning and management. However, such life history data are lacking or non-existent for most Ozark crayfishes, including *C. maculatus*. The goal of the proposed study is to document life history traits of *C. maculatus* populations in two streams to account for possible variation due to local

environmental conditions, and possibly for two years to investigate potential for interannual differences in timing of life cycle events. Specifically, we will describe these populations' life cycles by collecting data on timing of reproductive-related events, size/age at sexual maturity, realized fecundity, egg size, and timing of recruitment of juveniles. We will also collect supplemental data on traits important to population management such as molting, sex ratios, size structure, maximum body size, longevity and growth.

Linking waterfowl distribution and abundance to spatial and temporal distribution and abundance of wetland habitat

PIs: L. Webb

Funding: Missouri Department of Conservation

Wetland managers make repeated decisions that vary spatially and temporally as they attempt to ensure their management actions result in a diversity of habitat types and water depths to provide for the life history needs of wetland-dependent wildlife. Missouri's wetland managers focus on emulating system processes to provide suitable conditions to fulfill the life history needs of the full suite of waterfowl and other wetland-dependent wildlife. One of the key metrics used to inform wetland conservation and management decisions on a local, state and regional (Joint Venture or Flyway) scales is winter waterfowl abundance and distribution. Information on waterfowl distribution and abundance is used to inform questions on specific management areas, combined to calculate duck-use days within the state and inform Joint Venture monitoring objectives. Winter waterfowl surveys in Missouri have been conducted from 1947-2012 and have typically focused on intensively managed wetland areas (both MDC and U. S. Fish and Wildlife Service refuges). However these monitoring efforts may not accurately account for waterfowl distribution or abundance now that Missouri has restored over 130,000 acres of wetlands on private lands. Therefore, the objectives of this project are to 1) identify the most cost-efficient and effective sampling design to quantify waterfowl distribution and abundance across the landscape throughout the fall migration and wintering periods and 2) develop appropriate monitoring methods to assess wetland habitat distribution, availability (i.e., water of an appropriate depth), and quality (i.e., food production). **Brian Hidden** is the MS student working on the project and he is finishing up a pilot field season which he is using to inform his research proposal.



Research technician Caleb Knerr records vegetation data for a project evaluating secretive marsh bird habitat use

AWARDS, HONORS, AND OUTREACH

MISSOURI UNIT STUDENTS WELL REPRESENTED AT AMERICAN FISHERIES SOCIETY MEETING

Students, faculty, and research staff were well represented at the annual American Fisheries Society (AFS) Meeting that was held in Little Rock, Arkansas from September 8 to 12, 2013 and drew about 1100 participants. University of Missouri researchers presented 9 talks, and were co-hosts of 2 symposia, but were also active in leadership roles within the Society. **Craig Paukert** is the President of the Education Section of AFS, where **Landon Pierce** (PhD student) is the President of the Student Subsection. **Amanda Rosenberger** was the chair of the AFS Time and Place Committee and recently completed her duties as Secretary-Treasurer of the Habitat Section. **Jodi Whittier** was a member of the Governing Board, and is outgoing President of the Fisheries Information and Technology Section of AFS. In addition, **Jodi Whittier**, **Landon Pierce** and **Nick Sievert** (MS student) taught the basic and advanced GIS courses. Nick is also the newsletter editor for the Fisheries Information and Technology Section, while Landon is the newsletter editor for the Education Section.

Finally, our students were recognized at the meeting for their accomplishments. Undergraduate student **Travis Schepker** was one of four students nationwide to receive an undergraduate travel award to attend the meeting, whereas MS student **Nick Sievert** received the Best Student Poster at the meeting. This activity and recognition shows that Missouri Unit students and faculty are well recognized at this international meeting. We hope to have as much involvement (if not more) next year in Quebec City!



Nick Sievert (left) receiving the Best Student Poster Award from AFS President John Boreman



MU undergraduate Travis Schepker (center) receiving the Undergraduate Student Travel Award at AFS from Landon Pierce (right; Student Subsection President) and Craig Paukert (left; Education Section President).

AWARDS AND RECENT SERVICE

Several Missouri Unit students and staff received awards in the last several months. **Craig Paukert** received a Special Thanks for Achieving Results (STAR) award from USGS. **Amanda Rosenberger's** graduate students from Alaska received the 2013 Best Student Presentation awarded by American Fisheries Society Alaska Chapter (Trevor Haynes) and Best Student Presentation awarded by the Midnight Sun Science Symposium (Jason Neuswanger). Craig Paukert's graduate students **Emily Pherigo** and **Nick Sievert** are finalists for the Janice Lee Fenske Award that will be presented at the Midwest Fish and Wildlife Conference in January 2014. **Craig Paukert** was also asked to be on the Fish Passage Advisory Council for the 2014 International Conference on Engineering & Ecohydrology for Fish Passage, which will be held in summer 2014 in Madison, Wisconsin. **Lisa Webb** was elected as Vice-Chair of The Wildlife Society's Wetland Working Group in fall 2013.

MISSOURI UNIT AGAIN INVOLVED IN SOUTH FARM SHOWCASE



Jacob Westhoff showing kids radio telemetry

Missouri Unit staff participated in the College of Agriculture, Food and Natural Resources South Farm Showcase in September 2013. This event brought over 9,000 attendees and highlights the type of work the college conducts at its research farms. The Missouri Unit had a booth at the Showcase and highlighted some of the work we do including mussel and fish identification and education, electrofishing, and radio telemetry. This is a great opportunity to engage children and the public on the importance of fish and wildlife conservation, and a way to give back to the College of Agriculture, Food, and Natural Resources.



Asa Smith looking at fish at the South Farm Showcase

UNIT PUBLICATIONS IN 2013

Beatty, W. S., D. C. Kesler, E. B. Webb, A. H. Raedeke, L. W. Naylor, and D. D. Humburg. 2013. Quantitative and qualitative approaches to identifying migration chronology in a continental migrant. *PLoS ONE* 8(10):e75673.

Gerken, J., and C. Paukert. 2013. Fish community and habitat factors associated with the distribution of Topeka shiner (*Notropis topeka*) in Kansas streams. *Journal of Freshwater Ecology* <http://dx.doi.org/10.1080/02705060.2013.792754>

Haynes, T. B., A. E. Rosenberger, M. Lindberg, M. Whitman, and J. Schmutz. 2013. Method- and species-specific detection probabilities of fish occupancy in Arctic Lakes: Implications for design and management. *Canadian Journal of Fisheries and Aquatic Sciences* 70:1055-1062.

Haynes, T. B., J. A. Schmutz, M. S. Lindberg, and A. E. Rosenberger. Accepted with major revisions. Risk of predation and weather events affect nest site selection by sympatric yellow-billed and Pacific loons in Arctic habitats. *Waterbirds*.

Hoem Neher, T., A. E. Rosenberger, C. E. Zimmerman, C. M. Walker, and S. J. Baird. 2013. Use of glacier river-fed estuary channels by juvenile Coho Salmon: Transitional or Rearing Habitats? *Environmental Biology of Fishes* DOI 10.107/s10641-013-0183-x.

Hoem Neher, T. D., A. Rosenberger, C. Zimmerman, C.M. Walker, and S.J. Baird. 2013. Estuarine environments as rearing habitats for juvenile coho salmon in contrasting south-central Alaska watersheds. *Transactions of the American Fisheries Society* 142:1481-1494.

Neuswanger, J, M. S. Wipfli, A. E. Rosenberger, and N. F. Hughes. In Press. Mechanisms of drift-feeding behavior in juvenile Chinook salmon and the role of inedible debris in a clear-water Alaskan stream. *Environmental Biology of Fishes*.

Olmstead, V. G., E. B. Webb, and R. W. Johnson. 2013. Moist-soil seed biomass and species richness on Wetland Reserve Program easements in the Mississippi Alluvial Valley. *Wetlands* 33:197-206.

Pease, A. A., and C. P. Paukert. 2013. Potential impacts of climate change on growth and prey consumption of stream-dwelling smallmouth bass in the central United States. *Ecology of Freshwater Fish*. doi: 10.1111/eff.12084.

Staudt, A., A. K. Leidner, J. Howard, K. A. Brauman, J. S. Dukes, L. Hansen, C. Paukert, J. Sabo, and L. A. Solórzano. 2013. The added complications of climate change: understanding and managing biodiversity, ecosystems, and ecosystem services under multiple stressors. *Frontiers in Ecology and the Environment* 11(9):494-501.

Tidwell, P. R., E. B. Webb, M. P. Vrtiska, and A. A. Bishop. 2013. Diet and food selection of female mallards and blue-winged teal during spring migration. *Journal of Fish and Wildlife Management* 4:63-74.

Westhoff, J. T. and C. F. Rabeni. 2013. Resource selection and space use of a native and an invasive crayfish: evidence for competitive exclusion? *Freshwater Science* 32:1383-1397.

Westhoff, J. T. 2013. Upper St. Francis River drainage crayfish fauna interim monitoring plan. Missouri Department of Conservation, Columbia, MO.

Westhoff, J. T., A. V. Watts, and H. T. Mattingly. 2013. Efficacy of artificial refuge to enhance survival of young Barrens topminnows exposed to western mosquitofish. *Aquatic Conservation: Marine and Freshwater Ecosystems* 23:65-76.

Westhoff, J. T., and N. Sievert. 2013. Mortality and growth of crayfish internally tagged with PIT tags. *North American Journal of Fisheries Management* 33:878-881.



PRESENTATIONS BY STUDENTS AND STAFF

Invited Departmental Seminars

- Paukert, C. Native fish conservation in the Desert Southwest: lessons from Grand Canyon. Michigan State University, Dept. of Fisheries and Wildlife Sciences.
- Paukert, C. More than the Mississippi and Missouri: Conservation and Management of Other Large River Fishes in the Midwest. Missouri S & T Dept. of Biological Sciences.
- Rosenberger, A.E. and coauthors. Landscape Ecology of Alaska Fishes. University of Missouri, Dept. Fisheries and Wildlife Sciences.

American Fisheries Society Annual Meeting, Little Rock, AR, September 2013

- Harris, J., C. Paukert, S. Bush, M. Allen, and M. Siepker. How largemouth bass respond to a large reservoir habitat enhancement project. INVITED
- Klymus, K., D. Chapman, C. Richter, and C. Paukert. DNA shedding rates of Asian carps, for use in understanding field collections of eDNA.
- Pherigo, E., and C. Paukert. Fish community in a regulated and free-flowing Missouri River tributary, 2012-2013.
- Pierce, L., C. Paukert, and J. Whittier. A family-level evaluation of drivers of fish invasions.
- Quist, M. M. Mather, D. Parrish, S. Chipps, T. Kwak, and C. Paukert. The voices of reality: why effective fisheries education is challenging; practical ways to move forward. INVITED
- Sievert, N., and C. Paukert. A vulnerability assessment for Missouri stream fish species: development and evaluation.
- Sievert, N., C. Paukert, and J. Whittier. Missouri's conservation networks: representation of stream fish species and relative conservation value.
- Tracy-Smith, E., C. Paukert, D. Lobb, P. Blanchard, and J. Persinger. Fish responses to stream flow metrics.

Alaska Chapter of the American Fisheries Society, Fairbanks, AK October 2013

- Haynes, T. B., A. E. Rosenberger, M. S. Lindberg, M. Whitman, and J. A. Schmutz. Occupancy patterns of fishes in Arctic lakes provide clues to dispersal mechanisms in a harsh environment.
- Laske, S. M., J. C. Koch, C. E. Zimmerman, M. S. Wipfli, and A. E. Rosenberger. Fish distribution in a warming Arctic: what current patterns may tell us about the future.
- Neuswanger, J.R., N.F. Hughes, M.S. Wipfli, and A.E. Rosenberger. 3-D territoriality and shadow competition within schools of juvenile chinook salmon.
- Wirth, L., A. Rosenberger, A. Prakash, R. Gens, F.J. Margraf, and T. Hamazaki. A remote-sensing, GIS-based approach to identify spawning habitat for fall chum salmon in a Sub-Arctic, glacially-fed river.

Other Professional Society Meetings

- Beatty, W. S., D. C. Kesler, E. B. Webb, A. H. Raedeke, L. W. Naylor, and D. D. Humburg. 2013. Quantitative and qualitative approaches to identifying migration chronology in a continental migrant. Joint Meeting of the Cooper Ornithological Society and American Ornithologists' Union.
- Beatty, W. S., E. B. Webb, D. C. Kesler, A. H. Raedeke, L. W. Naylor, and D. D. Humburg. 2013. Midcontinent mallard movement and resource selection. Mississippi Flyway Council Meeting. INVITED
- Foley, K. M., A. E. Rosenberger, and F. J. Mueter. 2013. Effectiveness of low-effort, single-pass electrofisher use in for estimation of juvenile coho salmon abundance. Mat-Su Science & Conservation Symposium. INVITED
- Tapp, J. L and E. B. Webb. 2013. Effects of management on aquatic invertebrate biomass, production and community composition at Wetland Reserve Program easements in the lower Mississippi Alluvial Valley. International Society of Wetland Scientists Meeting.
- Webb, E. B., D. C. Kesler, W. S. Beatty, and A. H. Raedeke. 2013. Using agent-based waterfowl models to identify conservation solutions to environmental and land-use change. Mississippi Flyway Council Meeting. INVITED
- Westhoff, J. T. and C. P. Paukert. 2013. A predictive temperature model for a thermally heterogeneous stream system. Missouri Chapter of the American Fisheries Society – Rivers and Streams Committee Technical Meeting.



Evan Hill and Lisa Webb with 'Maxie' the self-proclaimed world's largest goose in Sumner, MO

CURRENT STAFF, STUDENTS, AND AFFILIATES CONTACT INFORMATION



Amanda Rosenberger (AUL-Fish) **Lisa Webb** (AUL-Wildlife) **Craig Paukert** (UL) **Niki Fuemmeler** (Admin Officer)

Missouri Cooperative Fish and Wildlife Unit

302 ABNR Building,
Dept. of Fisheries and Wildlife Sciences
University of Missouri
Columbia, Missouri 65211
573-882-3634
<http://www.coopunits.org/Missouri/>

Niki Fuemmeler

Administrative Officer
fuemmelern@missouri.edu

Dr. Craig Paukert

Unit Leader
paukerc@missouri.edu
<http://riverstudies.com/>

Dr. Elisabeth (Lisa) Webb

Assistant Leader Wildlife
webbli@missouri.edu

Dr. Amanda Rosenberger

Assistant Leader Fisheries
rosenbergera@missouri.edu

Dr. Joanna Whittier

Research Assistant Professor
whittierj@missouri.edu
<http://riverstudies.com/>

Dr. Jacob Westhoff

Instructor/Post-doctoral Researcher
jtw7a1@mail.mizzou.edu

Students

Leslie Crawford, MS student

Advisor: Rosenberger
lkc6x2@mail.missouri.edu

Corey Dunn, PhD student

Advisor: Paukert
dunnncg@missouri.edu

Jake Faulkner, MS student

Advisor: Paukert
jdf522@mizzou.edu

Brian Hidden, MS Student

Advisor: Webb
bsh3m8@mail.missouri.edu

Evan Hill, MS student

Advisor: Webb
ebhgf8@mail.missouri.edu

Ethan Kleekamp, MS student

Advisor: Paukert
erkb88@mail.missouri.edu

Emily Pherigo, MS student

Advisor: Paukert
ekvpx8@mail.mizzou.edu

Landon Pierce, PhD student

Advisor: Paukert
LLP5YC@mail.missouri.edu

Matthew Schrum, MS student

Advisor: Rosenberger
mcs7gb@mail.missouri.edu

Jacob Schwoerer, MS student

Advisor: Paukert
schwoererj@missouri.edu

Nick Sievert, MS student

Advisor: Paukert
nas4tf@mail.mizzou.edu

Post-Docs and Research Staff

Dr. William (Bill) Beatty

Post-doctoral Researcher
Advisor: Webb
BeattyW@missouri.edu

Dr. Katy Klymus

Post-doctoral Researcher
Advisor: Paukert
kektgb@mail.missouri.edu

Dr. Damon Krueger

Post-doctoral Researcher
Advisor: Paukert
kruegerdm@missouri.edu

Ryan Lueckenoff

Senior Research Associate
Supervisor: Paukert
LueckenhoffRW@missouri.edu

Dr. Michelle Staudinger

Post-doctoral Researcher
Advisor: Paukert
mstaudinger@usgs.gov

Emily Tracy-Smith

Senior Research Associate
Supervisor: Paukert
Email: tracysmithe@missouri.edu

MISSOURI UNIT WILDLIFE RESEARCH IN THE PRESS

A popular press article featuring research by Missouri Unit post-doc **Bill Beatty**, Assistant Leader **Lisa Webb** and MU collaborator **Dylan Kesler** was published in the October 2013 issue of Ducks Unlimited national magazine. The article highlights ongoing research using mallards marked with satellite transmitters to evaluate waterfowl migration chronology and habitat selection over large spatial scales during the non-breeding season. More details can be found at:

<http://www.ducks.org/conservation/waterfowl-biology/understanding-waterfowl-tracking-the-mallard-migration>

The Wildlife Management Institute featured research by former Missouri Unit student **Andy Dinges** and **Lisa Webb** in the December edition of the Outdoor News Bulletin. The article described research efforts to understand impacts of the Light Goose Conservation Order on non-target waterfowl species during spring migration in the Rainwater Basin region of Nebraska. For more details, see:

http://wildlifemanagementinstitute.org/index.php?option=com_content&view=article&id=697:cooperative-research-unit-corner-studying-impacts-of-extended-light-geese-hunting-seasons&catid=34:ONB%20Articles&Itemid=54